The Seasonality and Environmental Triggers of Medical Contacts made by School-age Asthmatics and Non-asthmatics

by

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I. Abstract

Introduction: Asthma is a common chronic condition that affects up to 1.1 million children in the UK. Exacerbations of asthma follow a pronounced seasonal pattern and are associated with environmental triggers. A number of studies have investigated the associations. However, few studies have undertaken an asthmatic-non-asthmatic design and with even fewer set within the UK.

Aims: To investigate medical contacts made by school age asthmatics and non-asthmatics across different health care settings and geographies with respect to the seasonality of the medical contacts and the association between the medical contacts and outdoor environmental exposures

Study design: A retrospective time-series and spatial investigation.

Data: for the outcome, clinical data were obtained from three geographies decreasing in size (England and Wales, the Trent Region and Sheffield) for school-age asthmatics and non-asthmatics. Daily counts of medical contact made by asthmatics and non-asthmatics were obtained for the period 1999 to 2004. The difference between daily counts of asthmatics and non-asthmatics was calculated to create the second outcome, daily excess. For Sheffield, medical contacts made for asthmatic and non-asthmatic reasons were also aggregated by Middle Super Output Area level (MSOA) for the spatial analysis. For the exposures of interest, daily measures of outdoor pollution, weather and pollen exposures were obtained for the city of Sheffield.

Method of Analysis: Graphical assessment was undertaken to examine seasonal patterns of daily counts/excess. Accounting for covariates, the effect of pollutant, weather and pollen exposures were investigated using autoregressive analyses. Exposures lagged by seven days were investigated. A separate spatial analysis was undertaken on Sheffield. Comparative Hospital Ratios (CHRs) were calculated and correlated with area defined pollutant measures at MSOA level.

Results: Seasonal patterns were more apparent in England and Wales. Seasonal patterns were also observed with the daily excess. Peaks and troughs correlated well with the school calendar – troughs during Easter and summer holidays and peaks after the return to school. With a greater total number of events observed there were a higher number of significant environmental exposures associated with daily counts from England and Wales compared to the Trent Region or Sheffield. Evidence of lagged effects was inconsistent. Results suggest the associations to be greater in non-asthmatics. In Sheffield, results from the spatial investigation revealed three significant hotspots of CHRs for asthmatic contacts only. Significant associations were found between CHRs for asthmatics and air quality measures of NO_2 (a positive correlation) and O_3 (a negative correlation). Significant negative associations were also found between CHRs for asthmatic contacts and the proportion of domestically and commercially sourced emissions.

Conclusion: The seasonal effect in asthmatics is over and above the average (non-asthmatics) school population. Little difference was observed in environmental associations between asthmatics and non-asthmatics. Further research is required to investigate the associations between asthma and environmental triggers at small area levels in the UK.

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IV. Publications

National Conferences

Poster Presentations

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2. Lai., J, Julious., SA, Mason., S, Freeman., JV. The Environmental Triggers of Childhood Asthma resulting in Medical Contact: A Retrospective Case-control Study. Society of Social Medicine, Warwick, UK September 2011.
3. Lai., J, Julious., SA, Mason., S, Freeman., JV. Pollutant associations with childhood asthma, a retrospective spatial case-control analysis. Population Health – Methods and Challenges. Birmingham UK 24th -26th April 2012.

Oral Presentation

1. Lai., J, Mason., S, Burke., D, Julious., SA, Freeman., JV. Paediatric Emergency Department attendances between 2000 and 2009: Trends in a large UK Children Hospital. College of Emergency Medicine Conference, Gateshead, September 2011. Presented by Professor Suzanne Mason.

International Conference

Oral Presentation

1. Lai., J, Julious., SA, Mason., S, Freeman., JV. A Retrospective Study investigating the association between Pollutant Exposures and Childhood Asthma resulting in Medical contact. Air Pollution Conference, Malta, September 2011.

Presentations within ScHARR, University of Sheffield

Oral Presentation

1. Lai., J, Julious., SA, Mason., S, Freeman., JV. The Seasonality of and Environmental Triggers of childhood asthma resulting in Medical Contact. Graduate Research Conference, June 2010.

Poster Presentations

1. Lai. J, Julious.. SA, Mason. S, Freeman. JV. The Association between School Return and Childhood Asthma resulting in Medical Contact: A Review of the Literature. Presented at the ScHARR Showcase in May 2010 and the Graduate Research Conference in June 2010.

2. Lai. J, Julious. SA, Mason. S, Freeman. JV. The Seasonality of Childhood Asthma resulting in Medical Contact. Presented at the ScHARR Showcase in May 2011 and the Graduate Research Conference in June 2011.

Reports

1. Julious., SA, Lai., J, Boote., J, Elphick., H, Smithson., H. 2011. A report of a Patient and Public Involvement Consultation Event with Children with Asthma and their Parents to Review a Proposal for a Primary Care Intervention around the September School Return. School of Health and Related Research (ScHARR), Universiy of Sheffield. ISBN: 1 900752 18 2

Publication

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V. Abbreviations

APHEA	Air Pollution and Health: a European Approach
ARIMA	Autoregressive Integrated Moving Average
CAMC	Childhood Asthma related Medical Contacts
CHRs	(Logged) Comparative Hospital contact Ratios
CO	Carbon Monoxide
DEFRA	Department of Environment, Food and Rural Affairs
DoH	Department of Health
ED	Emergency Department
ER	Emergency Room
EU	European Union
GINA	Global Initiative for Asthma
GP	General Practitioner
GPRD	General Practice Research Database
HAA	Health Activity Analysis
HMSO	Her Majesty's Stationary Office
HES	Health Episodes Statistics
ICAUK	Information Courtesy of Asthma UK
IRAS	Integrated Research Application System
km	Kilometre
LLR	Log-likelihood Ratio
LOCF	Last Observation Carried Forward
mgm^3	milligram per cubic metre
MSOA	Middle Super Output Area
NAEI	National Atmospheric Emissions Inventory
NHS	National Health Service
NICE	National Institute for Clinical Excellence
N^O	Number
NO_x	Oxides of Nitrogen; NO_2 - Nitrogen Dioxide; NO – Nitrogen Oxide
NPARU	National Pollen and Aerobiology Research Unit
O_3	Ozone
^oC	Celsius
OED	Oxford English Dictionary
ONS	Office of National Statistics
OR	Odds Ratio
PM	Particulate Matter PM_{10}, $PM_{2.5}$, $PM_{10-2.5}$
RR	Relative Risk
RSS	Residual Sum of Squares
RTP	Research Training Programme
SCH	Sheffield Children's Hospital

ScHARR	School of Health and Related Research
SD	Standard Deviation
SE	Standard Error
SO_2	Sulphur Dioxide
μgm^3	microgram per cubic metre
UK	United Kingdom
US	United States of America
WHO	World Health Organisation

Chapter One

Introduction

1.1. Introduction

The prevalence of asthma has increased substantially in the last half of the twentieth century (Anderson et al., 2007). This increase has been observed in several countries (Heinrich et al., 2002, Upton et al., 2000) including in the UK, the US and across Europe. The rise is more prominent in westernised, developed countries though numbers are also rising in poorer developing countries (Beasley et al., 2000). The observed increase in the asthma prevalence is not solely the result of improved diagnosis (Khot et al., 1983). It has also been reported that the genetic susceptibility is unlikely to have occurred in the time period during which this observed increase in asthma cases has happened (Seaton et al., 1994). Possible reasons for the increase may include changes in lifestyle and environmental quality over the last 50 years (von Mutius, 2000).

This chapter's purpose is to introduce the topic of childhood asthma, its seasonal characteristics, and potential triggers of exacerbation.

1.1.1. Aims of the Introductory Chapter

The aims of this chapter are to:

1. Describe the epidemiology of the childhood asthma in the UK
2. Illustrate a synopsis of the costs and consequences of childhood asthma
3. Describe environmental exposures in the UK and adverse health effects
4. Describe seasonality and specifically school-related seasonality
5. Summarise the rationale for this piece of research
6. Provide a synopsis of the content of the chapters that follow

1.2. Epidemiology of Asthma

1.2.1. The Definition of Asthma

There is no standard definition of asthma (Tattersfield et al., 2002). The World Health Organisation (WHO, 2011b) classifies asthma as a chronic condition that affects the airways in the lungs. It is characterised by recurrent attacks of breathlessness and wheezing. When the airways come into contact with irritants, the airway's muscles tighten, become narrower and the lining of the airways become inflamed (WHO, 2011b). On occasion, mucus can form and further tighten the airways (WHO, 2011b).

Asthma is coded J45.0 to J46.0 under the ICD-10 (International Classification of Diseases) and covers allergic asthma (J45.0), non-allergic asthma (J45.1), mixed asthma (J45.8), and non-specific asthma (J45.9) (WHO, 2007). J46.0 is the code for acute severe asthma (status asthmaticus) (WHO, 2007).

The symptoms of asthma include cough, wheeze, airflow obstruction, dyspnoea (shortness of breath) and chest tightness (WHO, 2011b). The severity of the disease varies from individual to individual. Asthma sufferers can have acute episodes ranging in severity from mild episodes (characterised with cough, auditable wheeze, normal speech between breaths and a Peak Expiratory Flow Rate (PEFR) of above 75 percent) to severe episodes (characterised by severe distress, cyanosis (appearance of blue or discolouration on the skin), reduced ability to speak and possibly bed or chair bound) (NICE, 2002).

1.2.2. Trend and Prevalence of Childhood Asthma

Several studies have recorded an increase in the prevalence of asthma especially in the second half of the twentieth century (Anderson et al., 2007, Rottem et al., 2005). The upward trend stabilised or decreased in a number of countries for instance, the UK (Anderson et al., 2007, Fleming et al., 2000b, Malik et al., 2011), US (Hartman et al., 2010), Switzerland (Bollag et al., 2005) and Spain (Gonzalez Barcala et al., 2010). One reason postulated for the stabilisation of the prevalence is the development of more aggressive strategies to manage asthmatic symptoms (Anderson, 2005, Shabu et al., 2007).

Worldwide, approximately 235 million people suffer with asthma (WHO, 2011b). In the UK, an estimated 8 million people have been diagnosed with asthma at some point in their lives with approximately 5.1 to 5.2 million persons receiving treatment for the condition in 2001 (National_Asthma_Campaign, 2001, ICAUK, 2004). Asthma is an under-diagnosed and under-treated condition (WHO, 2011b). Therefore, the difference between the number of people suffering from asthma and the number of those being treated may partly reflect under-diagnosis of the disease.

Asthma is the most common chronic disease in children worldwide (WHO, 2011). In 2001, between 1.1 and 1.4 million children had asthma in the UK (ICAUK, 2004, National Asthma Campaign, 2001). In 2008, 932,000 children had asthma in England, this equates to 1 in 10 children (ICAUK, 2009). The prevalence was lower in Scotland in comparison to England (1 in 13 children) and slightly higher in Wales (1 in 9 children) (ICAUK, 2009).

In England, there were 8,230 general practices in 2009 (The Information Centre, 2009). There were approximately 111 asthmatic children per general practice.

1.2.3. Hospital Contacts

According to ICAUK (2009), between 2006 and 2007, there were 80,593 hospital admissions for asthma in the UK, of which 33,285 (approximately 41 percent) were for children 14 years old or younger. In the UK, an average of 91 admissions per day were attributed to children with asthma, this equates to 1 admission every 16 minutes. Admission rates were highest in the northwest and lowest in the east of England, with these geographical differences potentially attributed to either differences in the environmental composition of the region or differences in health service provision (ICAUK, 2007). It has been estimated that with good routine care and management of the condition, 75 percent of asthma related hospital admissions (adult and children) could be prevented (ICAUK, 2008).

1.2.4. Summary of the Cost and Consequences attributed to Asthma

A number of studies report direct and indirect costs attributable to asthma (Child et al., 2002, DeWalt et al., 2007, Gupta et al., 2004, ICAUK, 2008). The presence of asthma places heavy demand on health care services in an effort to treat and keep the disease under control. A large proportion of the demands placed on hospital services could be prevented via good management (ICAUK, 2008). According to the Office of Health Economics (cited by (ICAUK, 2004)), for 2003, £889 million was used to treat asthma by the NHS; £659 million was spent on prescriptions, £117 million was attributed to dispensing, £49 million was spent on hospital admissions and £63 million was attributed to GP consultations. Another study reported that it cost £1 billion to treat asthma (and other allergic diseases - allergic rhinitis and eczema) (Gupta et al., 2004). Gupta et al estimated the GP prescription costs alone equalled approximately £0.7 billion per year whilst ED admissions cost £61 million. The costs attributed to caring for a person with poorly controlled asthma were three times higher than caring for a person with well controlled asthma (Hoskins et al., 2000).

For the asthmatic, the act of taking clinical treatment efficiently can also have cost implications. Inefficient inhaler techniques incur resource and financial costs. Children in particular find it more difficult to develop proper inhaler techniques (Child et al., 2002) which may result in wasting of the product and this can result in the issuing of more prescriptions than would otherwise be needed.

The financial effects are not exclusively attributed to the health service; asthma also has indirect ramifications on the workforce contributing to a substantial loss of economic productivity (ICAUK, 2004). In the UK, asthma accounts for 12.7 million work days lost (adults with asthma and parents of children with asthma) (ICAUK, 2004). It was estimated that £1.2 billion was the cost attributed to work days lost and £260 million were attributed to benefit costs due to asthma (Department of Work and Pensions, cited by (ICAUK, 2004)).

Not only is there a financial cost attributed to the presence of asthma, there is a substantial amount of literature investigating the negative effect of asthma on the child. Asthma can have a negative effect on the individual's and family's quality of life (DeWalt et al., 2007). Forty-three percent of children stated that having asthma restricted their ability to carry out everyday activities (ICAUK, 2009). Children with asthma experience an increased number of restricted days due to illness (restricted days refer to the child's reduced ability below normal capacity to perform normal activities) (Neffen et al., 2005, Newacheck and Halfon, 2000, Sotir et al., 2006). Other asthma-associated effects include negative impact on school performance (Anderson et al., 1983, Austin et al., 1998) and decreased school attendance (Milton et al., 2004, Newacheck and Halfon, 2000). There is also evidence that sleep can be affected by experiencing asthma symptoms at night (Diette et al., 2000, O'Connell, 2004) and this disturbance can in addition, affect the parents and family (Diette et al., 2000, Nocon and Booth, 1991).

School days missed is often used a marker of morbidity from childhood asthma. A small number of the studies report which school days missed as a quantitative measure to gauge the morbidity of the disease were scoped, Table 1.1 illustrates that the crude average number of school days missed between studies was 10.7 days.

Table 1.1: School days missed.

Author	School days missed (per year)
Doull et al (1996)	5
Manandhar et al (2006)	63
McCowan et al (1996)	3
Milton et al (2004)	8.45
Moonie et al (2006)	9.2
Newacheck and Halfon (2000)	10
Nocon and Booth (1991)	6.5
Okelo et al (2004)	1
Rand et al (2000)	9.7
Wang et al (2005)	2.48
Yeatts et al (2003)	4.5
Crude Mean	11.17

1.2.5. Treatment and Prognosis

The aim of asthma management is to prevent or control symptoms and if possible, achieve optimal lung function. At present, asthma is not curable. The prognosis is good for childhood asthmatics who continue to experience symptoms of the condition. The condition is controllable via routine management so that minimal disability is incurred.

Over 90 percent of deaths caused by asthma are preventable (Anon (2000) cited by (ICAUK, 2009)). Mortality due to asthma is relatively low especially in developed countries (WHO, 2011b). According to Information Courtesy of Asthma UK (2004, 2009), in 2002, for both adults and children, there were 1,400 deaths in the UK attributed to asthma. In 2006, this figure decreased to 1,200 deaths attributed to asthma in the UK; 40 of these were children 14 years or under.

1.3. The Development and Risk Factors of Asthma Exacerbation

The development of asthma can be the result of a number of factors. Factors that contribute towards the development of asthma are different to factors that trigger asthmatic attacks (NICE, 2002). Of the factors that contribute towards the development of asthma, a number of authors argue that many individuals have a predisposition to develop asthma and evidence suggests that the risk of developing asthma is genetically determined (Molis et al., 2008, Tattersfield et al., 2002).

Evidence suggests that gender is a risk for the development of asthma with a higher percentage of boys having asthma compared to girls (Almqvist et al., 2008, Postma, 2007). This is reflected in the samples of a number of studies included in the literature review (Mohr et al., 2008, Tolbert et al., 2000, White et al., 1994). There are a number of reasons put forward to explain possible gender differences. One study reported that males are born with smaller airways relative to lung size in comparison to females, and thus are more susceptible to allergy (Carlsen et al., 2006). Another study highlighted that compared to boys, girls were less likely to see the doctor and be diagnosed with asthma (White et al., 1994).

Individuals with allergic sensitisation are more at risk of developing asthma (Tattersfield et al., 2002). One author proposed that the increase in the number of persons with allergic sensitisation is possibly the result of living in developed societies where there is less exposure to infection (Strachan, 1989). Consequently, this inhibits the immune system to build barriers and deter allergens. Strachan (1989) coined this theory, the "Hygiene Hypothesis". In support for the hygiene hypothesis one study found that children who resided on farms and were exposed to animals were less likely to develop allergies (Riedler et al., 2001). Another study found that virus infection experienced at a younger age was negatively associated with asthma development (Ball et al., 2000). The inverse relationship was also observed with the pollen (Burr et al., 2003, Riedler et al., 2001).

Seaton argues that the rise in the prevalence of asthma is not simply the result of improved diagnosis or a change in genetic susceptibility the occurrence of which would have been unlikely given the short space of time in which the prevalence of asthma has risen (Seaton et al., 1994). A more probable explanation is exposure to more industrialised surroundings (Seaton et al., 1994). It has been suggested that many individuals have a predisposition to develop asthma but until recent times, the environmental exposures were not present at high enough levels to trigger asthmatic symptoms. Therefore, due to exposure to higher levels of pollution, individuals experience more asthmatic symptoms.

This thesis investigates the triggers as risk factors for asthma exacerbation rather than the risk factors that contribute to the development of the disease. A trigger can be anything that irritates the airways and induces an exacerbation (NHS, 2010). Different triggers affect different asthmatic individuals (NHS, 2010). Triggers that activate asthma attacks include inhaled substances and particles that may stimulate allergic reactions in the airways (WHO, 2011b). Exposure to pollutants is thought to have profound effects on asthma exacerbation (Tattersfield et al., 2002). Weather (Patz et al., 2000, Weiland et al., 2004) and pollen (Im and Schneider, 2005) are possible triggers of childhood asthma exacerbation. Other potential triggers for an attack include emotional distress and physical exercise (WHO, 2011b). Viral respiratory infection is a significant factor for the development of childhood wheezing especially in the first ten years of life (Lemanske, 2002). Once more, viral respiratory infections may have a stronger effect on asthma exacerbation around the time of school return (Johnston et al., 1996, Sears and Johnston, 2007).

This investigation focuses on outdoor pollution, weather and pollen exposures as potential triggers for medical contact made by children with asthma. In parallel to the environmental investigation, another investigation examines the seasonal pattern of medical contacts to gauge whether annual patterns are governed by the school calendar.

1.4. Environmental Exposures in the UK and Evidence of Adverse Effects on Health

The umbrella term "environmental" is used in this thesis' case to reference outdoor air pollutants, weather, and pollen exposures. There has been a substantial amount of research investigating the associations between environmental triggers and adverse health outcomes (Anderson et al., 1995, Huynh et al., 2010, Kovats et al., 2004, Zhao et al., 2008). This sub-section provides a background to pollution, weather, and pollen in the UK and scopes just a few studies that report associations between environmental exposures and adverse effects on health.

1.4.1. Pollution

Pollution is the introduction of contaminates into the environment that cause instability in the ecosystem (OED, 2010b). Air quality in the UK has improved over the last 10 years yet pollution levels are still high enough to cause harm to health (Department of Environment, Food and Rural Affairs (DEFRA, 2007)). London was reported as one of Europe's most polluted cities (Vidal, 2010).

In response to research indicating adverse effects to human health or to the environment, legislations relating to controlling pollutant levels were enacted. Currently, legislations such as the Clean Air Act (HMSO, 1993) and Environmental Protection Act (HMSO, 2010) are in place to monitor and lower air emissions. DEFRA governs UK air pollution guidelines and upper limits. DEFRA's guidelines are governed by European Air Quality legislation (DEFRA, 2009). The majority of the time, UK air pollution levels do not exceed the upper limits set by DEFRA. For 2008/9, DEFRA reported that for the majority of pollutants, there were few instances of breaches of the upper limits with the exception of annual upper limits of NO_2 and O_3 long term upper limits safe for human health. To compare DEFRA, European Air Quality and the WHO guidelines (for Europe) for pollution (EU, 2008, WHO, 2005), Table 1.2 and Table 1.3 illustrate the guidelines for DEFRA, EU and WHO.

Table 1.2: WHO and EU standards

Pollutant	WHO Guidelines (2005)	EU Limit values (2010)
NO_2	40 µgm^3 annual mean	40µgm^3 annual mean
	200 µgm^3 1hour mean	200 µgm^3 1hour mean
PM_{10}	20 µgm^3 annual mean	40 µgm^3 annual mean
	50 ugm^3 daily mean	50 µgm^3 daily mean
$PM_{2.5}$	10 µgm^3 annual mean	25 µgm^3 annual mean
	25 µgm^3 daily mean	
O_3	100 µgm^3 8hour mean	100 µgm^3 8hour mean
SO_2	20 µgm^3 daily mean	125 µgm^3 daily mean
	500 µgm^3 10 minute mean	350 µgm^3 1hour mean
CO		10mgm^3 8 hour mean

Table 1.3: DEFRA Banding and Index System.

		Measures (mean)				
Banding	**Index**	**O_3 8hr (µgm^3)**	**NO_2 24hr (µgm^3)**	**SO_2 15min (µgm^3)***	**CO 8hr (mgm^3)**	**PM_{10} 24hr (µgm^3)**
Low	1	0-33	0-95	0-88	0-3.8	0-21
Unlikely to harm individuals even	2	34-65	96-190	89-176	3.9-7.6	22-42
those sensitive to pollution	3	66-99	**191-286**	177-265	7.7-11.5	**43-64**
Moderate	4	**100-125**	287-381	266-354	11.6-13.4	65-74
Mild effect, unlikely to need action,	5	126-153	382-477	355-442	13.5-15.4	75-86
may be noticed by sensitive individuals	6	154-179	478-572	443-531	15.5-17.3	87-96
High	7	180-239	573-635	532-708	17.4-19.2	97-107
Significant effect may be noticed	8	240-299	636-700	709-886	19.3-21.2	108-118
by sensitive individuals. Action may be required to avoid highly polluted areas.	9	300-359	701-763	887-1063	21.3-23.1	119-129
Very High Effects to sensitive individuals may worsen	10	360<	764<	1064<	23.2<	130<

Sourced from the (DEFRA, 2007)
In bold, levels that compare with and include WHO Guidelines limits.
* SO_2, no comparison.
Underline, levels that compare with EU standards.

Air quality and pollution is a global key health concern (WHO, 2011a). The WHO reported that urban air pollution claims 1.3 billion lives annually (WHO, 2011a). In the UK, expenditure on illnesses related to air pollution was estimated to be between £9.1 billion and £21.4 billion every year (DEFRA, 2007).

Pollutant exposure has raised health concerns for many years (Brunekreef and Holgate, 2002). It is estimated that exposure to air pollution can shorten a person's life by seven to eight months (DEFRA, 2007). Air pollutants are most commonly associated with the exacerbation of acute respiratory illnesses (Peden, 2005). Exposure to air pollutants such as O_3 and PM are associated with an increase in mortality and hospital admissions due to respiratory and/or cardiovascular conditions (Brunekreef and Holgate, 2002, WHO, 2011a). Chronic pollutant exposure can lead to impaired lung growth and contribute to the development of asthma (Peden, 2005).

1.4.2. Weather

Weather is a term used to describe the atmosphere at a place and time with regards to temperature, wind and other factors (OED, 2010g). Weather is described with terms such as brightness, cloudiness, humidity, rainfall, temperature, visibility and wind.

The weather varies across the UK. In England, according to the average annual measures taken from 1971 to 2000 by the Met Office (Met Office, 2011a), the annual minimum and maximum temperature was 5.6^{o}C and 13.1^{o}C respectively and per year, 131 days experienced above one millimetre of rainfall. Scotland experienced slightly lower temperatures (the annual minimum and maximum temperature is 4^{o}C and 10.5^{o}C respectively) and a higher number of days where rainfall surpassed one millimetre (185 days per year) (Met Office, 2011d).

Weather exposures are associated with a number of conditions. Skin cancer is associated with prolonged exposure to the sun (Han et al., 2006, Walter et al., 1999). Also, there is evidence supporting a temperature-mortality association and excess winter mortality is a major concern in the UK (Aylin et al., 2001). A review of a number of studies investigating the temperature-mortality association found that rates of mortality were lowest when temperature ranged between 15 to 25^{o}C (Ballester et al., 2003). One study found evidence of a link between humidity and asthma (Weiland et al., 2004).

1.4.3. Pollen

Pollen is a powder produced by plants that, with the aid of wind and insects, is used to germinate compatible plants in order to produce more seeds for further plantation (OED, 2010). The pollen production process is highly seasonal with different pollens exhibiting different pollen seasons. In the UK, pollen (any type) is on average, present from January to September (Met Office, 2011c), and peaks between April and July.

Pollen allergy (allergic rhinitis) or hay fever is the most well-known condition attributed to pollen exposures and the condition is on the rise (Bousquet, 2003). This condition is often experienced as comorbidity with asthma (Bousquet et al., 2008).

The three types of outdoor exposure detailed above (pollution, pollen, and weather) are interrelated. The activities that create air pollution are also associated with weather changes (WHO, 2010). Climate change is one of the causes often cited for extending the pollen season (Beggs, 2004).

Chapter Two contains a more detailed literature review of the pollutant, weather and pollen associations with medical contact made by children with asthma.

1.5. School-related Seasonality

“Seasonality” or “seasonal” are terms often used to exemplify patterns or fluctuations ordered by time (Xirasagar et al., 2006) and are often defined as occurrences with annual cycles. For example, the four UK seasons spring, summer, autumn and winter typically occur from March to May, June to August, September to November, and December to February respectively. These seasons occur through the year and the pattern of occurrence is predictable. “Seasonality” or “seasonal” are terms that are used to characterise a vast array of “manufactured” events for example, the tax year April to March, university semesters, the school calendar and so on. Behaviours may also be described as seasonal such as the consumer purchasing of coats before the winter and ”holiday clothes” before the summer. Such behaviours have rippling effects that can also be considered as seasonal. For instance: as many individuals choose to go on holiday in the summer, this increases the airline prices at that time of year. Other behaviours typified as seasonal may include the heavier use of heating at home in the winter thus increasing fuel consumption or increased spending before Christmas and decreased spending in January. Natural occurrences are also described as seasonal such as when animals migrate and hibernate and when trees lose their leaves.

A multitude of events, occasions, behaviours and natural occurrences can be characterised as seasonal. Consequently, for this study, it is important to focus and define the type of seasonality to be analysed. This study focuses on the seasonal pattern of medical contacts by school age children that are influenced by the school calendar – school-related seasonality. This thesis examined the patterns of medical contact in association with the British school calendars. In England, the school year begins in the September and ends in July. Generally, there are school holidays for Christmas and New Year (two weeks), Easter (two weeks), and the summer holidays (six weeks) and in between these holidays, children receive three one week holidays for half term. In Scotland, the school year starts in August and finishes in late May/June. Scottish schoolchildren generally receive the same amount of holiday at around the same times as English schoolchildren. Evidence of school-related seasonality has illustrated an association with the number of medical contacts throughout the year and this is further demonstrated in Chapter Two sub-section, 2.3.1 and 2.3.2.

Two separate investigations shall be carried out, the first examines the school-related seasonality or medical contacts made by asthmatics and non-asthmatics and the second, examines the environmental association with medical contacts. An important note is that for the second investigation, though seasonal patterns are not investigated in conjunction with the environmental effects (if any) and medical contact, the season effect is accounted for in the autoregressive analysis. Therefore, any effect observed in this investigation is due to the environmental exposures and not season.

Sub-sections 1.4 and 1.5 gave a brief background to the study's component exposures (pollutants, pollen, weather) and characteristics of interest (school-related seasonality). Fuelled by the weaknesses in the literature (Chapter Two, 2.4.3), Sub-section 1.6 provides justification for further research examining the environmental associations and seasonal characteristics of medical contact made by school-age children.

1.6. Rationale for Research

The WHO (2011) highlights that the fundamental causes of asthma are not completely understood. Along with the costs attributed to asthma, the weaknesses of the literature (documented in Chapter Two) give justification for the proposed investigation. Although there are a substantial number of studies investigating associations between pollutant exposures and childhood asthma related medical contacts (CAMC), results were not consistent. In addition, there is no general agreement in the literature over the relationship between weather exposures and CAMC, and relatively few studies report pollen or school associations with CAMC.

The majority of previous studies have used hospital admissions data with few studies using GP related data or any other type of medical contact to define childhood asthma (Fleming et al., 2000a, Medina et al., 1997, Morris et al., 1997). Hospital contacts tend to capture only the population with the most severe asthma symptoms. No study was identified using a range of different medical contacts such as GP contacts and hospital contacts. Using a range of contacts may increase the ability to investigate a more diverse asthmatic population.

There have been few studies investigating the lag effects of weather exposures and childhood asthma exacerbation. In addition, of the studies that documented environmental lag effects, only two were set in the UK. Geographical location is an important factor in environmental exposures and influences the magnitude of the lag effect. The studies from outside the UK may not be relevant to the UK context.

Of the studies investigating pollution, pollen, or weather associations and CAMC, 10 were based in the UK. Two of these studies investigated a combination of weather and pollen exposures. Six studies investigated pollutant exposures; four studies investigated weather exposures and four studies investigated pollen exposures. Environmental composition varies from country to country, this poses a potential problem when generalising study findings to another population.

Given the limitations of the literature there is a need to investigate environmental triggers of asthma in the UK in different health care settings and across different geographies using a design that compares an asthmatic cohort matched to a non-asthmatic cohort.

1.7. Aims of the Thesis

This thesis uses the word "time-series" to describe time defined variables and analyses. "Spatial" refers to geographically defined variables and analyses. The aim of this thesis is to understand what influences the time and spatial patterns of asthma in school-aged children. Influences under investigation include pollution, weather, and pollen exposures. It is proposed that the knowledge gained from the investigations will be used to inform or support the development of preventative strategies to reduce asthma morbidity in children.

For each aim and type of outcome, three endpoints are assessed: the (daily or MSOA) number of medical contacts made by school-age asthmatics, the (daily or MSOA) number of medical contacts made by school-age non-asthmatics, and the excess over and above the average school population. The excess is calculated by taking the difference between the number of medical contacts made by asthmatics and the number of medical contacts made by non-asthmatics. Medical contacts were sourced from both primary and secondary care settings.

The first aim of the time-series investigation is to assess whether there is a peak in the mean daily number of medical contacts associated with the return to school after the summer vacation (in addition to school holidays, Easter and Christmas) in school-age asthmatics, non-asthmatics and the excess.

The second aim is to investigate the presence of association between daily measures of environmental exposures (collectively) and daily counts of medical contact made by school-age asthmatics and non-asthmatics. This investigation compares the magnitude of effect of environmental factors on asthmatics, non-asthmatics and the excess of asthmatics over non-asthmatics.

In parallel with the second aim, the thesis will investigate whether there are delayed associations between environmental exposures and daily counts of medical contacts.

For the first and second aims, analyses are performed at national (England and Wales), regional (Trent Region), and local (Sheffield) level so that comparisons can be made from samples sourced from varying geographical sizes.

A final aim is to spatially investigate MSOA level rates of medical contact made by school-age asthmatics, non-asthmatics and the excess. The excess here is difference in the mean rates of contacts made by school-age asthmatics and non-asthmatics. This investigation will observe whether these rates are associated with ward level pollution data in Sheffield.

1.7.1. Research Questions

The research questions for the time-series analyses are:

1. Is there a peak in medical contacts associated with the return to school after the Easter, summer, or Christmas vacations in school-age asthmatic and non-asthmatic children?
2. Is the peak associated with the return to school observed in asthmatics in excess of non-asthmatics?
3. Are environmental exposures associated with daily counts of medical contact made by school-age asthmatics or non-asthmatics?
4. Are the environmental associations observed in school age asthmatics in excess of those observed in school age non-asthmatic children?
5. Are there any lagged environmental associations observed with school-age asthmatics and/or non-asthmatics?
6. Are environmental exposures predictors of daily counts of school-age asthmatics and/or non-asthmatics?

The research questions for the spatial analyses to address follow:

1. Are there areas in Sheffield that have high levels of medical contact made by school-age children for asthmatic and non-asthmatic conditions?
2. Is there an association between pollution measures and levels of asthmatic or non-asthmatic medical contacts in Sheffield?
3. If there are areas with significantly high levels of asthmatic or non-asthmatic medical contact, are these also near the children's hospital?

1.8. Methodology of comparing medical contacts between asthmatic and non-asthmatic children

Medical contacts were derived from two sources, the General Practice Research Database (GPRD) and the Sheffield Children's Hospital (SCH).

The GPRD provided data of every medical contact that was made by school-age children with medically defined asthma and every medical contact made by non-asthmatic children who were matched to the asthmatic cohort by age, gender and general practice. For this sample, an asthmatic child may not have made medical contact for asthmatic reasons and for both the asthmatic and non-asthmatic cohort, a child may not have made any medical contacts at all.

From the SCH dataset, contacts made for asthmatic reasons were matched to contacts for non-asthmatics reasons by age, gender and MSOA for the time-series investigation and by age, gender and date of contacts for spatial investigation.

In relation to the time-series investigations, for the GPRD sample, medical contacts made by school-age asthmatics and non-asthmatics were aggregated by date of contact to produce the clinical outcome - daily counts. For the SCH sample, medical contacts made by school-age children for asthmatic and non-asthmatic reasons were aggregated by date of contact to produce the clinical outcome - daily counts. Comparing the outcome of the number of medical contacts between asthmatics and non-asthmatics was therefore slightly different between these two data sources, this is further detailed in section 3.5.

A second outcome, the daily excess was also investigated (the daily number of medical contacts made by asthmatics over the daily number of medical contacts made by non-asthmatics); this outcome represented the residual effect on asthmatics over and above the average school population.

1.9. Outline of the Thesis

Chapter Two reports existing literature investigating the seasonality of and environmental triggers (pollution, weather, pollen, schools) of asthma exacerbation resulting in medical contact in children. In addition, findings from studies examining the spatial relationship of pollutants and childhood asthma are reported. Limitations in the literature will be highlighted.

In Chapter Three, the clinical and environmental data that were used in the investigations will be described including information on the sources of the data, the sample size, outcomes of interest and organisation of the data in preparation for analyses.

Chapter Four describes the analysis undertaken to support the extrapolation of small area environmental measures against patient data at national level. This is followed by a description of the methods used in the time-series and spatial analyses of the data: descriptives, correlations, standard regressive, autoregressive, and mapping techniques. Although the results of these analyses are not reported in the main body of the thesis, the majority of the comparative analyses carried out to find the most suitable model were conducted using standard regressive techniques. The results of comparisons made between models are reported in Appendix F. The information gained from the comparative analyses informed both the regressive and autoregressive analyses. The stages of the comparative analyses are described.

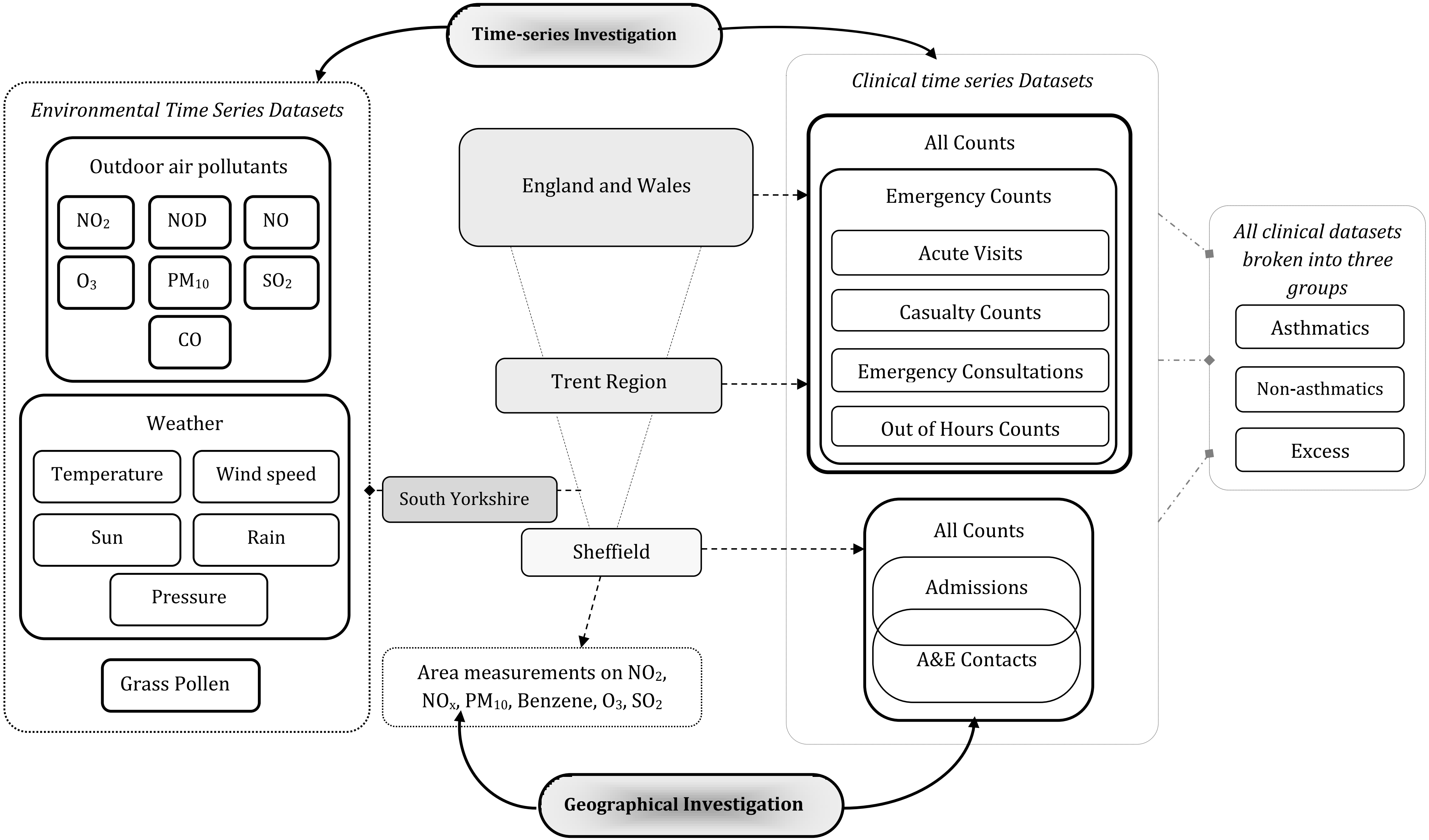


Figure 1.1: Environmental predictors and clinical outcomes.

Figure 1.1 provides a schema of the variables used in the investigation. On the left are the independent variables of interest, used in the time series investigation. In the right half are the outcomes of interests; there are six types of medical contact for England and Wales and the Trent Region (All Counts, Acute Visits, Casualty Counts, Emergency Consultations, Emergency Counts, and Out of Hours): All Counts include the data from the remaining five medical contacts.

For Sheffield, there are three medical contacts (All Counts, Admissions, and A&E Contacts); All Counts include the data from the remaining two medical contacts (Figure 1.1).

Each medical contact has three sub-categories: asthmatics, non-asthmatics, and the excess of asthmatics above the average school population. In the middle of the schema are the geographical locations where the clinical and environmental datasets were obtained. Time-series investigations will be conducted between the environmental exposures on the left and medical contacts on the right half of the diagram. Area based pollutant measurements (bottom centre of the diagram (Figure 1.1)) are used in the spatial investigation of Sheffield medical contacts.

Due to the large number of endpoints, not all the results can be included in main body to maintain the conciseness of the thesis. Chapter Five reports the results from the analysis investigating school-related seasonality with medical contacts for England and Wales, the Trent Region and Sheffield (See Figure 1.2). Chapter Six reports the results from the analysis investigating the environmental associations with medical contacts for England and Wales, the Trent Region and Sheffield. Chapter Seven reports the results from the analysis investigating the spatial association between pollutant measures and medical contacts from Sheffield.

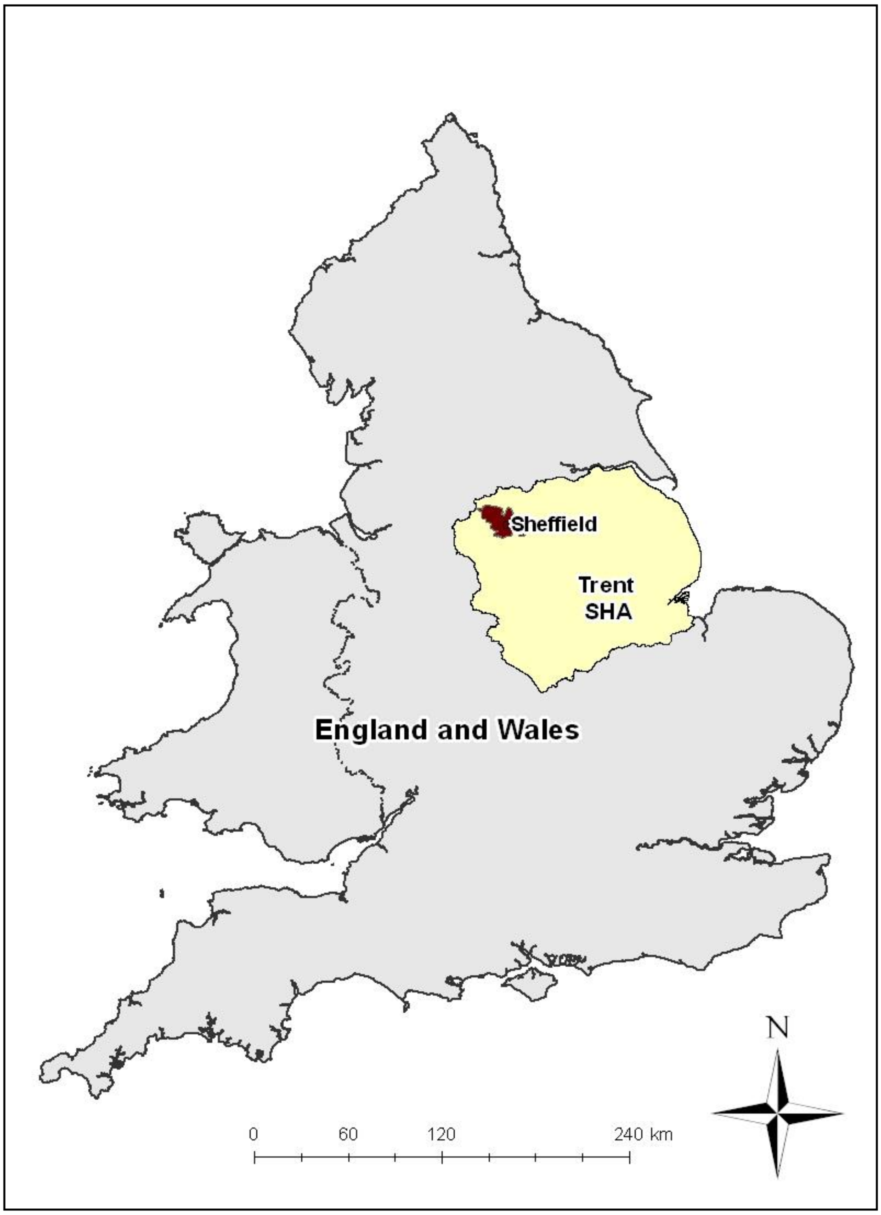


Figure 1.2: Geographical illustration of analysis performed at national, regional, and local level.

Chapter Eight summarises the findings from both the time-series and spatial analyses. This is followed by a discussion of the strengths and weaknesses of the methods used. The implications of the findings are addressed in light of the thesis' findings. This chapter closes with ideas for future research.

Chapter Nine provides a short conclusion to the thesis.

1.10. Summary

Asthma is a chronic condition that affects around 10.7 percent of children in the UK. The consequences of the condition may include financial cost to the family and society, and places a heavy demand on health services in an effort to control and minimise the symptoms of the disease. The consequences of asthma also affect the wellbeing of the child and family members. Knowledge of the triggers of asthma plays a substantial role towards facilitating the prevention of symptoms. A number of triggers have been associated with the exacerbation of asthma symptoms.

Chapter Two documents the findings of studies investigating the seasonality of and environmental triggers (pollutant, weather and pollen) of childhood asthma resulting in medical contact. It will also report the findings of studies observing school associated effects of medical contacts made by school-age asthmatics.

Chapter Two

Review of the Literature investigating the Seasonality of and Environmental (pollutants, weather, pollen) Triggers of childhood asthma resulting in medical contact

2.1. Introduction

Chapter One introduced asthma and briefly justified the motive for research in this area. As stated in the first chapter, this thesis' aim was to firstly examine the seasonality of medical contacts made by school-age children with asthma and specifically identify whether the pattern in medical contacts was related to the school calendar. The second aim was to examine the pollutant, weather and pollen (environmental) association with medical contacts. A literature review was conducted as background to this study.

A significant amount of research already exists illustrating the seasonality of medical contacts made by children with asthma. In addition, a large body of research has already been conducted illustrating associations between environmental triggers and medical contacts made by children with asthma. This chapter documents the literature investigating the seasonality and environmental triggers of childhood asthma resulting in medical contact.

This thesis' area of interest is broad; its interest lies in five aspects that trigger, or characterise, asthma in children: seasonality, school, pollutant, pollen and weather exposures. This chapter reports findings from existing literature for each aspect separately.

2.1.1. Aims of this chapter

The aims of this chapter are to:

1. Describe the process of searching for the literature
2. Document the findings of the literature
3. Summarise the main literature findings and discuss any gaps in the literature

2.2. Method: searching for literature

To review the literature, the topic area was broken into sub-sections. A systematic search of the literature was applied to each sub-section. For each search strategy, inclusion and exclusion criteria were set. A study was included if:

1. It was written in the English language as translation of any studies written in a different language was beyond the scope of the PhD
2. It included children only in their sample or alongside adults provided that the children's information was analysed separately
3. Asthma was defined by medical contact (hospitalisation, emergency department, Out of Hours, admissions)
4. All types of study design were included i.e. case-control, ecological etc
    - To scope for the literature investigating the pollutant associations with childhood asthma, only papers published after 1990 were included. Two reasons are given for defining this cut off; firstly, the pollutant composition has changed and studies conducted after the 90s may reflect current relationships between pollutants and medical contact. Secondly, there is a substantial amount of research conducted after this cut off.

A study was excluded if:

1. Asthma was not defined by medical contact
2. It did not include children
3. It examined children less than five or six only
4. It was not written in the English language

Once the search terms were established, the search strategy was implemented in four electronic databases (Medline, EMBASE, CINAHL, and Web of Science) and Google scholar. The search terms to define asthma, children, and medical contact included:
"asthma", "child*", "pediatric", paediatric" and "admi*", "present*", "family physician", "hospital*", "out of hours", "diar", "attend" and "general prac*"

Additional terms were used to scope for the exposures or characteristics of interest. When searching for studies investigating the:

1. seasonality of childhood asthma: the terms "season*", "trend*" and "pattern*" were used
2. pollutant associations/effects with childhood asthma: the terms "pollution" "nitr*", sulphur", "dioxide", "carbon monoxide", "particulate matter", "PM" and "ozone" were used
3. effect of proximity or location in relation to pollutant or other environmental exposures and childhood asthma relationships: terms used "proximity", "vicinity", "cluster" and "locat*" were used

4. weather associations/effects with childhood asthma: the terms "weather", “season”, “humid*”, “rain*”, “temp*”, “wind*” and “pressure” were used
5. pollen associations/ effects with childhood asthma: the term "pollen*" was used
6. school associations with childhood asthma: the term “school*” was used

The first two questions from the Critical Appraisal Skills Programme (CASP); making sense of evidence (Public Health Research Unit, 2006) were used to address the issue of data quality of the studies which were to be included in the reviews.
The questions follow:

- Did the study address a clearly focused question?
- Did the authors use an appropriate method to answer the question/issue?

Due to the number of studies under review, the information was extracted using a short version of the standard data extractions forms (See Appendix A for full details of the search strategy).

Table 2.1: Example of Mini Extraction form.

Reference	
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): Sample size: GP or Hospital:
Design (comparison group?)	
Setting (dates data collected)	
Independent variable	
Dependent variable	
Method of Analysis	
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	

For each sub-section reports the findings from a systematic search of the literature performed per topic area:

1. The seasonality of medical contacts for asthma in children
2. The associations between “school” exposures and medical contacts made by asthmatic children
3. The associations between pollutant exposures and medical contacts made by asthmatic children
4. The effect of proximity or location in the relationship between environmental exposures and medical contacts made by asthmatic children
5. The associations between weather exposures and medical contacts made by asthmatic children
6. The associations between pollen exposures and medical contacts made by asthmatic children

A search of the literature was conducted between March and September 2009. Another search was conducted in August 2011 to update the findings from new studies conducted in 2010 and 2011. Childhood asthma related medical contacts include hospitalisations, admissions, A&E contacts and primary care contacts and are referred to with the acronym CAMC. The next sub-section begins with the literature review documenting the findings of existing literature investigating the seasonality of childhood asthma resulting in medical contact.

2.3. Report of the Findings from the Literature

2.3.1. Review of the Literature investigating Seasonal Patterns of Childhood Asthma

This sub-section documents the findings from the literature investigating the seasonal patterns of childhood asthma exacerbation resulting in medical contact. Several studies use these terms to describe the pattern of CAMC and 34 studies were identified for this review. Overall, there was evidence to highlight the seasonal peaks and troughs in CAMC throughout the year.

2.3.1.1. Findings from the Literature

In the UK, four studies documented low CAMC between January and April, which then rose in early summer: this was followed by a decrease in August and a peak in September and October (Ashley, 1983, Fleming et al., 2000a, Khot et al., 1983, Khot and Burn, 1984). In Spain and Finland, studies found that high rates of CAMC in May, autumn and early winter whilst low rates of CAMC occurred in late winter and the summer (Gonzalez Barcala et al., 2010, Harju et al., 1997). In Greece, three studies found the number of asthma related hospitalisations in school-aged children peaked in May (Nastos, 2008, Nastos et al., 2010, Priftis et al., 1993) whilst another study reported higher counts in the winter compared to summer (Samoli et al., 2011).

There was a substantial amount of literature investigating seasonal patterns of childhood asthma from the United States and Canada. Studies document an increase in the number of medical contacts of asthmatic children in the autumn and a decrease in the summer (Babin et al., 2007, Blaisdell et al., 2002, Crighton et al., 2001, Gergen et al., 2002, Jariwala et al., 2011, Kimes et al., 2004, Lin et al., 2007, Mohr et al., 2008, Morris et al., 1997, Newell and Swafford, 1963, Reeves et al., 2006, Silverman et al., 2003, Strickland et al., 2010, Van Dole et al., 2009, Villeneuve et al., 2005). Strickland et al found in parallel to the seasonal variation to CAMC, there were also pronounced seasonal characteristics in the number of ED visits due to upper respiratory infections (asthma and upper respiratory related medical contacts made by separate individuals).

Reporting different seasonal patterns compared to the Europe, US and Canada, within Asia, seven studies found that the number (daily, weekly, or monthly) of CAMC displayed seasonality (Chew et al., 1998, Hashimoto et al., 2004, Kao et al., 2001, Kuo et al., 2002, Xirasagar et al., 2006, Yeh et al., 2008, Yeh et al., 2011). In Singapore, one study reported that the number of admissions peaked in January and February and from May to August in each year (Chew et al., 1998). A Taiwanese study reported that "school-goer" rates for asthma were low from June to August and high in March and September (Xirasagar et al., 2006). In similarity to Xirasagar et al, another Taiwanese study found a statistically significant increase in CAMC during October to December (Kao et al., 2001). An additional Taiwanese study found similar findings to Xirasagar et al and Kao et al (Yeh et al., 2008). Yeh et al suggested that this could be due to the high levels of humidity, school return, and viral infection or to poor adherence to medication during the summer, as symptoms seem less severe.

Elsewhere globally, a Costa Rican study found peaks in paediatric admissions in March and August (Chavarria, 2001). A Puerto Rican study recorded peaks in December and troughs in June (Montealegre et al., 2002). Similar to findings from the US and UK, an Israeli study reported high rates of CAMC in September (Scheuerman et al., 2009). South of the equator one study observed that CAMC peaked in May and November in Cape Town, South Africa (Ehrlich and Weinberg, 1994). Another South African study found a peak in CAMC in the summer months (October to February) (MacIntyre et al., 2001). One study found admissions for children aged 5 to 14 years were highest in the winter (June) and deaths attributed to asthma in the same age group were highest in the summer (January) (New Zealand) (Kimbell-Dunn et al., 2000).

Three studies found that although there were seasonal characteristics found with the number of CAMC; this was not replicated in the number of medical contacts made by the comparison group (Blaisdell et al., 2002, Lin et al., 2004b, Mohr et al., 2008). Two European studies observed no seasonal variation in number of CAMC yet total the number of visits in these studies were low (Fauroux et al., 2000, Giovannini et al., 2010).

2.3.2. Review of the Literature investigating School Associations with Childhood Asthma

The seasonal characteristic of childhood asthma has been attributed to the indirect effects of school return. One of the thesis' lines of research is to examine trends of medical contact in relation to school-return and determine whether there is school-related seasonality attributed to medical contacts made by for asthmatic and non-asthmatic reasons. Several studies explore the role of school return and its effect on CAMC. Evidence suggests that school return is an important event that tends to occur prior to a peak in the number of medical contacts resulting from asthma symptoms around September. This sub-section illustrates current literature investigating the relationship between school return and CAMC.

2.3.2.1. Findings from the Literature

School and specifically school attendance are potentially risk factors of CAMC. Eleven studies explored the association between school return and childhood asthma resulting in medical contact. A Maltese study documented that the end of school in June was associated with a 91 percent drop in admissions for asthma; when school resumed in October, school return was associated with a 165 percent increase in asthmatic admissions (Grech et al., 2002).

Viral infection is an important direct trigger of asthma exacerbation (Johnston et al., 2006). Ninety percent of asthmatics surveyed via the National Asthma Panel thought their asthma was triggered by viral infections (ICAUK, 2009). The return to school offers children the opportunity to mix with other children, this is often the time when viruses spread and trigger attacks in asthmatic children. One UK study reported low rates of CAMC in the school holidays and higher rates in term time (Storr and Lenney, 1989). The authors of this study speculated that school holidays disrupt the spread of viral infection in the community and when children return to school, they are re-introduced to a number of viruses that exacerbate asthmatic symptoms.

One study found strong correlations between the seasonal patterns of upper respiratory infections and asthma-related hospital admissions (Johnston et al., 1996). The correlations were more profound in children compared to adults. Another study speculated that schoolchildren carry viral infections and act as transmit agents responsible for epidemic in adults (Johnston et al., 2006). An additional study detected respiratory viruses in the majority of children presenting at an ED with asthma exacerbation (Johnston et al., 2005). Johnston et al also found that the children who presented at the ED were less likely to have taken routine medication.

2.3.2.1.a. Lag Effects

A lag effect is the time difference between the start of exposure and the event of interest. Eight studies show that asthma exacerbation after school return occurs after a certain amount of time had elapsed thus the effects of being exposed to the school environment were not instant. A US study found a lagged rate ratio of 1.46 and 1.13 in children categorised 5 to 11 years and 12 to 17 years respectively indicating an association between school opening and asthma admission rates in children (Silverman et al., 2005). The strongest lag effect in children aged 5 to 11 years was seen after a lag of four days.

A study in the US reported a significant increase in asthma admissions associated with school return after a vacation period (between 6 and 244%) (Lin et al., 2008c). The strongest association was found with school return after the summer holidays in children aged 5 to 11 years. An additional US study observed a three week delay between the start of the school year and a peak in hospital admissions for asthmatic children (Im and Schneider, 2005).

The magnitude of the peak in medical contacts varied by location and by the school year calendar. Four studies report geographical differences in the time taken for a peak in asthma related medical contacts to occur after school return. A review reported less pronounced peaks in countries where the school year commences at an earlier date; they speculate that conditions for rhinovirus transmission are less favourable in August compared to September (Sears and Johnston, 2007).

In support of Sears and Johnston's comments, a UK study demonstrated that peaks in the number of CAMC occurred two weeks after school return and that the a similar timing effect was observed in Aberdeen (where school return is scheduled in August) in comparison to Doncaster (Julious et al., 2007). The earlier peak observed in Aberdeen was less pronounced insinuating that possible external factors such as colder temperature in September might increase the probability of transmission of viral infection and thus asthma exacerbation in children. The difference in the magnitude of the peaks could also be the result of different environmental compositions between the locations.

A Canadian study used "Labor day" as a baseline to measure the exact delayed effect on childhood asthma hospitalisations. Children returned to school on the first Tuesday of September after "Labor day" Monday (Johnston et al., 2006). Johnston et al found that in each year on average across all locations, asthma hospitalisation rates peaked 17.7 days after "Labor day" in school-age children. Geographical variation was highlighted as an important indirect factor in Johnston et al's study as the epidemic peaked 4.2 days earlier in the northernmost latitudes compared to the southernmost latitudes. Similarly, a US study found a peak in admissions after a 19, 17, and 21 day delay from school return in preschool (2 to 4 years), elementary (5 to 11 years) and middle/high (12 to 17 years) children respectively (Lin et al., 2011). Lin et al also reported a lagged difference in the peak of admissions by geographical region (New York City 15 days, Upstate 18 days).

South of the equator, an Australian study found after adjusting for confounding variables, asthma admission rates peaked between two and four weeks after the first day back to school in each term (Lincoln et al., 2006). Australian seasons differ to seasons in the UK; the Australian summer takes place from December to February. The risk of an asthma attack was highest after the return from the summer holiday.

Where possible, all reported lag effects for each study that mentioned a school return-asthma association in children were collated and an average was calculated.

Table 2.2: Lag effect from school return, average between studies (days).

Author, Year	Number of days
Im and Schneider (2005)	21
Johnston et al (2006)	17.7
Julious et al (2007)	14
Lin et al (2011)	17
Lin et al (2008c)	23.5
Lincoln et al (2006)	23
Sears and Johnston (2007)	18
Silverman et al (2005)	5
Mean	17.4

The crude mean lag between studies was calculated at 17.4 days after school return. Crudely speaking globally, it takes an average of 17.4 days for asthma exacerbation to occur in children after school return. However, each study was conducted in different geographical settings that are arguably incomparable. Once more, samples from each study vary by age, gender, and ethnic composition, that all have potential effects on the results, and that in turn may make studies incomparable.

2.3.3. Review of the Literature investigating Pollutant Associations with Childhood Asthma

This sub-section reports the findings from literature investigating the environmental triggers of asthma exacerbation looking firstly at pollutant exposures. Air pollutants are most commonly associated with the exacerbation of acute respiratory illnesses (Peden, 2005). Chronic pollutant exposure can lead to impaired lung growth and can contribute to the development of asthma (Peden, 2005). Inhaling gaseous pollutants can irritate and tighten the airways potentially triggering asthma exacerbation.

2.3.3.1. Findings from the Literature

To display the findings of the review, sections are separated by pollutant type. The definitions of the pollutant are described then the studies investigating the pollutant's effects on childhood asthma exacerbation resulting in medical contact will be illustrated. The definitions for pollutants were sourced from the DEFRA website. The following table illustrates the main findings from the studies included in the review.

Table 2.3: Associations/effects found between pollutants and childhood asthma exacerbation resulting in medical contact (direction of the association).

Author(s)	Did the studies find a statistically significant association btw the air pollutant CAMC? Yes+= positive association; Yes-= negative association; No=no association; - = not studied						
	SO_2	NO_2	PM_{10}	$PM_{2.5}$	O_3	CO	Other e.g. TSP, NO, $PM_{10-2.5}$
Samoli et al (2011)	Yes+	No	Yes+	-	Yes+ in summer	-	
Yeh et al (2011)	Yes+	Yes+	Yes+	-	No	Yes+	
Giovannini et al (2010)	-	Yes+	Yes+	-	No	Yes+	
Lee et al (2010)	-	-	-	-	Yes in 1 out of 2 cities	-	
Nastos et al (2010)	-	-	Yes+	-	-	-	
Pereira et al (2010)	-	Yes+ 0-4yrs only	No	-	No	Yes+ 0-4yrs only	
Silverman et al (2010)	-	-	-	Yes+	Yes+	-	
Strickland et al (2010)	Yes+ in warm season	No	Yes+ warm season	Yes+, EC= yes warm season	Yes+ warm season	Yes+ warm season	PM10-2.5 = Yes+ cold season
Burra et al (2009)	Yes+	Yes+	-	Yes+	Yes-	-	
Chan et al (2009)	No	Yes+	Yes+	-	No	-	
Yamazaki et al (2009)	-	Yes+ in warm	-	Yes+ in warm	Yes+ in warm	-	
Abe et al (2009)	No	No	-	-	-	No	Suspended PM = No
Andersen et al (2008)	-	Yes+	No	No	No	-	NO_x = yes+
Babin et al (2008)	-	-	-	Yes+	Yes+ Spring,	-	
Halonen et al (2008)	-	Yes+		Yes+		Yes+	
Hirshon et al (2008)	-	-	-	$PM_{2.5}$ zinc = Yes*	-	-	
Jalaludin et al (2008)	1-4yrs=Yes+	1-4yrs=Yes+	1-4yrs=Yes+ 5-9yrs=Yes+	1-4yrs=Yes+ 5-9yrs=Yes+	1-4yrs=Yes+	Yes+	
Lin et al (2008a)	-	-	-	-	Yes in 5 out of 11 states)	-	
Mohr et al (2008)	No	-	-	EC=yes+	-	-	NOx = Yes+
Moore et al (2008)	No	No	No	-	Yes	No	
Nastos et al (2008)							
Szyszkowicz et al (2008)	No	Yes+	Yes+ warm season	No	Yes warm season	Yes	
Tecer et al (2008)	-	-	Yes+	Yes+	-	-	$PM_{10-2.5}$= Yes
Andersen et al (2007)	-	Yes	Yes+	-	-	Yes	
Babin et al (2007)	-	-	-	-	Yes+	-	
Ko et al(2007)	No	Yes+	Yes+	Yes+	Yes+	-	
Magas et al (2007)	-	Yes+	-	No	No	-	

Table 2.2 continued

Author(s)	Did the studies find a statistically significant association btw the air pollutant CAMC? Yes+= positive association; Yes-= negative association; No=no association; - = not studied						
	SO_2	NO_2	PM_{10}	$PM_{2.5}$	O_3	CO	Other e.g. TSP, NO, $PM_{10-2.5}$
Villneueve et al (2007)	No	Yes+	Yes+	Yes+	Yes+	-	
Lee et al (2006a)	No	Yes+	Yes+	Yes+	Yes+	-	
Lee et al (2006b)	Yes+	Yes+	Yes+	-	Yes+	No	
Paliatsos et al (2006)	Yes+	0-4yrs=No 5-14yrs=Yes+	-	-	0-4yrs=Yes+ 5-15yrs=No	0-4yrs=Yes+ 5-14yrs=No	
Xirasagar et al (2006)	Yes+	No	Yes+	-	Yes+	No	
Barnett et al (2005)	Yes+	No	No	No	No	No	
Erbas et al (2005)	-	Yes+ according to region	Yes+	-	Yes+ according to region	-	
Farhat et al (2005)	No	Yes+	No	-	No	No	
Peel et al (2005)	-	Yes+	No	-	Yes+ in summer	Yes+	
Wilson et al (2005)	Yes+	-	-	-	Yes+ in warm season	-	
Lin et al(2004a)	Yes+ Females	Yes+ Males	-	-	No	No	
Lin et al (2004b)	Yes	-	-	-	-	-	
Magliaretti and Cavallo (2004)	-	Yes+	-	-	-	-	TSP = Yes+
Neidell (2004)	-	Yes+	Yes+	-	Yes-	Yes+	
Lierl and Hornung (2003)	-	-	-	-	No	-	
Lin et al (2003)	Yes+ Females	Yes+	-	-	No	Yes+ Males	
Sunyer et al (2003)	Yes+	-	-	-	-	-	
Kuo et al (2002)	Yes+	Yes+	Yes+	-	No	-	
Lee et al (2002)	Yes+	Yes+	Yes+	-	Yes+	Yes+	
Lin et al (2002a)	-	-	No	No	-	-	$PM_{10-2.5}$ =Yes.
Atkinson et al (2001)	-	-	Yes + according to region	-	-	-	BS = Yes+
Fusco et al (2001)	No	Yes+	No	-	No	Yes+	
Thompson et al (2001)	Yes+	Yes+	Yes	-	No	Yes+	NO = Yes
Fauroux et al (2000)	-	Yes+	Yes+	-	Yes+	-	
Tolbert et al (2000)	-	-	Yes+	-	Yes+	-	NOx=No
Wong et al (2001)	Yes+	Yes+	Yes+	-	-	-	

Table 2.2 continued

Author(s)	Did the studies find a statistically significant association btw the air pollutant CAMC? Yes+= positive association; Yes-= negative association; No=no association; - = not studied						
	SO_2	NO_2	PM_{10}	$PM_{2.5}$	O_3	CO	Other e.g. TSP, NO, $PM_{10-2.5}$
Chew et al (1999)	Yes+	Yes+	-	-	Yes+		TSP=Yes
Norris et al (1999)	No	No	-	Yes+	No	Yes+	
Anderson et al (1998)	Yes+	Yes+	-	-	Yes-	-	
English et al (1998)	-	-	Yes+	-	Yes+	-	
Garty et al (1998)	-	Yes+	No	-	Yes-	-	NOx Yes+
Morgan et al (1998)	-	Yes+	No	-	No	-	
Rosas et al (1998)	No	No	-	-	No	-	
Holmen et al (1997)	No	Yes+	-	-	No	-	
Medina et al (1997)	Yes+	Yes+	-	-	Yes over 20°C	Yes+	PM_{13} = Yes+
Sunyer et al (1997)	Yes+	No	-	-	No	-	BS=No
Ponka and Virtanen (1996)	No	No	-	-	Yes+	-	TSP=No
Romieu et al (1995)	Yes+	No	-	-	Yes+	-	
White et al (1994)	-	-	-	-	Yes+	-	
Tseng et al (1992)	Yes-	No			No	-	TSP=Yes+
Ponka (1991)	No	No	-	-	Yes+	Yes+	
Bates et al (1990)	-	No	-	-	No	-	

2.3.3.1.a. Oxides of Nitrogen

Oxides of nitrogen are usually the product of combustion processes emitting a mixture of nitric oxide (NO) and nitrogen dioxide (NO_2), these are collective known as NO_x (DEFRA, 2011). Studies investigate the effects of NO_2 more often than other NO_x exposures, therefore, this section report's findings for NO_2 exposure only. NO_2 associations with CAMC were investigated by 50 studies. The majority of the studies agree that there were significant associations between exposure to NO_2 and CAMC (Andersen et al., 2007, Andersen et al., 2008, Anderson et al., 1998, Burra et al., 2009, Chan et al., 2009, Chew et al., 1999, Erbas et al., 2005, Farhat et al., 2005, Fauroux et al., 2000, Fusco et al., 2001, Garty et al., 1998, Giovannini et al., 2010, Grineski et al., 2010, Halonen et al., 2008, Holmén et al., 1997, Jalaludin et al., 2008, Ko et al., 2007, Kuo et al., 2002, Lee et al., 2002, Lee et al., 2006a, Lee et al., 2006b, Lin et al., 2003, Lin et al., 2004a, Magas et al., 2007, Medina et al., 1997, Migliaretti and Cavallo, 2004, Morgan et al., 1998, Paliatsos et al., 2006, Peel et al., 2005, Pereira et al., 2010, Szyszkowicz, 2008, Thompson et al., 2001, Villeneuve et al., 2007, Wong et al., 2001, Yamazaki et al., 2009, Yeh et al., 2011).

Of the studies that found associations between NO_2 exposure and CAMC, one study found the NO_2 association was subject to geographical area (Erbas et al., 2005). Two studies found a statistically significant effect of NO_2 exposure with ED visits made by children one to four years old only (Jalaludin et al., 2008, Pereira et al., 2010). One study found greater associations on CAMC in the warmer months (Yamazaki et al., 2009).

On the other hand, 14 studies found no association between NO_2 exposure and CAMC (Abe et al., 2009, Barnett et al., 2005, Bates et al., 1990, Moore et al., 2008, Norris et al., 1999, Ponka, 1991, Ponka and Virtanen, 1996, Romieu et al., 1995, Rosas et al., 1998, Samoli et al., 2011, Strickland et al., 2010, Sunyer et al., 1997, Tseng et al., 1992, Xirasagar et al., 2006).

2.3.3.1.b. Sulphur Dioxide (SO_2)

Sulphur dioxide (SO_2) is a corrosive acid gas that combines with water vapour in the atmosphere to produce acid rain (DEFRA, 2011). SO_2 associations with CAMC were investigated by 38 studies. Overall, over half the studies concluded that SO_2 exposure is associated with CAMC (Anderson et al., 1998, Barnett et al., 2005, Bates, 1995, Burra et al., 2009, Chew et al., 1999, Kuo et al., 2002, Jalaludin et al., 2008, Lee et al., 2002, Lee et al., 2006b, Lin et al., 2003, Lin et al., 2004b, Medina et al., 1997, Paliatsos et al., 2006, Romieu et al., 1995, Samoli et al., 2011, Strickland et al., 2010, Sunyer et al., 1997, Sunyer et al., 2003, Thompson et al., 2001, Tseng et al., 1992, Wilson et al., 2005, Wong et al., 2001, Xirasagar et al., 2006, Yeh et al., 2011).

Of the studies that found associations between SO_2 exposure and CAMC, one study found a positive association between SO_2 and paediatric ED visits for asthma in the "warm season"

(May to October) (Strickland et al., 2010). Another study also found an association with children one to four years of age only (Jalaludin et al., 2008). Two studies (by the same authors) showed that prolonged SO_2 exposure had significant effects on female childhood asthma admissions (Lin et al., 2003, Lin et al., 2004b).

In contrast, 15 studies found no association between SO_2 exposure and CAMC (Abe et al., 2009, Chan et al., 2009, Farhat et al., 2005, Fusco et al., 2001, Holmén et al., 1997, Ko et al., 2007, Lee et al., 2006b, Mohr et al., 2008, Moore et al., 2008, Norris et al., 1999, Ponka, 1991, Ponka and Virtanen, 1996, Rosas et al., 1998, Szyszkowicz, 2008, Villeneuve et al., 2007).

2.3.3.1.c. Particulate matter (PM)

Particulate Matter (PM) consists of "primary components, which are emitted directly into the atmosphere, and secondary components, which are formed within the atmosphere as a result of chemical reactions" (DEFRA, 2011). Particles less than 10 microns in diameter are known as PM_{10}. Particles less than 2.5 microns in diameter are referred to as $PM_{2.5.}$ A number of studies report findings for exposure to both PMs. The effects of PM_{10} are investigated with asthma medical contacts more so than $PM_{2.5}$. In addition, the effects of $PM_{2.5}$ were not investigated in this investigation, therefore, this section reports the findings from current literature for PM_{10} only. PM_{10} associations with CAMC were investigated by 35 studies. Two-thirds of the studies report a positive association between PM_{10} exposure and CAMC (Andersen et al., 2007, Atkinson et al., 2001, Chan et al., 2009, English et al., 1998, Erbas et al., 2005, Fauroux et al., 2000, Giovannini et al., 2010, Jalaludin et al., 2008, Ko et al., 2007, Kuo et al., 2002, Lee et al., 2002, Lee et al., 2006a, Lee et al., 2006b, Nastos et al., 2010, Neidell, 2004, Samoli et al., 2011, Strickland et al., 2010, Szyszkowicz, 2008, Tecer et al., 2008, Thompson et al., 2001, Tolbert et al., 2000, Villeneuve et al., 2007, Wong et al., 2001, Xirasagar et al., 2006, Yeh et al., 2011).

Of the studies that found an association between PM_{10} exposure and CAMC, two studies found a positive association between PM_{10} in the warm season only (Strickland et al., 2010, Szyszkowicz, 2008). One study found that PM exposure was significantly associated with admissions in children one to four years and five to nine years only (Jalaludin et al., 2008).

Ten studies found no association between PM_{10} and CAMC (Andersen et al., 2008, Barnett et al., 2005, Farhat et al., 2005, Fusco et al., 2001, Garty et al., 1998, Lin et al., 2002a, Moore et al., 2008, Morgan et al., 1998, Peel et al., 2005, Pereira et al., 2010).

2.3.3.1.d. Ozone (O_3)

Ozone (O_3) is a secondary pollutant produced by the reaction between NO_2, hydrocarbons and sunlight (DEFRA, 2011). O_3 is a seasonal pollutant; its levels peak in the summer months when sunlight is most abundant (Fuller and Green, 2006). O_3 levels are lower in urban areas because the high levels of NO from vehicle emissions create a sink for O_3. O_3 associations with CAMC were investigated by 55 studies. More than half the studies agree that there was a significant association (or effect) between O_3 exposure and CAMC. Associations were noted by half the studies (Anderson et al., 1998, Babin et al., 2007, Babin et al., 2008, Burra et al., 2009, Chew et al., 1999, English et al., 1998, Erbas et al., 2005, Fauroux et al., 2000, Garty et al., 1998, Jalaludin et al., 2008, Ko et al., 2007, Lee et al., 2002, Lee et al., 2006a, Lee et al., 2006b, Lee et al., 2010, Lin et al., 2008b, Medina et al., 1997, Moore et al., 2008, Neidell, 2004, Paliatsos et al., 2006, Peel et al., 2005, Ponka, 1991, Ponka and Virtanen, 1996, Romieu et al., 1995, Samoli et al., 2011, Silverman and Ito, 2010, Strickland et al., 2010, Szyszkowicz, 2008, Tolbert et al., 2000, Villeneuve et al., 2007, White et al., 1994, Wilson et al., 2005, Xirasagar et al., 2006, Yamazaki et al., 2009).

Of those that found an O_3-asthma association, eight studies documented O_3 associations with CAMC in the summer or warmer seasons (Babin et al., 2008, Medina et al., 1997, Peel et al., 2005, Samoli et al., 2011, Strickland et al., 2010, Szyszkowicz, 2008, Wilson et al., 2005, Wong et al., 2001). Three studies showed the association between O_3 exposure and CAMC was subject to geographical differences (English et al., 1998, Erbas et al., 2005, Lin et al., 2008a). Two studies reported an association in children zero to four years old only (Jalaludin et al., 2008, Paliatsos et al., 2006).

No associations between exposure to O_3 and CAMC were reported by 21 studies (Andersen et al., 2008, Barnett et al., 2005, Bates et al., 1990, Chan et al., 2009, Farhat et al., 2005, Fusco et al., 2001, Giovannini et al., 2010, Holmén et al., 1997, Kuo et al., 2002, Lierl and Hornung, 2003, Lin et al., 2003, Lin et al., 2004b, Magas et al., 2007, Morgan et al., 1998, Norris et al., 1999, Pereira et al., 2010, Rosas et al., 1998, Sunyer et al., 1997, Thompson et al., 2001, Tseng et al., 1992, Yeh et al., 2011).

2.3.3.1.e. Carbon Monoxide (CO)

Carbon Monoxide (CO) is a colourless, odourless gas produced by the incomplete combustion of hydrocarbon fuels. Exposure to CO can potentially interfere with the bloods ability to carry oxygen to body tissues (DEFRA, 2011). Associations between CO exposure and CAMC were investigated by 25 studies. Significant associations were reported by almost three-quarters of the studies (Andersen et al., 2007, Fusco et al., 2001, Giovannini et al., 2010, Halonen et al., 2008, Jalaludin et al., 2008, Lee et al., 2002, Lin et al., 2003, Medina et al., 1997, Neidell, 2004, Norris et al., 1999, Paliatsos et al., 2006, Peel et al., 2005, Pereira et al., 2010, Ponka, 1991, Strickland et al., 2010, Szyszkowicz, 2008, Thompson et al., 2001, Yeh et al., 2011).

Of these studies, one study found an association with children aged zero to four years old only (Paliatsos et al., 2006). One study found an association with CO exposure and CAMC in the warm season only (Strickland et al., 2010). Seven studies found no association connecting CO and CAMC (Abe et al., 2009, Barnett et al., 2005, Farhat et al., 2005, Lee et al., 2006a, Lin et al., 2004a, Moore et al., 2008, Xirasagar et al., 2006).

2.3.3.1.f. Lag Effects

From the studies that were included in this review, a number of studies report that the effects of pollutant exposure were not instant but take time to take effect. A lag effect is the time measured between the start of exposure and the event of interest. The evidence of lag or delayed effects (single or cumulative) were extracted where possible (not including studies that did not analyse lagged effects) and a mean was calculated (see Table 2.4).

Table 2.4. Lag effect from pollutant exposures, average between studies (days).

Author (Year)	Pollutants (single lags effects *=cumulative lag)				
	NO_2	SO_2	PM_{10}	**CO**	**O_3**
Giovannini et al (2010)	1	-	-	1	-
Lee et al (2010)	-	-	-	-	2
Nastos et al (2010)	-	-	4	-	-
Silverman et al (2010)	-	-	-	-	2
Chan et al (2009)	1	2	2	-	2
Yamazaki et al (2009)	-	0.5	-	-	0.5
Halonen et al (2008)	4	-	-	5	-
Lin et al (2008b)	-	-	-	-	2
Szyzkowicz et al (2008)	2	-	2	2	1
Andersen et al (2007)	-	-	1	-	-
Babin et al (2007)	-	-	-	-	4
Ko et al (2007)	4	-	2	-	2
Villenueve et al (2007)	1	-	-	-	-
Lee et al (2006a)	3	-	4	-	2
Peel et al (2005)	-	-	4	-	2
Lin et al (2004b)	-	3	-	-	-
Lin et al (2004a)	4 males	6 females	-	-	-
Lin M et al (2003)	4 males	6 females	-	-	2 males
Lee et al (2002)	2.5	2.5	1	2.5	1
Lin et al (2002a)	2.5	2.5	3	2.5	3
Fusco et al (2001)	1	-	-	1	-
Thompson et al (2001)	0.5	0.5	-	0.5	-
Tolbert et al (2000)	-	-	1	-	1
Wong et al (2001)	0	3	5	-	-
Fauroux et al (2000)	-	-	-	-	1
Chew et al (1999)	2	2	-	-	1
Norris et al (1999)	-	-	1	1	-
Anderson et al (1998)	3	3	-	-	2
Morgan et al (1998)	0	-	-	-	-
Medina et al (1997)	1.5	1.5	-	-	-
Ponka and Virtanen (1996)	-	-	-	-	0.25
Romieu et al (1995)	-	-	-	-	2
White et al (1994)	-	-	-	1	-
Bates et al (1990)	-	1	-	-	-
Mean	2.06	2.58	2.50	1.83	1.72

Table 2.4 documents the single day lag effects that studies have found for each pollutant (unless otherwise stated). Lag effects ranged from 0 to 6 days. For NO_2, lag effects were reported in 18 studies, the average of those lags was calculated at 2.06 days. For SO_2, lag effects were reported in 13 studies, the average lag was 2.58 days. For PM_{10}, lag effects were noted in 12 studies, with an average of 2.5 days. CO lag effects were noted in 9 studies with an average of 1.83 days. O_3 lags effects were noted in 19 studies with an average lag of 1.72 days. These means are only indicative as effects vary from study to study.

2.3.4. Literature Investigating the Spatial Characteristic of Exposures with Childhood Asthma

The strength of exposures can be subject to a person's location and proximity to pollutant's source. A number of studies incorporate the spatial aspect of exposures in time-series analysis. Referenced in sub-section 2.3.3, a number of studies found differences in pollutant-asthma associations according to spatial variation (Atkinson et al., 2001, Babin et al., 2008, Barnett et al., 2005, English et al., 1998, Erbas et al., 2005, Tolbert et al., 2000, Wilson et al., 2005). In contrast to examining the spatial differences between pollutant-asthma associations, four additional studies (referenced in 2.3.2) found a spatial difference (according to latitude) in the seasonal characteristic of asthma related medical contacts in children (Johnston et al., 2006, Julious et al., 2007, Lin et al., 2011).

2.3.4.1. Findings from the Literature

Three studies examined (repeated) hospital encounters in children with asthma in relation to residential proximity to traffic (Chang et al., 2009, Delfino et al., 2009, English et al., 1999). Chang et al found that children living within 300 metres of a major arterial road or freeway (equal to or more than 750 metres long) were at higher risk of repeated admission. Delfino et al found that the relationship was stronger for females and infants.

One study found that after adjusting for age and poverty levels, children hospitalised for asthma were more likely to live on roads with the highest tertile (upper third) of vehicle miles travelled (Lin et al., 2002b). Another study found that on average, paediatric asthma patients tended to live closer to major roadways than patients who did not have asthma (Newcomb and Li, 2008). Newcomb and Li found that three quarters of the patients with asthma lived within 1500 metres of a major roadway compared to a third of patients with non-asthmatic diagnoses.

Another US study found that Buffalo's east side had the highest percentage of children with asthma in comparison to other locations in New York: this location coincidentally had a high number of pollution sources (Oyana and Rivers, 2005). In association with the pollutant sources, compared to the westside of Buffalo, children were at higher risk of having a medical contact if they resided in the eastside.

Two US studies found small associations between exposure to high pollutant sources and risk of medical contact for asthma. One study found that the risk of asthma (identified via medical visits) was associated with residing near a grain mill, petroleum refinery, asphalt plant or power plant (Loyo-Berríos et al., 2007). Residence near a major air emission source (more than 100 tonnes per year) increased the risk of asthma by 1.08 percent. Another study found a local asthma cluster close to two of the top three contributors to pollution in the county (Meliker et al., 2001). After creating a model to predict risk of medical contact due to pollutant exposure (accounting for weather parameters, one model was constructed per day for 15 days), they identified a weak association (only 5 out of 15 models predicted above average asthma visits) between the pollutant levels from the two sources and asthma ED visits.

An Australian study used four methods to evaluate the association between road traffic exposure and emergency visits made by children with asthma (Pereira et al., 2009). Examining high against low traffic exposure, Pereira et al reported a twofold increased risk of medical contact due to asthma. Using length of road, distance to the nearest major road (carrying more than 15,000 vehicles) or a density weighted traffic method to measure exposure produced a decreased risk of medical contact for asthma. Another study investigated potential O_3-asthma relationships between 10 regions in New York State; only 1 of those regions exhibited higher risk of paediatric asthma medical contact associated with O_3 exposure (Pantea et al., 2008). One study found no association between the risk of hospital admission for asthma and proxy markers of road traffic pollution (Wilkinson et al., 1999).

2.3.5. Review of the Literature investigating Weather Associations with Childhood Asthma

This sub-section reports the findings from literature investigating the potential weather triggers of CAMC. Weather encapsulates a number of exposures and temperature, sunlight, rainfall, pressure, wind, and humidity were reviewed. Definitions of each weather type investigated were sourced from the Oxford English Dictionary (OED).

2.3.5.1. Findings from the Literature

Table 2.5 illustrates a summary of the findings from the review of the literature investigating weather exposures in association with CAMC.

Table 2.5: Associations found between Weather Exposures and CAMC.

Author	Is there an association between weather exposures and childhood asthma admissions? Yes+= positive association; Yes-= negative association; No=no association; - = not studied						
	Temperature	Humidity	Rainfall	Thunderstorm	Wind	Pressure	Other
Yeh et al (2011)	No	Yes-	Yes-	-	-	-	-
Mireku et al (2009)	diff=Yes+	Yes	-	-	-	No	-
Abe et al (2009)	No	No	No	-	-	No	-
Nastos et al (2008)	Yes-	Yes+	-	-	Yes-	-	-
Prospero et al (2008)	-	-	-	-	-	-	-
Babin et al (2007)	Yes+	-	-	-	-	-	-
Xiao-Mei et al (2009)	Yes	Yes-	-	-	No	Yes+	-
Mohr et al (2008)	Yes+	-	-	-	-	-	-
Pritis et al (2006)	No	Yes+	No	-	-	Yes+	-
Xirasagar et al (2006)	Yes-	Yes-	No	-	-	Yes+	Sunshine = Yes-
Gyan et al (2005)	diff=Yes+	Yes+	-	-	-	Yes-	-
Villenueve et al (2005)	No	No	Yes+	Yes+ in summer	No	No	Fog=Yes+, Snow=Yes-
Hashimoto et al (2004)	Yes+	Yes-	No	-	Yes-	Yes-	Sunshine= No
Dales et al (2003)	No	No	-	Yes+	-	-	-
Kashiwabara et al (2003)	Yes+ night	No	No	-	No	Yes+	Mist=Yes, Fog=Yes
Grech et al (2002)	-	Yes-	-	-	-	-	-
Kashiwabara et al (2002)	Yes+ night	No	No	-	No	No	Mist=Yes, Fog=Yes
Chavarria (2001)	No	Yes+	Yes+	-	-	-	-
Ivey et al (2001)	Yes+	No	No	-	Yes+	No	-
Wong et al (2001)	No	No	-	-	-	No	-
Ehara et al (2000)	diff=Yes+	Yes+	No	No	-	Yes+	-
Garty et al (1998)	Yes-	No	-	-	-	Yes+	-
Newson et al (1998)	-	No	Yes+	Yes+	No	No	-
Palusci et al (1998)	No	No	No		No	Yes+	-
Rosas et al (1998)	Yes-						-
Higham et al (1997)	-	-	-	Yes	-	-	-
Newson et al (1997)	-	-	-	Yes+	-	-	-
Ponka and Virtanen (1996)	Yes+	No	-	-	-	-	-
Beer et al (1991)	Yes+	-	-	-	-	-	-
Khot et al (1988)	No	No	Yes				
Newell and Swafford (1963)	-	-	-	-	No	-	-

2.3.5.1.a. Temperature

Temperature is the measurement (in degrees centigrade or Fahrenheit) of how hot or cold a place or object is (OED, 2010f). The difference between hot and cold days can affect human health (Met Office, 2011b). Cold air (temperature) has been associated with the onset of asthma attacks (NHS, 2010). Results from a survey revealed that 75 percent of asthmatics believed that cold air triggered their asthma symptoms (National Asthma Panel study (ICAUK, 2009)).

Six studies found a positive association between temperature and asthma hospital contacts (Babin et al., 2008, Beer et al., 1991, Hashimoto et al., 2004, Ivey et al., 2001, Mohr et al., 2008, Ponka and Virtanen, 1996). Two studies found positive associations with temperature and childhood asthma admissions during the night (Kashiwabara et al., 2002, Kashiwabara et al., 2003). Another five studies found negative associations between temperature and asthma hospitalisations in children deducing that the colder the temperature the higher the number of CAMC (Garty et al., 1998, Nastos, 2008, Rosas et al., 1998, Xiao Mei et al., 2009, Xirasagar et al., 2006). Three studies found that daily temperature difference was associated with CAMC (Ehara et al., 2000, Gyan et al., 2005, Mireku et al., 2009).

In contrast, nine studies found no association between temperature and CAMC (Abe et al., 2009, Chavarria, 2001, Dales et al., 2003, Khot et al., 1988, Palusci et al., 1998, Priftis et al., 2006, Villeneuve et al., 2005, Wong et al., 2001, Yeh et al., 2011).

2.3.5.1.b. Wind

Wind is the movement of air; wind direction refers to the current blowing in a particular direction (OED, 2010h). Wind has an important role in the movement of respirable particles (PM, pollen, aeroallergens) from one location to another. There was a mixed array of findings from studies investigating wind associations with CAMC. On one hand, two studies found a positive association between wind speed and children's asthma admissions (Ivey et al., 2001, Nastos, 2008).

On the other hand, one study found that the number of CAMC increased in association with lower wind speeds in Japan (Hashimoto et al., 2004). Seven studies found no association between wind exposure and CAMC (Kashiwabara et al., 2002, Kashiwabara et al., 2003, Khot et al., 1988, Newson et al., 1998, Newell and Swafford, 1963, Palusci et al., 1998, Villeneuve et al., 2005). One study found no relation between African dust carried by the Atlantic trade winds to Trinidad and Tobago and paediatric asthma medical contacts (Prospero et al., 2008).

2.3.5.1.c. Pressure

Air/Atmospheric pressure is “the force per unit area exerted by the weight of the atmosphere above an object/surface or above the earth's surface” (OED, 2010c). Sixteen studies investigated associations between pressure and CAMC. Six studies reported that higher air pressure was associated with CAMC (Ehara et al., 2000, Garty et al., 1998, Kashiwabara et al., 2003, Priftis et al., 2006, Xiao Mei et al., 2009, Xirasagar et al., 2006).

One study found a change in barometric pressure was independently associated with paediatric asthma ED visits (Palusci et al., 1998). In contrast, two studies found that the number of CAMC increased when barometric pressure rapidly decreased (Hashimoto et al., 2004, Gyan et al., 2005). Seven studies found no association between atmospheric pressure and CAMC (Abe et al., 2009, Ivey et al., 2001, Kashiwabara et al., 2002, Mireku et al., 2009, Newson et al., 1998, Villeneuve et al., 2005, Wong et al., 2001).

2.3.5.1.d. Rainfall

Rainfall refers to the quantity of rain within a given area at a specific time (OED, 2010d). Rainfall is caused by the condensation of water in air that has been lifted and cooled (MetOffice.co.uk [Accessed 28th April 2009]). Perhaps the most referenced rainfall related weather event in the literature in association with asthma related outcomes is thunderstorms. Thunderstorms are described as:

“a local storm produced by a cumulonimbus (towering vertical) cloud, and always accompanied by thunder and lightning.” (National Weather Service [Accessed Online 29/09/2011]).

Seasonally, thunderstorms tend to occur in the summer when convection caused by heating of the earth’s surface causes shower clouds to form and large amounts of rainfall can occur in showers or in more extreme cases, thunderstorms (Met Office, 2010). There were a number of studies investigating the role of thunderstorms or rainfall in relation to CAMC.

One study found a strong association between rainfall and CAMC (Khot et al., 1988). Another study speculated that thunderstorms may have an effect on asthma exacerbations resulting in the use of out of hours services (Higham et al., 1997). An additional study found that on days with thunderstorms, daily childhood asthma admission rates increased from 8.6 to 10 ($P<0.05$) compared to days without thunderstorms (Dales et al., 2003).

Another UK study found that on days with extremely high counts of CAMC the mean density of lightning flashes and rainfall was greater than those on control days (Newson et al., 1998). Simultaneously, lightning flashes and grass pollen further increased the probability of an asthma epidemic more than was expected by chance alone. However, the majority of the asthma epidemics between 1987 and 1994 did not follow a thunderstorm event. This suggests that other factors were involved in triggering asthma epidemics. The findings mirrored a previous study conducted by the same authors (Newson et al., 1997).

One study found the mean number of asthmatic ED visits was higher on nights that were misty or foggy in comparison to nights that were clear (Kashiwabara et al., 2002). The odds ratio of an ED visit from asthmatic children on a foggy or misty night was calculated at 1.74. The authors suggested that mist and fog hold airborne droplets that could possibly exacerbate asthmatic symptoms. The findings were replicated in a later study conducted by the same authors (Kashiwabara et al., 2003). These two studies did not find associations with actual rainfall and CAMC. Another study suggested that the presence of fog and liquid precipitation was associated with increased asthma ED visits (Villeneuve et al., 2005). One study found a negative association between rainfall and CAMC (Yeh et al., 2011).

Overall, nine studies found no association between rainfall and CAMC (Abe et al., 2009, Ehara et al., 2000, Hashimoto et al., 2004, Ivey et al., 2001, Kashiwabara et al., 2002, Kashiwabara et al., 2003, Palusci et al., 1998, Priftis et al., 2006, Xirasagar et al., 2006).

2.3.5.1.e. Humidity

Humidity refers to the amount of water vapour present in the atmosphere (OED, 2010a). Relative humidity refers to the amount of water vapour present in the air; this is expressed as a percentage of the amount needed for saturation at the same temperature (OED, 2010). A mixed set of findings were extracted from the studies that observed humidity-CAMC associations. Four studies found that increased rates of ED visits were associated with a drop in humidity (Hashimoto et al., 2004, Xiao Mei et al., 2009, Xirasagar et al., 2006, Yeh et al., 2011). In contrast, five studies found that relative humidity positively correlated with CAMC (Chavarria, 2001, Ehara et al., 2000, Gyan et al., 2005, Nastos, 2008, Priftis et al., 2006). One study reported fluctuations in humidity one to two days before appeared to influence CAMC (Mireku et al., 2009). On the other hand, 12 studies found no association between CAMC and humidity (Abe et al., 2009, Dales et al., 2003, Garty et al., 1998, Ivey et al., 2001, Kashiwabara et al., 2002, Kashiwabara et al., 2003, Khot et al., 1988, Newson et al., 1998, Palusci et al., 1998, Ponka and Virtanen, 1996, Villeneuve et al., 2005, Wong et al., 2001).

2.3.5.1.f. Sunshine

Sunlight at its most basic description is the light from the sun (OED, 2010e). In the UK, the shortest days with the least amount of sunlight occur in December and the longest day with the highest amount of sunlight occurs in June (Met Office, 2011a). Sunlight as an "exposure" has not been researched widely in association with CAMC. One study found a negative association between hours of sunlight and school-age asthma admissions

(Xirasagar et al., 2006). However, another study found no association between sun exposure and asthma admissions in children (Hashimoto et al., 2004). Sunlight may act as an indirect factor influencing the production of other exposures that may trigger asthma such as O_3 or pollen.

2.3.5.1.g. Lag Effects

Lag effects were reported in three studies: one study reported an association between humidity after a one to two day delay and CAMC (Mireku et al., 2009). Another study documented a one day lag for temperature, humidity, and pressure and CAMC (Dales et al., 2003). The third study detected that one day prior to a peak in childhood asthma admission rates, relative humidity was lower and temperature difference (between minimum and maximum measures of temperature) was wider than compared to days preceding no asthma admissions (Ehara et al., 2000).

2.3.6. Review of the Literature investigating Pollen Associations with Childhood Asthma

This sub-section reports the findings from studies investigating another potential trigger of asthma exacerbation, exposure to pollen. As part of a survey conducted by the National Asthma Panel, 79 percent of asthmatics thought that pollen triggered their asthma symptoms. This sub-section summarises the evidence for and against the association between pollen exposures and childhood asthma exacerbation resulting in medical contact.

2.3.6.1. Findings from the Literature

Only 11 studies were identified investigating the association between pollen and CAMC. The majority of the studies found a positive relationship between pollen exposure and CAMC.

In Canada and the US, positive associations were found between grass exposure and asthma after a three-day lag and that the effect of grass pollen was stronger in readmissions in contrast to the initial visits (Héguy et al., 2008). One study found weak associations between weed pollen exposure and ED visits resulting after a two-day lag. Another study found that weed pollen was the only significant predictor of children's asthma hospital admissions during the autumn (Im and Schneider, 2005). Three additional studies found that grass; ragweed, oak/maple and pineceae pollen had a significant association with CAMC (Babin et al., 2007, Lierl and Hornung, 2003, Zhong et al., 2006).

A Mexican study examined the relationship between environmental factors and asthma ED admissions (analysing adults and children separately) (Rosas et al., 1998). Mexico experiences a different set of climate conditions in comparison to the UK: Mexico experiences a wet season between May and October and a dry season between November and April. In children, the authors found that grass pollen was associated with ED admissions in both wet and dry seasons.

In the UK, two studies (already referenced in 2.3.5) found that elevated pollen counts after thunderstorms amplified the "thunderstorm effect" on asthma (Newson et al., 1997, Newson et al., 1998). Another UK study found a positive and negative effect with birch and grass pollen (respectively) in relation to childhood asthma admissions (Anderson et al., 1998). Two studies did not find an association between pollen exposure and asthma exacerbations resulting in medical contacts in children (Garty et al., 1998, Khot et al., 1988).

2.3.6.1.a. Lag Effects

The lag effects from pollen exposure were documented in the seven studies included in the review. Lags from each pollen type were collated where possible and an average was calculated.

Table 2.6: Lag effect from pollen exposures, average between studies (days).

Author, Year	**Pollen Type**				
	Grass	**Birch**	**Oak**	**Ragweed**	**Pine**
Anderson et al (1998)	0	0	-	-	-
Babin et al (2007)	3	-	-	-	2
Heguy et al (2008)	3	-	-	2	-
Im and Schneider (2005)	-	-	-	3	-
Khot et al (1988)	-	-	-	-	-
Lierl and Hornung (2003)	3	3	-	-	-
Zhong et al (2006)	-	-	3	-	5
Mean	2.25	1.5	3	2.5	3.5

The average lag provides an idea as to how long pollen exposure takes to have an effect on CAMC across different settings. For grass pollen, lag effects varied from zero to three days in four of the seven studies with an average of 2.25 (Table 2.6). Oak pollen lag effects were reported by a single study. Birch pollen lag effects were reported by two studies with an average lag of 1.5 days. Ragweed pollen lag effects were investigated by two studies with an average of a two and half day lag. Pine pollen lag effects were reported by two studies with an average lag of 3.5 days.

2.3.7. Interactive effects: a consideration when investigating Environmental Associations

When considering the cause and effect relationship between environmental exposures and asthma exacerbation, it is often the case that X cannot cause or be related to Y without A, B and C e.g. other factors thus the effect of an exposure is often confounded by another exposure. For example, O_3 exposure cannot be related asthma exacerbation without the presence of other factors such as sunlight (this is influenced by the time of year, amount of hours of sunshine, cloudiness, and geographical position), NO_2 (influenced largely by how much humans emit mainly via the use of road transport and industry) and hydrocarbons. Proximity to exposures and the amount an individual is exposed to are also factors that affect the likelihood of exacerbation and medical contact.

A number of studies included in the review have documented the interactive and/or additive effects between environmental exposures and childhood asthma. Interactive effects occur when the effects from one predictor variable on an outcome is dependent on another predictor variable (Bland, 2000). Within this investigation's analyses, interactive effects between environmental exposures in relation to daily counts of medical contact were not investigated. However, to highlight an awareness of the potential interactions between exposures, examples from studies reporting an interactive, additive, or confounding effect from environmental exposures on childhood asthma exacerbation are reported.

Commenting on examples of pollutant interactions and the combined effect on childhood asthma, one study found smaller effects from two-pollutant models compared to those derived from single pollutant models suggesting interactive effects between pollutants (Jalaludin et al., 2008). In the two-pollutant analysis, for 5 to 9 year olds, the PM effect reduced when O_3 or CO measures were added to the model. In 10 to 14 year olds, the PM effect reduced when CO measures was added to the model. Another study observed no effect from SO_2 on childhood asthma admissions with addition of other pollutants (CO and PM_{10}) or temperature (Sunyer et al., 2003). Sunyer et al noted that this may be due to the high correlation between pollutant measures.

Examining weather exposure interactions and the combined effect on childhood asthma, perhaps the most notable interaction between weather exposures occurs in the event of a thunderstorm. The effects of thunderstorms are noted in sub-section 2.3.6.

Several studies found pollutant-asthma associations within sections of the year defined by seasonal attributes such as warm, cool/wet, or dry seasons. Examining interactions between pollution and weather exposures, one study found interactions between elemental carbon ($PM_{2.5}$) and temperature for children aged 11 to 17 in the summer and winter seasons (Mohr et al., 2008). During the summer, an increase of 0.10 mgm^3 of elemental carbon resulted in a 9.5 percent increase in asthma ED visits and risk increased as temperature increased. However, during the winter, a decrease of 0.10 mgm^3 of elemental carbon resulted in a 2.8 percent increase in asthma admissions thus the risk increased with decreasing temperatures. Therefore, there appeared to be a u-shaped relationship: daily number of asthma ED visits were associated with increased levels of elemental carbon at higher temperatures in the summer and decreased carbon levels with lower temperatures in the winter.

Climate change is producing warmer, more humid climates which incidentally affects pollen production (D'Amato et al., 2005). Due to these changes in climate, exposure to pollen has increased with longer pollen seasons (Beggs, 2004). Wind transported pollen is the main cause of hay fever exacerbation and potentially asthma (NPARU, 2008). Pollen seasons are lengthening (Beggs, 2004). No published studies were found examining climate change and its role in pollen production in association with CAMC.

Of the studies referenced in the literature review, few reported an interaction or confounding effect between pollution and pollen exposures. One study also found an interaction between high PM_{10} levels and pollen count; these exposures combined were predictors of asthma exacerbations in children (Lierl and Hornung, 2003). Another study found evidence that an interaction between SO_2 and pollen had an effect on asthma admissions in children (Anderson et al., 1998).

Combining the three groups of exposure (pollution, pollen and weather), an Israeli study found when excluding September's variables (excluded because other factors that are present within September may manipulate results for instance, school return and the Jewish holidays), 61 percent of the variance in ED visits was explained by NO_x, SO_2 and O_3 concentrations (Garty et al., 1998). Weather parameters explained 46 percent of the variance and 66 percent of the variance in ED visits was explained by the relationship between NO_x, SO_2, and barometric pressure. The addition of September's variables weakened the effects of these groups of parameters. Garty et al noted that the effects from air pollutants were stronger than that of weather exposures.

Another study examined the relationship between asthma ED visits and environmental factors (aeroallergens, pollution and weather) (Rosas et al., 1998). They observed that grass pollen was significantly associated with asthma admissions in children during both wet (May to October) and dry seasons but pollen had a stronger effect in the dry season. For children, the most appropriate model that explained asthma admissions included grass, maximum temperature and rainfall measures from the wet season: this explained approximately 35 percent of the deviance. Rosas et al found no support to suggest that pollutant exposure induced asthma exacerbation and concluded that aeroallergens such as spores and pollen had significant roles in exacerbating asthma in children.

In addition to the associations found between pollutant, pollen and weather associations, other combinations of exposures were found to have an effect on CAMC. For example, Dales et al assessed the relationship between thunderstorms, air pollutants, aeroallergens and asthma admissions in children over a six year period (Dales et al., 2003). On thunderstorm days, pollen and air pollutant concentrations remained relatively the same in comparison to non-thunderstorm days but fungal spore concentrations doubled and irrespective of the presence of thunderstorms, fungal spores were associated with a 2.2 percent increase in asthma admissions. Another study also found an association between fungal spore counts and childhood asthma admissions (Khot et al., 1988). However, an additional study found no association between fungal spore concentrations and paediatric asthma visits (Lierl and Hornung, 2003).

School return is one of the main facilitators of the characteristic seasonal pattern of childhood asthma resulting in medical contact. Strachan (2000) argued that the seasonal characteristic of asthma exacerbations was more strongly related to the school holidays than the seasonal variations in aeroallergens and air quality exposure. One study found that environmental factors and ED visits decreased significantly when the September's measurements (when school return is scheduled in Israel) were included (Garty et al., 1998). This suggests that the effect of school return diminishes the effects from environmental exposures.

2.4. Discussion of the Literature

2.4.1. Summary of the Studies' Characteristics

2.4.1.1. Type of Study

It would be unethical (and impractical) to randomise individuals to exposures that were thought to be potentially harmful. Consequently, all the studies included in this review examining the possible triggers of asthma exacerbation were observational. The majority of the studies used retrospective cohort, case-control or ecological designs. No randomised control trials were included in the literature review. Approximately one-seventh (19/117) of the studies that investigate pollution, pollen, weather, or spatial relationships with CAMC included used a comparison group in their design. This design was often used with studies observing spatial associations between pollutant exposure and childhood asthma. A number of studies used case-crossover designs (for example, Barnett et al (2005); Lin et al (2003)).

2.4.1.2. Locations

Studies were set in a worldwide array of locations. A large proportion of the studies were set in the US (approximately 50), particularly studies investigating pollutant exposures. Other frequently mentioned study settings include Canada (13) and the UK (10). Studies were also set in Taiwan, Australia, and Greece.

2.4.1.3. Sample Size

Sample size of the actual number of participants was rarely referenced in the studies. Instead, the number of hospital contacts over a period was reported. The number of medical contacts obtained in the studies ranged from as low as 110 visits obtained over 1 year (Giovannini et al., 2010) to as high as 532,826 admissions across an 11 year period (Silverman et al., 2003).

2.4.1.4. Age of Sample

Overall, from the studies included in the review, age ranged from 0 to 21 years. Studies such as Im and Schiender (2005), Meliker et al (2001) and Tolbert et al (2000) included children aged from 0 to 16 years. Strickland et al (2010) and Chang et al (2009) included children aged 5 to 18 years.

Several studies observed associations with smaller age groups, for example, Jalaludin et al (2008) separated children into age groups 1 to 4, 5 to 9, and 10 to 14. Often, studies removed very young children less than 12 months of age (such as Mireku et al (2009)) or investigated the environmental association with children less than 1 or 2 years of age as a separate group (such as Grech et al (2002)) as it is notoriously difficult to accurately diagnose asthma in this age group (Portnoy, 2002).

2.4.1.5. Sub-Periods of the Year

Several studies analysed the environmental association using data split into sections of the year as opposed to the whole year's data. Often these sections were defined by weather/climate conditions for example, warm and cool season or dry and wet season. For instance, Strickland et al (2010) analysed the warm season (May to October) and cold season's data separately. Yamazaki et al (2009), Samoli et al (2011) and Wilson et al (2005) also analysed data from different seasons separately and found differences in association between seasons.

2.4.1.6. Analysing the relationship between environmental exposures and childhood asthma

Chavarria et al (2001) and Khot et al (1988) also used simple bivariate analyses to assess a relationship between exposures and the number of medical contacts. Garty et al (1998), Im and Scheinder (2005) and Tseng et al (1992) used correlations as a preliminary test prior to more advanced statistical techniques.

Autoregressive techniques were often used to analyse the environment-asthma relationship. One project that utilised autoregressive techniques based on a Poisson distribution to investigate the effect of air pollution on health was the "Air Pollution and Health: a European Approach" (otherwise known as APHEA) project. The AHPEA project was set up in 1991 (Katsouyanni et al., 1996). This project aimed to use a standardised methodology to investigate the short terms effect of air pollution on several health conditions across 15 cities (including London, Barcelona, Paris, Helsinki, and Krakow) in Europe (Katsouyanni et al., 1996). As a result of the findings from this project, there were several publications including Sunyer et al (2003), Anderson et al (1998), Atkinson et al (2001) and Ponka and Virtanen (1996). Other studies that used Poisson autoregressive methods include Ko et al (2007), and Thompson et al (2001). Studies that used Normal autoregressive methods include Chew et al (1998) and Crighton et al (2001).

A number of studies report the use of other methods to analyse the environmental-asthma association. Paliatsos et al (2006) and Priftis et al (2006) used stepwise multiple regressions whereby predictors were added or subtracted one by one and remain in the model on the basis that they made a significant contribution. A well-known technique implemented to analyse count data include Poisson and negative binomial regressions. Babin et al (2007) used Poisson regression analysis. Magas et al (2007) implemented negative-binomial regression analyses. Generalised Additive Modelling (GAM) was also referenced as a statistical method in literature and the prevalence of its use has increased over the last few years (Touloumi et al., 2006). GAM models data with both linear and additive properties. Its use was cited in the following studies, Mireku et al (2009), Lincoln et al (2006) and Erbas et al (2005).

2.4.1.7. Covariates

A number of studies included several additional covariates to account for effects not attributed to the independent exposure. For example, Strickland et al (2010), Pereira et al (2009) and Morgan et al (1998) included days of the week as a covariate in their models. Another variation of the day of the week effect is the weekday weekend effect, this was utilised as a covariate by Loyo-Berrios et al (2007). In addition, Hirshon et al (2008), Medina et al (1996) and Sunyer et al (2003) accounted for bank holiday within their analyses.

Further confounding factors that were controlled for in studies include school holidays (Andersen et al., 2007), influenza epidemics (Lee et al., 2006b, Sunyer et al., 2003) and month of the year (Jalaludin et al., 2008, Strickland et al., 2010). Weather and/or pollen variables were also added as covariates. Temperature and humidity were frequently referenced as covariates in studies investigating pollutant associations (for example, Abe et al (2009), Barnett et al (2005), Giovainnini et al (2010), Villeneuve et al (2007), Wilson et al (2005)). Without observing the actual effects from temperature and humidity on pollutant exposures, the heavy usage of temperature and humidity as covariates implies that these two variables modify the association between pollutant exposures and CAMC.

2.4.1.8. Differences in Results

Examining the literature investigating pollutant or weather associations revealed mixed results. Evidence for and against the association between the exposures and CAMC may be the result of the variations in sample size or the number of medical contacts, length of time that data were collected and geographical location. The average sample size, average number of years that data were collected, and most referenced location were compared with studies that found an association and studies that found no association between pollutants or weather exposures and CAMC.

Table 2.7: Characteristics of studies that found an association and studies that found no association between exposures and medical contacts.

Exposure	Yes or no association	Number of studies	Average number of contacts	Average period data were collected (years)	Most referenced country (number of studies)
NO_2	Yes	36	81088.50	5.69	Canada (5)
	No	14	34150.00	4.03	US (3)
SO_2	Yes	24	63090.21	4.59	Canada (4)
	No	15	12461.83	4.52	US (3)
PM_{10}	Yes	26	46654.60	4.11	Taiwan, US (4)
	No	10	7391.83	5.67	Australia (3)
O_3	Yes	34	63290.00	5.45	US (13)
	No	21	31437.79	3.55	US, Canada, Australia (3)
CO	Yes	18	36914.31	6.29	US (4)
	No	7	7296.20	5.86	Different countries (1)
Temperature	Yes	17	5545.25	3.76	Japan (4)
	No	9	9040.29	5.92	Canada (2)
Rainfall	Yes	6	9710.33	5.03	UK, Canada (2)
	No	9	8872.89	4.80	Japan (5)
Pressure	Yes	9	7815.44	5.13	Japan (3)
	No	7	9880.17	3.14	Japan (2)
Wind speed	Yes	3	8858.50	9.33	Different countries (1)
	No	7	3856.00	4.07	Japan, US (2)

It was hypothesised that more consistent findings result from studies that have larger sample size (or higher numbers of medical contacts) collected over a larger span of time (provided environmental exposures remain constant) from the same countries. There was some evidence that with a number of exposures, studies with larger samples collected over a longer period of time yielded results that were more consistent. With the exposures SO_2, NO_2, O_3, CO, rainfall, and wind speed, compared to studies that found no association, studies that found an association had on average, higher numbers of medical contacts collected over a longer span of time.

There was also evidence contradicting our hypothesis. With PM_{10}, compared to studies that found no association, on average, studies that found an association had higher numbers of medical contacts collected over a shorter span of time. With temperature, studies that found an association had on average lower numbers of medical contacts collected over a shorter span of time. The most referenced locations with studies that investigated pollutant-asthma associations include the US and Canada. The most referenced location with studies that investigated weather-asthma associations was Japan. No country was referenced more often amongst studies reporting an association or no association.

2.4.1.9. Spatial Investigation investigating Association

Logistic regressions were often used in spatial analysis to assess the risk of medical contact due to pollutant exposure (for example, Lin et al., (2002a), Newcomb and Li (2008)). Pereira et al (2009) used logistic regression to calculate the risk of ED presentation relative to traffic related exposures. Chang et al (2009) conducted a “Recurrent event proportional hazard analysis” to calculate the risk of readmission due to traffic related exposures.

2.4.2. Summary of the Literature Findings

The findings from the review give evidence for and against an association between environmental exposures and CAMC.

Sub-sections 2.3.3 and 2.3.5 provided evidence for and against the association between pollutant or weather exposures and childhood asthma exacerbation resulting in medical contact. Approximately half the studies found associations with pollutant exposures in relation to CAMC. Overall, relatively few studies investigate the association between pollen exposure and CAMC. Of the studies that examine pollen as an exposure, the majority advocate an association.

The disparity in the reported associations could be attributed to geographical differences or differences in the sample size. With a number of the pollutant exposures (SO_2, NO_2, O_3, CO), and weather exposures (wind speed and rainfall), compared to studies that found no association, studies that found an association had on average, higher numbers of medical contacts collected over a longer span of time.

The daily/weekly/monthly numbers of CAMC exhibit a seasonal characteristic. This may be to some extent influenced by environmental exposures but stronger evidence suggests that the seasonal characteristic is more likely the result of events relating to the school calendar.

Examining findings of studies investigating the "school" associated effects on childhood asthma, there is a relationship between school return and an increase in the number of medical contacts made by children with asthma. School return does not cause the increase in medical contacts for childhood asthma it facilitates the increase. The most viable (and most quoted) explanation for the relationship between school return and childhood asthma exacerbation is that school provides a setting for children to socialise with other children thus viruses have the opportunity to spread (Johnston et al., 1996). It is hypothesized that children tend not to take any medication through the summer holidays as they experience less symptoms: this indirectly amplifies the "school return" effect. The event of school return is also a time that children may foresee as stressful. All these factors have a combined effect on asthma exacerbation.

The associations between exposures that have been described in the review potentially cover an overwhelming number of mechanisms involved in the exacerbation of childhood asthma. Yet, many more factors are involved, including how we have used and continue to use resources that induce climate change, which in turn affects weather patterns which in turn affects pollen productivity. We are experiencing warmer climates, more rain, and longer pollen seasons that increases may pollen allergenicity. This has rippling effects on asthmatic individuals where potentially increasing exposures may trigger asthma exacerbation. Further research is required (not within the realms of this thesis) to untangle how these environmental triggers collaborate to exacerbate asthma.

Table 2.8 demonstrates the factors that may influence the seasonal trend in asthma exacerbation in childhood in the UK.

Table 2.8: Year Round Triggers of Childhood Asthma Exacerbation resulting in Medical Contact.

Month	Exposure description
January	Children return to school after Christmas holidays. Pollen season starts (NPARU, 2008) – pollen types; Hazel and Yew, not predominantly strong triggers for asthma or hay fever. In general, the UK experiences its lowest temperatures in January.
February	
March	Spring begins. Temperatures increase.
April	Easter holidays are normally scheduled at the end of March/April time. Pollen season starts to get into full swing.
May	The UK typically exhibits the least amount of rainfall in May according to the Met Office based on patterns from 1971 to 2000.
June	Summer: 21st of June = longest day of the year. High levels of O_3 mainly in rural locations.
July	The school year ends. Temperature is high in comparison to all year average. Still sunny, hot weather stimulates the process of summer smog. Weather conditions trap pollution especially in central England.
August	School holidays, children interact with less people. In general, there are fewer asthma exacerbations. Asthmatic children tend to reduce their medication.
September	Autumn begins. Children return to school and this begins the mix of viral infection; introduction to new allergens as result of mixing with other children. Pollen season trails off. CAMC start to increase.
October	Number of children's asthma related medical contacts to hospital and GP (in the UK) increase
November	Bonfire night on the 5th of November; the event is a potential source of exposure to higher levels of PM_{10}. The number of CAMC starts to plateau.
December	Winter: Cold temperatures set in, possibly triggering asthma exacerbation in children. Based on the averages from 1971 to 2000, the Met Office reported that the UK exhibits the most amounts of rainfall and number of days with rainfall of more than one millimetre in December. Shortest day is in December thus the shortest amount of sunshine inhibits O_3 production. Higher use of heating systems due to the cold weather induces higher pollution levels. Christmas holidays begin.

2.4.3. Weaknesses of the Literature

More than 150 studies have been included in five reviews. These reviews provide evidence of the possible relationships between environmental exposures and CAMC. However, there remains a number of unanswered questions and weaknesses within the literature that should be noted.

Although a substantial amount of research reported pollutant associations with medical contacts made by children with asthma, there were also studies that report no association. Overall, the numbers of studies that reported associations did not outweigh the number of studies that reported no association.

It is debatable whether weather exposures have a direct association with asthma exacerbation. This question arises because there was no consensus that these exposures were positively associated, negatively associated or not associated with CAMC. Some studies conjectured that weather conditions have intermediary role towards influencing the strengths and placement of the direct triggers of asthma such as pollen and pollutants.

There were very few lag effects reported for weather exposures and asthma exacerbation in children.

Varied results for the association between environmental associations with childhood asthma possibly reflect each study's geographical and climate differences. Even within the same country, results were inconsistent. In Greece, one study found a negative association between temperature and CAMC (Nastos, 2008) whilst another study found no association (Priftis et al., 2006). This highlights a disparity in results that requires further clarification.

There was little evidence to suggest that air pollution has risen in parallel with the increased asthma prevalence in the past decades (Seaton et al., 1994). In addition to the overall trend, the seasonal characteristics of asthmatic symptoms do not run parallel with the seasonal patterns of air pollution. Seaton et al pointed out that though there has been an increase in asthma rates in the UK, there has not been a rise in the level of pollutant exposures since the 1950s. Thus, the strength of pollutant exposures has not increased and the chances of experiencing exacerbation due to inhaling pollutant particles are potentially the same in comparison to 50 years ago. It is more difficult to suggest that air pollution is a factor in exacerbation if levels of air pollution have not increased to mirror the rise in asthma prevalence rates. Yet, if pollutant exposures are to blame for the rise in the asthma prevalence then the reason may be as Seaton et al suggested, individuals have become more susceptible to the environmental surroundings.

UK air quality has drastically improved since the 1950s (DEFRA, 2007). Levels of smog and SO_2 have fallen due to the reduction of coal burning in UK cities. DEFRA notes that O_3 is primarily a rural pollutant and found limited evidence to suggest that O_3 levels had changed in urban areas. Yet, asthma rates are higher in urban compared to rural areas. In opposition to the pollution-asthma relationship, one study investigated allergic conditions in schoolchildren and compared findings from Leipzig (considered heavily polluted) and Munich (less polluted) (Von Mutius et al., 1994). The authors found that hay fever prevalence was higher in Munich but the asthma prevalence and other allergic conditions were not distinctly different between the two German cities. If there is a pollutant-asthma relationship, a potential explanation may be that the rise in pollution levels prior to the 1950s has had a delayed and accumulated effect on persons with asthma.

Arguably, the seasonality of asthma is more the result of a manufactured process rather than of natural influences. As Khot and Burn state, the two troughs for childhood admission rates in April and August consistently happen when the school holidays occur. It seems apparent that the school calendar strongly influences the pattern of CAMC (Khot and Burn, 1984). However, one study reported that though there was a peak in medical contacts after school return in Aberdeen (school return scheduled two weeks earlier than England) and Sheffield, the magnitude of the peak was larger for Sheffield inferring that there may be other non-school related factors that have an effect on asthma (Julious et al., 2007). Further investigation is necessary to investigate the causes of the seasonality of childhood asthma exacerbation in children.

Though the reviews included studies that investigated the environmental effects on children aged 0 to 16, the results for children under 5 were not comparable to this thesis' sample of interest, children of school-age between 5 and 16 years. A number of studies found pollutant associations with children younger than five years of age (Jalaludin et al., 2008, Paliatsos et al., 2006). These studies often found non-significant results in children aged five and above thus conjecturing that particular exposures had no effect on asthmatic children above the age of five.

A lack of variation in the medical contacts and particularly, a lack of the use of primary care data were observed in the studies included in the review. Four studies investigated GP or other types of medical contact to define asthma. One study used "out of hour" GP contacts to define asthma (Higham et al., 1997). Two additional studies used GP related contacts (Fleming et al., 2000a, Medina et al., 1997). Yamazaki et al (2009) used data from a primary care clinic. A further two studies used billing claims for treatment to measure the number of asthmatics (Morris et al., 1997, Van Dole et al., 2009).

No studies observed the effect or association with environmental exposures on both primary and secondary care contacts. The majority of the studies used medical records from hospitals to supply the data for analysis. The disadvantage with using such data is that it only captures a certain type of asthmatic patient (Maantay, 2007). In general, these cases correspond with the most severe cases of asthma. Further research should utilise other sources of data such as primary care information to define asthma.

Geographical location is an important determinant of the environmental composition of exposures. To an extent, the generalisation of findings is often constrained by the location and the environment where the study was set. Theoretically, findings from a study set in Asia may not be applicable to the UK due to differences in environmental composition. Literature examining the environmental triggers of childhood asthma resulting in medical contact in the UK was somewhat limited. Eighteen studies included in the review were set in the UK (two of the studies examine both weather and pollen exposures). Only four UK studies investigated the seasonal pattern in CAMC; six investigated pollutant exposures and CAMC; four investigated weather exposures; four studied the effects of pollen; one study investigated the spatial relationship between pollutant exposures and childhood asthma; three explored the role of school in reference to childhood asthma exacerbation. Although new research may re-iterate what has already been found in studies set in other countries, it would be beneficial to conduct further research to study the association of environmental exposures and CAMC in a UK setting.

The majority of the studies included in the review did not use comparison cohorts to compare findings. Approximately one-seventh of studies that investigate pollution, pollen, weather and spatial associations used a control/comparison group within their investigations. Only one study that used a comparison group was based in the UK (Wilkinson et al., 1999). Almost half of the studies that used a comparison group investigated the spatial relationship between environmental exposures and medical contact. Comparison groups were often defined as the remaining number of visits that were non-asthma or non-respiratory related and were often not matched by certain factors that may influence the differences in effect between the asthma and non-asthma cohort. One paper pointed out that, seasonal patterns as a result of weather or pollutant exposures have a potential effect on children with non-respiratory illnesses (Buchdahl, 2000). Therefore is it possible to suggest that environmental exposures may have an effect on the number of medical contacts made by non-asthmatic children. Hence, the use of comparison cohorts is necessary to evaluate whether seasonal patterns or environmental effects on CAMC are in excess of the effects experienced by non-asthmatic children.

Lag effects were observed in less than half the studies investigating pollutant, weather, pollen, and/or school associations with childhood asthma resulting in medical contact. Of the studies that reported a lag or delayed effect, two were set in the UK. Further research can be conducted to investigate the lag effects of environmental exposures in the UK.

2.4.4. Strengths and Limitations of the Method of Review

The objective of the report was to explore existing literature investigating the environmental triggers of asthma resulting in medical contact. One advantage of this review was the scope of literature used. Another advantage is the search strategies were consistent across the databases though not consistent across the topics investigated. For example, “school” was scoped for in the title of the articles only. The reason behind searching for key terms within the title was to reduce the number of articles that needed to be evaluated for inclusion in the review. In addition, it was assumed that if the key term was not included in the title, then that characteristic would not be present in that particular study. This may have affected the number of studies obtained.

The data extraction was not up to the standards required for a systematic review. The data extraction used was a shorter version of the data extraction forms used in standard systematic reviews. A shorter data extraction was used because there were a large number of studies to extract information from, hence this method was used to ease the extraction process given the time and resource constraints of the PhD.

Only the first 2 questions of the Critical Appraisal checklist were used to test the quality of the studies, ideally all 11 or 12 questions should have been applied to assess whether the paper was up-to-standard to be included in the review. Again, the reason for this shortcut was related to time and resource restrictions.

2.5. Summary

This chapter documents the findings from over 150 studies investigating the seasonality and environmental triggers of childhood asthma resulting in medical contact. Several studies reported seasonal patterns in medical contacts made by children with asthma and that part of the reason for the seasonal patterns is an association with school return. In general, there was evidence for and against associations between pollutant and weather exposures and childhood asthma related medical contacts. More evidence that is consistent supports a pollen-asthma association.

Though a large number of studies were conducted examining the five aspects that are of interest to this thesis, a number of limitations were observed which fuelled justification for this investigation. One weakness of the literature review was that most of the research was conducted in a hospital based setting from a single geography.

Another weakness was that few studies used a comparison group in their design and even fewer studies matched asthmatics to non-asthmatic individuals or contacts by certain factors for instance age and gender. Therefore, limited evidence is currently available distinguishing whether the seasonal or environmental effect is stronger with an asthmatic cohort compared to a non-asthmatic cohort. It follows that the magnitudes of the environmental associations and seasonal patterns with medical contacts made by children with asthma have not been strongly established as being different to the effects with non-asthmatics and this provides motive for further investigation.

A further issue is that a small number of studies were conducted in the UK and as location and proximity are influential factors to the strength of exposure; findings from studies set outside the UK may not be appropriately applied to the UK that provides another motive for further investigation in the UK.

Lag effects were reported in only approximately half the studies with only two of those studies being set in the UK. The lack of research using a comparison group to compare effects with asthmatics, the lack of research from the UK and the requirement to reinforce the findings of previous research provides a niche for this thesis' investigation.

To respond to some of the questions left unanswered from the literature, this thesis aims to conduct a retrospective matched asthmatic non-asthmatic analysis using large and complex datasets to evaluate the seasonality of counts of medical contact made by school-age asthmatics and non-asthmatics in a different health care settings (primary care and hospital) across different geographies.

These datasets will allow an investigation of an association between environmental triggers and medical contacts made by asthmatics and non-asthmatics as well as a spatial relationship between pollutant exposures and medical contacts made by asthmatics and non-asthmatics.

Chapter Three

Description of the Original Clinical and Environmental (Outdoor Air Pollutants, Weather, Pollen) Datasets

3.1. Introduction

In Chapter Two, the existing literature investigating the seasonality and environmental (pollutants, weather, pollen) exposures of childhood asthma resulting in medical contact was documented. It also discussed the weaknesses within the literature, which fuelled the justification for this piece of research. This thesis used clinical data from the General Practice Research Database (GPRD) obtained prior to the start of the project and clinical data from the Sheffield Children's Hospital (SCH) collected whilst the project was conducted (alongside the analyses of the GPRD data). Investigations were conducted using time-series and spatial outcomes. This chapter shall describe the original clinical datasets.

This thesis examined the pollutant, weather and pollen associations with medical contact made by children with asthma. As stated in Chapter One, this thesis uses the term "environmental" as an umbrella term for outdoor air pollutants, pollen and weather exposures. Overall, the thesis included 28 independent variables for the time-series analyses and 28 for the spatial analysis. The exposure data were obtained from the English region of Yorkshire. This chapter shall also describe the sources of the environmental data.

3.1.1. Aims of the Chapter

The aims of the chapter are to:

1. Describe the source and structure of the original clinical and environmental datasets
2. Report the process of ethical approval needed to conduct this research
3. Describe the time-series and spatial outcomes of interest
4. Describe the source of the environmental datasets used in the time-series and spatial analyses

3.2. Data Source Summary

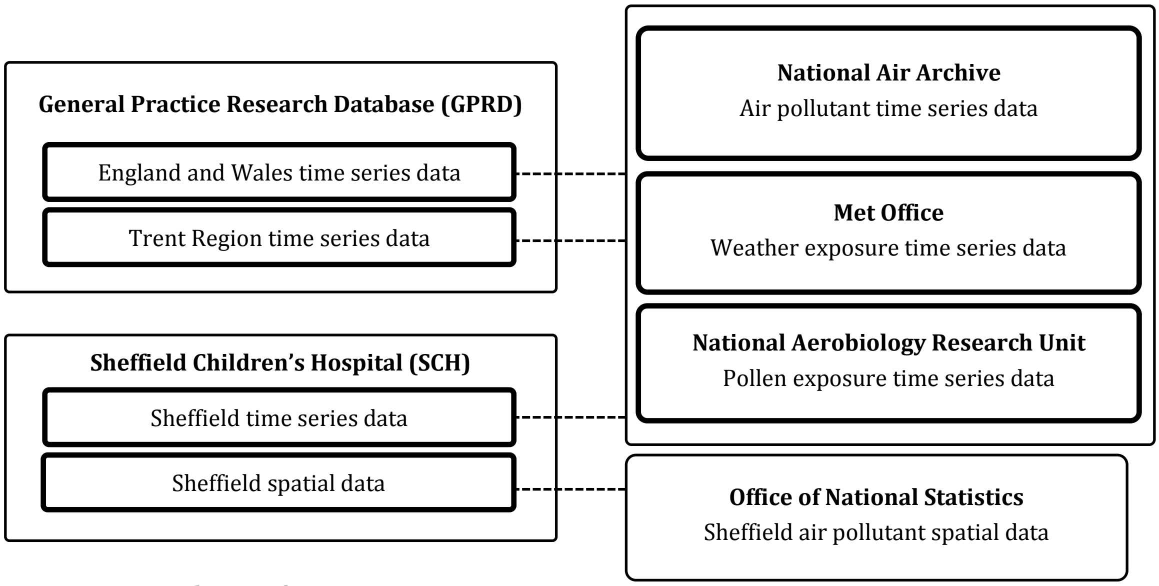


Figure 3.1: Schema of Data Sources.

The data used in the study were obtained from a number of sources. Gathering the types of data used, Figure 3.1 shows for each source, what type of data were obtained. From the GPRD, daily counts of medical contact were obtained at a national (England and Wales) and regional (Trent) level. The study intended to conduct the time-series investigations at national, regional and local level to in effect, drill the analysis down from a large to a small geography. As there was no finer level of geographical information in the GPRD dataset, for local representation, further clinical data were sourced from Sheffield Children's hospital. The Sheffield Children's hospital provided daily counts for the time-series investigations and area based counts for the spatial investigation.

Exposure data were obtained from four sources in total. Three of the sources provided daily measures of pollutant, weather and pollen data for the South Yorkshire area; these were used in the time-series environmental-medical contact investigation. The fourth source provided spatial pollutant measures for Sheffield; these were used in the pollutant-medical contact spatial investigation.

3.3. Clinical Data from the General Practice Research Database

3.3.1. Source of Data (General Practice Research Database)

The largest dataset was obtained from the General Practice Research Database (GPRD). The GPRD is now currently known as the CPRD though for the purposes of this thesis, as the data were collected from the formerly titled GPRD, the acronym GPRD is used. The GPRD is a computerised database that collects anonymous longitudinal medical records from over 500 primary care practices in the UK (http://www.cprd.com/intro.asp

[Accessed 4th April 2013]). The GPRD group within the Medicines and Healthcare products Regulatory Agency (MHRA) manages the database.

To obtain GPRD data, an application for data was made to the Independent Scientific Advisory Committee (ISAC) for Medicine and Healthcare products Regulatory Agency (see Appendix B for protocol submission for scientific review). The original datasets were obtained as CSV files.

3.3.2. Clinical Features of the General Practice Research Database Dataset

The original GPRD dataset included 10 million rows of individual patient information. For each patient, the following information was obtained:

- Gender; male or female
- Region of the practice; London, South East, South West, Eastern, West Midlands, Trent, North West, Northern and Yorkshire, Wales, Scotland and Northern Ireland
- Country of the practice; England, Scotland, Wales, Northern Ireland
- Type of contact: for example, "Night visit, Deputising service", Out of hours, Practice", "Telephone call from a patient". There were 30 types of contact in the original dataset (see 3.3.2.1).
- Date of contact or date of the event: additional columns in the set separated for day, month and year
- Reason for contact

Other variables were also obtained on the patients including weight, height, drinking and smoking and so on but these variables were not used within this investigation and so are not detailed further.

3.3.2.1. Type of Contact

To consolidate the number of types of emergency contact, (Table 3.1) types of contact were further aggregated into six categories (medical contacts): All Counts, Acute Visits, Casualty Counts, Emergency Consultations, Emergency Counts, and Out of Hours Counts. Within the consultation files, consultations were coded.

Table 3.1: Codes for GP consultation (type of contact)

Code	Definition	Code	Definition
166	Night visit, Deputising service	**177**	Letter from Outpatients
167	Follow-up/routine visit	**178**	Repeat Issue
168	Night visit, Local rota	**179**	Other
169	Mail from patient	**180**	Results recording
170	Night visit, practice	**181**	Mail to patient
171	Out of hours, Practice	**182**	Emergency Consultation
172	Out of hours, Non Practice	**183**	Administration
173	Surgery consultation	**184**	Casualty Attendance
174	Telephone call from a patient	**185**	Telephone call to a patient
175	Acute visit	**186**	Third Party Consultation
176	Discharge details		

Only unscheduled contacts were included in this investigation. Therefore, routine medical appointments, correspondence to and from a patient, and other non-emergency contacts were removed. The following codes were omitted: 167, 169, 176, 177, 178, 180, 181, and 183.

The remaining codes were categorised into six categories (six datasets):

1. 165; 166; 168; 170; 171; 172; 173; 174; 175; 179; 182; 184; 185; 186 = All Counts
2. 175 = Acute visits
3. 184 = Casualty
4. 166; 168; 170; 171; 172; 175; 182; 184 = Emergency
5. 182 = Emergency Consultations
6. 166; 168; 170; 171; 172 = Out of Hours

Acute Visits were house calls made by the GP. Casualty attendances were contacts made to the accident and emergency department. Emergency Consultations were "Open surgery or emergency appointments" by the GP made within normal working hours. Out of Hours contacts were contacts made between the hours of 6.30pm and 8am during weekdays, all hours at weekends and bank holidays.

3.3.3. Ethics Approval (General Practice Research Database)

The GPRD data were anonymised. As part of the process of obtaining the data, the GPRD obtained ethics approval prior to constructing the datasets. The GPRD sought ethical approval the Trent multi-centre Research Ethics Committee (see Appendix B). For the data to be analysed within ScHARR, the "Form IC: Ethics Application for Secondary Analysis of Anonymised Data" was completed and approved (see Appendix B).

3.3.4. School-age children (General Practice Research Database)

The original purpose of the dataset obtained from the GPRD was to investigate the association between school return and childhood asthma related medical contacts. As the investigation was interested in school-age children, the age range was restricted to 5 to 16 years. By including only school-age children, the school associated effects were kept constant throughout the sample.

An additional reason for the use of only school-age children was that, should a child seek medical contact for a respiratory related problem, there is normally no (or few) other underlying respiratory (or other) condition than asthma (primary condition of respiratory illness in this population). This is not the case for children under five years of age as the diagnosis of asthma is often less accurate (Townshend et al., 2007). Respiratory related symptoms in children less than five may be attributed to a number of causes not only asthma.

Going forward, the information gained from this piece of work is to be used to form part of the background for a trial investigating the efficacy of a simple intervention to encourage earlier uptake of routine medication by school-aged children with asthma. This intervention aims to prevent the upsurge in medical contacts made by school-age children with asthma after school return in September.

3.3.5. Definition of asthmatics and non-asthmatics (General Practice Research Database)

Several studies use self-reported wheeze within the past 12 months to define asthma as an outcome (Tattersfield et al., 2002). For a more formal description reflecting on the severity of the condition, the proposed investigation defined the dependent variable as school-age asthma related medical contacts. Asthmatics and non-asthmatics were born between 1983 and 2000 with a clinical or referral record documented between 1st January 1999 and 31st December 2004. The asthmatic cohort comprised of patients who had been diagnosed with asthma prior to the study or have been newly diagnosed with asthma during the study period. The GPRD protocol stipulated that the patients included in the asthmatic cohort must have a medical diagnosis code from the READ/OXMIS codes for asthma (see Appendix B). Children with a medical diagnosis of asthma could have multiple medical contacts (for any reason). This investigation was interested in how many contacts were made by the cohort of asthmatic children.

Non-asthmatics were selected if their medical documentation reported no history of asthma. Asthmatics were matched on a one-to-one basis to non-asthmatics according to age (same age as asthmatic); gender (same gender as asthmatic) and general practice (came from the same practice as the asthmatic). In similarity to the asthmatic cohort, non-asthmatic individuals could have more than one medical contact. This investigation was interested in how many contacts were made by the cohort of non-asthmatic children.

3.3.6. Sample size (General Practice Research Database)

Due to the application of the ISAC Protocol No.06_020, data were obtained for 76,116 school-age asthmatic patients matched one-to-one to non-asthmatics by age, gender, and general practice. A number of asthmatic patients (n=808) who do not have a matched non-asthmatic individual were also included in the sample as it was decided that the addition of these contacts would make no difference to the results. This approach is consistent with Julious et al (2011b). In total, data on 153,040 patients were sourced from the GPRD. Not all these patients were included in the final analyses (Clinical data from Ireland omitted, see sub-section 3.6).

3.4. Clinical data from the Sheffield Children's Hospital

3.4.1. Source of Data (Sheffield Children's Hospital)

One limitation of the GPRD data was that spatial analysis could not be conducted except for at regional level. Therefore, additional local data were obtained to allow a more spatially accurate investigation. To illustrate any environmental associations at a smaller geographical level, additional data were obtained from SCH. Patient data were obtained from two types of medical contact: hospital admissions and A&E attendances. The original intention was to use SCH data to investigate potential spatial relationships between pollutant measures and childhood asthma admissions. This dataset had a second purpose and was used in the time-series analysis to examine localised time-series relationships with environmental exposures. These results were to be compared with the results from medical contacts from the England and Wales and the Trent Region as a means of cross-validation.

3.4.2. Defining Spatial Resolution

As stated, the initial reason this investigation sought SCH data was to conduct a spatial investigation with pollutant measures. One important aspect of spatial analyses is the degree of granularity (also known as spatial resolution) that the independent and dependent variables are measured at geographically. Granularity refers to the level of coarseness or the resolution of data (www.ersi.com) [Accessed 1st March 2013]. It is the extent to which a geographical area is broken into pieces. If 1 area is broken into 20 pieces, this has finer granularity than an area that is subdivided into 10 pieces. Granularity is particularly important when assessing spatial relationships. Often studies observing spatial relationships do not have the opportunity to obtain personal exposure measurements. These studies often use point source or background measurements nearest to a person's residence and these acts as proxy markers for exposure. As these measures often differ spatially, it is important to try to keep the area unit as small as possible to capture the most accurate relationship. To obtain the smallest level of granularity, the ideal situation would be to analyse patients' postcodes in relation to pollution.

Super Output Areas (SOAs) are a unit of geography used mainly by the ONS to collect, aggregate and publish area-based statistics. The size of an SOA is standard and is largely based on the number of persons living within the boundaries of the SOA (number of persons calculated using census data). Middle Super Output Areas (MSOAs) hold a minimum of 5,000 persons with an average population of 7,200. This area unit dictated the geographical level of information required in the clinical dataset because this investigation was only able to obtain pollutant data at this level. There currently are 71 MSOAs in Sheffield.

Prior to the handing over of the SCH dataset to ScHARR, for each patient, residential information was defined by postcode. This is patient identifiable. In order to obtain anonymous patient data, the hospital was provided with all postcodes in Sheffield matched to the MSOA. "Geoconvert" (a website used to convert geographical measures) was used to obtain all postcodes for Sheffield matched to each MSOA. An Excel dataset including all postcodes matched to a MSOA was given to the SCH.
This strategy was a compromise between using data that could be obtained at:

a) full postcode level, this information would result in a potential issue of patient identifiability and would have required NHS ethical approval, and

b) three digit postcode level, this level of information would not give a very accurate spatial illustration of the relationship between childhood asthma and pollution levels.

3.4.3. Clinical Features of the Sheffield Children's Hospital Dataset

Two datasets were obtained from the SCH in Excel format. One dataset included all admissions and the second dataset included all A&E contacts made to the hospital. These datasets included in total 751,867 rows of data (admissions dataset n=270,032 rows, A&E dataset n=481,835 rows). These rows represented every medical contact made to the hospital from September 1999 to March 2010.

For each patient, the following information required for this study was obtained:

- Age
- Gender; male or female
- Date of contact or date of the event: additional columns in the set separated for day, month and year
- Type of admission: only non-elective admissions were selected to capture unplanned emergency contacts (Admissions dataset only)
- Reason/diagnosis for contact (Admissions dataset, ICD-10; A&E dataset, Diagnosis text. See definition of asthmatics and non-asthmatics)
- Area of residence defined by MSOA

Asthmatic events and matched non-asthmatic events were extracted from the 768,167 rows of contacts (see sub-section 3.4.6).

3.4.4. Ethics Approval (Sheffield Children's Hospital)

The SCH data were anonymised. Ethic approval to conduct research on this dataset in the ScHARR was obtained (see "Form IC: Ethics Application Form for Secondary Analysis of Anonymised Data" in Appendix B).

3.4.5. School-age children (Sheffield Children's Hospital)

As with the GPRD data, the sample of interest from the SCH included contacts made by children aged 5 to 16 years of age.

3.4.6. Definition of asthmatic and non-asthmatic medical contacts (Sheffield Children's Hospital)

As with definitions used in the GPRD dataset, the aim was to obtain asthmatics with a medical diagnosis of asthma. The two datasets had different types of information for reason for contact/diagnosis:

1. In the Admissions dataset: non-elective admissions with a primary diagnosis defined using ICD.10 codes: J45.0, J45.9, and J45.X were selected for asthma diagnosis.
2. In the A&E dataset: two variables were available for diagnosis, the first column included text the doctor had written upon examination and the second column included standardised coded fields for national use. If "asthma" was used in either or both fields then this was defined as a medical contact for asthma.

Non-asthmatics were defined as those records with no medical diagnosis of asthma.

3.4.7. Sample for Time-series Analyses (Sheffield Children's Hospital)

From 1999 to 2004 (in line with the GPRD dataset), data were obtained on 1,772 asthmatic events matched one-to-one to non-asthmatic contacts by age, gender and MSOA. The matching criteria were chosen to examine whether an asthmatic contact is more likely to occur on a different day to its matched non-asthmatic contact. This illustrated whether the seasonal patterns of medical contacts were different between asthmatic and non-asthmatic contacts. Non-asthmatic contacts were selected on the basis that the reason for hospital contact did not include asthma thus the non-asthmatic contact could have resulted from any other diagnosis. On a few occasions, matching exactly by age in years and gender was not feasible; the lowest level of matching included as asthmatic contact matched to a non-asthmatic contact that was older or younger by three years and not matched by gender or MSOA (see Appendix B Matching method used Sheffield Children hospital data).

The number of events included some duplicate asthmatic contacts where a patient moved from A&E to inpatient care. From 1999 to 2004, 304 duplicate asthmatic contacts were admitted as A&E contacts. For All Counts, if a patient that attended A&E was admitted, they were included in the sample once. For the Admissions and A&E datasets, if a patient that attended A&E was admitted, their contacts were included in both datasets.

3.4.8. Sample for Spatial Analyses (Sheffield Children's Hospital)

From 2002 to 2005 (pollution data obtained for these years), 1,305 asthmatic contacts matched one-to-one to non-asthmatic contacts by date of contact, age, and gender were obtained. The matching criteria were chosen to illustrate whether on any given date, an asthmatic contact was more likely to be made by a person who resided in a different MSOA compared to its matched non-asthmatic contact. This illustrated whether the geographical distribution of medical contacts was different between asthmatic and non-asthmatic contacts. Non-asthmatic contacts were selected on the basis that the reason for hospital contact did not include asthma thus the non-asthmatic contact could have resulted from any other diagnosis. On a few occasions, matching exactly by age in years and gender was not feasible; the lowest level of matching included asthmatic contacts matched to non-asthmatic contacts by date of contact only (see Appendix B).

As with the sample selected for the time-series analysis, there were a number of contacts that were made by the same patient where a patient moved from A&E to inpatient care. There were 220 duplicate asthmatic contacts whereby A&E contacts from 2002 to 2005 were admitted. For this sample, if a patient that attended A&E was admitted, their contact was included in the sample once.

3.5. Distinction in the Matching Methods used for the GPRD datasets and Sheffield Datasets

The matching process (matching an asthmatic to a non-asthmatic (individual or event)) used for the GPRD and Sheffield datasets has been briefly described in sub-sections 3.3.5 and 3.4.7. However, these processes were not described in conjunction with one another and as the two matching processes were different; this sub-section makes direct comparison of the methods.

For datasets sourced from the GPRD (England and Wales, Trent Region and Scotland), an individual with a medical diagnosis of asthma was matched with individual with no asthma diagnosis by age, gender and general practice. In this case, an individual was followed up and may have made medical contact on more than one occasion. Each medical contact that individual made equates to a single contact regardless of whether they made a contact previously. Hence, an individual may have made five contacts and all these contacts were included. Also, an individual may have made no contact.

For the Sheffield dataset, as identifying individuals was not possible, a hospital contact made for asthmatic reasons was matched to a hospital contact for non-asthmatic reasons by age gender and MSOA or year of contact. In this case, if a patient moved from A&E to inpatient care, an individual may have made two contacts (attended hospital on two different days). However, this matching process did not match on an individual but hospital contact basis. Thus, if an individual made two contacts for asthmatic reasons on two separate days, each of these contacts would have been matched to two non-asthmatic hospital contacts. This differs from the GPRD datasets where individuals and not the contacts they made were matched.

3.6. Clinical Data for Northern Ireland and Scotland

GPRD data were originally sought to investigate school-age asthma trends over time in Scotland and England. Clinical data from Northern Ireland were also obtained from the GPRD. However, these data were not included in this investigation. Northern Ireland's sample was the smallest of the four countries in the UK (n=5,630 matched asthmatics and non-asthmatics) and daily counts (range from 0 to 203) were low. In addition, when the analysis of the data was undertaken, environmental data were not obtained for Northern Ireland. Since environmental data were already obtained for Scotland and England and Wales, it was deemed that an additional analysis using Northern Ireland's data would not add further value to this investigation.

The Scottish data were analysed in parallel with England and Wales, the Trent Region and Sheffield. The intention was to deduce and compare results from national to local level. Since national representation of results was already obtained using England and Wales' data, it was decided that to minimise the length of the main thesis, the results from Scotland should be reported in the Appendix.

3.7. Clinical Outcome of Interest

3.7.1. Time-series Outcome

For the time-series investigation, the outcome of interest was the daily number of asthma related and non-asthma related medical contacts (daily counts). In addition, the daily excess of asthmatics over non-asthmatics was the second outcome of interest. The excess represents the residual effect of the asthmatic group over and above (or below) the average school population. The data for the medical contacts from the GPRD and SCH were aggregated by day, month, and year of the medical contact, and by region and country and by the type of medical contact. Daily counts were obtained from the 1st of January 1999 to 31st of December 2004.

The intention was to conduct the time-series analyses on three geographical areas decreasing in size. Analyses were carried out on data sourced from England and Wales, the Trent Region and Sheffield. Clinical data from England and Wales were examined so the relationships could be revealed at national level. Data for Sheffield were obtained to observe localised associations with the environmental data (also sourced from Sheffield or surrounding locations). Trent Region was selected because at the time the data were collected (1999-2004), Sheffield sat within Trent Strategic Health Authority (SHA). Currently, Sheffield sits within the Yorkshire and Humber SHA. The results from the three geographies were compared to evaluate consistency.

Clinical data for England and Wales and the Trent Region were obtained from the GPRD dataset whilst clinical data for Sheffield were obtained from SCH. Analyses were carried out on the following aggregated non-mutually exclusive datasets:

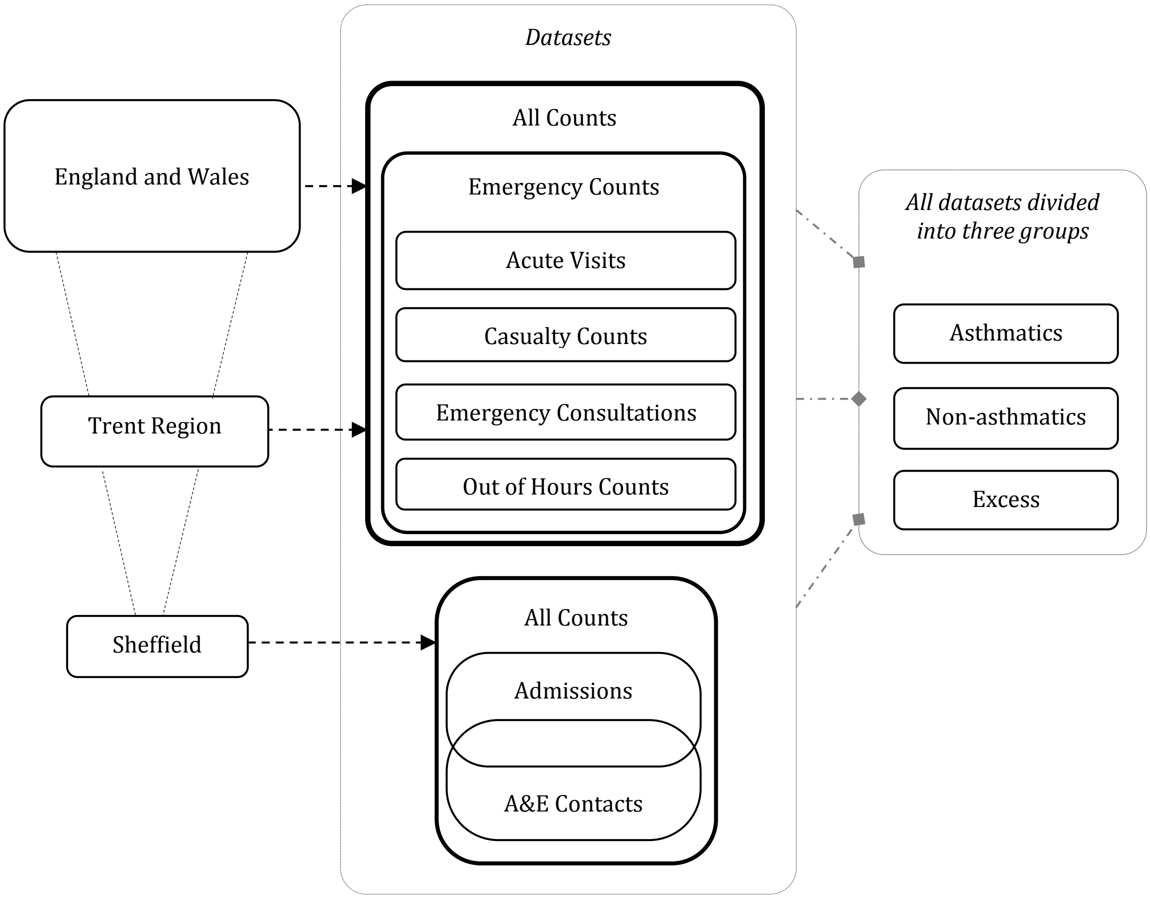


Figure 3.2: Schema of Medical contacts.

As Figure 3.2 illustrates, for England and Wales, and the Trent Region, there were six non-mutually exclusive medical contact categories. Emergency Counts included four types of medical contact: Acute Visits, Casualty Counts, Emergency Consultations, and Out of

Hours Counts. All Counts included Emergency Counts in addition to a number of other contacts not large enough in sample to categorise alone. All types of medical contact bar Casualty Counts were GP related.

For Sheffield, there were three non-mutually exclusive medical contacts. Admissions (admitted to hospital), A&E Contacts (treated within the A&E department) and All Counts (Admissions and A&E Contacts combined, no duplicates included). On some occasions, if the patient presents with severe symptoms, the patient will be admitted, thus, there is some overlap with A&E and Admission contacts. However, no patient was included twice in the All Counts dataset.

3.7.2. Spatial Outcome

For the spatial analysis (Sheffield only), originally counts of medical contact made for asthmatic and non-asthmatic reasons by MSOA were aggregated per year (2002 to 2005). This analysis intended to calculate Comparative Hospital contact Ratios (CHRs) to examine the difference between the numbers of observed over expected contacts (see sub-section 4.6.1 for CHR calculation). If MSOAs included no contacts, CHRs could not be calculated. As there were a number of MSOA's with no contacts, MSOA counts were further aggregated to obtain the mean over four years. Logged Comparative Hospital contact Ratios (CHRs) were the outcome of interest for the spatial analysis. CHRs were calculated for asthmatic and non-asthmatic contacts and the ratio of asthmatic over non-asthmatic contacts (excess). In similarity with the time-series analysis, the excess was the average difference between the number of medical contacts made for asthmatic reasons and the number of medical contacts made for non-asthmatic reasons.

3.8. Environmental data used to support the extrapolation of Sheffield's environmental measures across England and Wales

In the time-series analyses, initially, environmental data were sourced from one region in England, Yorkshire. These measures were then extrapolated against patient data at national level. Thus, it was assumed that environmental exposures are the same across the country. It is well known that particularly for pollutant exposures, exposures can vary by location. To support the use of only one region's environmental data (Yorkshire), daily outdoor air pollution, and monthly weather data for a number of sites across the England and Wales were obtained. These data were originally obtained in CSV format.

Daily mean pollution data were obtained from the DEFRA website. Pollution sites included Bristol Centre, Birmingham Centre, Manchester Piccadilly, London Brent, Newcastle Centre, and Cardiff (see Figure 3.3). There are different types of air monitoring sites defined by the type of environment (and the dominant source of pollutant) the site is situated within. These include rural background, traffic, rural and industrial sites (See

DEFRA website http://uk-air.defra.gov.uk/networks/ [Accessed 4th April 2013]). In comparison with Sheffield's city centre site, all sites used in this investigation were Automatic Urban and Rural Network (AURN) air quality monitoring sites (see section 3.9.1 for further information on AURN). In line with Sheffield site measures, these sites measure urban background pollution. Data were collected on the same mean measures as used in this investigation (NO, NO_2, NOD, SO_2, PM_{10}, CO, O_3).

Additional monthly weather data from different sites were obtained from the Met Office website. Weather sites included Heathrow, Eastbourne, Yeovilton, Cwmystwyth, Whitby, and Bradford (Figure 3.3). Data were obtained on monthly average minimum and maximum temperature, monthly total rainfall and monthly total number of hours of sunlight.

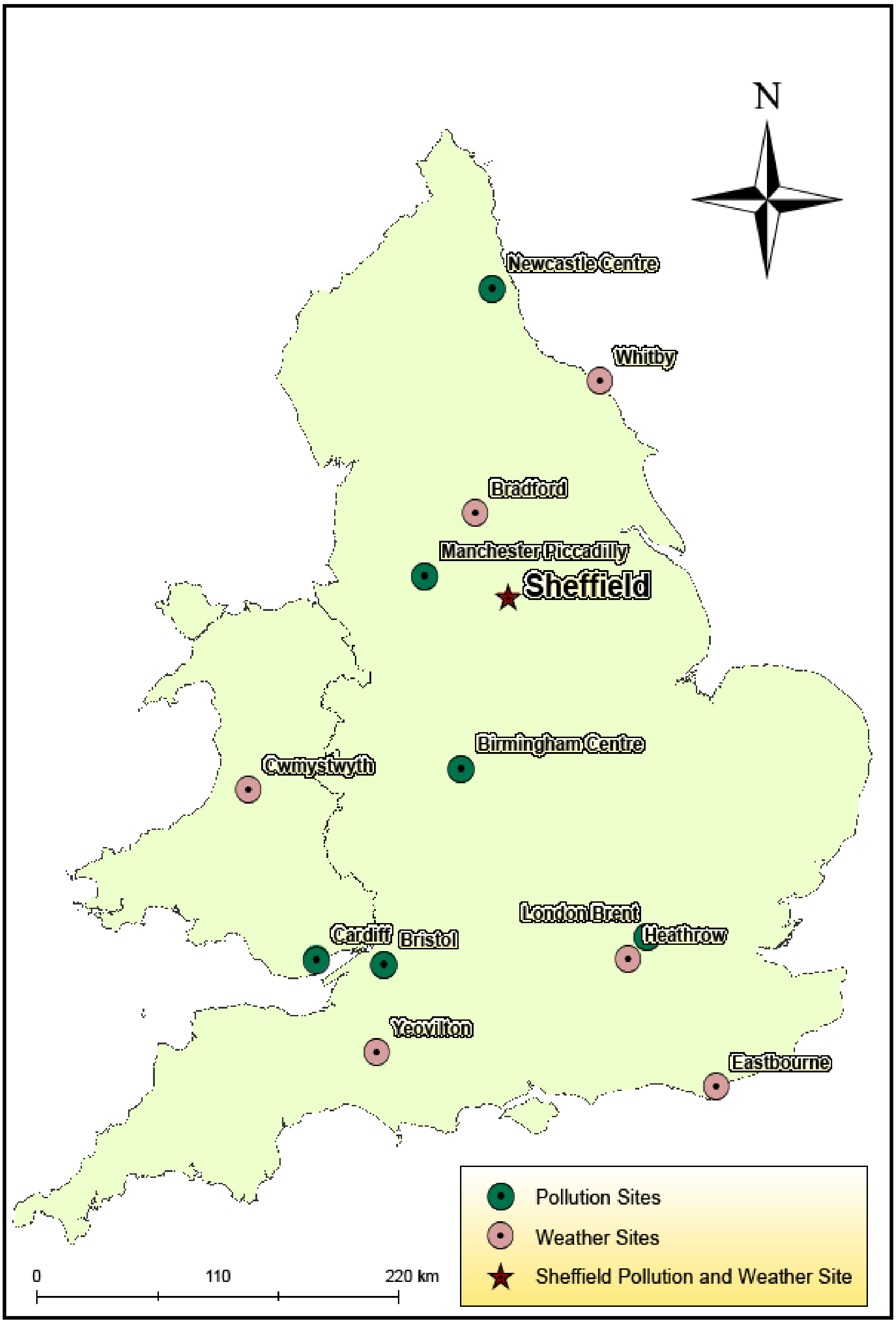


Figure 3.3: Map of locations of pollution and weather data.

3.9. Environmental Exposures for the Time-series Analyses

The results of the analysis conducted using measures described in sub-section 3.8 provide justification for the use of measures obtained from the area of Yorkshire only.

3.9.1. Outdoor Air Pollutant Exposure dataset

Daily measures of pollutant exposures were obtained from the National Air Archive in CSV format. Data were sourced from the Sheffield AURN air quality-monitoring site located in the centre of the city. The AURN is the UK's most important pollution-monitoring network initially brought in to measure compliance with to air quality directives (DEFRA, 2007). In Sheffield, the site measures urban background emissions thus values represent overall emissions sourced from a number of contributors. "These (background) sampling points shall, as a general rule, be representative for several square kilometres" (See Defra website http://uk-air.defra.gov.uk/networks/site-types [Accessed online 4th April 2013]). Data were obtained for the minimum (lowest measure that occurred on the day), mean (overall mean measure), and maximum (highest measure that occurred on the day) for the following pollutants:

- Nitric Oxide (NO) μgm³ (see glossary for definition of μgm³)
- Nitrogen Dioxide (NO_2) μgm³
- Nitrogen Oxides of Dioxide (NOD) μgm³
- Particulate Matter 10 (PM_{10}) measured hourly in μgm³ (GRAV EQ – gravimetric equivalent)
- Sulphur Dioxide (SO_2) μgm³
- Ozone (O_3),μgm³
- Carbon Monoxide (CO) mgm³ (see glossary for definition of mgm³)

Over 20 percent of the data from South Yorkshire were missing. Thus, multiple imputations were used to predict missing values. These data were imputed in a statistical package called SAS using the command PROC MI (Julious et al., 2011b).

3.9.2. Weather Exposure dataset

Daily measures of weather exposures were obtained from the Met Office in Excel format. From Sheffield, data were obtained on the following weather exposures:

- Minimum and maximum temperature degrees Celsius (°C)
- Sunlight hours per day
- Rainfall millimetres (mm) per day (less than 0.3mm was categorised as 0mm)

From Church Fenton (North Yorkshire), daily measures of pressure were obtained and measured as hectopascals at mean sea level. From Rotherham (South Yorkshire), daily measures of wind speed were obtained; this was measured as mean knots per day.

There were some missing values with the weather exposures. Therefore, as with the missing pollution data, multiple imputations were used (Julious et al., 2011b). For the missing pressure data, measures from another location (Ringway) were used to assist the imputation.

3.9.3. Pollen Exposure dataset

Daily measures of pollen exposure were obtained from the National Pollen and Aerobiology Research Unit in Excel format. Pollen levels were measured as grains per m^3. Data for grass pollen were obtained for South Yorkshire.

For all environmental exposures, as well as the measurement itself, information on the date and source of measurement was attained.

3.9.4. Environmental Data from Scotland

Environmental data were also obtained from Aberdeen, Scotland. An additional three environmental variables were sourced for Scotland; these included birch, oak and nettle pollen. As noted in 3.6 data from Scotland were analysed in parallel with England and Wales, the Trent Region and Sheffield. Results of the analyses conducted on Scottish data are reported in the Appendix.

3.9.5. Independent Variables of Interest (Time-series Analysis)

Daily measures of the exposures listed in sub-section 3.9.1 to 3.9.3 are the time-series independent variables of interest. There were 28 environmental variables overall.

3.10. Outdoor Pollutant Exposures for the Spatial Analysis

3.10.1. Source

The exposure data for the spatial analyses were obtained from a different source to the environmental data sources for the time-series analyses. Pollution data for Sheffield were obtained from the Office of National Statistics (ONS) website under the topic “Physical Environment”. The data were not collected by the ONS but were provided to the ONS by Netcen on behalf of DEFRA and the Devolved Administrations. Netcen compiled these data as part of the National Atmospheric Emissions Inventory (NAEI). The NAEI calculated estimates of emissions for several sources e.g. cars and power stations. At its smallest geographical level freely available, pollutant measures were obtained at MSOA level.

3.10.2. Air Quality

Air quality refers to assessment of the air quality relative to safety requirements necessary for human or ecological health. Air quality is calculated using air dispersion models that incorporate information from emissions inventory estimates and meteorological data (ONS, 2005). These measures were categorised into scores. Scores correspond to the annual mean concentration of a specific pollutant. Higher scores indicate poorer air quality. Background measures were taken from locations away from influential sources of pollution such as major roads or industrial sites (ONS, 2005). Roadside measures were taken from locations 5 to 10 metres from an urban road such as A-roads or motorways (ONS, 2005). For each year from 2002 to 2005, air quality scores were obtained for background and roadside concentrations for the following pollutants:

- NO_2
- PM_{10}
- Benzene
- SO_2 (Background only)
- O_3 (Background only)

3.10.3. Air Emissions

Air emissions are measures of the total amount of particular pollutant for a given time and geographical area. Emission data estimates were calculated using the amount of the pollutant produced relative to the unit in process. Air emission scores were compiled by combining point source (emission sources are usually known locations e.g. power stations) and area source (an emission source that is dispersed across the country and consists of a number of individual emission sources such as car emissions) measures (ONS, 2005). Area sources were based on surrogate statistics, not actual measurements of local emissions (ONS, 2005).

Scores for the emission intensity were obtained representing the total emission intensity status for a specific pollutant per MSOA (ONS, 2005). Within Great Britain, MSOAs were allocated scores of one to eight based on the amount of emissions produced for a specific pollutant. The scores correspond to eight quantiles; each quantile had an equal number of MSOAs. A score of one inferred that the MSOA was placed within the lowest eighth in the country that produced the least amount of emissions of the particular pollutant. A score of eight denoted that the MSOA was placed within the highest eighth in the country signifying that MSOA emits one the highest amounts of the specific pollutant.

Emission data also included percentage of emissions from the following sources: Industry, Domestic and Commercial, Roadside Transport and Other Sources.

Air emission scores and percentages of the emissions per source were obtained for the following pollutants for 2005 only:

- NO_x (Nitrogen Oxide, collective term for Nitric Oxide and Nitrogen Dioxide)
- PM_{10}
- Benzene
- SO_2

3.10.4. Independent Variables of Interest

Air quality scores for 2002 to 2005 were aggregated to obtain mean measures over four years. Air emissions data were available for 2005 only; no modifications were made to these measures.

3.11. Data cleaning and the removal of outlying data points

Daily environmental measures on the 29th of February (in this study's case, years 2000 and 2004) were removed to keep constant the annual number of days for any given year. Daily counts on New Year's and Christmas day were also removed after descriptive and seasonal assessment, as counts on these two days were extremely low. Low counts on New Year's and Christmas day were consistent with studies that analyse the same GPRD data (Julious et al., 2011a). Environmental data measured on Christmas and New Year's day were also removed.

The datasets were checked for outlying data points. With one environmental measure, where one extreme data point was detected; the daily number of hours of sunlight was measured at 59 hours. The average measure calculated from the previous month's measures should reflect a plausible measure for that day. Thus, to correct the outlying measure, an average based on the previous data points was used to correct the measure of sunlight on that day. Whether any other outliers were deemed influential to the analyses was evaluated by checking the assumptions of the analysis and employing comparative analysis to see if results altered.

3.12. Summary

This thesis used data from both primary and secondary clinical sources to reflect varying severities of the asthmatic condition. Clinical data were obtained from the GPRD and SCH. This thesis used only school-age children with a medical diagnosis of asthma (GPRD) or who made medical contact for asthmatic symptoms (SCH). The asthmatics were matched to non-asthmatics by age and gender (and general practice or MSOA). Time-series datasets were constructed using GPRD data from England and Wales, and the Trent Region and from the SCH dataset for Sheffield. Daily counts were obtained from the 1st of January 1999 to the 31st of December 2004. This analysis also observed any patterns and effects on a second outcome: the excess of asthmatics over non-asthmatics. The excess represents the effect on the asthmatic cohort over and above (or below) the average school population.

The spatial clinical dataset was constructed using the SCH dataset only. Asthma defined medical contacts by school-age children were matched to contacts made for non-asthmatic reasons by age, gender, and date of contact. Matched events were aggregated by MSOA and averaged over a period of four years (2002 to 2005). The difference of asthmatic medical contacts over non-asthmatic contacts (excess) was also an outcome of interest.

For the time-series analyses, daily measures of environmental exposure were obtained from the National Air Archive (pollutants), Met Office (weather), and National Pollen and Aerobiology Research Unit (pollen) from the 1st of January 1999 to the 31st of December 2004. For the spatial analyses, pollutant (air quality and air emissions) measures were obtained from the ONS website for MSOAs within Sheffield from 2002 to 2005. Chapter Four explains the method of analyses for the time-series and spatial investigation.

Chapter Four

Method of Analyses

4.1. Introduction

Chapter Three documented the sources of the clinical and environmental datasets. In order to describe how these datasets were utilised in this investigation, the aim of this chapter is to describe the time-series and spatial methods of analyses. Where necessary, justifications are provided for the decisions made concerning the choice of analytical techniques.

4.1.1. Aims of this chapter

The aims of this chapter are to:

1. For the time-series investigation, describe analyses undertaken to support the extrapolation of the environmental exposures from Sheffield to across England and Wales
2. Describe methods for the descriptive, correlational, and autoregressive analyses
3. Describe methods used in the standard multiple regressions analyses and provide a rationale for why the results from this method were not presented in the main findings
4. Report the methodology used to investigate the spatial relationship between pollutant exposures and childhood asthma

4.2. Graphical Examination to support extrapolation of Sheffield environmental data across England and Wales

In the time-series analyses, small area measures of environmental data were analysed against patient data on a national, regional, and local level. Analysing small area weather measures against national level outcomes has been used previously by another study (Murphy and Campbell, 1987). The rationale for this technique follows, using the example for weather exposures; there is little variability in weather typologies across the regions in the UK and changing patterns observed in weather conditions across different regions correlate with one another. For example, if it is five degrees colder in Sheffield today compared to yesterday, it is likely that it will be five degrees colder in London. Although it has been demonstrated that there are small overall differences in the weather conditions across the UK, the overall weather trends are similar.

There is less evidence to support the same argument for pollutant and pollen exposures. Indeed, it has been illustrated that there can be a great amount of geographical variation in the strength pollutant exposures. To provide evidence to support the use of measures sourced from only one location and its extrapolation nationwide, an investigation was undertaken to assess agreement of measures taken from different locations in England and Wales using Bland-Altman methods (Bland and Altman, 1986). Daily mean pollutant and monthly weather measures from a number of locations were obtained (see 3.8 for source information). Daily mean pollutant measures were aggregated into monthly means. As very few months had missing data, imputation was deemed unnecessary. Monthly measures of weather exposures were not modified.

This analysis investigated whether environmental measures from Sheffield were similar to environmental measures taken from other locations. Bland-Altman plots were used to plot the difference between location A and location B against the average of location A and B. The means and standard deviation (SD) of the difference between measures from location A and B were calculated to see whether 95 percent of the data falls in line within ±2 (or more precisely 1.96, known as “limits of agreement”) SDs (Bland and Altman, 1986). There should be no pattern in the spread of the data points within the plot. If 95 percent of the data points fall within the limits of agreement and there is no pattern in the spread of the data points, then the measures from one location or another can be used interchangeably. The results of the Bland-Altman analyses are reported in Appendix C.

4.3. Structure for the Time-Series Investigation

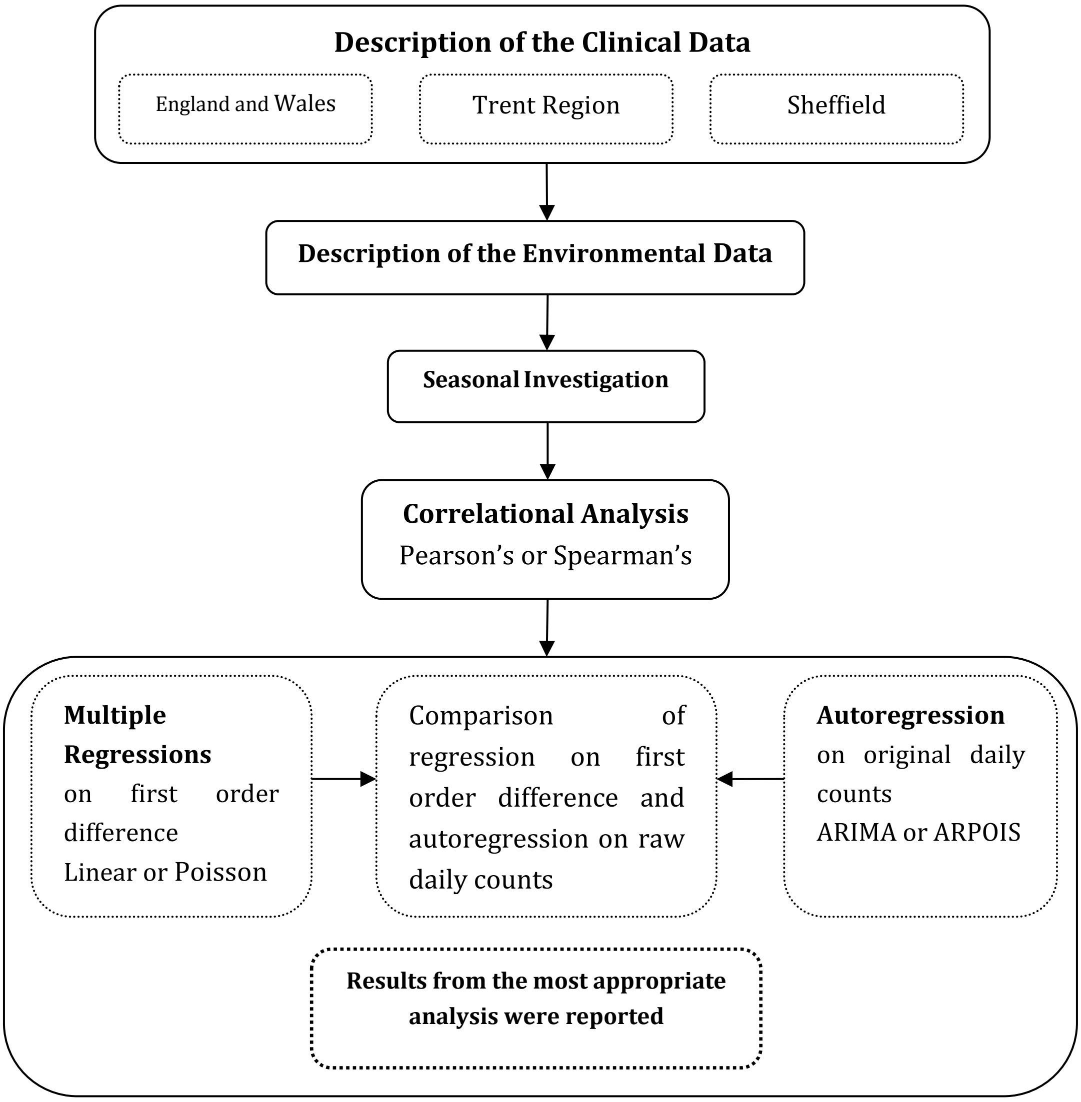


Figure 4.1: Schema of the Time-series Data Analyses.

Figure 4.1 illustrates a schema of the analyses undertaken to explore seasonal patterns of daily counts of medical contacts and to analyse the relationship over time between environmental exposures and medical contacts made by school-age asthmatics and non-asthmatics. Further sub-sections detail the steps for each of the analyses.

4.4. Descriptives

4.4.1. Descriptive Analyses for the Clinical Datasets

Descriptive statistics as appropriate were undertaken on asthmatics, non-asthmatics, and the excess for all types of medical contact grouped by geographical region. Plots of daily medical counts were explored by year.

For daily counts from 1999 to 2004, the mean, median, SD, minimum and maximum values were calculated. The frequency of daily counts by medical contact (asthmatics, non-asthmatics, and the excess separately) were displayed via histograms to assess the distributions of the data (Normal or non-Normal). Daily counts were aggregated by month and year and these monthly means were graphically presented to reveal overall trends across the period.

For every year, an Indexday was given from 1 to 365. Daily counts were aggregated by Indexday to produce a dataset containing aggregated mean daily counts. These data were used to illustrate characteristics within an average year. The mean, median, SD, minimum and maximum values for each group by medical contact were calculated. Aggregated daily means were used to investigate sub-periods within an average year (see 4.5.1).

4.4.2. Descriptive Statistics for Environmental Datasets

First, daily measures by year were graphically examined. Secondly, descriptive statistics for overall daily measures from 1999 to 2004 for the average year were undertaken for the environmental variables. Histograms were used to examine the distribution of the data for each exposure. Daily measures were aggregated by month and year and these monthly means were graphically presented to reveal overall trends across the period.

4.5. Time-series Investigation

4.5.1. Seasonal Patterns Investigation

This part of the study was interested in examining peaks and troughs of medical contact made by school-age asthmatics in relation to the school-calendar. As such, this study examined whether the pattern of medical contacts across the year exhibited school-related seasonality. To examine peaks and troughs in daily counts in relation to the school holidays, the following sub-periods of the year were evaluated: Easter, summer, and Christmas. These are the longest school holiday durations during the year thus there is a stronger possibility of observing potential peaks and troughs in these periods.

1. For each year, the Easter period was defined 28 days before and after Easter Sunday. This was considered an appropriate period to evaluate potential peaks

and troughs attributed to the holiday. Peaks and troughs that occur before or after this period maybe caused by events or factors unrelated to the Easter holiday. Easter Sunday was represented on the x-axis by 0. The timeline on the x-axis was defined from -28 days before and 28 days after Easter Sunday.

2. The summer period was defined from the 1st of July to the 31st of October. The period was defined from the 1st of July to observe a potential drop in daily counts at the end of the school term. The period followed through until the 31st of October to detect the trough in the summer holiday and the accumulative increase in daily counts from the start of the school year. The timeline on the x-axis was defined from Indexday 182 to Indexday 304 this represents the 1st of July to the 31st of October.
3. For the same reasons used to define the Easter period, daily counts four weeks before and after Christmas day were investigated. Christmas Day was represented on the x-axis by 0; New Year's Day is represented by Indexday 7. The timeline on the x-axis was defined from -28 before and 28 days after Christmas day.

Descriptive statistics and plots of each sub-period for asthmatics, non-asthmatics, and the excess by medical contact were examined to observe whether the sub-periods had higher or lower than average number of counts compared to the annual average.

Day of the week patterns were also examined and an analysis of variance with 84% CIs (Julious, 2004) were used to test the significant difference between the days of the week counts (England and Wales All Counts only). With a 84% overlapping CIs would infer no statistically significant difference whereas 95% CIs can overlap with a $P<0.01$. Results are reported in the Appendix D.

4.5.2. Data Preparation for further Analyses

The following analyses (correlations, multiple regressions, and autoregressions) were performed using daily counts and daily measures from 1999 to 2004. Data measured on New Year's and Christmas day were omitted. Daily counts and daily measures of environmental exposures by geographical region were consolidated into one dataset. Lagged terms of the environmental variables were added to investigate delayed effects.

4.5.3. Correlational Analyses

In comparison to existing literature (for example Garty et al., 1998, Im and Scheinder, 2005, Tseng et al., 1992), this investigation used correlations as a preliminary test prior to more advanced statistical analyses. The objective of this analysis was to assess whether there was an association between daily measures of environmental exposures and the daily number of medical contacts made by school-age asthmatics and non-asthmatics.

Bivariate analyses using Pearson or Spearman's correlation were conducted on daily measures of environmental exposures and daily counts of medical contact. The correlational method was dependent on the distribution of the daily numbers of medical contact. The choice of correlational method was also influenced by what type of analysis (Normal or non-Normal) would be employed in the next analysis (autoregressive analysis). For each geographical area, the objective was to use the same type of analysis throughout the investigation.

To investigate any potential lagged effects from environmental exposures, correlations were carried out between the lag terms of the environmental variables and daily medical contacts. Each correlation was conducted with two-tailed statistical significance set at five percent.

4.5.3.1. Comparative Analyses (Correlations)

For Normal data, Pearson's correlation was used whilst for non-Normal data, Spearman's correlation was employed. England and Wales All Counts included a relatively high daily counts thus Pearson's was suitable for England and Wales' data. However, All Counts from the Trent Region and Sheffield held non-Normal distributions and counts were relatively low. Therefore, it was questionable whether parametric correlations were suitable for the data. Two comparative analyses were conducted on All Counts only.

1. Spearman's correlation was compared to Pearson's correlation to test the robustness of the results.
2. Correlations conducted up until 7 days were compared to correlations conducted up until 14 days to investigate whether results were more significant with further lag terms.

A synopsis of the results from these two analyses can be found in Chapter Six.

For the purposes of this thesis, the term "comparative" is used to refer to the comparison of two models to observe whether the results produced from one method are a) robust and/or b) more significant than results produced from another method. A sensitivity analysis is an analysis which does not make the same assumptions as the main analysis and so allows an investigation of the robustness of the results to possible deviations in that analysis's assumptions. If the results are consistent then the sensitivity analysis gives confidence in any inferences drawn. For example, a linear regression is performed under the assumption that the data are Normal. To question and validate the assumption, another method was used on the same data to see whether results are similar. If results are similar then this implies that the original assumption is correct. The term "comparative" is used instead of "sensitivity" because not all the comparisons made test the assumptions of a certain method. Though a small number of comparative analyses referenced in this sub-section and in sub-sections 4.5.5.2 and 4.5.7.1 can be referred to as sensitivity analyses, for consistency, the term "comparative" is coined to cover all comparisons made between two models.

4.5.3.2. Consolidation of Results (Correlations)

No account was made within the analysis for the potential issue of multiplicity. Multiplicity refers to the increased probability of obtaining a false positive result as the consequence of multiple testing (Bender and Lange, 2001). However, in this investigation, inferences were not based on single correlations that were possibly false positive results. This analysis examined all the P-values and draws conclusions based on a collective association between all the environmental exposures and types of medical contact.

There were a large number of correlations. Separating the correlations by geographical region, medical contact and group, this thesis observed associations for three separate geographical areas: England and Wales, Trent Region and Sheffield. For England and Wales, and Trent Region, there were six medical contacts: All Counts, Acute Visits, Casualty Counts, Emergency Consultations, Emergency Counts, and Out of Hours Counts. For Sheffield, there were three medical contacts: All Counts (admissions and A&E Contacts), Admissions, and A&E Counts. For each type of medical contact, there were three groups: asthmatics, non-asthmatics and the excess of asthmatics over non-asthmatics. For each group, correlations were conducted with 28 exposures measured on the current day and 7 days previous. Therefore, there were (28x8) 224 correlations to summarise per group.

To keep the analysis simple, the results of the correlations were consolidated. This investigation evaluated the following aspects of the correlations to compare results between asthmatics and non-asthmatics and to observe overall significance of the relationship between environmental exposures and daily counts:

Individual environmental associations

1. The number of statistically significant correlations amongst the eight lag days per environmental exposure were obtained. Tables were produced illustrating the number of statistically significant coefficients per environmental exposure out of eight lagged associations.
2. To compare whether results were more significant with asthmatics or non-asthmatics, a difference in the numbers of statistically significant correlations between asthmatics and non-asthmatics was calculated. A difference between 1 and -1 was categorised as no difference. Differences of 2 or more illustrated a difference in favour of asthmatics thus the number of statistically significant correlations is higher for asthmatics than non-asthmatics. A difference of less than or equal to 2 inferred the opposite in favour of non-asthmatics. Wilcoxon sign rank test was used to test whether there was a statistically significant difference in the

number of statistically significant correlations between asthmatics and non-asthmatics. P-values and CIs are given to test the median difference. If P-values contradict CIs, the P-value takes precedent. Contradictory evidence suggests the assumptions made for the CI do not hold.

Collective environmental associations

1. To assess whether there was a collective environmental lagged association with daily counts, the most significant (need not be statistically significant) correlations according to lag day were tallied. For asthmatics, non-asthmatics, or the excess of each type of medical contact, for each environmental variable, the most significant correlation was selected according the lag day it fell on (see Table 4.1 for example of analysis). In Table 4.1, the asterisk* refers to the most significant (need not be statistically significant) P-value amongst the lag days for each environmental exposure.

Table 4.1: **Tally of most significant P-values.**

Exposure	Lag0	Lag1	Lag2	Lag3	Lag4	Lag5	Lag6	Lag7
NO	0.93	0.00	0.75	0.46	0.24	*0.00	0.00	0.33
NO_2	0.03	0.00	0.01	0.99	0.40	0.01	*0.00	0.38
NOD	0.35	0.00	0.20	0.69	0.24	0.00	*0.00	0.81
SO_2	*0.00	0.31	0.05	0.28	0.08	0.46	0.07	0.04
PM_{10}	0.00	0.00	0.00	0.00	0.75	0.00	*0.00	0.01
O_3	*0.00	0.00	0.00	0.34	0.76	0.96	0.00	0.00
CO	0.87	0.01	0.92	0.14	0.01	*0.00	0.01	0.55
Tally	2	0	0	0	0	2	3	0

Tallies were illustrated using bar charts to depict collective lagged associations.

2. To highlight the spread of significance, for each group (asthmatics, non-asthmatics, or the excess) per medical contact, the P-values of all the coefficients were pooled together and histograms were used to demonstrate the distribution. The histograms illustrated whether there was a collective association between environmental exposures and daily numbers of medical contact. A mean of a uniform distribution of values that range from 0 to 1 is 0.5; this is otherwise known as the expected value and is used to set the cut off for significance. A positive distribution with a mean P-value of less than 0.5 illustrates a collective association between environmental exposures and daily counts. A uniform distribution with a mean P-value equal to or higher than 0.5 illustrates no association. Negative distributions should not occur since under the null hypothesis, a group of P-values should exhibit a uniformed distribution. The difference between the mean P-value and the null hypothesis (set at 0.5) was calculated.

4.5.4. Multiple Regressions Analyses

Correlating environmental daily measures with daily counts of school-age asthmatic and non-asthmatic medical contacts provided preliminary evidence of associations between environmental exposures and medical contacts. However, the correlations only investigate bivariate associations. Correlations do not account for the fact that in this investigation, observations (daily counts and daily measures) were ordered by time and by being ordered by time, these observations have some intrinsic characteristics or structure (Chatfield, 1996). Correlations do not take into account the effect of possible external factors (i.e. day of the week effects). In addition, correlations also do not take into account the possibility that the data maybe autocorrelated (see Autocorrelation 4.5.5). To investigate the relationship between environmental exposures and childhood asthma, standard multiple regressive techniques were applied to investigate environmental associations with daily counts of school age asthmatics, non-asthmatics, and excess controlling for confounding factors (day of the week, bank holiday, and season).

4.5.5. Autocorrelation

Autocorrelation is often encountered in time series datasets (Chatfield, 1996). Autocorrelation is the correlation between two or more data points separated by time. What happens on a day is likely to be influenced by what happened in the days previous. In general, compared to events made one week ago, events that occurred days previous have a stronger influence on current day events. In this investigation, medical contacts made on one day are independent of the medical contacts made on the second day. However, it may be possible that due a constant exposure, the numbers of daily medical contacts made on the first and second day are similar, and thus may be correlated.

Standard linear regression techniques require independence between observations and errors. If present, autocorrelation implies non-independence between the observations ordered by time thus the dependent variable appears to hold non-random data. The presence of autocorrelation invalidates the technique used and thus, other more complex techniques allowing for autocorrelation need to be employed.

4.5.5.1. Preliminary Model: testing the assumptions of a Multiple Regression

The objective of this analysis was to improve upon the weaknesses present in correlational analyses by investigating relationships, controlling for a number of confounding factors. This analysis was designed to compare a null model that included covariates only to an alternative model that included covariates and environmental exposures with its seven lag terms (one exposure per model). Thus, associations with lagged measures were observed concurrently with current day measures.

A number of studies referenced in the literature review included dummy variables to control for day of the week influences (Grineski et al., 2010, Halonen et al., 2008, Anderson et al., 1998). A number of studies added bank holiday as a covariate (Lee et al., 2006a, Peel et al., 2005). In addition, several studies (see 2.3.1) report a seasonal pattern in asthma medical contacts. In this investigation, graphically exploring daily counts and daily environmental measures revealed evidence of the seasonal patterns. Day of the week patterns were also evident in the clinical data. Informed by the methods used in the literature and by the seasonal inspection of the data, the first null model included day of the week (except Sunday), bank holiday, and season.

In order to carry out a suitable linear regression, the following assumptions should be fulfilled: the relationship between the independent and dependent variable is approximately linear and as a result of the model the errors/residuals are produced at random and are Normally distributed (Machin et al., 2007). In addition, predictors (if more than one) should be linearly independent and not highly correlated (Field, 2009).

Samples of null and alternative models were evaluated to assess whether all the assumptions of a Normal regression were satisfied. Testing a number of the assumptions was achieved by examining: the distribution of the residuals; the cumulative probability using a Normal Probability Plot; the scatter plot of the predicted values and standardised residuals; and the autocorrelation plot of the standardised residual. Autocorrelation plots illustrate the autocorrelation coefficient (y-axis) by time lag (x-axis).

To meet the assumptions of a linear regression, the distribution of the residuals should be Normally distributed, the Normal Probability plot should follow a fairly straight diagonal line, the scatter plot should show a random scatter of predicted values against standardised residuals. The Auto Correlation Function (ACF) should exhibit autocorrelations within the lower and upper confidence intervals (-0.05 to 0.05).

4.5.5.2. Comparative Analyses Multiple Regressions

As a number of the standard regressive assumptions were not fulfilled in particular, there was quite a high level of autocorrelation (see Appendix F, F1), further work was conducted to see whether linear regression was suitable for England and Wales, Trent and Sheffield datasets and whether modification to the outcome or the addition of more covariates could reduce deviation from the assumptions. A number of comparative analyses were carried out to find the most suitable model to represent the investigation's null hypothesis. These analyses were conducted mainly using the medical contact with the highest counts: All Counts. Comparisons were made to evaluate the robustness or similarity in results of the primary analysis; changes were conducted only if the new model proved more appropriate and produced results that were more significant.

To verify whether results from the comparative analysis conducted for the correlational analysis hold true using regressive techniques, the first comparative analysis compared a linear model using daily counts as the outcome with environmental exposures lagged by 7 days versus a linear model using daily counts as the outcome with environmental exposures lagged by 14 days.

Transforming daily counts into first order difference is one method used to reduce autocorrelation (Chatfield, 1996). First order difference is the difference between current daily counts and daily counts lagged by one day. Lag bank holiday effects were a possible confounder if first order difference were used as an outcome. This was illustrated by examining the residuals of a null model (day of the week, bank holiday and season) with first order difference as the outcome. A lagged bank holiday dummy variable was constructed: this was defined as a day after a bank holiday but it must not land on a day that was already a bank holiday. Thus, there were no double lagged bank holidays. For example, at Christmas, two bank holidays are followed by only one lag bank holiday. Since Christmas day was omitted from the analysis, there were only three double holidays for England and Wales from 1999 to 2004. The second comparative analysis compared a linear model using first order difference as an outcome with no lag bank holiday versus a linear model using first order difference with lag bank holiday. The results of this analysis were not only used to see if there was added value by including another covariate but also, the results were compared to the first comparative analysis to observe whether first order difference was a better endpoint compared to daily counts.

Governed by the results from the second comparative analysis, the third comparative analysis compared a linear model with all data versus linear model with outlying residuals omitted. This comparison was made using first order difference as an outcome. This comparison observed whether there was any advantage by removing the outlying residuals.

Informed by the results of the third comparative analysis, the fourth comparative analysis compared a linear model versus Poisson model using All Counts first order difference only. This comparison observed whether there was any advantage in using a different analytical approach. At the end of these analyses, it was concluded that using all the data (no omissions), a Normal regressive model using first order difference as an outcome and day of the week, bank holiday, lagged bank holiday and season as covariates was the appropriate null model for England and Wales' data.

In an attempt to find an alternative endpoint that could be used instead of first order difference (defined earlier within this sub-section) and could also be explained using a linear model, the fifth comparative analysis compared a linear model using rank of daily counts (tied ranks not modified) versus Poisson model using daily counts on the Trent Region only. This analysis observed whether there was any advantage to using a linear model on the rank of daily counts compared to using a Poisson model on daily counts.

Again in an attempt to further investigate the results of the first order difference, the final comparative analysis compared a linear model using rank of first order difference versus Poisson model using first order difference using the Trent Region's data only.

Comparative analyses were also conducted using Scotland's data. A detailed account of the comparative results for England and Wales, the Trent Region and Scotland are given in Appendix F.

4.5.5.3. Final Method used in the Multiple Analyses

A summary of the results of the comparative analyses are given in Chapter Six. From results of the comparative analyses, linear multiple regressions were employed to analyse the England and Wales dataset and Poisson multiple regressions were used to analyse the Trent Region and Sheffield datasets. Informed by the comparative analyses, there was no advantage in investigating environmental exposures lagged further than seven days. The alternative model included all covariates plus the addition of an environmental variable lagged by seven days.

Twelve covariates were included in the final null model. These included days of the week (Monday to Saturday, Sunday was excluded and was the reference day), bank holiday lagged bank holiday, and four sinusoidal terms. Sinusoids are a series of waves employed to control annual seasonal patterns (Samoli et al., 2001, Schwartz et al., 1996). First order difference of the daily counts was used as an outcome in order to reduce autocorrelation.

For England and Wales, the point-estimates and P-values for the environmental variables were extracted along with the residual sum of squares from each standard multiple regression. An F-test calculation of the difference in the residual sum of squares (RSS) between the two models was used to compare the fit of the null model against the model with the addition of each environmental variable lagged by seven days (see calculation in sub-section 4.5.7.2).

For Trent Region and Sheffield, point-estimates (illustrated as a percentage change per one unit increase) and P-values for the environmental variables were extracted along with the deviance of each multiple regression (Poisson). Overdispersion refers to the presence of greater variability in the observed model than is expected based on mean-variance relationship (Hinde and Demétrio, 1998). Examining overall model effects that include continuous variables is more appropriately tested using an F-test calculation where models may exhibit overdispersion (Collett, 2002).

The presence of autocorrelation was investigated via ACF (Auto Correlation Function) plots in all the models and a minimal presence of autocorrelation was detected (between -0.1 and 0.1).

4.5.6. Weaknesses of Multiple Regression Analyses

Although the Multiple (Linear and Poisson) regressions revealed a number of relationships between daily environmental measures and daily counts, there were problems related to the use of first order difference as an endpoint. The predominant issue was the difficulty in interpreting the results using first order difference as the outcome. Results using first order difference were interpreted as day-to-day changes in daily counts. Day-to-day change refers to the difference between daily counts occurring on day one and day two. It was more desirable to find a method that can analyse the raw data so that interpretation infers that a one-unit increase with any given environmental measure equalled a daily increase in the number of daily counts. Once more, the variance in the models conducted using first order difference was higher in comparison to models using the original daily counts.

As this was an exploratory analysis, it was necessary to explain any relationships using raw daily counts. To account for the autocorrelation encountered with medical contacts from England and Wales, autoregressive techniques were used to explain the relationships between environmental exposures and daily counts of medical contact.

4.5.7. Autoregressive Analyses

Autoregressive techniques are often used to investigate time series data and have been utilised in a number of the studies referenced in the literature review (for example, Sunyer et al (2003) and Atkinson et al (2001)). Autoregressive techniques based on a Poisson distribution to investigate the effect of air pollution on health were used in the "Air Pollution and Health: a European Approach" (otherwise known as APHEA) project.

The autoregressive (AR) process within a model is a random (stochastic) process that computes future values based on past values of the time series. The AR term is often used in conjunction with a moving average (MA) which reduces and smoothes out the effects of the random variation by taking the average of a subset of data points moving across the time series (Chatfield, 1996). Autoregressive Moving Average models often include an Integrated term (I) which differences the time series to a create stationarity (Chatfield, 1996) thus parameters such as the mean stay constant over time. AutoRegressive Integrated Moving Average models are referred to as ARIMA models. The terms for the AR, I and MA are normally bracketed for example ARIMA (1,0,0); the first value refers to the autoregressive term, the second value represents the integrated term, and the third value represents the moving average.

4.5.7.1. Comparative Analyses Autoregressions

A number of different ARIMA models were investigated under the criteria that a model removed the presence of autocorrelation and could be implemented across all medical contacts within one geographical area. Firstly, using only All Counts, the simplest model (ARIMA (1,0,0)) was implemented to evaluate where autocorrelation was present. The autocorrelation plots revealed significant autocorrelation every seven lags. This implied that observations every seven days were correlated (seventh order autocorrelation) thus were non-independent of each other. Therefore the models should either include an AR7 (this uses the last seven values to predict the next value) or a MA7 term (this smoothes the data using seven day moving averages) in an effort to minimise the seventh order autocorrelation. This analysis did not difference any of the time series thus the integrated term remained as 0. The next model that was examined included MA7 but autocorrelation was still present though at lesser severity in comparison to autocorrelation produced by the ARIMA (1,0,0) model. Therefore, a model included AR(7) was examined; this model removed the majority of the autocorrelation. Together with a MA(1), the model ARIMA (7,0,1) removed slightly more of the autocorrelation and was used for further analyses. See Appendix G for a sample of the autocorrelation plots.

Two further comparative analyses were conducted using autoregressive models with seven autoregressive lag terms.

First, in an attempt to remove any traces of autocorrelation, within the Normal autoregressive analysis, the results from autoregressions conducted without robust Standard Errors (SE) were compared to results from autoregressions conducted with robust SEs. This comparison was not implemented with the Poisson autoregressive analysis because at present (December, 2012), autoregressive models based on a Poisson distribution cannot be conducted with robust SEs in STATA.

Second, from the results of the previous comparative analyses, Normal autoregressive models were to be applied to the England and Wales data whilst Poisson autoregressive models were to be applied to the Trent Region and Sheffield data. A Normal autoregressive model can be suitably applied to assess the effects of independent variables on the second outcome – the excess (difference between the daily number of asthmatics and non-asthmatics). However, it is questionable whether Poisson autoregressive methods could appropriately be used on the excess as an outcome. Not least as for a Poisson regression the outcome must be greater than zero as the distribution represents counts or the number of events per specified interval in this case, time. However, the difference between two Poisson distributions (daily counts of medical contact by asthmatics and non-asthmatics) does not necessarily result in a Poisson distribution. If possible, to be able to compare results, the intention was to keep the outcome of the excess the same across the three geographical areas. To investigate whether the excess as an outcome was sufficient and did not produce dissimilar results from an otherwise more appropriate model, the results from a autoregressive analysis using the excess as an outcome were compared to the results from an autoregressive analysis using daily counts of medical contact made by asthmatics as the dependent variable and daily counts of medical contact made by non-asthmatics as a covariate.

A summary of the results from these two comparative analyses is given in Chapter Six.

4.5.7.2. Final Methods used in the Autoregressive Analyses

Similar to the multiple regression analyses, the null model (including covariates only) was compared to the alternative model (including covariates plus environmental terms lagged by seven days). The null model includes the following covariates: Monday to Saturday, bank holiday, and four sinusoidal terms.

Informed by previous comparative analyses performed using standardised regressive techniques, there was little to gain by adding more than seven environmental lagged terms. Therefore, the alternative model included covariates plus the addition of an environmental variable lagged by seven days.

For England and Wales, an ARIMA (7,0,1) was the most appropriate model that was tested. Note, with one of the medical contact types – Acute Visits, a number of models would not converge. The intention was to use the same model across the types of medical contact from one geographical region thus for Acute Visits, convergence thresholds were lowered to allow convergence to be achieved.

The results calculated from an ARIMA analysis should produce similar point-estimates and P-values to a linear regression. Thus, as an internal check of the ARIMA results, Normal regressions were carried out on a sample of the models (null model plus four models including environmental variables for each medical contact, asthmatics, non-asthmatics, and the excess). Point-estimates from the ARIMA models and regression models were similar. Correlograms were used to investigate the presence of autocorrelation. Minimal autocorrelation was found.

For England and Wales, point-estimates and P-values for the environmental variables were extracted along with the log-likelihood statistic for each autoregressive model. Point-estimates were not comparable across the environmental measures due to incomparable unit increases (one unit increase in degrees centigrade is not comparable to one unit increase in μgm^3 (see glossary for μgm^3 definition)). Thus, point-estimates were standardised by dividing the point-estimate by the Standard Error (SE). Under the null hypothesis, every standardised point-estimate is Normally distributed with a mean of 0 and a SD of 1 (N(0,1)). Consequently, every unit increase reflects a "standardised" unit that is comparable across the environmental variables.

A log-likelihood ratio test was used to compare the fit of the null model against the alternative model with the addition of an environmental variable lagged by seven days. The calculation that examined the difference in the log-likelihood follows:

$$\text{Chi value} = 2\text{x}(\text{LLR1} - \text{LLR2})$$

Where LLR1 represents the log-likelihood statistic from the null model and LLR2 represents the log-likelihood statistic from the alternative. The P-value for the chi-value was calculated using the CHIDIST function in Excel using the following formula:

$$\text{CHIDIST} = ((\text{LLR1-LLR2})\ \text{x-2}),(\text{df1-df2}))$$

There were 11 degrees of freedom (df) accounted for by the null model (model1) and 19df for the alternative (model2) thus the difference was 8df. Statistical significance for each model was set at five percent.

For the Trent Region and for Sheffield, the daily counts were extremely low and the data were not Normally distributed. An autoregressive analysis using a log-linear Poisson distribution (created by Tobias A and Campbell MJ, published in STATA Bulletin, November 1998) was implemented. In similarity with an ARIMA model, this type of analysis accounts for autocorrelation. It also accounted for potential overdispersion. This analysis was instructed using a statistical package called STATA with the command "arpois" (Tobias and Campbell, 1998).

Contrasting with the ARIMA models, moving averages were not specified in the model thus autocorrelation could only be accounted for using the AR term. The same autoregressive term as used for England and Wales was implemented for the Trent Region and Sheffield (AR7). As Poisson regressions do not allow for negative values, a constant was added to the daily excess of medical contact to create positive integers. As conducted for England and Wales, for an internal check of the arpois results, a Poisson regression was carried out on a sample of the models (null model and four models including environmental variables for each medical contact, asthmatics, non-asthmatics, and the excess). Point-estimates and P-values from the arpois models and Poisson regression models were similar. Correlograms were used to investigate the presence of autocorrelation. Minimal autocorrelation was found.

For the Trent Region and Sheffield, the point-estimates and P-values for the environmental variables were extracted along with the residual sum of squares from each Poisson autoregression model. Point-estimates were illustrated as percentage change per one unit increase. In comparison to the point-estimates in the ARIMA analysis, the unit increase was not comparable across the environmental measures, therefore, point-estimates were standardised by dividing the point-estimate by the SE. Under the null hypothesis, every standardised point-estimate is Normally distributed with a mean of 0 and a SD of 1 (N(0,1)). Consequently, every unit increase reflects a "standardised" unit that is comparable.

An F-test was used to compare the fit of the null model against the model with the addition of each environmental variable lagged by seven days. The calculation follows:

$$\text{F-value} = \frac{((RSS1-RSS2)/(df2-df1))}{(RSS2/(n-df2))}$$

Where RSS1 represents the RSS statistic from the null model and RSS2 represents the RSS from the alternative. n refers to the observations or number of days in the model minus 1 and minus the number of terms specified in the model (AR (7) = 7 terms). There were 11df for the null model (model1) and 19df for the alternative (model2) thus the difference was 8 df. The P-value for the F-value was calculated using the FDIST function in Excel.

P-value = (F-value, RSS1-RSS2, df2-df1)

Statistical significance for each model was set at five percent.

4.5.7.3. Consolidation of Results

As with the correlational analyses, no account was made for the multiplicity in the analysis. Multiple testing increases the chance of obtaining a false positive result (Cook et al. 2004). However, with this investigation, inferences were not solely drawn from single associations that were possibly the product of chance. This analysis examined all the P-values and draws conclusions based on a collective association from all the environmental exposures and medical contact. This is one method of allowing for the presence of multiplicity.

This analysis produced a large number of results that had to be summarised, the results of the autoregressive analyses were consolidated.

Individual environmental associations

1. To examine individual overall model associations per environmental exposure, tables of LLR/F-test values and P-values were produced.

2. To examine individual associations per environmental exposure, tables were produced illustrating the number of statistically significant point-estimates per environmental exposure out of 8 lagged associations.

Collective environmental associations

1. To examine the spread of significance of the overall model (LLR or F-test) P-values, histograms of model P-values were used to examine whether environmental exposures (collectively) were predictors of daily counts of medical contact. This examined whether there was a general association between environmental exposures and daily numbers of medical contact. A positive distribution with a mean P-value of less than 0.5 illustrates a collective association between environmental exposures and daily counts. A uniform distribution with a mean P-value equal to or higher than 0.5 illustrates no association. The difference between model mean P-values (calculated from all 28 models including environmental exposures) and the null hypothesis (0.5) were calculated.
2. To examine potential collective lag effects, the most significant point-estimates according to lag day were tallied to illustrate among all environmental exposures, whether there was a delayed environmental effect on daily counts of medical contact.
3. To investigate whether conclusions from the model P-value distributions were similar to conclusions based on the point-estimate P-values, point-estimate P-values (environmental point-estimates only, not covariates) were pooled together and histograms used to illustrate the distributions. In comparison to the interpretation of the model P-value distributions, a positive distribution with a mean P-value of less than 0.5 illustrates a collective association between environmental exposures and daily counts. A uniform distribution with a mean P-value equal to or higher than 0.5 illustrates no association. The difference between the point-estimate mean P-value (calculated from all point-estimate P-values) and the null hypothesis (set at 0.5) were calculated.

The same methods to consolidate results were used for the standard multiple regressions with first order difference as the outcome.

4.6. Method for Spatial Analyses

A simple analysis was conducted to investigate spatial relationships between pollutant exposures and medical contacts in Sheffield.

4.6.1. Comparative Hospital contact Ratios (CHR)

Age standardised logged Comparative Hospital Contact Ratios (CHRs) were calculated to examine whether the observed number of mean (over four years, 2002 to 2005) counts per MSOA was significantly above, below or the same as the expected number of mean counts. These were calculated for asthmatic medical contacts (observed number of asthmatic medical contacts above or below the expected asthmatic medical contacts) and non-asthmatic medical contacts and for asthmatic over non-asthmatic medical contacts (observed excess above or below the expected excess). The CHRs were logged so that robust Standard Errors (SE) could be computed. The SE of the logged CHRs were used to obtain test-statistics with corresponding P-values which revealed whether the ratio was significant.

The following steps were taken for the calculation of the logged CHR, SE of the CHR and the P-value for asthmatics and non-asthmatic medical contacts, and the excess.

1. To calculate a logged CHR, an age-specific rate was calculated. Age-specific rates (observed number of asthmatic or non-asthmatic medical contacts per age strata, each age strata consists of four years) were calculated by dividing the number of asthmatic medical contacts per age strata per MSOA by the population count per age strata per MSOA. Population counts were obtained for 2001 from the ONS website.

1.a. The numbers of asthmatic medical contacts were aggregated to obtain the crude sum per MSOA.

1.b. The expected counts were obtained by multiplying the total population (of 5 to 16 years olds in Sheffield) per age strata per MSOA by the age-specific rate.

1.c. The observed counts were the total number of asthmatic medical contacts for the whole of Sheffield.

1.d. The dataset were aggregated so that the observed, expected, and crude statistics were summed/averaged per MSOA.

1.e. CHR was obtained by dividing the expected over observed count. The CHR was logged to obtain a logged CHR.

2. The SE of the CHR and the SE of the logged CHR were required to calculate the test-statistic and corresponding P-value, which signifies the significance of ratio. To calculate the SE for each CHR for asthmatic medical contacts (or non-asthmatic medical contacts), the following equation was used (in paper Julious et al (2001)):

$$= \frac{\sqrt{((N^2)*(d/(n^2)))}}{X}$$

Where: N=population in Sheffield
d=crude number of medical contacts
n=population per MSOA in Sheffield
X= observed number of medical contacts

To calculate the SE of the logged CHR, the SE(CHR) was divided by the CHR.

3. To calculate the test statistic for asthmatic or non-asthmatic medical contacts only, the logged CHR for asthmatic medical contacts were divided by the SE of the logged CHR for asthmatic medical contacts. The absolute values (of the test statistic) and P-values using the Normal distribution were obtained.

4. To calculate the test statistic for the CHR of asthmatic over non-asthmatic medical contacts the following equation was used (Julious et al., 2001):

$$= \frac{(A - B)}{\sqrt{((\text{SE of } A^2)+(\text{SE of } B^2))}}.$$

Where: A=logged CHR for asthmatic medical contacts
B=logged CHR for non-asthmatic medical contacts

The absolute values and P-values using the Normal distribution were obtained.

4.6.2. Relationship between the Clinical and Environmental Datasets

To identify bivariate relationships, correlations were conducted between the logged CHR for asthmatic and non-asthmatic medical contacts, and the excess in conjunction with pollution data.

4.6.3. Graphical Presentation of Results

Using Geographical Information Systems, firstly, a map of Sheffield was created to depict CHRs for asthmatic and non-asthmatic medical contacts, and the excess. Secondly, maps were created to display the pollution scores from the ONS to identify whether any asthma hotspots fall within MSOA's with higher pollution scores. Comparing these maps illustrated whether there was evidence of a geographical relationship between pollutant levels and counts of hospital contact. Colour gradients were used to depict whether MSOAs had above or below the expected number of observations, the statistical significance of the CHR and the pollution measures for each MSOA.

4.7. Software

The time-series analyses, descriptive assessments, correlations and multiple regressions were conducted using SPSS16 and PASW18. The autoregressive analyses were conducted using STATA11. The calculating of model P-values, consolidation of the P-values and selecting the most significant point-estimates were conducted using Microsoft Excel 2007.

For spatial analyses, the statistical analysis was performed using PASW18. To produce maps of Sheffield, ArcGIS 9.3 mapping software was used.

4.8. Summary

This chapter reported the methods of analyses used for the time-series and spatial analyses. In summary, for the time-series investigation, to explore the original data, a descriptive assessment of the clinical endpoints and environmental measures was undertaken. This was followed by a description of the analysis used to support the national extrapolation of environmental measures sourced from one city specific location (Bland-Altman plots).

Aggregated daily means were calculated and these were graphically examined to explore seasonal patterns in the average number of daily contacts.

To investigate the relationship between environmental exposures and medical contact, a bivariate analysis was undertaken to assess crude associations. This was followed by an autoregressive analysis to identify relationships accounting for confounders including day of the week, bank holiday, and season. For both the correlational and the autoregressive analyses, to account for multiplicity and consolidate the results, the environmental associations were examined together by combining model or point-estimate P-values and tallying the most significant point-estimate across eight lagged days to assess lagged effects. Therefore, the majority of results are referred to as collective environmental association with daily counts.

To investigate potential spatial associations between pollutant and rates of medical contact, simple graphical and correlational methods were conducted.

Chapter Five commences this thesis' presentation of the results starting firstly with the investigation examining school related seasonality in medical contacts made by school-age asthmatics and non-asthmatics.

Chapter Five

School-related seasonality of medical contacts made by school-age asthmatics and non-asthmatics

5.1. Introduction

Methods of analyses were discussed in Chapter Four. To address the first aim, this chapter aims to provide the results of a simple time-series investigation to examine whether there is a peak in the mean daily number of medical contacts associated with the return to school after the summer vacation (in addition with school holidays, Easter and Christmas) in school-age asthmatics, non-asthmatics and the excess. In this chapter, the terms seasonal or seasonality are used in reference to school-related seasonality.

Using aggregated mean daily counts calculated from the six-years of data, this chapter examined patterns within an "average year". The average year as well as sub-periods chosen around the three longest school holidays (Easter, summer and Christmas) were investigated to see whether peaks and troughs were associated with school holiday periods.

Note this analysis uses time-series datasets and reports seasonal patterns for All Counts only. For GRPD datasets representing England and Wales and the Trent Region, All Counts consist of unscheduled Emergency Consultations, Acute Visits, Casualty Counts and Out of hours Contact. For the SCH dataset representing Sheffield, All Counts consist of Admissions and A&E Contacts. Seasonal patterns were also investigated with the medical contacts that contributed to All Counts. However, due to the vast number of endpoints, for reasons of conciseness, seasonal patterns for the remaining datasets are displayed in Appendix D.

5.1.1. Aims of the chapter

This chapter aims to answer the three following questions:

1. Is there a peak in medical contacts associated with the return to school after the Easter, summer, or Christmas vacations in school -age asthmatic and non-asthmatic children?
2. Is the peak associated with the return to school observed in asthmatics in excess of non-asthmatics?

Table 5.1: All year indexday reference.

Indexday	Day and month reference
1	1st January
32	1st February
59	1st March
90	1st April
120	1st May
151	1st June
181	1st July
195	Approximate start of the school summer holiday (3rd week in July)
212	1st August
243	1st September
247	Approximate start of the school year
273	1st October
304	1st November
334	1st December
358	Christmas Day

Observations made in reference to the school calendar are in relation to the English/Welsh school calendar specifically.

For every year, each day was given an index number (Table 5.1). For each indexday, the mean number of medical contacts on that day was calculated over six years. For each indexday, the mean number of contacts was based on six observations; this produced aggregated daily means. To examine seasonal patterns using the aggregated daily means, sub-periods of the year were compared to "average" year summary statistics. These sub-periods were defined around the three longest school holidays.

1. The Easter period was defined 28 days before and after Easter Sunday (n=57 days).
2. The summer period was from the beginning of July to the end of October (n=123 days). In England and Wales, school summer holidays are normally scheduled to start in the third week in July and school return after the summer holiday is usually scheduled for the first week in September.
3. The Christmas period was defined 28 days before and after Christmas day (n=57 days).

5.2. Is there a peak in medical contacts associated with the return back to school after the Easter, summer, or Christmas vacations in school age asthmatic children and non-asthmatic children?

5.2.1. England and Wales Seasonal Patterns with Asthmatic and Non-asthmatics Medical Contacts

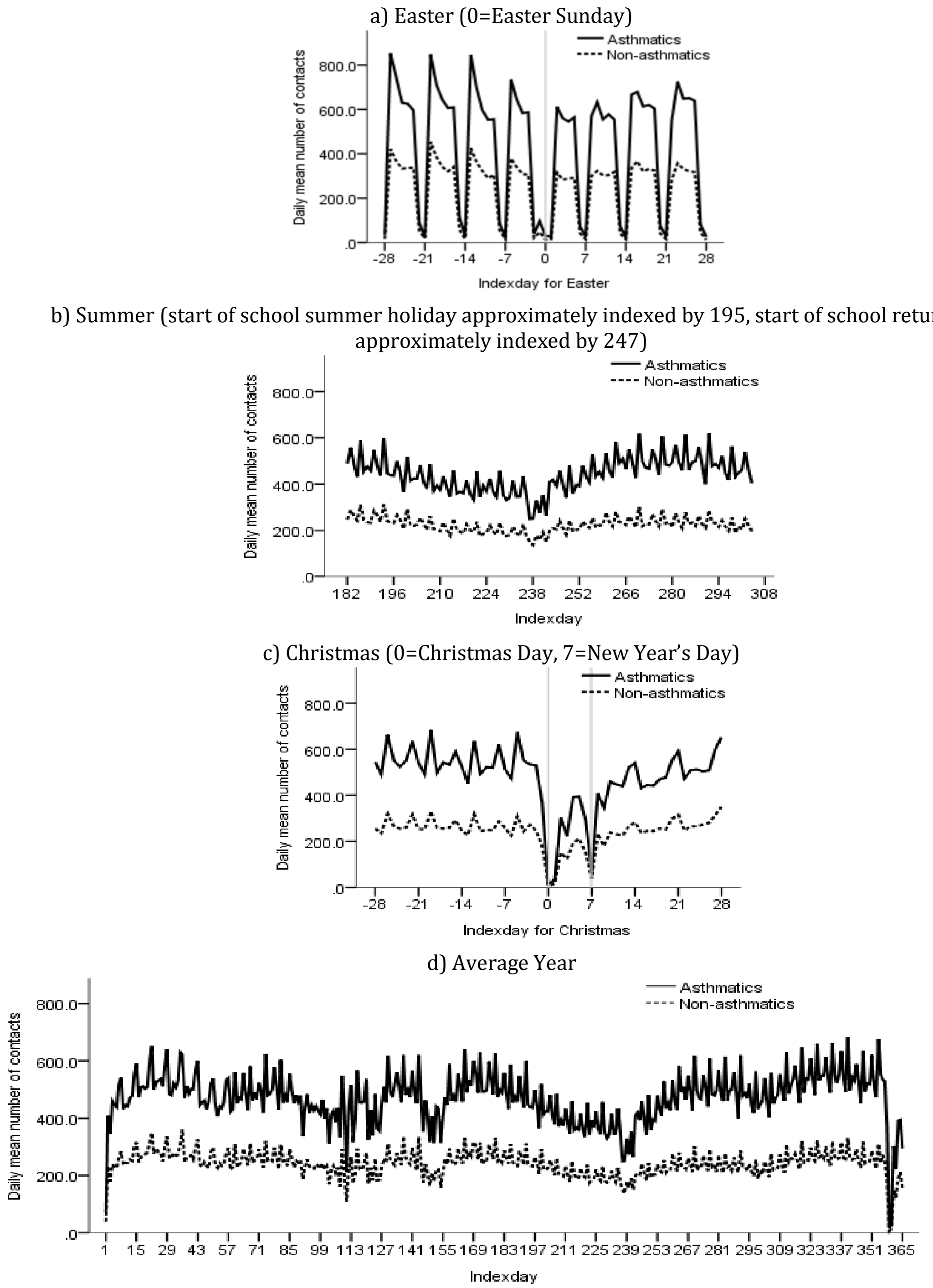


Figure 5.1: England and Wales All Counts - plot of the aggregated daily mean number of contacts at a) Easter b) summer, c) Christmas and d) Average Year.

Figure 5.1 illustrates the average seasonal pattern of mean daily counts around the three sub-periods and for the average year. The seasonal pattern correlates with the school calendar.

In Easter period, counts drop every weekend but there was a more prolonged drop for three to four days around Easter Sunday (Figure 5.1a). Counts before Easter Sunday were higher than after Easter Sunday. During the summer period, counts decreased gradually from the end of July into August (Figure 5.1b). Counts remained low until the mid-September then increased and fluctuated at a steady level until mid-October. The peak in medical contacts occurred approximately two to three weeks after school return in September. In the Christmas period, mean daily counts fluctuated at the same level until Christmas Eve (Figure 5.1c). The lowest counts occurred on Christmas and New Year's Day; counts between these two holidays were low compared to counts before Christmas Day and after New Year's Day. Counts before Christmas Day were slightly higher compared to counts after New Year's Day.

The patterns observed in the sub-period graphs replicate patterns observed across the average year (Figure 5.1). Therefore, there were pronounced drops in counts on New Year's Day and Christmas Day. There were also troughs in April (Easter), at the beginning of May, at the beginning of June where generally schoolchildren have a half-term break, and in August where children are taking their summer holidays. In each period, the trend for non-asthmatics mirrored asthmatics but the increases and decreases in counts were less pronounced.

Similar seasonal patterns were observed with other types of medical contact, these results are reported in Appendix D.

5.2.2. Trent Region Seasonal Patterns with Asthmatic and Non-asthmatics Medical Contacts

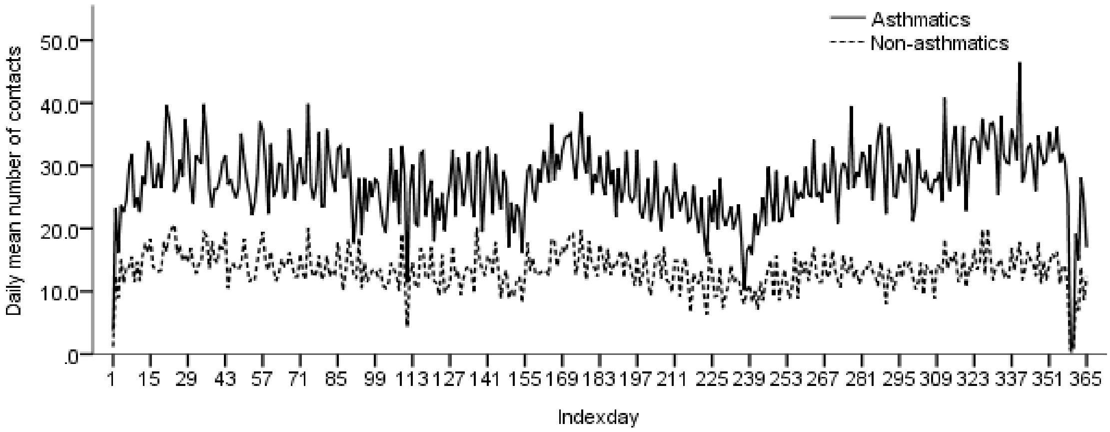


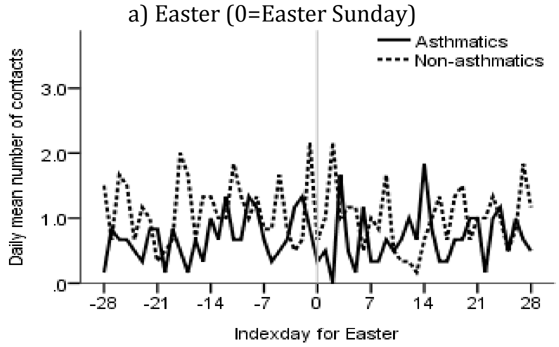
Figure 5.2: Trent Region All Counts - plot of the aggregated daily mean number of contacts at a) asthmatics and non-asthmatics.

As Trent seasonal patterns were similar to those seen in the England and Wales dataset, sub-period plots for Easter, summer and Christmas periods are given in Appendix D. Seasonal patterns were less pronounced with the Trent dataset compared to England and Wales. Aggregated mean daily counts fluctuated at a constant level throughout the year (Figure 5.2). There was a slight drop after March (31st March = indexday 91), at the beginning of June (indexday 151) and in August (1st August = indexday 212). In each period, the trend for non-asthmatics mirrored asthmatics but the increases and decreases in counts were not as pronounced.

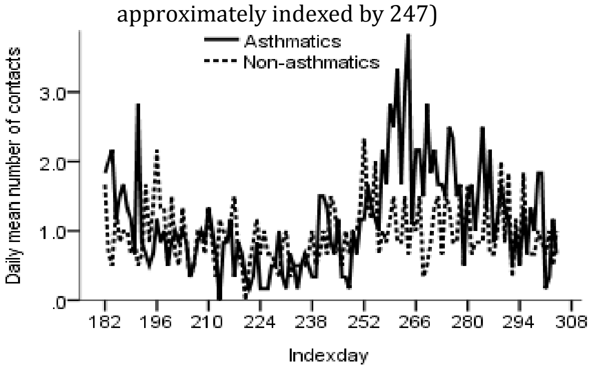
Similar seasonal patterns were observed with the remaining five medical contacts, these results are reported in Appendix D.

5.2.3. Sheffield Seasonal Patterns with Asthmatic and Non-asthmatics Medical Contacts

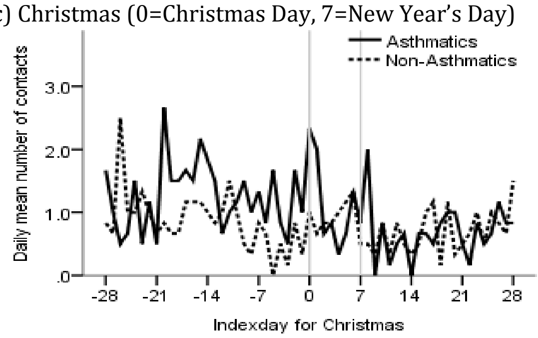
a) Easter (0=Easter Sunday)



b) Summer (start of school summer holiday approximately indexed by 195, start of school return approximately indexed by 247)



c) Christmas (0=Christmas Day, 7=New Year's Day)



d) Average Year

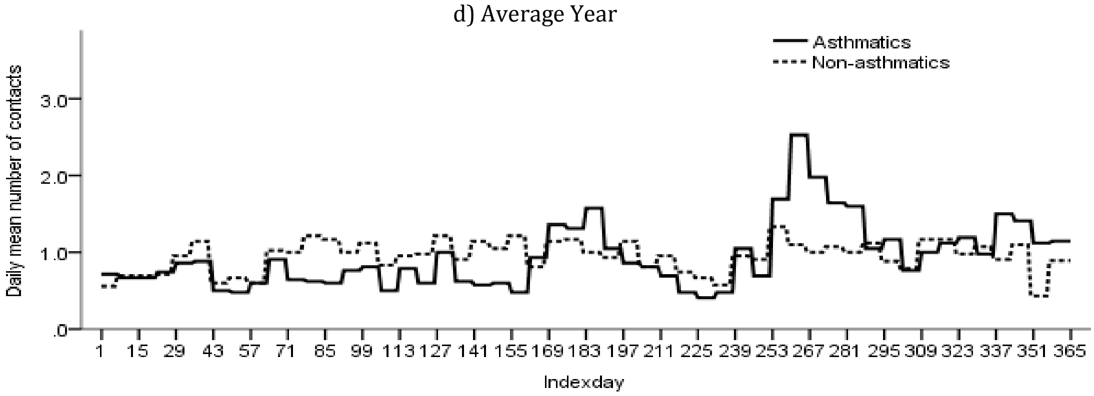


Figure 5.3: Sheffield All Counts - plot of the aggregated daily mean number of contacts at a) Easter b) summer, c) Christmas and d) Average Year (seven-day average).

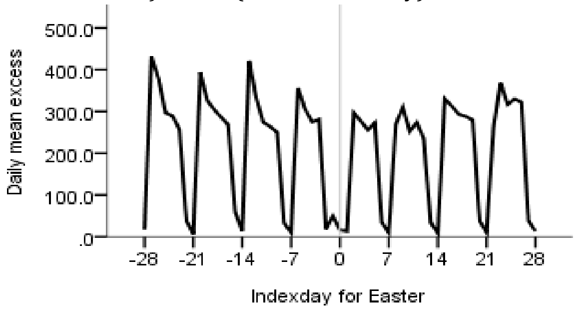
Sheffield seasonal patterns were more pronounced with asthmatic rather than non-asthmatic medical contacts. There was almost no change in the pattern of mean daily counts around Easter period (Figure 5.3a). In similarity to summer patterns that England and Wales and the Trent Region exhibited, there was a trough in daily counts in August (August 1st marked by 212) followed by an increase in September (September 1st marked by indexday 243) (Figure 5.3b). The peak in medical contacts occurred approximately two weeks after school return in September. In the Christmas period, counts were slightly higher before the Christmas holiday compared to after New Year's Day (Figure 5.3c). Compared to England and Wales and Trent where counts on Christmas and New Year's Day were low compared to the rest of the year, for Sheffield, counts on Christmas and New Year's Day were comparable with the rest of the year. This may be attributed to a higher demand in hospital services whilst general practices were closed.

Very slight seasonal patterns were observed with Admissions and A&E counts, these results are reported in Appendix D.

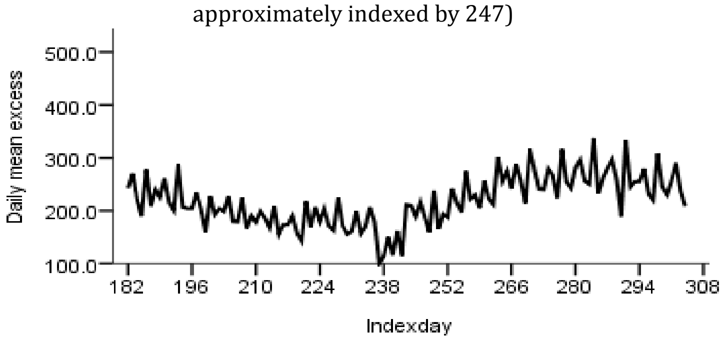
5.3. Is the peak associated with the return back to school observed in asthmatics in excess of non-asthmatics?

5.3.1. England and Wales Seasonal Patterns with the Excess

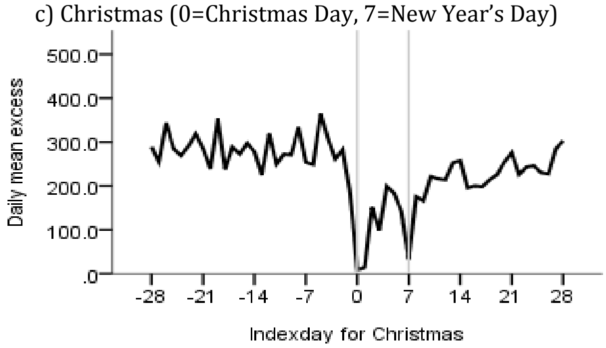
a) Easter (0=Easter Sunday)



b) Summer (start of school summer holiday approximately indexed by 195, start of school return approximately indexed by 247)



c) Christmas (0=Christmas Day, 7=New Year's Day)



d) Average Year

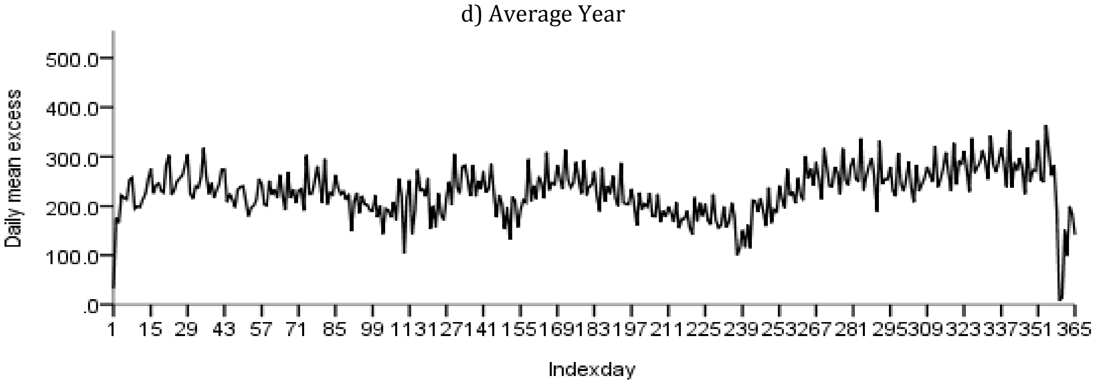


Figure 5.4: England and Wales All Counts - plot of the aggregated daily mean excess at a) Easter b) summer, c) Christmas and d) Average Year.

Seasonal patterns were observed with the excess of asthmatics medical contacts over and above the average school population with national level data; these patterns correlate with the school calendar. The excess in the Easter, summer, and Christmas periods (Figure 5.4) illustrate similar patterns to asthmatics and non-asthmatics. The daily excess before the Easter weekend were generally higher than the excess after Easter weekend (Figure 5.4a). Compared to other normal two-day weekends where troughs in counts/excess occurred, there was a prolonged trough around the Easter weekend. Before the Easter weekend, the excess was lower on Sunday, peaked on Monday then decreased until the end of the week with the sharpest decreasing occurring between Friday and Saturday. These weekly patterns occurred after the Easter holiday; however, the peak at the beginning of the week was lower. There was a trough in the excess during with the first half of the summer followed by an increase towards the end of the summer (Figure 5.4b). The daily excess before Christmas and New Year's holiday was higher than after afterwards (Figure 5.4c). The excess was particularly low on Christmas day and New Year's Day. For the average year, patterns reflect the sub-period descriptions.

Similar seasonal patterns were observed with the remaining five medical contacts, these results are reported in Appendix D.

5.3.2. Trent Region Seasonal Patterns with the Excess

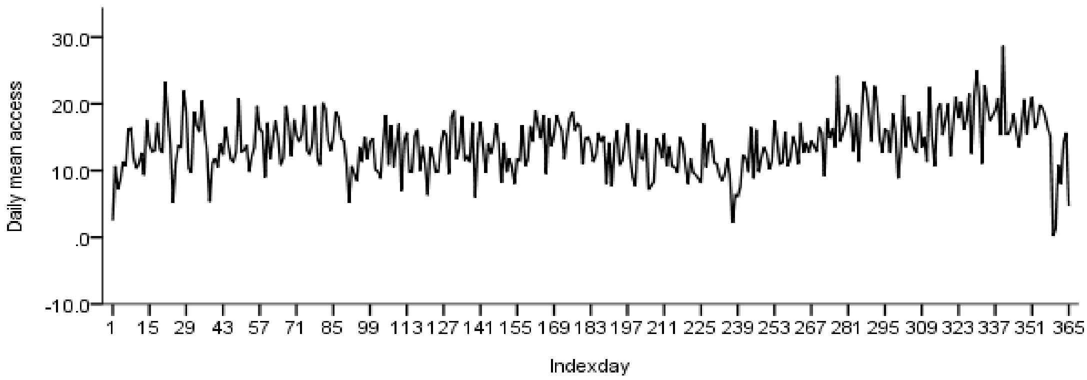


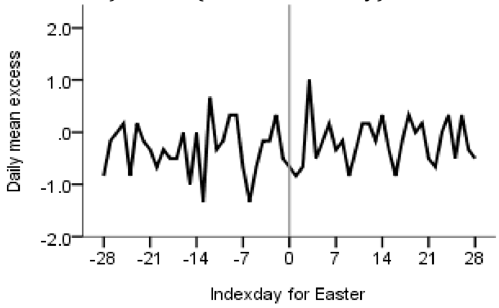
Figure 5.5: Trent Region All Counts - plot of the aggregated daily mean excess.

The seasonal pattern in the average Trent daily excess was less pronounced compared to England and Wales (Figure 5.5). The excess increased at the beginning of the year then fluctuated steadily and slowly declined until the end August. The excess gradually increased from September onwards – consistent with England and Wales' data.

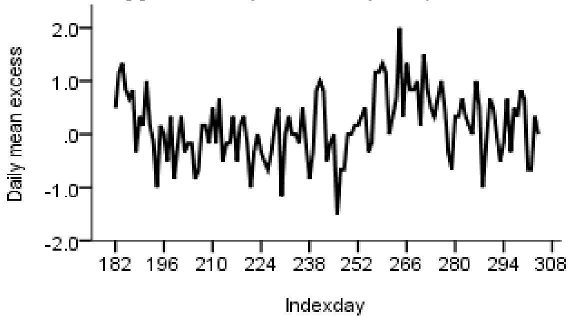
Similar seasonal patterns were observed with the remaining five medical contacts, these results are reported in Appendix D.

5.3.3. Sheffield Seasonal Patterns with the Excess

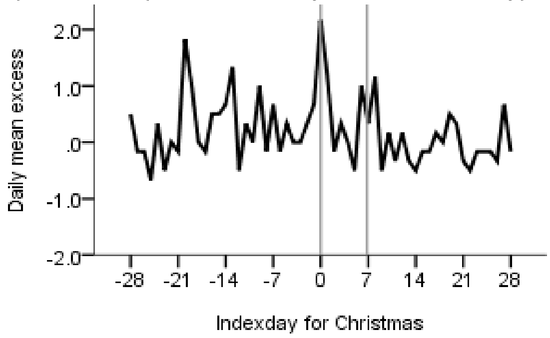
a) Easter (0=Easter Sunday)



b) Summer (Start of school summer holiday approximately indexed by 195, start of school return approximately indexed by 247)



c) Christmas (0=Christmas Day, 7=New Year's Day)



d) All Year

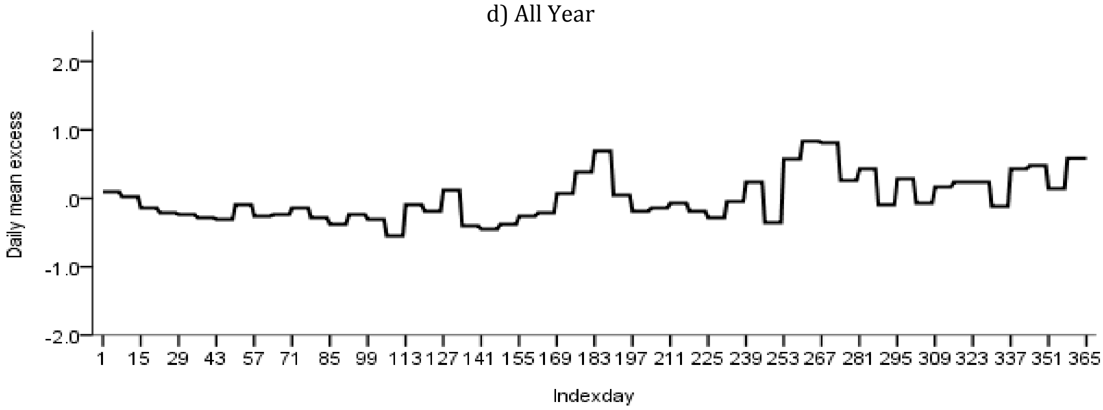


Figure 5.6: Sheffield All Counts - plot of the aggregated daily mean excess at a) Easter b) summer, c) Christmas and d) All Year (seven-day average).

Sheffield seasonal patterns of the daily excess of asthmatics over non-asthmatics were similar to the patterns exhibited by asthmatics and non-asthmatics (Figure 5.6). There was almost no distinct pattern in the Easter (Figure 5.6a) and Christmas periods (Figure 5.6c). There was a slight trough in the excess in the first half of the summer followed by an increase in the second half of the summer (Figure 5.6b). The excess was greatest after the school return after the summer holidays.

Very slight seasonal patterns were observed with Admissions and A&E excess, these results are reported in Appendix D.

5.4. Summary

Aggregated daily mean counts were graphically examined for the presence of seasonal characteristics in medical contacts made by school-age asthmatics and non-asthmatics. Examination of the peaks and troughs was in relation to the school calendar.

Is there a peak in medical contacts associated with the return to school after the Easter, summer, or Christmas vacations in school-age asthmatic and non-asthmatic children?

Graphical outputs highlighted seasonal characteristics in the average daily number of medical contacts made by school-age asthmatic and non-asthmatic children. Seasonal patterns were more evident with the All Counts datasets from England and Wales (primary care contacts) compared to the Trent Region (primary care contacts) and Sheffield (secondary care contacts). Aggregated counts in the latter two datasets were low thus; the task of extracting seasonal patterns was more difficult. The seasonal differences between regions were most likely due to sample size: England and Wales had a larger sample compared to the Trent Region and Sheffield. Generally, troughs in the daily number of medical contacts were observed within the school holidays whilst peaks occurred after school return. The most prominent trough was observed during August whilst the most prominent peak was observed after September and may be attributed to school return following the long summer holiday.

In conclusion, there was a peak in medical contacts associated with the return to school after the Easter, summer, or Christmas vacations in school-age asthmatic and non-asthmatic children.

Is the peak associated with the return to school observed in asthmatics in excess of non-asthmatics?

For England and Wales and the Trent Region, the seasonal pattern was stronger with asthmatics (more severe peaks and troughs) compared to non-asthmatics. In addition, for England and Wales and the Trent Region, the asthmatic cohort was made of a much higher number of medical contacts than the non-asthmatic cohort and this was reflected in the excess. The average daily excess (difference the average daily number of medical contacts made by asthmatics and the average daily number of medical contacts made by non-asthmatics) exhibited seasonal patterns similar to those exhibited by daily counts of asthmatics and non-asthmatic related medical contacts. The seasonal peaks and troughs were associated with the school holiday calendar. Troughs in daily excess were observed within the school holidays whilst peaks occurred after school return. The most prominent trough was observed during August whilst the most prominent peak was observed after September and may be attributed to school return following the long summer holiday. For Sheffield, mean daily excess remained steady until June and the most prominent peak occurred after school return in September.

The peak associated with the return to school after the summer holiday amongst the asthmatic cohort was thus in excess of non-asthmatics.

Chapter Six reports the results from the investigation examining the environmental association with medical contacts made by school-age asthmatics and non-asthmatics.

Chapter Six

Associations between environmental exposures and medical contacts made by school-age asthmatics and non-asthmatics

6.1. Introduction

Chapter Six presented the results that addressed the second aim of the study examining whether there is a peak in the daily number of medical contacts associated with the return to school after certain school holidays by school-age asthmatics, non-asthmatics and the excess. The seasonality of medical contacts made by school-age children with asthma may be influenced by other factors and this study interest lies in environmental (outdoor air pollutants, weather and pollen) factors associated with school-age asthma related medical contacts. This investigation examined the associations between environmental exposures and medical contacts made by school-age children in separation to the seasonal characteristics of the school-age asthma related medical contacts.

This chapter presents the results that address the second aim of this study: to investigate the presence of association between daily measures of environmental exposures (collectively) and daily counts of medical contact made by school-age asthmatic children and non-asthmatics. This investigation compared the magnitude of effect of environmental factors on asthmatics, non-asthmatics and the excess of asthmatics over non-asthmatics. In parallel with this aim, the thesis investigates whether there were delayed associations between environmental exposures and daily counts of medical contacts.

To recap on the methods used: correlations were used as the preliminary analyses whilst autoregressive models were used as the main analyses. The autoregressive analyses accounted for day of the week, season and bank holidays effects. This chapter presents the results largely from the autoregressive analyses. Results will also be selected from the correlational analysis and displayed alongside the autoregressive results for comparison.

Analyses were carried out on three geographical areas: England and Wales, the Trent Region and Sheffield. The England and Wales and the Trent Region data were divided into six medical contacts whilst Sheffield data were divided into three medical contacts. For each medical contact, there were three groups: asthmatics, non-asthmatics, and the excess. In total correlations and autoregressive models with environmental exposures were conducted using 45 endpoints. Consequently, not all the results can be reported in this chapter.

To illustrate the breadth of the analyses, for England and Wales, the results are presented for all six medical contacts. For Trent and Sheffield, results based on the Acute Visits, Casualty Counts, Emergency Consultations, Emergency and Out of Hours Counts were fairly consistent with All Counts, for conciseness, the remaining results for all medical contacts except All Counts are given in Appendix E (correlational results) and G (autoregressive results).

6.1.1. Aims of the Chapter

Firstly, this chapter will present a summary of the results from comparative analyses conducted to evaluate the most appropriate statistical technique and model.

Secondly, this chapter aims to answer the four following questions:

1. Are environmental exposures associated with daily counts of medical contact made by school-age asthmatics or non-asthmatics?
2. Are the environmental associations observed in school age asthmatics in excess of those observed in school age non-asthmatic children?
3. Are there any lagged environmental associations observed with school-age asthmatics and/or non-asthmatics?
4. Are environmental exposures predictors of daily counts of school-age asthmatics and/or non-asthmatics?

The fourth question is to be addressed in the discussion as results addressing the first three questions contribute towards answering the last question.

6.2. Results from the Comparative analyses

6.2.1. Results from the Correlation Comparative Analyses

Two comparative analyses were conducted to inform what type of correlation should be used and if there was added value in conducting correlations with 14 environmental lagged terms compared to 7.

In the first comparative analysis, Pearson's correlation was applied on All Counts from England and Wales, the Trent Region, and Sheffield. To test the robustness of the Pearson's investigation, Spearman's correlations were also conducted. The comparison of Pearson's and Spearman's coefficients and P-values revealed little difference in the overall conclusions (see Appendix E) for all three geographical regions. For the Trent

Region and Sheffield, it was planned (based on examining the distribution of the daily counts) that Poisson autoregressive techniques were to be used in further analyses as daily counts were low. Therefore, at this stage, Spearman's correlation was conducted with data from these two geographical areas.

For the second comparative analysis, as a number of the most significant coefficients fell on lag day 7, it was investigated whether more significant coefficients would result with environmental exposures lagged beyond 7 days. This analysis assessed whether there was a difference (in average significance) in the results from conducting correlations with 7 or 14 environmental lag terms. The average P-value from 224 correlations (total number of correlations conducted with 7 environmental lag terms) was compared to the average P-value calculated from 448 correlations (total number of correlations conducted with 14 environmental lag terms). By aggregating the P-values and obtaining an average P-value, multiplicity was accounted for in the results. There was little difference in the mean P-values from correlations conducted with environmental variables lagged to 7 days or 14 days. Thus, correlations were carried out with environmental exposures lagged to 7 days (see Appendix E).

For the final analyses, using the daily counts from 1999 to 2004 against daily measures from the same period, Pearson's correlation was applied to the England and Wales datasets whilst Spearman's correlation was applied to the Trent Region and Sheffield datasets. Correlations were conducted with environmental exposures lagged by seven days only.

6.2.2. Results from the Standard-regressive and Autoregressive Comparative Analyses

As described in Chapter Four, a number of the assumptions that validate the appropriateness of a standard linear model were not satisfied. Thus, six comparative analyses were conducted to investigate the most appropriate model that could be employed using standard regressive techniques. Each analysis compared how well the model fit the data and the results informed the next comparative analysis.

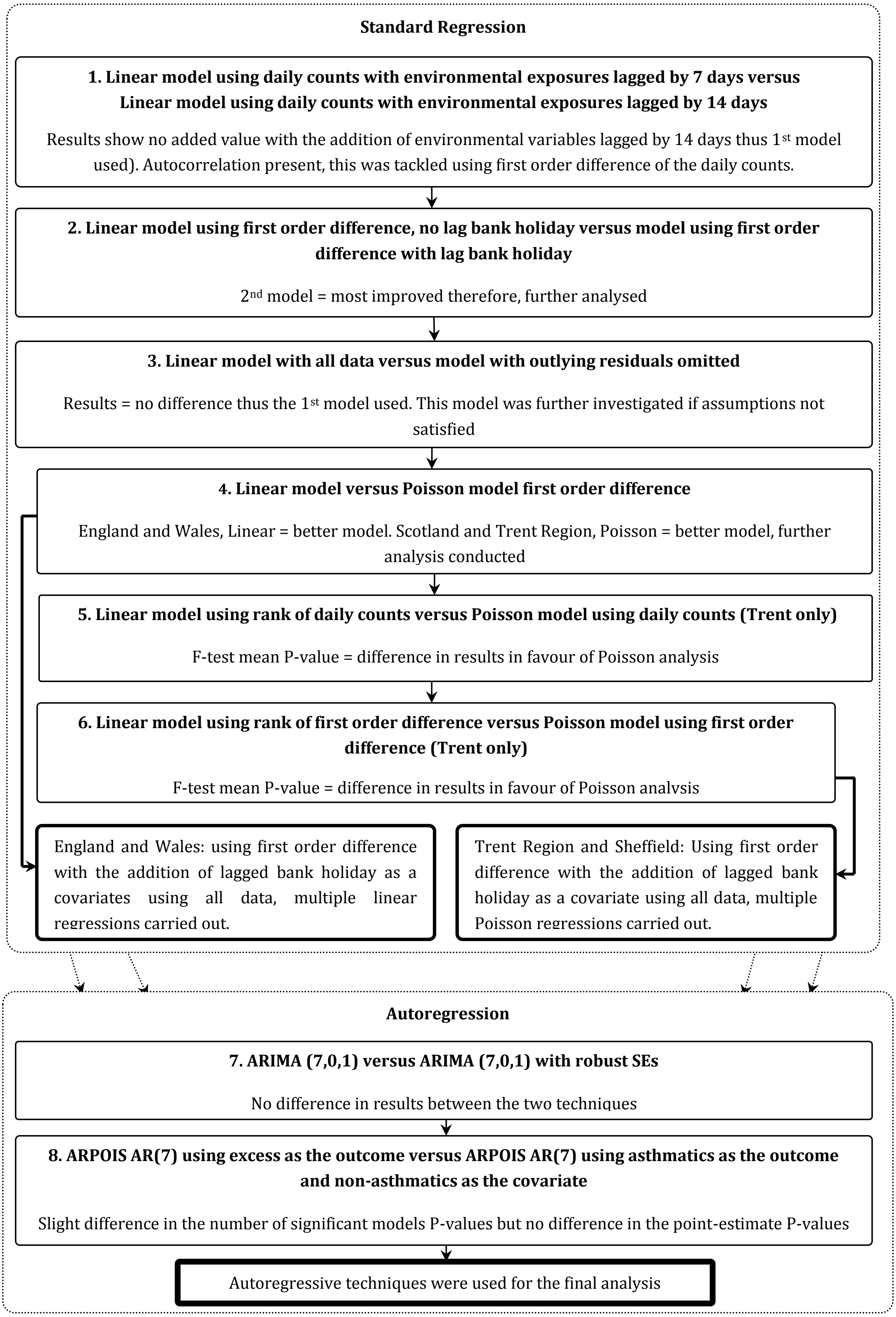


Figure 6.1: Comparative analyses.

A detailed description of the comparative analyses (what was compared and the rationale for the comparison) is given in Chapter Four. A summary of the results of the comparative analyses can be found in Figure 6.1. Informed by the results from the first comparative analysis, environmental lag terms up until seven days were analysed concurrently with present day exposures. Informed by results from the second to fourth comparative analyses, multiple linear regressions and Poisson regressions were conducted with first order difference as an outcome. The fifth and sixth comparative analyses were conducted to find alternative outcomes that may be analysed instead of first order difference in a standard linear model. However, results favoured the use of the Poisson model using first order difference as the outcome.

As it was difficult to interpret the first order difference as an outcome, autoregressive methods were used to analyse the association between environmental triggers and daily counts. The results of the previous analyses were also used to inform autoregressive methods. Taking the decisions informed by results from comparative analysis using standard regressive techniques, Normal autoregressive techniques were applied to England and Wales datasets whilst Poisson autoregressive techniques were applied to Trent and Sheffield datasets. After fitting a number of autoregressive models (see Chapter Four), ARIMA (7,0,1) (England and Wales) and ARPOIS (7) (Trent Region and Sheffield) were the most appropriate models. However, two weaknesses were still present. Firstly, minimal autocorrelation was still present in these models. Secondly, it was questioned whether the excess was an appropriate outcome that could be analysed using Poisson autoregressive techniques. A further two comparative analyses were conducted using autoregressive techniques to evaluate whether models could be improved (Figure 6.1).

For the first autoregressive comparative analysis, in an attempt to remove all traces of autocorrelation, the differences between the results from Normal autoregressive analysis with or without robust SEs were compared but no difference was found. Thus, minimal autocorrelation remained regardless of whether robust SEs were used. Robust SEs could not be instructed within the Poisson autoregressive model therefore whether conducting Poisson autoregressive models with robust SEs made a difference to results could not be evaluated.

For the second autoregressive comparative analysis, the difference in results between an autoregressive analysis using the excess as an outcome and an analysis using asthmatics as the dependent variable and non-asthmatics as a covariate were compared. Small differences were found between the two analyses. To keep the outcome consistent with England and Wales, autoregressive analyses were implemented using the excess as an outcome.

6.3. Are environmental exposures associated with daily counts of medical contact made by school-age asthmatics or non-asthmatics?

6.3.1. England and Wales Environmental Associations with Asthmatics and Non-asthmatic Medical Contacts

Table 6.1: England and Wales – LLR test statistic and P-values (on 8 df) from comparison of null model against model including each predictor lagged by 7 days asthmatics and non-asthmatics (all medical contacts).

a) Asthmatics Exposure			All Counts		Acute Visits		Casualty Counts		Emergency Consultations		Emergency Counts		Out of Hours Counts	
			LLR	P-value	LLR	P-value	LLR	P-value	LLR	P-value	LLR	P-value	LLR	P-value
Outdoor air pollutants	Min'	NO	17.58	*0.025	5.19	0.737	14.51	0.069	10.70	0.219	9.91	0.271	9.38	0.311
		NO_2	13.50	0.096	1.83	0.986	12.89	0.116	7.10	0.526	13.03	0.111	4.07	0.850
		NOD	12.62	0.126	1.22	0.996	13.57	0.094	9.68	0.288	9.33	0.316	4.26	0.833
		SO_2	14.28	0.075	5.87	0.662	5.57	0.695	8.77	0.362	3.52	0.897	8.75	0.364
		PM_{10}	11.08	0.197	4.03	0.855	9.25	0.322	9.39	0.310	6.85	0.553	7.78	0.455
		O_3	12.72	0.122	7.27	0.508	8.24	0.410	7.49	0.485	5.16	0.740	16.08	*0.041
		CO	8.94	0.347	7.79	0.454	7.49	0.485	4.92	0.766	8.15	0.419	5.58	0.694
	Mean	NO	16.76	*0.033	3.78	0.876	5.49	0.704	11.87	0.157	6.25	0.620	7.71	0.463
		NO_2	11.12	0.195	5.55	0.697	3.34	0.911	3.98	0.859	7.77	0.457	11.64	0.168
		NOD	16.32	*0.038	3.96	0.861	5.25	0.730	10.35	0.241	6.25	0.619	7.44	0.490
		SO_2	15.58	*0.049	20.38	**0.009	1.67	0.990	6.07	0.639	6.69	0.571	8.42	0.394
		PM_{10}	17.54	*0.025	6.92	0.545	7.08	0.528	10.39	0.239	8.87	0.354	14.16	0.078
		O_3	6.38	0.605	4.11	0.847	4.06	0.851	8.11	0.423	6.57	0.583	10.45	0.235
		CO	14.94	0.060	3.99	0.858	5.00	0.758	3.46	0.903	8.69	0.369	9.14	0.331
	Max'	NO	9.14	0.331	6.93	0.545	3.04	0.932	7.86	0.447	5.73	0.677	7.76	0.457
		NO_2	12.84	0.117	6.76	0.563	4.96	0.762	4.04	0.853	10.24	0.249	9.28	0.319
		NOD	10.50	0.232	6.59	0.581	3.00	0.934	9.02	0.341	6.61	0.579	6.56	0.584
		SO_2	11.38	0.181	10.54	0.229	2.58	0.958	2.27	0.972	10.41	0.238	16.42	**0.037
		PM_{10}	13.40	0.099	2.75	0.949	9.40	0.310	5.28	0.727	5.11	0.746	6.39	0.604
		O_3	12.98	0.113	5.69	0.682	4.63	0.796	11.26	0.188	4.05	0.853	7.40	0.494
		CO	11.18	0.192	6.37	0.605	0.91	0.999	3.81	0.874	5.50	0.703	5.48	0.706
Weather	Min'	Temperature	19.24	*0.014	4.28	0.831	6.66	0.573	13.33	0.101	9.56	0.298	7.92	0.441
	Max'	Temperature	21.54	*0.006	12.22	0.142	16.14	*0.040	23.66	**0.003	6.75	0.564	5.66	0.685
		Sun	1.06	0.998	2.52	0.961	4.82	0.777	3.81	0.874	9.13	0.332	11.82	0.159
		Rain	5.44	0.710	7.72	0.461	4.06	0.852	7.81	0.452	7.01	0.536	8.06	0.427
		Pressure	21.22	*0.007	9.85	0.276	18.51	*0.018	9.49	0.303	6.01	0.646	6.72	0.567
		Wind speed	16.66	*0.034	2.94	0.938	21.52	*0.006	6.62	0.578	9.37	0.312	10.81	0.213
Pollen		Grass	51.80	**<0.001	10.95	0.204	21.77	**0.005	16.87	*0.031	13.66	0.091	7.24	0.511
Total number of statistically significant models				10		1		4		2		0		2

Table 6.1 continued

b) Non-asthmatics	Exposure		All Counts		Acute Visits		Casualty Counts		Emergency Consultations		Emergency Counts		Out of Hours Counts	
			LLR	P-value	LLR	P-value	LLR	P-value	LLR	P-value	LLR	P-value	LLR	P-value
Outdoor air pollutants	Min’	NO	19.04	*0.015	23.33	**0.003	4.70	0.789	6.18	0.627	6.36	0.607	4.67	0.792
		NO_2	14.68	0.066	12.58	0.127	7.64	0.469	5.75	0.675	2.56	0.959	4.81	0.777
		NOD	15.34	0.053	19.40	*0.013	4.77	0.782	5.33	0.721	5.82	0.668	4.15	0.843
		SO_2	15.62	*0.048	6.50	0.591	1.84	0.986	1.68	0.989	2.62	0.956	7.75	0.458
		PM_{10}	16.82	*0.032	12.76	0.120	6.33	0.611	5.53	0.700	5.02	0.755	3.70	0.883
		O_3	9.38	0.311	8.17	0.417	10.17	0.253	3.83	0.872	9.01	0.341	7.06	0.530
		CO	8.16	0.418	13.70	0.090	5.00	0.757	3.96	0.861	6.43	0.600	1.46	0.993
	Mean	NO	15.20	0.055	13.40	0.099	6.66	0.574	4.48	0.812	8.93	0.348	9.12	0.333
		NO_2	19.08	*0.014	10.47	0.234	12.12	0.146	5.86	0.662	8.91	0.350	6.05	0.641
		NOD	16.08	*0.041	12.58	0.127	7.52	0.481	5.18	0.738	9.21	0.325	8.71	0.367
		SO_2	28.96	*<0.001	16.00	*0.042	5.83	0.666	8.30	0.405	7.11	0.525	9.64	0.292
		PM_{10}	27.74	*0.001	13.58	0.093	7.12	0.524	4.41	0.818	8.35	0.400	7.57	0.477
		O_3	11.44	0.178	7.23	0.512	16.38	*0.037	5.70	0.681	14.31	0.074	8.03	0.431
		CO	15.22	0.055	17.75	*0.023	8.81	0.359	4.90	0.768	8.93	0.348	6.11	0.635
	Max’	NO	7.16	0.519	14.89	0.061	10.52	0.231	7.93	0.440	8.90	0.351	8.20	0.414
		NO_2	15.16	0.056	13.45	0.097	10.92	0.207	2.31	0.970	7.21	0.514	11.63	0.168
		NOD	9.40	0.310	15.18	0.056	11.17	0.192	6.63	0.577	9.46	0.305	8.83	0.356
		SO_2	22.16	*0.005	19.93	*0.011	2.81	0.946	8.41	0.394	9.40	0.310	13.60	0.093
		PM_{10}	14.42	0.071	9.27	0.320	5.95	0.653	8.33	0.402	6.15	0.631	9.26	0.321
		O_3	9.14	0.331	10.11	0.257	7.93	0.440	5.44	0.710	7.22	0.513	4.37	0.822
		CO	10.68	0.220	19.78	*0.011	6.65	0.574	10.81	0.213	12.60	0.126	9.23	0.323
Weather	Min’	Temperature	15.06	0.058	8.65	0.372	22.76	*0.004	15.48	0.050	32.98	**<0.001	4.69	0.791
	Max’	Temperature	23.94	*0.002	1.79	0.987	24.26	**0.002	6.72	0.567	13.56	0.094	10.26	0.248
		Sun	9.62	0.293	3.60	0.891	17.21	*0.028	9.77	0.281	4.78	0.780	3.47	0.902
		Rain	12.64	0.125	6.92	0.546	21.28	*0.006	3.63	0.889	3.43	0.904	4.14	0.844
		Pressure	17.68	0.024	2.90	0.941	13.01	0.112	12.60	0.126	10.75	0.217	2.46	0.964
		Wind speed	9.04	0.339	10.94	0.205	7.66	0.468	12.60	0.126	7.33	0.501	10.73	0.217
Pollen		Grass	52.02	**<0.001	10.36	0.241	15.20	0.055	18.12	**0.020	20.92	*0.007	11.66	0.167
Total number of statistically significant models				11		6		4		1		2		0

** Most significant P-value.

* Statistically significant exposure.

A null model including covariates only was compared to an alternative model including covariates and one environmental exposure along with its seven lag terms using a LLR test (see Chapter Four).

Examining individual environmental associations, Table 6.1 displays the LLR test statistics and model P-values for England and Wales' medical contacts. For All Counts, out of a possible 28 exposures, 10 environmental exposures were statistically significantly associated with daily counts of medical contact made by asthmatics and 11 environmental exposures were associated with non-asthmatics. The model including grass was the most statistically significant model for both All Counts asthmatics and non-asthmatics. Grass also contributed to statistically significant models for Emergency Consultations and Emergency Counts. The LLR value of All Counts' most significant model was slightly higher for non-asthmatics compared to asthmatics suggesting that the effect of grass exposure was stronger on non-asthmatics. Other environmental exposures that significantly improved the fit of the data compared to the null model included minimum measures of NO, mean measures of NOD, $SO_{2,}$ and PM_{10}, maximum measures of temperature. In general, the LLR value for these models was higher with non-asthmatics than asthmatics.

Other types of medical contact had fewer or no statistically significant models that included environmental exposures. There was a large difference in the number of significant models including environmental exposures between Acute Visits asthmatics and non-asthmatics. The difference in the number of statistically significant models between asthmatics and non-asthmatics for the remaining five medical contacts was no more than two. Asthmatics had a higher number of statistically significant models compared to non-asthmatics in two of the six medical contacts (Emergency Consultations and Out of Hours Counts). Non-asthmatics had higher number of significant models compared to asthmatics in three out of six medical contacts (All Counts, Acute Visits, and Emergency Counts).

Table 6.2: England and Wales – autoregressive point-estimate descriptive statistics per one unit increase (n=224), asthmatics and non-asthmatics.

Statistic		All Counts	Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours Counts
Asthmatics	Mean	0.58	0.05	0.09	0.18	0.05	0.00
	Median	0.50	0.05	0.06	0.16	0.03	0.02
	Minimum	-2.19	-2.11	-2.27	-3.35	-2.51	-2.66
	Maximum	3.85	3.44	3.11	2.45	2.55	3.16
Non-asthmatics	Mean	0.52	0.18	0.07	-0.03	0.02	0.18
	Median	0.44	0.06	-0.01	-0.13	0.04	0.21
	Minimum	-2.62	-2.92	-3.45	-2.25	-3.16	-2.04
	Maximum	4.46	5.50	3.58	2.57	3.03	2.75

Table 6.2 illustrates descriptive statistics of the point-estimates per one unit increase. Point-estimates were standardised so that every unit increase were comparable between

the environmental exposures (see Chapter Four sub-section 4.5.7.2). Point-estimates and the corresponding P-values can be found in Appendix G. Point-estimates for the environmental exposures (and 7 lag terms) ranged from -2.19 to 3.85 for All Counts asthmatics and from -2.62 to 4.46 for All Counts non-asthmatics. Compared to the range of point-estimates attributed to day of the week effects (for example All Counts asthmatics, the (standardised) point-estimate attributed to "Monday" effects were approximately 104), the effect from environmental exposures was minute. The largest effects were observed with All Counts asthmatics (3.85) and Acute Visits non-asthmatics (5.50).

Table 6.3: England and Wales - number of statistically significant autoregressive point-estimates per environmental exposure (out of 8 point-estimates), a) Asthmatics and b) Non-asthmatics.

a) Asthmatics	Exposure		All Counts	Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours Counts
Outdoor air pollutants	Min'	NO	3	0	1	2	0	1
		NO_2	0	0	1	1	0	0
		NOD	2	0	2	1	0	0
		SO_2	1	0	1	1	0	0
		PM_{10}	0	0	0	1	0	0
		O_3	1	0	0	2	0	1
		CO	1	0	0	0	0	0
	Mean	NO	2	0	0	2	0	0
		NO_2	0	0	0	0	0	1
		NOD	2	0	0	0	0	0
		SO_2	1	1	0	0	0	0
		PM_{10}	2	0	0	2	1	2
		O_3	0	0	0	1	0	1
		CO	1	0	0	0	0	0
	Max'	NO	1	0	0	0	0	0
		NO_2	1	0	0	0	0	0
		NOD	1	0	0	0	0	0
		SO_2	0	0	0	0	0	2
		PM_{10}	1	0	1	0	0	0
		O_3	0	0	0	1	0	0
		CO	2	0	0	0	0	0
Weather	Min'	Temperature	1	0	0	1	0	1
	Max'	Temperature	2	2	1	2	0	0
		Sun	0	0	0	0	1	1
		Rain	0	0	0	1	0	1
		Pressure	1	0	0	0	0	0
		Wind speed	1	0	2	0	0	1
Pollen		Grass	5	0	2	1	1	0
Total			32	3	11	19	3	12
Mean			1.14	0.11	0.39	0.68	0.11	0.43

Table 6.3 continued

b) Non-asthmatics	Exposure		All Counts	Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours Counts
Outdoor air pollutants	Min'	NO	4	3	0	0	0	0
		NO_2	2	1	0	0	0	0
		NOD	1	2	0	0	0	0
		SO_2	1	0	0	0	0	0
		PM_{10}	1	1	0	0	0	0
		O_3	0	0	1	0	1	0
		CO	1	0	0	0	0	0
	Mean	NO	3	1	0	0	0	1
		NO_2	2	0	2	0	1	0
		NOD	3	1	0	0	0	1
		SO_2	2	1	0	0	1	0
		PM_{10}	3	2	0	0	0	1
		O_3	1	0	1	0	1	0
		CO	2	2	1	0	1	0
	Max'	NO	1	1	1	1	1	1
		NO_2	1	1	1	0	0	0
		NOD	1	1	2	0	1	1
		SO_2	1	2	0	0	1	0
		PM_{10}	2	0	0	0	0	0
		O_3	1	1	1	0	0	0
		CO	1	3	0	2	0	0
Weather	Min'	Temperature	1	1	1	1	1	0
	Max'	Temperature	1	0	3	0	1	0
		Sun	0	0	2	0	0	0
		Rain	1	0	1	0	0	0
		Pressure	0	0	0	0	0	0
		Wind speed	1	0	1	0	0	2
Pollen		Grass	5	1	0	1	1	1
Total			43	25	18	5	11	8
Mean			1.54	0.89	0.64	0.18	0.39	0.29

Table 6.3 displays the number of statistically significant autoregressive point-estimates per environmental exposure for each medical contact, asthmatics, and non-asthmatics. Each number per environmental exposure was out of eight point-estimates (one alternative model investigated the effects of an environmental variable measured on the current day along with its seven lag terms concurrently). The number of significant point-estimates per environmental exposure ranged from zero to five. The mean refers to the average number of significant point-estimates per environmental exposure. For example, All Counts asthmatics and non-asthmatics, the average number of significant point-estimates per environmental exposure was 1.14 and 1.54 respectively.

All Counts had the highest total number of statistically significant point-estimates compared to other types of medical contact. With the exception of Emergency Consultations and Out of Hours Counts, non-asthmatics had a higher total number of statistically significant point-estimates compared to asthmatics. Thus, there were higher numbers of individual environmental effects on non-asthmatics compared to asthmatics. Compared to all other environmental exposures, the highest numbers of statistically significant point-estimates were observed with All Counts and grass exposures. This suggested that grass had a greater effect on daily numbers of medical contact (All Counts) compared to other exposures.

a) Asthmatics b) Non-asthmatics

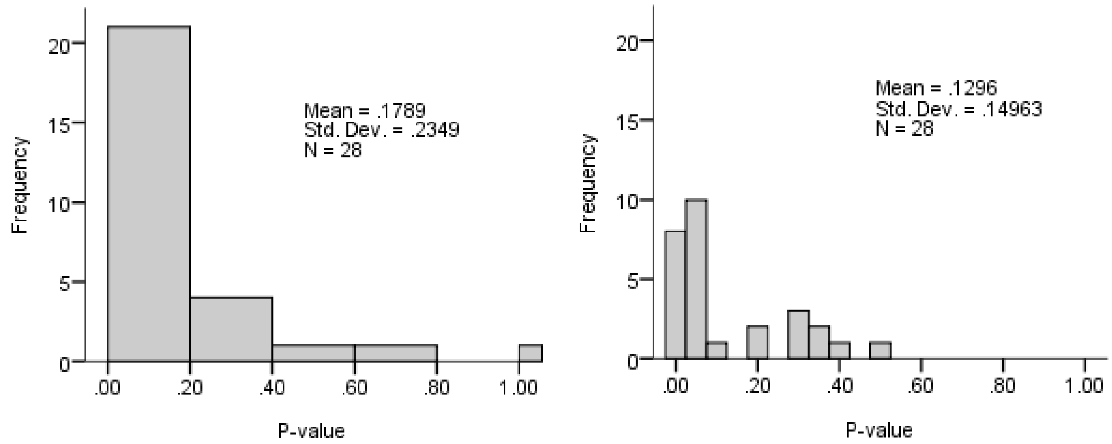


Figure 6.2: England and Wales All Counts - distribution of chi-squared P-values a) Asthmatics and b) Non-asthmatics.

a) Asthmatics b) Non-asthmatics

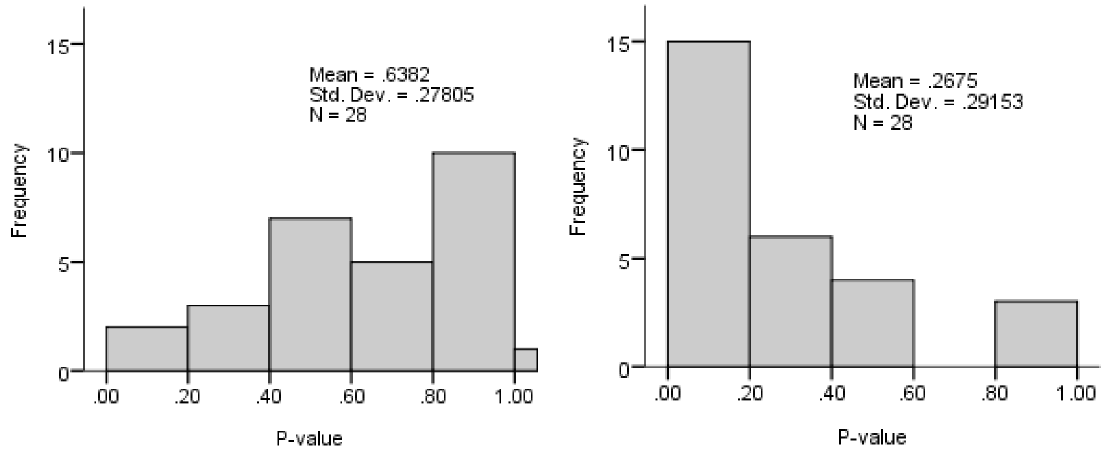


Figure 6.3: England and Wales Acute Visits - distribution of chi-squared P-values a) Asthmatics and b) Non-asthmatics.

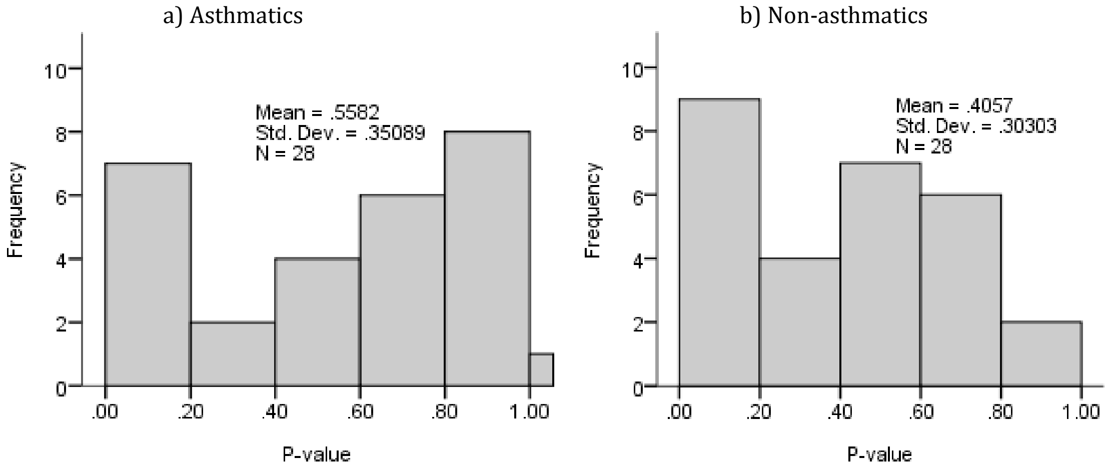


Figure 6.4: England and Wales Casualty Counts - distribution of chi-squared P-values a) Asthmatics and b) Non-asthmatics.

Examining the collective environmental associations, Figure 6.2 to Figure 6.4 gives the distributions of the model P-values for three of the six medical contacts. A positive distribution with a mean P-value less than 0.5 illustrates a collective association (considering all 28 environmental exposures) between environmental exposures and medical contacts. A P-value equal to or above 0.5 illustrates the opposite, no association between environmental exposures and medical contact. Positively distributed P-values were exhibited by All Counts asthmatics and non-asthmatics. For Acute Visits and Casualty Counts, uniform distributions and positive distributions were displayed for asthmatics and non-asthmatics respectively. The model P-value distributions for the remaining medical contacts were fairly uniform (see Appendix G). The distributions together with the statistics from Table 6.4 infer that collectively, for All Counts, Emergency Consultations, Emergency Counts and Out of Hours Counts asthmatics and for All Counts, Acute Visits, Casualty Counts and Emergency Counts non-asthmatics, there was an effect from environmental variables on daily counts of medical contact. All Counts asthmatics and non-asthmatics had the lowest mean P-values compared to the other medical contacts. Non-asthmatics had a lower mean P-value in compared to asthmatics in four of the six medical contacts (All Counts, Acute Visits, Casualty Counts, and Emergency Counts). This indicated that the effect from environmental exposures was greater on non-asthmatics than asthmatics.

Table 6.4: England and Wales - mean chi P-value's distance from the null hypothesis (0.5) and difference between asthmatics and non-asthmatics.

Medical Contact	Asthmatics	0.5-Asthmatics	Non-asthmatics	0.5-Non-asthmatics	Difference between asthmatics and non-asthmatics
All Counts	0.18	0.32	0.13	0.37	0.05
Acute Visits	0.64	-0.14	0.27	0.23	0.37
Casualty Counts	0.56	-0.06	0.41	0.09	0.15
Emergency Consultations	0.47	0.03	0.58	-0.08	-0.11
Emergency Counts	0.49	0.01	0.45	0.05	0.04
Out of Hours Counts	0.43	0.08	0.54	-0.04	-0.11

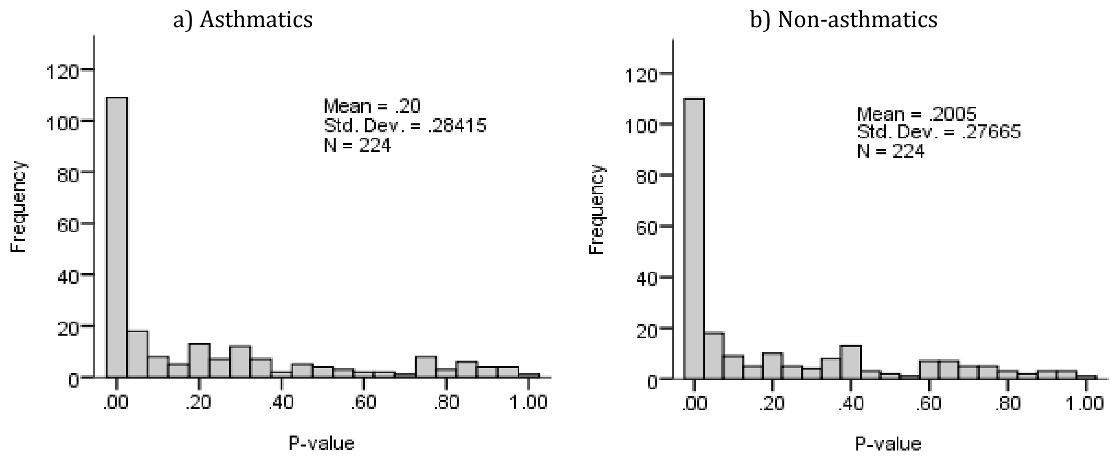


Figure 6.5: England and Wales All Counts – distribution of the Pearson's correlation P-values a) Asthmatics and b) Non-asthmatics.

Figure 6.5 shows when crude associations (correlations) were used, the distribution of the correlation coefficient P-values was positive for asthmatics and non-asthmatics. From these results, it follows that there were similar collective associations between environmental exposures and the daily number of medical contacts made by school-age asthmatics and non-asthmatics. However, when confounding factors were accounted for (autoregressive models), there was a less prominent positive skew in the distribution of the autoregressive point-estimate P-values suggesting less significant associations (Figure 6.6). Therefore, the crude associations were influenced by factors (day of the week, bank holiday, season) accounted that were accounted for in the autoregressive analysis.

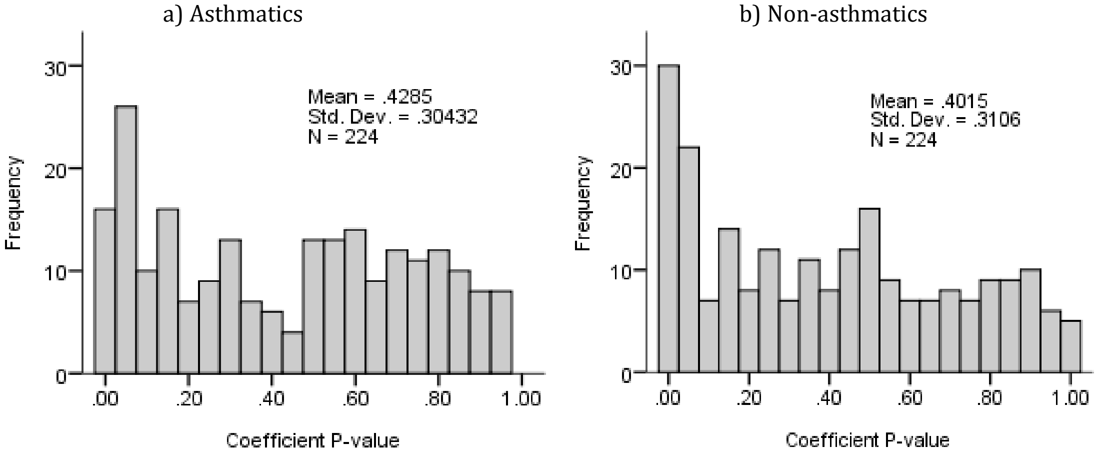


Figure 6.6: England and Wales All Counts - distribution of the autoregressive point-estimate P-values a) Asthmatics and b) Non-asthmatics.

Accounting for covariates, All Counts asthmatics and non-asthmatics had the lowest mean P-values (Figure 6.6) and slightly positive distributions compared to other medical contacts. This signified that environmental exposures had a slight effect of the number of All medical contacts. For the remaining medical contacts, the distribution of the autoregressive point-estimate P-values were uniform suggesting that collectively, there were weak or non-existent effects from environmental exposures on daily counts. Table 6.5 supports Figure 6.6. With exception to All Counts, mean point-estimate P-values cluster around the null value of 0.5 and ranged from 0.45 to 0.56. With four of the six medical contacts (All Counts, Emergency Counts, Acute Visits and Casualty Counts), the mean P-value for non-asthmatics was lower than asthmatics suggesting that the environmental effect was stronger on non-asthmatics.

Table 6.5: England and Wales – autoregressive mean point-estimate P-value's distance from the null value (0.5).

Medical Contact	Asthmatics	0.5-Asthmatics	Non-asthmatics	0.5-Non-asthmatics	Difference between asthmatics and non-asthmatics
All Counts	0.43	0.07	0.40	0.10	0.03
Acute Visits	0.52	-0.02	0.45	0.05	0.07
Casualty Counts	0.52	-0.02	0.47	0.03	0.05
Emergency Consultations	0.46	0.04	0.51	-0.01	-0.05
Emergency Counts	0.50	0.00	0.48	0.02	0.02
Out of Hours Counts	0.51	-0.01	0.56	-0.06	-0.05

To some extent, the mean point-estimate P-values support inferences drawn from mean model P-values. For example, if the mean model P-value was lower for asthmatics compared to non-asthmatics then mean point-estimate P-value would also be lower for asthmatics (Table 6.6). Overall, the mean model P-values were lower than mean point-estimate P-values. This was especially apparent for All Counts where a large difference between model and point-estimate P-values was observed.

Table 6.6: England and Wales - comparison of mean model and point-estimate P-values, asthmatics and non-asthmatics.

Asthmatics or Non-asthmatics	Medical Contact	Mean model P-values	Mean point-estimate P-values
Asthmatics	All Counts	0.18	0.43
	Acute Visits	0.64	0.52
	Casualty Counts	0.56	0.52
	Emergency Consultations	0.47	0.46
	Emergency Counts	0.49	0.50
	Out of Hours Counts	0.43	0.51
Non-asthmatics	All Counts	0.13	0.40
	Acute Visits	0.27	0.45
	Casualty Counts	0.41	0.47
	Emergency Consultations	0.58	0.51
	Emergency Counts	0.45	0.48
	Out of Hours Counts	0.54	0.56

6.3.2. Trent Region Environmental Associations with Asthmatics and Non-asthmatic Medical Contacts

Table 6.7: Trent Region All Counts - F-values and P-values (on 8 and 2156 df) from comparison of null model against model including each predictor lagged by 7 days, asthmatics and non-asthmatics.

Exposure			Asthmatics		Non-asthmatics	
			F-value	P-value	F-value	P-value
Outdoor air pollutants	Min'	NO	3.59	*<0.001	3.41	*0.001
		NO_2	1.48	0.160	0.99	0.444
		NOD	2.50	*0.010	2.25	*0.022
		SO_2	0.42	0.907	0.80	0.599
		PM_{10}	0.64	0.743	1.57	0.130
		O_3	0.50	0.859	1.40	0.193
		CO	1.88	0.059	1.26	0.261
	Mean	NO	1.19	0.301	1.19	0.301
		NO_2	0.47	0.877	0.26	0.977
		NOD	0.84	0.566	0.98	0.448
		SO_2	0.92	0.499	0.60	0.781
		PM_{10}	0.25	0.980	1.09	0.365
		O_3	1.27	0.255	1.48	0.160
		CO	0.64	0.743	1.18	0.310
	Max'	NO	1.01	0.425	0.89	0.525
		NO_2	0.29	0.968	0.70	0.691
		NOD	0.91	0.509	0.73	0.663
		SO_2	1.45	0.172	0.89	0.521
		PM_{10}	0.61	0.774	1.48	0.159
		O_3	1.50	0.153	1.51	0.148
		CO	0.39	0.929	0.98	0.447
Weather	Min'	Temperature	0.39	0.929	0.27	0.975
	Max'	Temperature	0.86	0.547	0.77	0.631
		Sun	1.33	0.221	1.49	0.157
		Rain	1.25	0.268	1.04	0.404
		Pressure	1.50	0.151	1.49	0.156
		Wind speed	0.49	0.865	0.81	0.592
Pollen		Grass	7.44	**<0.001	4.25	**<0.001
Total number of statistically significant models				3		3

** Most significant P-value.

* Statistically significant exposure.

An autoregressive analysis using a log-linear Poisson distribution was performed on Trent Region's daily counts. An F-test calculation using the residual sum of squares was used to compare the fit of the null model against the model with the addition of an environmental variable lagged by seven days (see Chapter Four).

Examining individual environmental associations, in comparison to England and Wales (where a number of models including environmental exposures significantly improved the fit of the data) for Trent Region All Counts, three models for asthmatics and non-asthmatics statistically improved the fit of the data compared to the null model (Table 6.7). For asthmatics and non-asthmatics, the most statistically significant model included grass. The environmental exposures: minimum measures of NO and NOD and grass contributed to statistically significant models for asthmatics and non-asthmatics. In contrast with the comparison of the effect made with England and Wales All Counts (where LLR values suggested that exposure effects were stronger on the non-asthmatics compared to asthmatics), the F-values of the significant models were higher for asthmatics. This suggested that the environmental effect from the statistically significant models was stronger on asthmatics compared to non-asthmatics.

Table 6.8: Trent Region All Counts - autoregressive point-estimate descriptive statistics per one unit increase (n=224), asthmatics and non-asthmatics.

Statistic	Asthmatics	Non-asthmatics
Mean	0.07	0.04
Median	0.06	0.06
Minimum	-2.09	-2.15
Maximum	3.66	2.39

Point-estimates produced from the autoregressive analysis were interpreted as percentage change per one unit increase. Point-estimates were standardised to formulate comparable unit increases between the environmental measures. In similarity to point-estimates resulting from the analyses using England and Wales daily counts, point-estimates for the Trent Region were relatively small (compared to the point-estimates attributed to the covariates) (Table 6.8).

Table 6.9: Trent Region All Counts - number of statistically significant autoregressive point-estimates per environmental exposure (out of 8 point-estimates), asthmatics and non-asthmatics.

Exposure			Asthmatics	Non-asthmatics
Outdoor air pollutants	Min'	NO	1	1
		NO_2	0	0
		NOD	1	0
		SO_2	0	0
		PM_{10}	0	0
		O_3	0	0
		CO	1	0
	Mean	NO	0	0
		NO_2	0	0
		NOD	0	0
		SO_2	0	0
		PM_{10}	0	0
		O_3	0	0
		CO	0	0
	Max'	NO	0	1
		NO_2	0	0
		NOD	0	1
		SO_2	0	0
		PM_{10}	0	0
		O_3	0	0
		CO	0	1
Weather	Min'	Temperature	0	0
	Max'	Temperature	0	0
		Sun	2	1
		Rain	1	0
		Pressure	1	0
		Wind speed	0	0
Pollen		Grass	3	0
Total			10	5
Mean			0.36	0.18

Compared to the total number of significant point-estimates exhibited by England and Wales All Counts, Trent All Counts had relatively few significant point-estimates. Out of a possible 224 associations, only 10 and 5 environmental exposures lagged from 0 to 7 days were significantly associated with asthmatics and non-asthmatics, respectively (Table 6.9). Consequently, individual environmental effects were associated with asthmatics more so than non-asthmatics.

For asthmatics, statistically significant point-estimates were present in models which overall, provided a statistically significant improvement to the fit of the data compared to the null model (minimum measures of NO, NOD and grass, see Table 6.7). For non-asthmatics, significant point-estimates were not always present in models that provided a significantly improved for to the data compared to the null model.

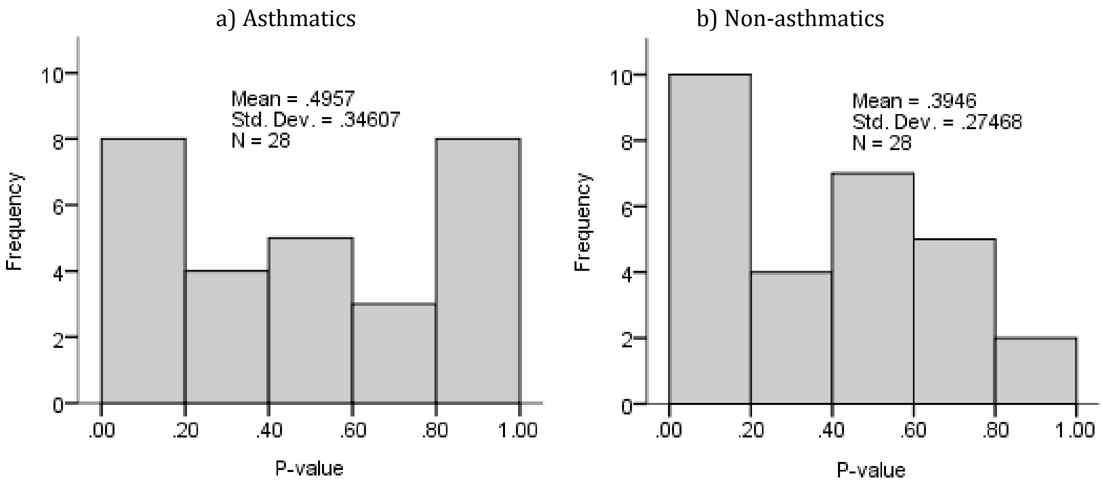


Figure 6.7: Trent Region All Counts - distribution of F-test P-values a) Asthmatics and b) Non-asthmatics.

Examining the collective environmental associations, Figure 6.7 displays the distribution of all 28 model's F-test P-values for All Counts only. Table 6.10 displays mean model P-values for each type of medical contact. Focusing on All Counts, the mean P-value of asthmatics equalled that of the null value whilst for non-asthmatics, the mean P-value was lower (Table 6.10). Figure 6.7 suggests that whilst there was no overall effect from environmental exposures on asthmatics, there was an overall effect observed on non-asthmatics.

Table 6.10: Trent Region All Counts - Mean F-test P-value's distance from the null value (0.5) and difference between asthmatics and non-asthmatics.

Medical Contact	Asthmatics	0.5-Asthmatics	Non-asthmatics	0.5-Non-asthmatics	Difference between asthmatics and non-asthmatics
All Counts	0.50	0.00	0.39	0.11	0.11
Acute Visits	0.27	0.23	0.41	0.09	-0.13
Casualty Counts	0.47	0.03	0.55	-0.05	-0.08
Emergency Consultations	0.36	0.14	0.42	0.09	-0.06
Emergency Counts	0.49	0.01	0.66	-0.16	-0.17
Out of Hours Counts	0.60	-0.10	0.49	0.01	0.10

a) Asthmatics b) Non-asthmatics

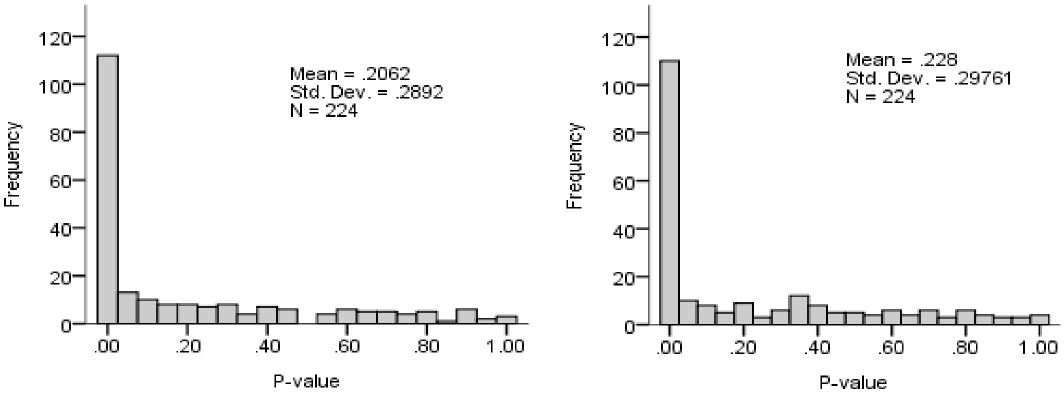


Figure 6.8: Trent Region All Counts – distribution of the Spearman's correlation P-values a) Asthmatics and b) Non-asthmatics.

Figure 6.8 shows when crude associations (correlations) were used, the distribution of the correlation coefficient P-values was positive for asthmatics and non-asthmatics. From these results, it follows that there was a collective association between environmental exposures and the daily number of medical contacts made by school-age asthmatics and non-asthmatics. In addition, the crude association was slightly stronger with the asthmatic cohort. However, when confounding factors were accounted for (autoregressive models), the distribution of the autoregressive point-estimate P-values was uniform and suggested no (asthmatic) or a weak (non-asthmatic) association (Figure 6.9). Therefore, the crude association was largely influenced by factors (day of the week, bank holiday, season) accounted for in the autoregressive analysis.

a) Asthmatics b) Non-asthmatics

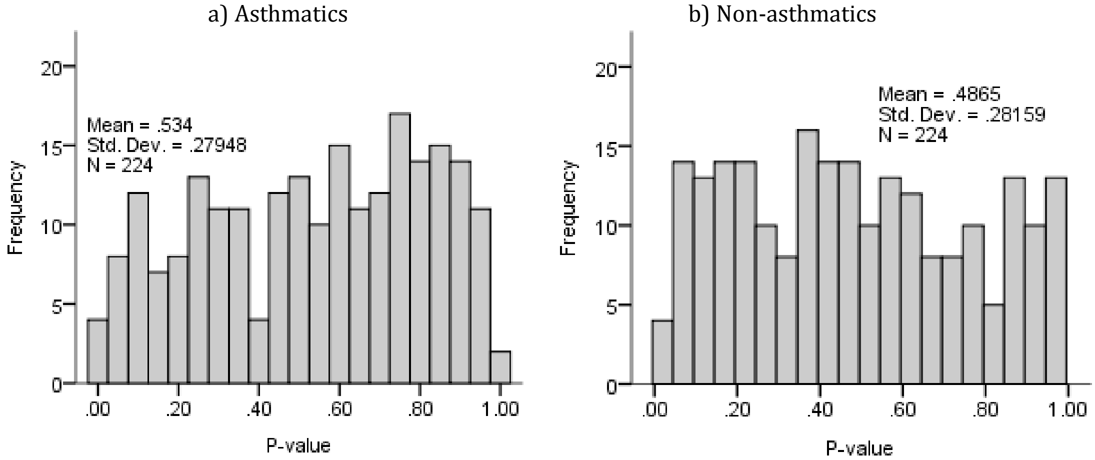


Figure 6.9: Trent Region All Counts - distribution of the autoregressive point-estimate P-values a) Asthmatics and b) Non-asthmatics.

The autoregressive point-estimate distributions highlight less significant results compared to the distributions of the autoregressive model P-values. Yet the direction of whether the effect was stronger on asthmatics or non-asthmatics was the same as that inferred by the model P-value distributions. Model P-value distributions signified more significant results with All Counts non-asthmatics compared with asthmatics. This was witnessed with the point-estimate P-value distributions. All Counts non-asthmatics had a lower mean P-value compared to asthmatics (Figure 6.9, Table 6.11). In addition, non-asthmatics had a lower mean P-value than 0.5 whereas asthmatics had a higher mean P-value than 0.5. Both the distributions of the P-values and the mean P-values (calculated as an average of all 28 environmental variables plus their lag terms) conjecture no (asthmatics) or a potentially weak (non-asthmatics) effect from the environmental variables on daily counts.

Table 6.11: Trent Region All Counts - autoregressive mean point-estimate P-value's distance from the null value (0.5) and difference between asthmatics and non-asthmatics.

Medical Contact	Asthmatics	0.5-Asthmatics	Non-asthmatics	0.5-Non-asthmatics	Difference between asthmatics and non-asthmatics
All Counts	0.53	-0.03	0.49	0.01	0.05
Acute Visits	0.45	0.05	0.48	0.02	-0.03
Casualty Counts	0.43	0.07	0.48	0.02	-0.06
Emergency Consultations	0.44	0.06	0.41	0.09	0.02
Emergency Counts	0.49	0.01	0.54	-0.04	-0.04
Out of Hours Counts	0.47	0.03	0.53	-0.03	-0.06

Table 6.12: Trent Region - comparison of mean model and point-estimate P-values, asthmatics and non-asthmatics.

Asthmatics or Non-asthmatics	Medical Contact	Mean model P-values	Mean point-estimate P-values
Asthmatics	**All Counts**	0.50	0.53
	Acute Visits	0.27	0.45
	Casualty Counts	0.47	0.43
	Emergency Consultations	0.36	0.44
	Emergency Counts	0.49	0.49
	Out of Hours Counts	0.60	0.47
Non-asthmatics	**All Counts**	0.36	0.49
	Acute Visits	0.41	0.48
	Casualty Counts	0.55	0.48
	Emergency Consultations	0.42	0.41
	Emergency Counts	0.66	0.54
	Out of Hours Counts	0.49	0.53

Focusing primarily on All Counts results, compared to the differences observed between mean model and point-estimate P-values with England and Wales' All Counts, smaller differences were observed with the Trent All Counts asthmatics (inferring consistency in the conclusions drawn from the model and point-estimate results) (Table 6.12). There was a noticeable difference (larger than ±0.1) between mean model and point-estimate P-values with All Counts non-asthmatics.

6.3.3. Sheffield Environmental Associations with Asthmatics and Non-asthmatic Medical Contacts

Table 6.13: Sheffield All Counts - F-value and P-values (on 8 and 2156 df) from comparison of null model against model including each predictor lagged by 7 days, asthmatics and non-asthmatics

Exposure			Asthmatics		Non-asthmatics	
			F-value	P-value	F-value	P-value
Outdoor air pollutants	Min'	NO	-0.05	1.000	0.58	0.794
		NO_2	-0.42	1.000	0.96	0.465
		NOD	-0.76	1.000	1.52	0.143
		SO_2	3.27	*0.001	1.36	0.211
		PM_{10}	0.08	1.000	2.02	*0.040
		O_3	1.40	0.191	0.74	0.656
		CO	-0.71	1.000	0.18	0.994
	Mean	NO	0.45	0.890	1.88	0.059
		NO_2	0.32	0.960	2.16	*0.028
		NOD	0.07	1.000	2.12	*0.031
		SO_2	-0.26	1.000	1.72	0.088
		PM_{10}	0.67	0.715	2.20	*0.025
		O_3	0.29	0.969	1.54	0.137
		CO	0.49	0.865	2.16	*0.028
	Max'	NO	0.72	0.670	0.96	0.464
		NO_2	0.06	1.000	1.11	0.355
		NOD	0.73	0.663	1.02	0.415
		SO_2	0.25	0.980	1.47	0.164
		PM_{10}	0.64	0.748	1.87	0.061
		O_3	0.68	0.707	0.97	0.460
		CO	1.37	0.206	1.63	0.110
Weather	Min'	Temperature	0.86	0.547	0.91	0.510
	Max'	Temperature	0.94	0.479	1.13	0.342
		Sun	2.78	*0.005	1.63	0.110
		Rain	1.03	0.411	0.50	0.854
		Pressure	2.39	*0.015	0.76	0.640
		Wind speed	0.70	0.695	1.48	0.160
Pollen		Grass	3.66	**<0.001	3.75	**<0.001
Total number of statistically significant models				4		6

** Most significant P-value.

* Statistically significant exposure.

Autoregressive analysis using a log-linear Poisson distribution was conducted on Sheffield daily counts. Examining individual environmental associations, compared to the null model (covariates only), four and six models including environmental exposures provided a statistically significant improvement concerning the fit of the data for asthmatics and non-asthmatics respectively (Table 6.13). The model including grass was the most significant model for asthmatics and non-asthmatics. Models including minimum measures of SO_2, sun and pressure also provided statistically significant improvements to the fit of the data compared to the null model for asthmatics. Models including minimum measures of PM_{10} and mean measures of NO_2, NOD, PM_{10} and CO provided statistically significant improvements to the fit of the data compared to the null model for non-asthmatics.

Table 6.14: Sheffield All Counts - autoregressive point-estimate descriptive statistics per one unit increase (n=224), asthmatics and non-asthmatics.

Statistic	Asthmatics	Non-asthmatics
Mean	0.02	-0.06
Median	0.07	-0.18
Minimum	-3.57	-2.50
Maximum	3.11	3.13

Point-estimates (illustrated as percentage change per one unit increase) were standardised to formulate comparable unit increases between the environmental measures. Standardised percentage changes ranged from -3.57 to 3.11 and from -2.50 to 3.13 for asthmatics and non-asthmatics respectively (Table 6.14). Overall, the percentage change was small in relation to covariate effects.

Table 6.15: Sheffield All Counts - number of statistically significant autoregressive point-estimates per environmental exposure (out of 8 point-estimates), asthmatics and non-asthmatics.

Exposure			Asthmatics	Non-asthmatics
Outdoor air pollutants	Min'	NO	0	0
		NO_2	0	0
		NOD	0	0
		SO_2	1	1
		PM_{10}	0	0
		O_3	2	1
		CO	0	0
	Mean	NO	0	1
		NO_2	0	0
		NOD	0	1
		SO_2	0	0
		PM_{10}	0	0
		O_3	0	0
		CO	0	0
	Max'	NO	1	0
		NO_2	0	0
		NOD	1	0
		SO_2	0	0
		PM_{10}	0	0
		O_3	1	2
		CO	0	1
Weather	Min'	Temperature	0	0
	Max'	Temperature	0	0
		Sun	1	0
		Rain	0	0
		Pressure	0	0
		Wind speed	0	2
Pollen		Grass	0	1
	Total		7	10
	Mean		0.25	0.36

Table 6.15 shows few significant point-estimates with Sheffield All Counts. Out of possible 224 point-estimates, only 7 and 10 point-estimates were statistically significant for asthmatics and non-asthmatics respectively. Per environmental variable, the number of significant point-estimates ranged from 0 to 2. For asthmatics, minimum measures of O_3; for non-asthmatics, maximum measures of O_3 and measures of wind speed had the highest number of statistically significant point-estimates.

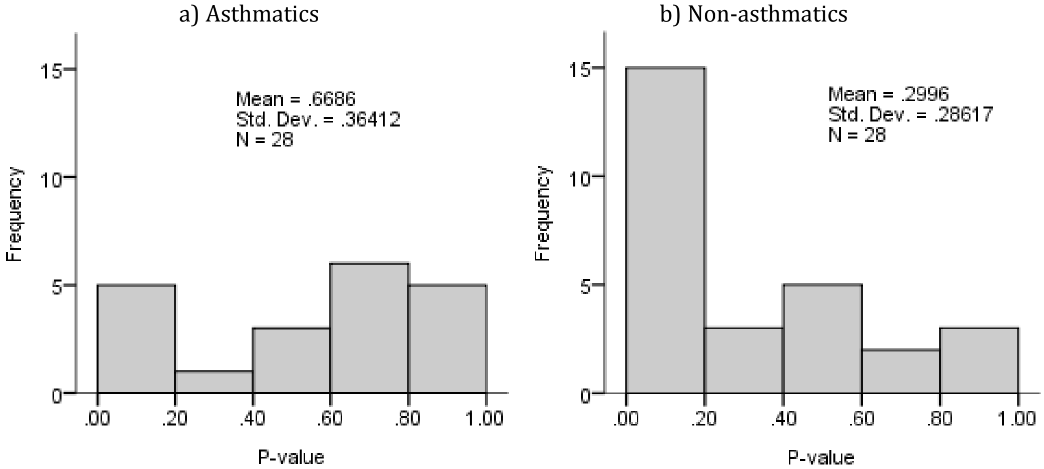


Figure 6.10: Sheffield All Counts - distribution of F-test P-values a) Asthmatics and b) Non-asthmatics.

Looking at collective environmental associations, histograms of the model P-values illustrate a uniform distribution for asthmatics and a positive distribution for non-asthmatics (Figure 6.10). Thus, when evaluating the association with all 28 models, the effect from environmental exposures was stronger on non-asthmatics compared to asthmatics. Not only was the effect stronger, the effect on non-asthmatics was statistically significant (i.e. lower than the null value, see All Counts distance from the null value (Table 6.16)).

Table 6.16: Sheffield All Counts - Mean F-test P-value's distance from the null hypothesis (0.5) and difference between asthmatics and non-asthmatics.

Medical Contact	Asthmatics	0.5-Asthmatics	Non-asthmatics	0.5-Non-asthmatics	Difference between asthmatics and non-asthmatics
All Counts	0.66	-0.16	0.3	0.2	0.36
Admissions	0.63	-0.13	0.43	0.07	0.2
A&E Counts	0.57	-0.07	0.59	-0.09	-0.02

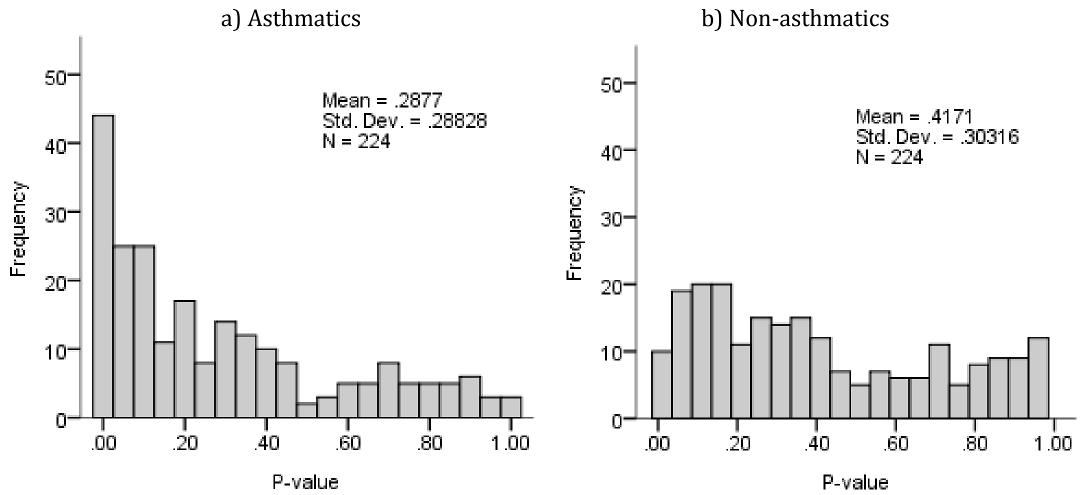


Figure 6.11: Sheffield All Counts – distribution of the Spearman's correlation P-values a) Asthmatics and b) Non-asthmatics.

Figure 6.11 shows when crude associations (correlations) were used, the distribution of the correlation coefficient P-values was positive for asthmatics and fairly uniform for non-asthmatics. It follows that there was a stronger collective crude association between environmental exposures and the daily number of asthmatic medical contacts compared to non-asthmatic medical contacts. However, when confounding factors were accounted for (autoregressive models), the distribution of the autoregressive point-estimate P-values was uniform (Figure 6.12). Therefore, the crude association seems to be largely influenced by factors (day of the week, bank holiday, season) that were accounted for in the autoregressive analysis. Thus, when effects of these factors were controlled for, the environmental effects were not statistically significant.

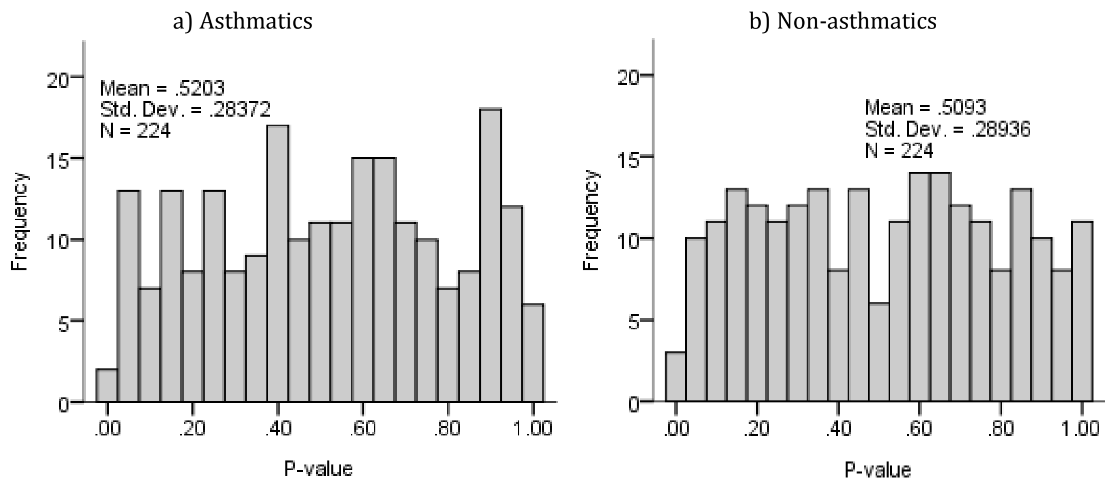


Figure 6.12: Sheffield All Counts - distribution of point-estimate P-values a) Asthmatics and b) Non-asthmatics.

Table 6.17 illustrates the mean point-estimate P-values for each type of medical contact. Focusing primarily on the All Counts results, non-asthmatics had a slightly lower mean point-estimate P-value compared to asthmatics. However, mean P-values above 0.5 suggested no effect from environmental exposures on daily counts.

Table 6.17: Sheffield - autoregressive mean point-estimate P-value's distance from the null hypothesis (0.5) and difference between asthmatics and non-asthmatics.

Medical Contact	Asthmatics	0.5-Asthmatics	Non-asthmatics	0.5-Non-asthmatics	Difference between asthmatics and non-asthmatics
All Counts	0.52	-0.02	0.51	-0.01	0.01
Admissions	0.52	-0.02	0.44	0.06	0.08
A&E Counts	0.48	0.02	0.52	-0.02	-0.04

Table 6.18: Sheffield - Comparison of mean model and point-estimate P-values, asthmatics and on-asthmatics.

Asthmatics or Non-asthmatics	Medical Contact	Mean model P-values	Mean point-estimate P-values
Asthmatics	**All Counts**	0.66	0.52
	Admissions	0.63	0.52
	A&E Counts	0.57	0.48
Non-asthmatics	**All Counts**	0.3	0.51
	Admissions	0.43	0.44
	A&E Counts	0.59	0.52

Focusing primarily on All Counts results, there was a noticeable difference (larger than ±0.1) between mean model and point-estimate P-values with asthmatics and non-asthmatics (Table 6.18) inferring inconsistency within results.

6.4. Are the environmental associations observed in school age asthmatics in excess of those observed in school age non-asthmatic children?

6.4.1. England and Wales Environmental Associations with the Excess

Table 6.19: England and Wales – LLR values and P-values (on 8 df) from comparison of null model against model including each predictor lagged by 7 days, Excess (all medical contacts).

Exposure			All Counts		Acute Visits		Casualty Counts		Emergency Consultations		Emergency Counts		Out of Hours Counts	
			LLR	P-value	LLR	P-value	LLR	P-value	LLR	P-value	LLR	P-value	LLR	P-value
Outdoor air pollutants	Min'	NO	8.84	0.356	9.18	0.328	14.34	0.073	17.18	*0.028	8.98	0.344	6.10	0.636
		NO_2	10.72	0.218	4.88	0.770	13.12	0.108	14.06	0.080	10.55	0.228	3.15	0.924
		NOD	9.06	0.337	6.89	0.549	13.18	0.106	16.58	*0.035	10.14	0.256	6.33	0.610
		SO_2	9.80	0.279	7.59	0.474	5.55	0.697	21.29	*0.006	1.66	0.990	10.50	0.232
		PM_{10}	6.58	0.583	6.66	0.574	5.76	0.674	7.69	0.464	6.02	0.645	5.80	0.670
		O_3	7.94	0.439	7.25	0.510	11.94	0.154	8.46	0.390	3.46	0.902	8.99	0.343
		CO	5.52	0.701	6.79	0.559	6.84	0.554	3.38	0.909	3.28	0.916	4.65	0.794
	Mean	NO	11.04	0.199	7.86	0.447	5.16	0.741	14.59	0.068	8.63	0.374	4.66	0.793
		NO_2	6.72	0.567	9.43	0.307	7.86	0.447	5.89	0.660	11.32	0.184	12.84	0.117
		NOD	10.28	0.246	8.88	0.353	5.04	0.753	13.86	0.085	9.82	0.278	5.98	0.650
		SO_2	7.68	0.465	-6.84	1.000	2.23	0.973	13.82	0.087	5.59	0.693	6.80	0.558
		PM_{10}	7.94	0.439	7.26	0.509	7.34	0.501	4.61	0.799	7.91	0.442	13.89	0.085
		O_3	7.64	0.469	3.64	0.888	5.97	0.651	15.84	*0.045	10.78	0.215	4.75	0.784
		CO	10.94	0.205	-11.50	1.000	4.01	0.856	5.49	0.704	-8.88	1.000	6.87	0.551
	Max'	NO	7.68	0.465	-14.94	1.000	4.14	0.844	12.45	0.132	8.06	0.428	6.32	0.611
		NO_2	7.40	0.494	10.93	0.206	6.59	0.581	4.18	0.841	-6.51	1.000	12.84	0.117
		NOD	8.22	0.412	-13.96	1.000	3.98	0.859	12.35	0.136	8.68	0.370	6.01	0.646
		SO_2	7.64	0.469	-11.39	1.000	2.41	0.966	5.99	0.648	6.98	0.539	12.72	0.122
		PM_{10}	7.48	0.486	3.98	0.859	2.55	0.960	8.05	0.429	5.03	0.754	5.89	0.660
		O_3	12.04	0.149	4.04	0.853	11.58	0.171	13.90	0.085	9.12	0.332	6.32	0.611
		CO	10.66	0.222	-5.53	1.000	2.05	0.979	8.65	0.372	4.66	0.793	6.16	0.630
Weather	Min'	Temperature	12.58	0.127	4.94	0.764	10.49	0.232	8.66	0.372	5.57	0.695	10.79	0.214
	Max'	Temperature	7.62	0.471	9.88	0.274	7.32	0.503	18.17	*0.020	3.25	0.917	6.76	0.562
		Sun	6.54	0.587	3.13	0.926	2.75	0.949	11.73	0.164	6.35	0.608	8.08	0.426
		Rain	5.04	0.753	6.86	0.552	6.75	0.564	4.84	0.775	-10.70	1.000	8.17	0.417
		Pressure	10.32	0.243	8.92	0.349	7.46	0.487	35.27	**0.001	6.83	0.556	7.60	0.474
		Wind speed	13.66	0.091	-14.95	1.000	10.42	0.237	22.84	*0.004	4.67	0.792	5.72	0.679
Pollen		Grass	23.48	**0.003	-6.32	1.000	12.96	0.113	9.97	0.267	18.24	**0.020	14.25	0.076
Total number of statistically significant models				1		0		0		7		1		0

** Most significant P-value.

* Statistically significant exposure.

The daily excess represents the daily number of medical contacts made by asthmatics over and above (or below) the average school population represented by non-asthmatics. Examining on the individual environmental associations, with exception to All Counts, Emergency Consultations and Emergency Counts, no statistically significant model including environmental exposures improved the fit of the data compared to the null model. All Counts Excess only had one significant model that improved the fit of the data compared to the null model; this model included grass (Table 6.19). Emergency Consultations had a high number of statistically significant models. The model including grass (and its seven lag terms) was the most significant model in two of the six medical contacts (All Counts and Emergency Counts).

Table 6.20: England and Wales - autoregressive point-estimate descriptive statistics per one unit increase, (n=224), Excess.

Statistic	All Counts	Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours Counts
Mean	0.36	0.06	0.04	0.24	0.07	-0.01
Median	0.38	0.07	-0.05	0.46	0.20	0.02
Minimum	-2.14	-2.45	-2.70	-3.37	-2.81	-3.02
Maximum	2.57	2.32	3.12	3.17	2.50	3.05

Point-estimates were examined to assess lagged associations and to illustrate support for or against the inferences made from the model P-values. Table 6.20 illustrates the descriptive statistics of the environmental exposure's point-estimates, these were standardised to formulate comparable unit increases between the environmental measures. See Appendix G for point-estimates and corresponding P-values. Compared to other covariate effects (for example, the standardised effects of "Monday" on All Counts Excess = 77) environmental exposure point-estimates were relatively small. The largest effect was observed with Emergency Consultations (-3.37).

Table 6.21: England and Wales - number of statistically significant autoregressive point-estimates per environmental exposure (out of 8 point-estimates), Excess.

Exposure			All Counts	Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours Counts
Outdoor air pollutants	Min'	NO	0	0	2	3	1	0
		NO_2	0	0	1	1	1	0
		NOD	1	0	2	3	1	1
		SO_2	0	0	0	0	0	0
		PM_{10}	0	0	0	1	0	0
		O_3	0	0	1	1	0	0
		CO	0	1	0	0	0	0
	Mean	NO	1	1	0	1	1	0
		NO_2	0	0	0	0	1	2
		NOD	1	1	0	2	1	0
		SO_2	0	2	0	0	0	0
		PM_{10}	0	1	0	0	1	2
		O_3	0	0	0	2	1	0
		CO	0	0	0	0	0	0
	Max'	NO	0	0	0	0	0	0
		NO_2	0	1	0	0	0	1
		NOD	0	0	0	1	0	0
		SO_2	0	0	0	0	0	1
		PM_{10}	0	0	0	0	0	0
		O_3	2	0	1	0	2	1
		CO	1	1	0	0	0	0
Weather	Min'	Temperature	1	0	0	1	0	1
	Max'	Temperature	0	1	0	1	0	0
		Sun	0	0	0	1	0	0
		Rain	0	0	0	0	0	1
		Pressure	0	0	0	3	0	0
		Wind speed	1	0	0	1	0	0
Pollen		Grass	1	0	0	0	1	1
Total			9	9	7	22	11	11
Mean			0.32	0.32	0.25	0.79	0.39	0.39

Each number per environmental exposure was out of eight point-estimates (one alternative model investigated the effects of an environmental variable measured on the current day along with its seven lag terms concurrently). Table 6.21 displays low numbers of statistically significant point-estimates per environmental exposure across the lag days. Environmental exposures had no more than three individual statistically significant point-estimates. Environmental variables that gathered three statistically significant point-estimates were investigated with the excess of Emergency Consultations. The mean refers to the average number of significant point-estimates per environmental exposure. Thus, for All Counts, the average number of significant point-estimates per environmental exposure was 0.32. Emergency Consultation's excess displayed the highest whilst Casualty Counts had the lowest total number of statistically significant point-estimates.

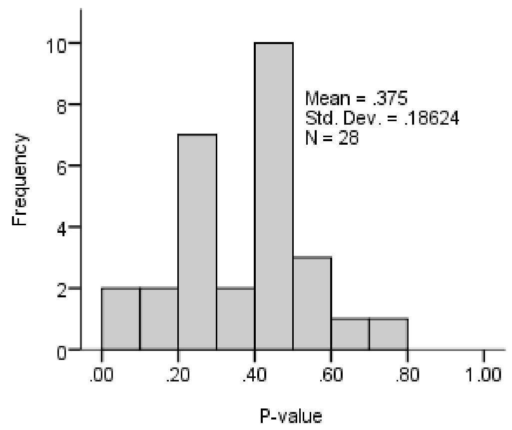


Figure 6.13: England and Wales All Counts - distribution of chi-squared P-values, Excess.

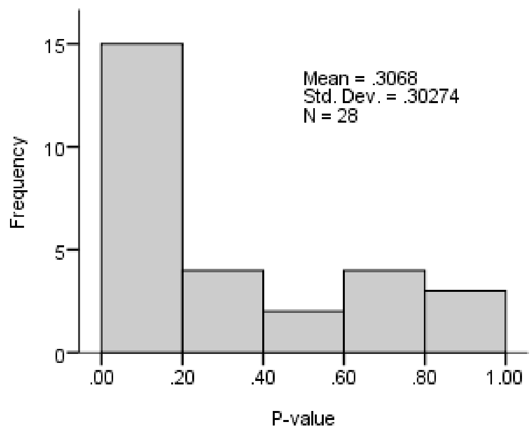


Figure 6.14: England and Wales Emergency Consultations - distribution of chi-squared P-values, Excess.

Table 6.22: England and Wales – LLR test mean P-value's distance from the null value (0.5), Excess.

Medical Contact	Excess	0.5-Excess
All Counts	0.38	0.12
Acute Visits	0.68	-0.18
Casualty Counts	0.56	-0.06
Emergency Consultations	0.31	0.19
Emergency Counts	0.58	-0.08
Out of Hours Counts	0.50	0.00

Examining collective environmental associations, the distribution of the model P-values are given for two of the six medical contacts, All Counts and Emergency Consultations. The model P-value distributions for the remaining four medical contacts are given in Appendix G. All Counts excess exhibits a uniform distribution yet the mean P-value was below 0.5 thus lower than the null value (Figure 6.13). Emergency Consultations exhibit a positive distribution (Figure 6.14). For all other medical contacts (Appendix G) the model P-values follow a uniform distribution. Table 6.22 illustrates evidence for and against associations between environmental exposures and daily excess. Only All Counts and Emergency Consultations exhibit mean model P-values below 0.5. Thus, collectively environmental exposures were associated with All Counts and Emergency Consultations excess. Results for the remaining medical contacts support the null hypothesis stating no associations between environmental exposures and daily excess.

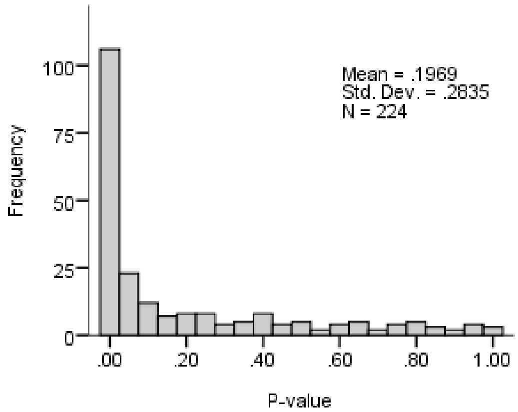


Figure 6.15: England and Wales All Counts – distribution of the Pearson's correlation P-values, Excess.

Figure 6.15 shows when crude associations (correlations) were used, the distribution of the correlation coefficient P-values was positive inferring a collective crude association between environmental exposures and the daily excess of medical contacts made by school-age asthmatics over and above the average school population. However, when confounding factors were accounted for (as in the autoregressive models), the distribution of the autoregressive point-estimate P-values was uniform suggesting almost no association (Figure 6.16). It follows that the crude associations observed in Figure 6.15 were influenced by the day of the week, bank holiday and seasonal effects.

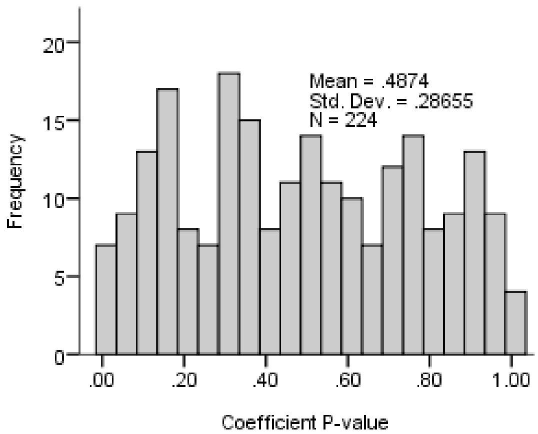


Figure 6.16: England and Wales All Counts - distribution of the autoregressive point-estimate P-values, Excess.

Point-estimate P-values from the remaining medical contacts exhibited uniform distributions. Uniform distributions signify weak or non-existent effects from environmental exposures on daily excess of asthmatics over non-asthmatics. Point-estimate P-value distributions for the remaining medical contacts were consistent with All Counts hence; the uniform distribution was illustrated for All Counts only (Figure 6.16). Table 6.23 illustrates the mean P-values distance for the null hypothesis and supports inferences made from Figure 6.16.

Table 6.23: England and Wales - autoregressive mean point-estimate P-value's distance from the null value (0.5), Excess.

Medical Contact	Excess	0.5 - Excess
All Counts	0.49	0.01
Acute Visits	0.50	0.00
Casualty Counts	0.50	0.00
Emergency Consultations	0.40	0.10
Emergency Counts	0.49	0.01
Out of Hours Counts	0.52	-0.02

The autoregressive mean point-estimate P-values partly concur with inferences drawn from mean model P-values. For example, Emergency Consultations exhibit mean model and point-estimate P-values lower than the null hypothesis; this infers association between environmental exposures and daily counts of Emergency Consultations. For Acute Visits, Casualty and Out of Hours Counts, both mean model and point estimate P-value signified non-significant associations between environmental exposures and daily excess. However, for All Counts, the mean model and the point-estimate P-values do not completely agree with one another with the former exhibiting a relatively lower mean P-value than the latter (Table 6.24).

Table 6.24: Comparison of mean model and point-estimate P-values, Excess.

Medical Contact	Mean model P-values	Mean point-estimate P-values
All Counts	0.38	0.49
Acute Visits	0.68	0.50
Casualty Counts	0.56	0.50
Emergency Consultations	0.31	0.40
Emergency Counts	0.58	0.49
Out of Hours Counts	0.50	0.52

6.4.2. Trent Region Environmental Associations with the Excess

Table 6.25: Trent Region All Counts - F-values and P-values (on 8 and 2156 df) from comparison of null model against model including each predictor lagged by 7 days, Excess.

Exposure			F-value	P-value
Outdoor air pollutants	Min'	NO	2.95	*0.003
		NO_2	1.27	0.254
		NOD	2.30	*0.019
		SO_2	0.47	0.881
		PM_{10}	1.59	0.122
		O_3	0.27	0.975
		CO	1.06	0.391
	Mean	NO	1.56	0.133
		NO_2	0.39	0.926
		NOD	1.09	0.364
		SO_2	1.03	0.409
		PM_{10}	0.73	0.662
		O_3	0.76	0.641
		CO	0.18	0.993
	Max'	NO	0.76	0.640
		NO_2	0.10	0.999
		NOD	0.60	0.782
		SO_2	1.34	0.216
		PM_{10}	1.08	0.378
		O_3	1.85	0.064
		CO	0.40	0.922
Weather	Min'	Temperature	0.35	0.945
	Max'	Temperature	0.90	0.517
		Sun	1.52	0.143
		Rain	0.98	0.453
		Pressure	2.02	*0.041
		Wind speed	0.20	0.992
Pollen		Grass	3.15	**0.001
Total number of statistically significant models				4

** Most significant P-value.
* Statistically significant exposure.

Examining individual environmental associations, in comparison to England and Wales (where the F-test revealed that a number of models including environmental exposures significantly improved the fit of the data) for Trent Region All Counts Excess, four models including environmental exposures statistically improved the fit of the data compared to the null model (Table 6.25). The most statistically significant model included grass. Minimum measures of NO and NOD and pressure also contributed to statistically significant models.

Table 6.26: Trent Region All Counts - autoregressive point-estimate descriptive statistics per one unit increase (n=224), Excess.

Statistic	Excess
Mean	0.08
Median	-0.01
Minimum	-2.36
Maximum	3.58

Table 6.27: Trent Region All Counts - number of statistically significant autoregressive point-estimates per environmental exposure (out of 8 point-estimates), Excess.

Exposure			Excess
Outdoor air pollutants	**Min'**	**NO**	1
		NO_2	1
		NOD	1
		SO_2	0
		PM_{10}	1
		O_3	0
		CO	1
	Mean	**NO**	1
		NO_2	0
		NOD	0
		SO_2	1
		PM_{10}	0
		O_3	1
		CO	0
	Max'	**NO**	0
		NO_2	0
		NOD	0
		SO_2	1
		PM_{10}	0
		O_3	0
		CO	0
Weather	**Min'**	**Temperature**	0
	Max'	**Temperature**	1
		Sun	1
		Rain	0
		Pressure	2
		Wind speed	0
Pollen		**Grass**	1
Total			14
Mean			0.50

Compared to the total number of significant point-estimates exhibited by England and Wales All Counts, Trent All Counts had relatively few significant point-estimates. Out of a possible 224 associations, 14 were significant for the excess (Table 6.27). Statistically significant point-estimates were present in models which overall, provided a statistically significant improvement to the fit of the data compared to the null model (minimum measures of NO, NOD, pressure and grass, Table 6.25).

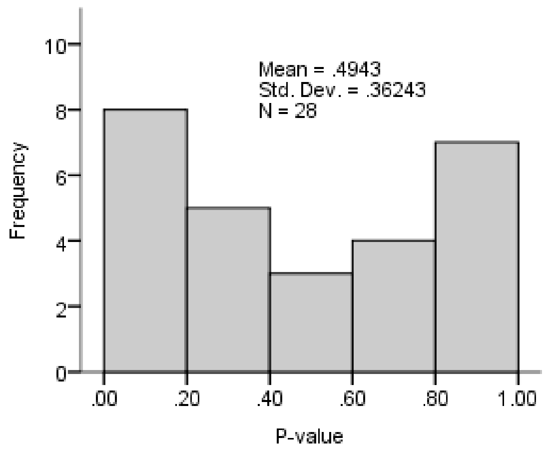


Figure 6.17: Trent Region All Counts - distribution of F-test P-values, Excess.

Inspecting collective environmental associations, Figure 6.17 displays the distribution of all 28 model's F-test P-values for All Counts only. The P-value histogram for the excess exhibited a uniform distribution. Table 6.28 displays mean model P-values for each type of medical contact. Focusing primarily on All Counts excess (Table 6.28), the mean P-value was slightly lower than the null value thus the environmental effect was almost non-significant with daily excess.

Table 6.28: Trent Region All Counts - Mean F-test P-value's distance from the null value (0.5), Excess.

Medical Contact	Excess	0.5-Excess
All Counts	0.49	0.01
Acute Visits	0.25	0.25
Casualty Counts	0.47	0.03
Emergency Consultations	0.53	-0.03
Emergency Counts	0.50	0.00
Out of Hours Counts	0.50	0.00

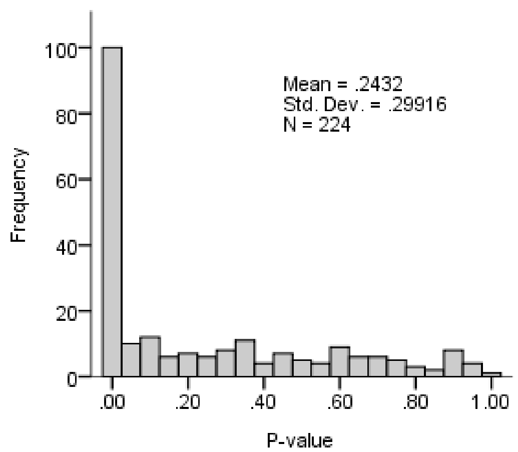


Figure 6.18: Trent Region All Counts – distribution of the Spearman's correlation P-values, Excess.

Figure 6.18 shows when crude associations (correlations) were used, the distribution of the correlation coefficient P-values was positive inferring a collective crude association between environmental exposures and the daily excess of medical contacts made by school-age asthmatics over and above the average school population. However, when confounding factors were accounted for (as in the autoregressive models), the distribution of the autoregressive point-estimate P-values was uniform inferring no association (Figure 6.19). It follows that the crude association observed in Figure 6.18 was most likely influenced by day of the week, bank holiday and seasonal effects.

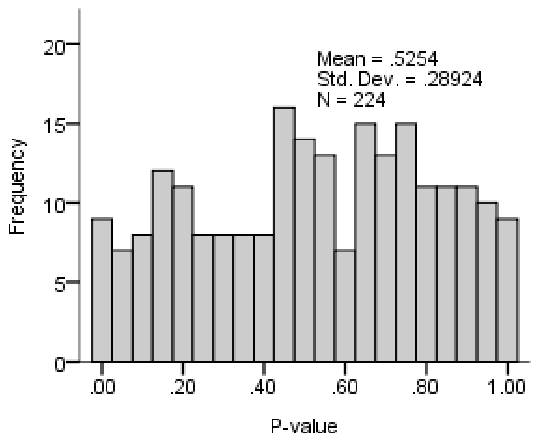


Figure 6.19: Trent Region All Counts - distribution of the autoregressive point-estimate P-values, Excess.

The autoregressive point-estimate distributions highlight less significant results compared to the distributions of the model P-values (Figure 6.17). The mean P-values from the point-estimate P-value distributions (calculated from all environmental variables plus their lag terms) conjecture no effect from the environmental variables on All Counts daily excess.

Table 6.29: Trent Region All Counts - autoregressive mean point-estimate P-value's distance from the null hypothesis (0.5), Excess.

Medical Contact	Excess	0.5-Excess
All Counts	0.53	-0.03
Acute Visits	0.43	0.07
Casualty Counts	0.53	-0.03
Emergency Consultations	0.53	-0.03
Emergency Counts	0.51	-0.01
Out of Hours Counts	0.48	0.02

With exception to Acute Visits where there was a large difference between the model and point-estimate mean P-values, for the remaining medical contacts, there were small differences between model and point-estimates suggesting agreement between the results (Table 6.30).

Table 6.30: Trent Region - comparison of mean model and point-estimate P-values, Excess.

Medical Contact	Mean model P-values	Mean point-estimate P-values
All Counts	0.49	0.53
Acute Visits	0.25	0.43
Casualty Counts	0.47	0.53
Emergency Consultations	0.53	0.53
Emergency Counts	0.50	0.51
Out of Hours Counts	0.50	0.48

6.4.3. Sheffield Environmental Associations with the Excess

Table 10.1: Sheffield All Counts - F-value and P-values (on 8 and 2156 df) from comparison of null model against model including each predictor lagged by 7 days, Excess.

Exposure			F-value	P-value
Outdoor air pollutants	Min'	NO	0.58	0.792
		NO_2	0.43	0.901
		NOD	0.37	0.939
		SO_2	0.99	0.445
		PM_{10}	0.37	0.937
		O_3	0.71	0.686
		CO	1.05	0.395
	Mean	NO	1.03	0.414
		NO_2	0.28	0.973
		NOD	0.69	0.702
		SO_2	0.14	0.998
		PM_{10}	0.64	0.744
		O_3	0.43	0.905
		CO	1.67	0.100
	Max'	NO	0.98	0.453
		NO_2	0.39	0.925
		NOD	0.98	0.451
		SO_2	0.30	0.967
		PM_{10}	0.96	0.469
		O_3	0.95	0.474
		CO	1.62	0.115
Weather	Min'	Temperature	0.91	0.510
	Max'	Temperature	1.07	0.380
		Sun	2.00	**0.042
		Rain	0.40	0.920
		Pressure	0.96	0.468
		Wind speed	1.46	0.168
Pollen		Grass	1.81	0.071
Total number of statistically significant models				1

** Most significant P-value.
* Statistically significant exposure.

Examining individual environmental associations, compared to the null model (covariates only), one model including environmental exposures provided a statistically significant improvement to the fit of the data for the excess (Table 6.33). The model including sunlight was the most statistically significant model for the excess.

Table 6.31: Sheffield All Counts - autoregressive point-estimate descriptive statistics per one unit increase (n=224), Excess.

Statistic	Excess
Mean	0.05
Median	0.10
Minimum	-3.18
Maximum	2.22

Point-estimates (illustrated as percentage change per one unit increase) were standardised to formulate comparable unit increases between the environmental measures. Standardised percentage changes ranged from -3.18 to 2.22 (Table 6.31). Overall, the percentage change was small in relation to covariate effects.

Table 6.32: Sheffield All Counts - number of statistically significant autoregressive point-estimates per environmental exposure (out of 8 associations), Excess.

Exposure			Excess
Outdoor air pollutants	Min'	NO	0
		NO_2	0
		NOD	0
		SO_2	0
		PM_{10}	0
		O_3	0
		CO	0
	Mean	NO	0
		NO_2	0
		NOD	0
		SO_2	0
		PM_{10}	0
		O_3	0
		CO	1
	Max'	NO	0
		NO_2	0
		NOD	0
		SO_2	0
		PM_{10}	0
		O_3	0
		CO	0
Weather	Min'	Temperature	0
	Max'	Temperature	1
		Sun	1
		Rain	0
		Pressure	0
		Wind speed	1
Pollen		Grass	2
Total			6
Mean			0.21

Table 6.32 shows few significant point-estimates with Sheffield All Counts. Out of possible 224 point-estimates, only 6 point-estimates were statistically significant for the excess. Per environmental variable, the number of significant point-estimates ranged from 0 to 2. Grass pollen had the highest number of statistically significant point-estimates.

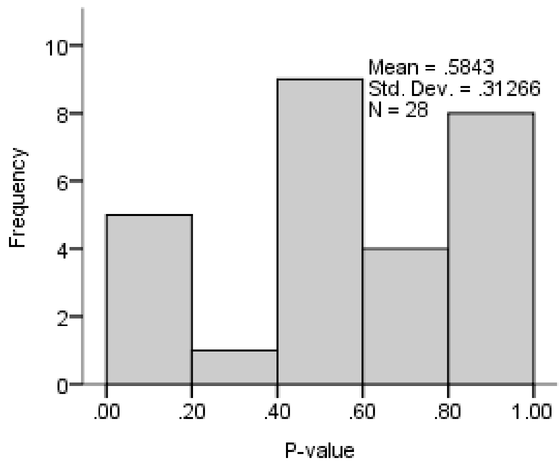


Figure 6.20: Sheffield All Counts - distribution of F-test P-values, Excess.

Examining collective associations, histograms of the model P-values illustrate a uniform distribution for the excess (Figure 6.20, Table 6.33). The mean P-value suggested no association between environmental exposures and daily excess.

Table 6.33: Sheffield All Counts - Mean F-test P-value's distance from the null hypothesis (0.5), Excess.

Medical Contact	Excess	0.5-Excess
All Counts	0.58	-0.08
Admissions	0.44	0.06
A&E Counts	0.53	-0.03

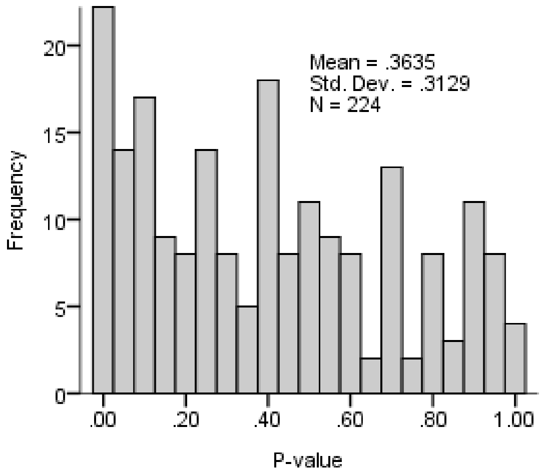


Figure 6.21: Sheffield All Counts – distribution of the Spearman's correlation P-values, Excess.

Figure 6.21 shows when crude associations (correlations) were used, the distribution of the correlation coefficient P-values was positive inferring a collective crude association between environmental exposures and the daily excess of medical contacts made by school-age asthmatics over and above the average school population. However, when confounding factors were accounted for (as in the autoregressive models), the distribution of the autoregressive point-estimate P-values was uniformed inferring no association (Figure 6.22). It follows that the crude association observed in Figure 6.21 was most likely influenced by day of the week, bank holiday and seasonal effects.

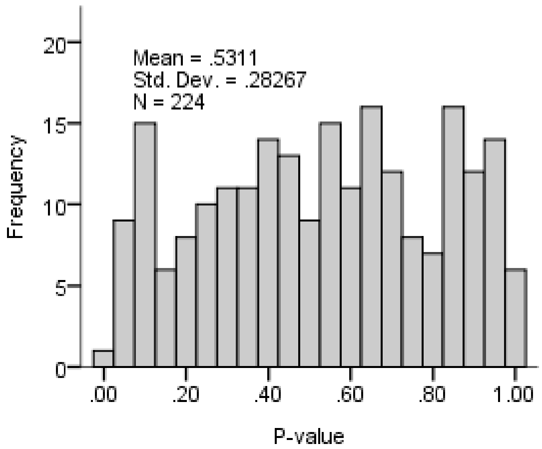


Figure 6.22: Sheffield All Counts - distribution of the autoregressive point-estimate P-values, Excess.

Table 6.34 illustrates the mean point-estimates for each type of medical contact. Focusing primarily on the All Counts results, there was little difference in the mean point-estimate P-values and the null hypothesis suggesting no effect from environmental exposures on the daily excess.

Table 6.34: Sheffield - autoregressive mean point-estimate P-value's distance from the null hypothesis (0.5), Excess.

Medical Contact	Excess	0.5-Excess
All Counts	0.53	-0.03
Admissions	0.44	0.06
A&E Counts	0.49	0.01

Focusing primarily on All Counts results, there were small differences between mean model and point-estimate P-values (Table 6.35); this inferred to some extent, consistency within results.

Table 6.35: Sheffield - Comparison of mean model and point-estimate P-values, Excess.

Medical Contact	Mean Model P-values	Mean Point-estimate P-values
All Counts	0.58	0.53
Admissions	0.43	0.44
A&E Counts	0.53	0.49

6.5. Are there any lagged environmental associations observed with school-age asthmatics and/or non-asthmatics?

To investigate possible delayed effect from environmental exposures (overall) on the number of daily counts or daily excess, the most significant correlation coefficients or autoregressive point-estimates by lag day were tallied across the environmental exposures and graphically illustrated. This section illustrates results from the correlational and autoregressive analyses.

6.5.1. England and Wales Environmental Lagged Associations

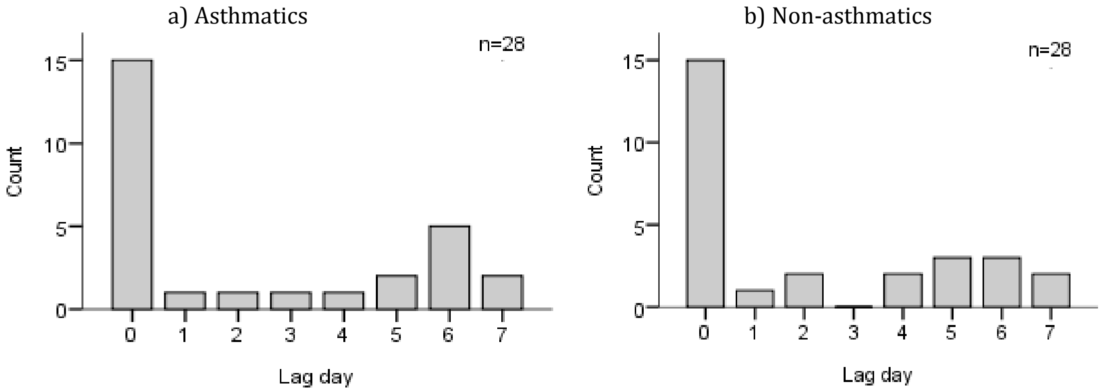


Figure 6.23: England and Wales All Counts – number of the most significant correlation coefficients per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

Figure 6.23 illustrates number of most significant correlation coefficients per environmental exposure by lag day for All Counts only. Current day (lag day 0) had the highest number of most significant coefficients for All Counts. However, when covariates were considered, for asthmatics, the number of most significant point-estimates fell on lag day seven (Figure 6.24). Therefore when accounting for day of the week, bank holiday and season, there was a longer delayed effect from environmental exposures on medical contacts made by asthmatics.

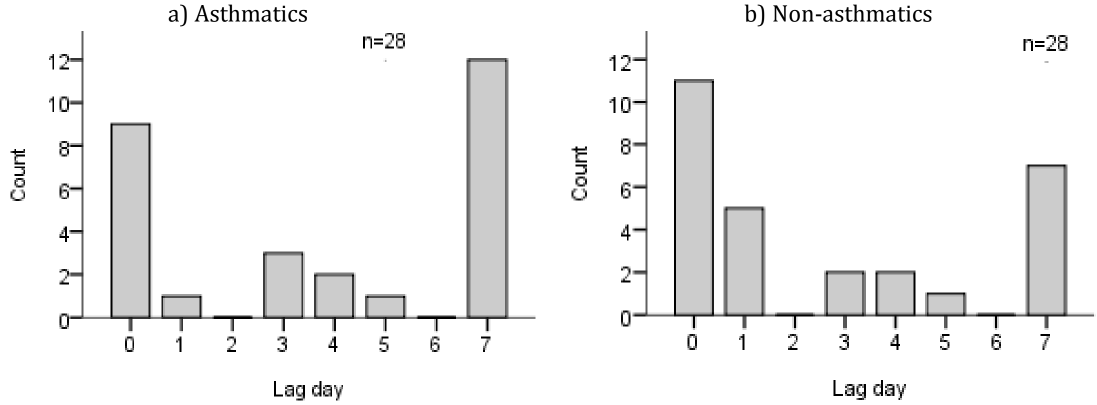


Figure 6.24: England and Wales All Counts - number of the most significant autoregressive point-estimates per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

Table 6.36: England and Wales - lag day with the highest number of most significant autoregressive point-estimates, asthmatics and non-asthmatics.

Medical Contact	Asthmatics	Non-asthmatics
Acute Visits	1	4, 7
Casualty Counts	4	0
Emergency Consultations	1	0
Emergency Counts	7	0
Out of Hours Counts	2, 7	4

The results from the autoregressive analysis infer that for All Counts non-asthmatics, environmental effects were strongest on the current day of exposure whilst for asthmatics; environmental effects were strongest after a delay of seven days. Examining the delayed environmental effects with the remaining medical contacts (Table 6.36), for asthmatics lag day seven had the highest number of most significant point-estimates in two out of the five medical contacts (Emergency and Out of Hours Counts). For non-asthmatics, current day (lag day 0) had the highest number of most significant point-estimates in three out of the five medical contacts (Emergency Consultations, Casualty, and Emergency Counts).

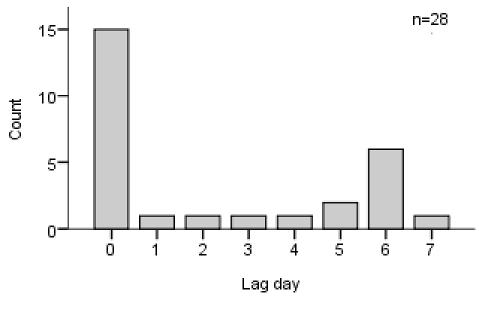


Figure 6.25: England and Wales All Counts – number of the most significant correlation coefficients per environmental exposure by lag day, Excess.

In similarity with the asthmatics, Figure 6.25 illustrates that the current day (lag day 0) had the highest number of most significant coefficients for All Counts Excess. However, when covariates were considered, the number of most significant point-estimates fell on the lag day seven (Figure 6.26).

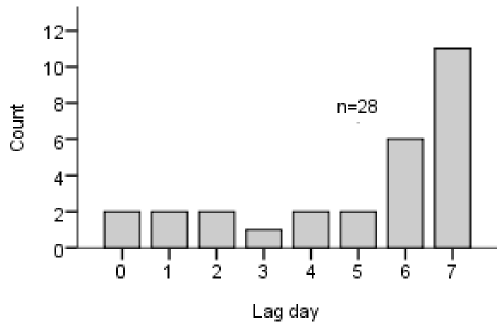


Figure 6.26: England and Wales All Counts - number of the most significant autoregressive point-estimates per environmental exposure by lag day, Excess.

Table 6.37: England and Wales - lag day with the highest number of most significant autoregressive point-estimates, Excess.

Medical Contact	Excess
Acute Visits	4, 5
Casualty Counts	0
Emergency Consultations	1
Emergency Counts	1
Out of Hours Counts	2

Table 6.37 summarises the lag day with the most significant point-estimates for the remaining five medical contacts. Bar charts for the remaining medical contacts are given in Appendix G. Compared to All Counts excess, the excess of the remaining five medical contacts experienced shorter delayed effects from environmental exposure. For Acute Visits lag day four and five; Casualty Counts lag day zero; Emergency Consultations and Emergency Counts lag day one, and Out of Hours Counts lag day two had the highest number of most significant point-estimates.

6.5.2. Trent Region Environmental Lagged Associations

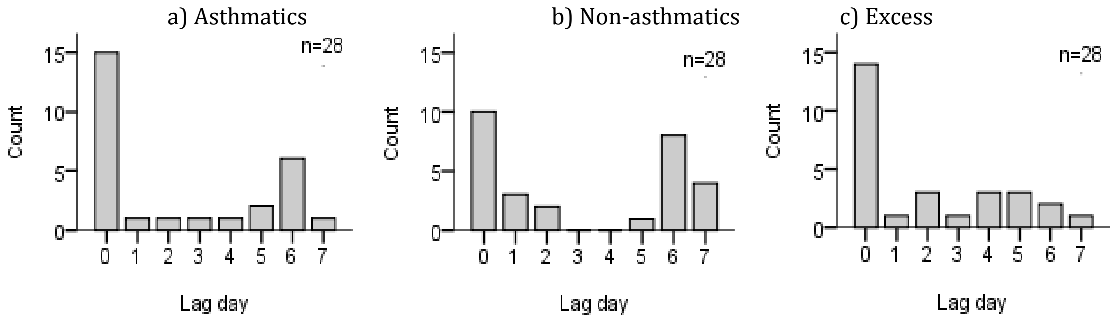


Figure 6.27: Trent Region All Counts– number of the most significant correlation coefficients per environmental exposure by lag day a) Asthmatics, b) Non-asthmatics, and c) Excess.

From the correlational analysis using All counts as the outcome, Figure 6.27 illustrates that the majority of the most significant coefficients fell on the current day thus the associations from current day exposures were more significant compared to exposures from days previous. Results from the autoregressive analysis illustrated slightly different results for the excess; a longer delayed effect was observed from environmental exposures on daily excess when covariates were considered (Figure 6.28). In similarity with the correlational analysis, for asthmatics and non-asthmatics, the highest number of most significant point-estimates fell on the current day highlighting no delayed effect from exposure on the numbers of medical contact.

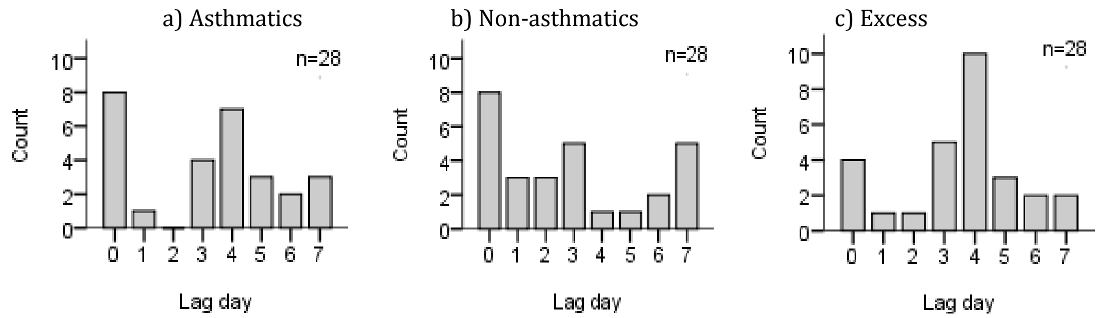


Figure 6.28: Trent Region All Counts - number of the most significant autoregressive point-estimates per environmental exposure by lag day a) Asthmatics, b) Non-asthmatics, and c) Excess.

6.5.3. Sheffield Environmental Lagged Associations

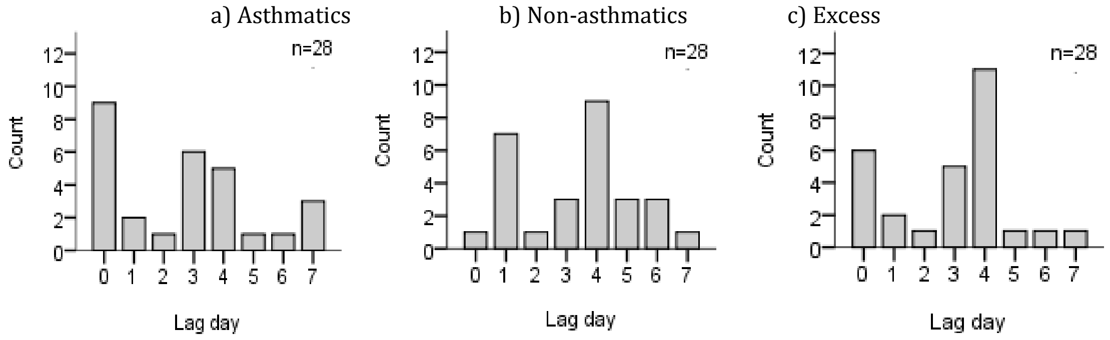


Figure 6.29: Sheffield All Counts – number of the most significant correlation coefficients per environmental exposure by lag day a) Asthmatics, b) Non-asthmatics, and c) Excess.

From the correlational analysis using All counts as the outcome, Figure 6.29 shows that the highest number of most significant coefficients fell on current day for asthmatics and lag day four for non-asthmatics and the excess. This suggested that there was a shorter delayed association between environmental measures and daily counts of asthmatics compared to non-asthmatics or the excess. Results from the autoregressive analysis demonstrate that in contrast to the correlation lagged results, highest number of most significant point-estimates fell on lag day three for asthmatics and current day for non-asthmatics (Figure 6.30). Thus, when covariates were considered, environmental exposures had a longer delayed effect (if any effect was present) on asthmatics compared to non-asthmatics.

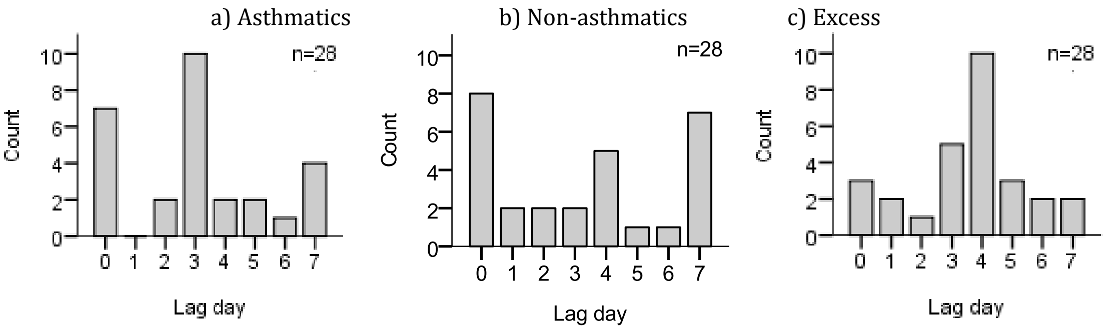


Figure 6.30: Sheffield All Counts - number of the most significant autoregressive point-estimates per environmental exposure by lag day a) Asthmatics, b) Non-asthmatics, and c) Excess.

Comparing between the three geographies, there was no pattern in delayed associations between environmental exposures and medical contacts.

6.6. Summary

Correlations and autoregressive techniques were employed to investigate the association between environmental exposures and daily counts of medical contact. Pearson's correlation (England and Wales dataset) and Spearman's correlation (Trent Region and Sheffield dataset) were used as preliminary analyses. This was followed by Normal (England and Wales dataset) and Poisson autoregressive techniques (Trent Region and Sheffield dataset). Controlling for confounding effects (day of the week, bank holiday and season), the value of adding one environmental variable (in conjunction with its seven lag terms) was investigated to answer four questions, three of which are summarised here. Analyses were conducted on data at national (England and Wales), regional (Trent Region) and local (Sheffield) level to illustrate whether results differed across geographies varying in size.

Are environmental exposures associated with daily counts of medical contact made by school-age asthmatics or non-asthmatics?

Comparing selected results from the simple correlational and autoregressive analyses (which allowed for covariates), results were not consistent between the two analyses – with the simple analysis providing more statistically significant results. For All Counts only, at national level (England and Wales), examining single environmental variables (in conjunction with their seven lag terms), a number of the environmental exposures made a significant improvement to the fit of the data compared to the null model. Compared to England and Wales, fewer environmental variables made a significant improvement to the fit of the data with the Trent Region and Sheffield datasets.

Examining the collective association from the effect of all the environmental exposures on medical contacts, the inferences made from overall model P-value histograms were not always supported by the inferences made from the point-estimate P-value distributions. In general, with All Counts, in contrast to the positively skewed model P-value distributions that signified collective associations between environmental exposures and medical contacts, the uniform point-estimate P-value distributions suggested weak or no associations. Therefore, results within the analysis were not always consistent.

The association therefore between environmental exposures and daily counts of medical contact made by school-age asthmatics or non-asthmatics is equivocal.

Are the environmental associations observed in school age asthmatics in excess of those observed in school age non-asthmatic children?

When examining whether the environmental association was stronger for asthmatics or non-asthmatics using correlations, with the Trent Region and Sheffield dataset, results favoured asthmatics. For England and Wales, there was no difference in association between asthmatics and non-asthmatics.

In slight contrast, the results of the autoregressive analysis tended to suggest that if there was any difference between the two cohorts, the association was in favour (more significant) of non-asthmatics. Results of the analysis conducted with the excess revealed that in parallel to the small differences made between asthmatics and non-asthmatics, there was little or no significant results observed with the excess.

The environmental associations observed in school age asthmatics were thus not in excess of those observed in school age non-asthmatic children.

Are there any lagged environmental associations observed with school-age asthmatics and/or non-asthmatics?
From the correlations, there were delayed associations with Sheffield daily counts and excess, yet, there were no delayed associations with England and Wales and Trent Region daily counts and excess. These results differed to the autoregressive analysis where covariates were included. Thus, for England and Wales All Counts asthmatics and excess, exposures were most significant seven days after exposure. For the Trent Region excess, exposures were most significant four days after exposure. For Sheffield asthmatics, non-asthmatics and excess, exposures were most significant on the third, current and fourth lag day. From the main analyses, it follows that the number of most significant point-estimates fell on different lag days across the medical contacts hence there were inconsistent lagged effects.

Therefore, there was inconsistent evidence of lagged environmental associations observed with school-age asthmatics and/or non-asthmatics.

The literature highlighted that environmental associations with childhood asthma vary spatially. Alongside investigating the relationship between environmental exposures and medical contacts over time, this thesis investigates spatial relationship between pollutant exposures and medical contacts. Chapter Seven reports results from a spatial analysis.

Chapter Seven

Spatial associations between pollutant exposures and asthma and non-asthmatic related medical contacts made by school-age children

7.1. Introduction

Chapter Six presented the results that addressed the second aim of the study examining the association between daily measures of environmental exposures (collectively) and daily counts of medical contact made by school-age asthmatics and non-asthmatics. Previous literature highlights that the association between environmental associations and medical contacts made by children with asthma may be spatially influenced. Following this, a parallel investigation was conducted to address the third aim of the study - to investigate MSOA level rates of medical contact made by school-age asthmatics, non-asthmatics and the excess alongside spatially defined pollutant exposures. The excess here was difference in the mean rates of contacts made by school-age asthmatics and non-asthmatics. This investigation observed whether these rates were associated with ward level pollution data in Sheffield.

7.1.1. Aims of the Chapter

This chapter aims to answer the three following questions:

1. Are there areas in Sheffield that have high levels of medical contact made by school-age children for asthmatic and non-asthmatic conditions?
2. Is there an association between pollution measures and levels of asthmatic or non-asthmatic medical contacts in Sheffield?
3. If there are areas with significantly high levels of asthmatic or non-asthmatic medical contact, are these also near the children's hospital?

7.2. Geographical Distribution of the Comparative Hospital contact Ratios and Pollutant Exposures

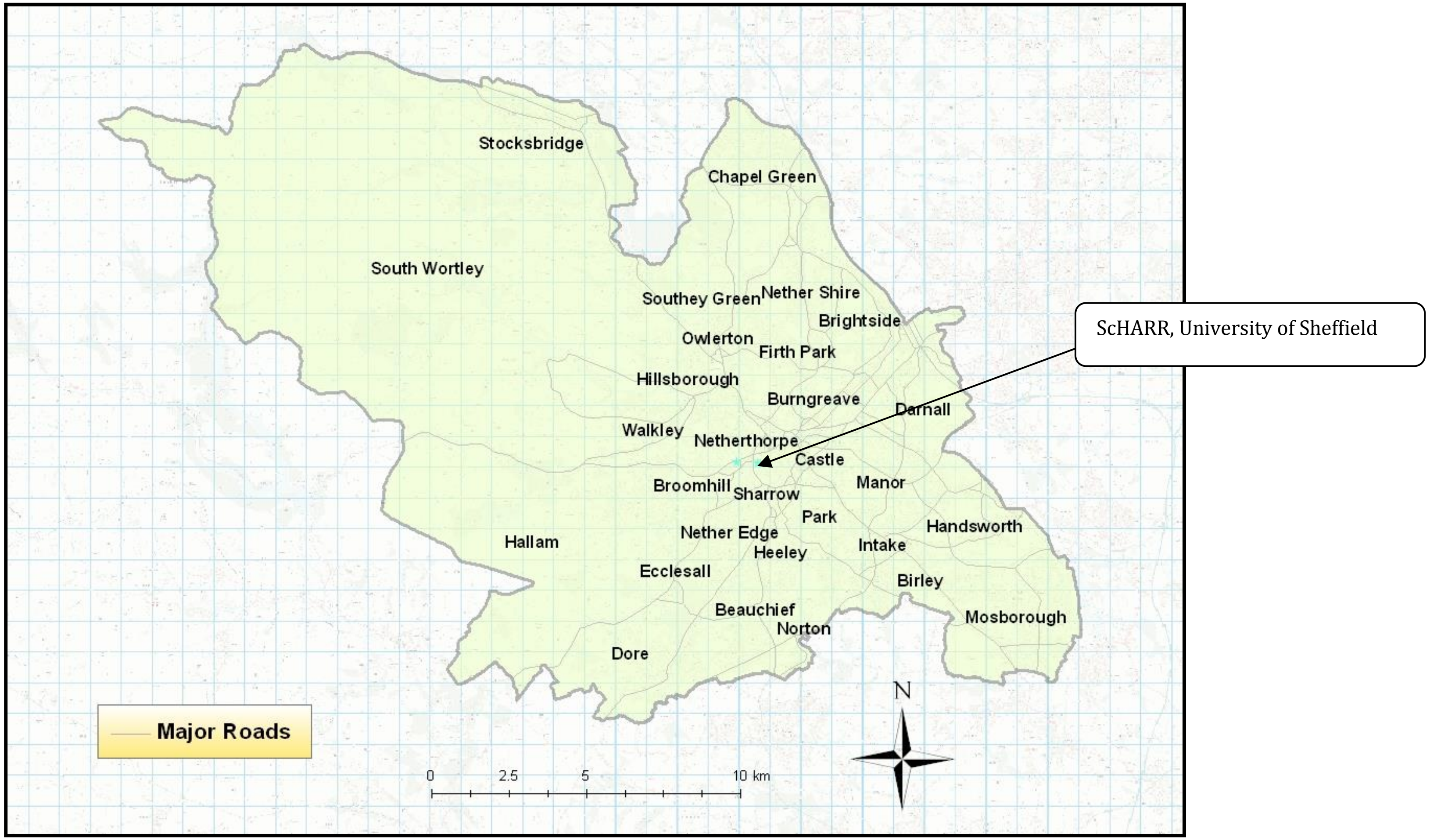


Figure 7.1: Map of Sheffield Wards.

Sheffield is situated at the bottom of South Yorkshire, England. Prior to 2006, Sheffield was under the Trent Strategic Health Authority: currently Sheffield (December 2011) is part of the Yorkshire and the Humber SHA (2010). Figure 7.1 illustrates wards in Sheffield. Wards are larger scale area measures compared to MSOAs; on average, an electoral ward encompasses two or three MSOAs. Electoral wards were geographically smaller on the east half of Sheffield compared to the west as these areas hold greater concentrations of the population. "Major Roads" include motorways, A-roads and B-roads. Figure 7.1 show that the majority of the major roads were situated on the east side of Sheffield.

According to the Indices of Multiple Deprivation (IMD) in 2001, Ecclesall, Broomhill, and Hallam had the highest ranks of IMD indicating that these three areas were the least deprived in Sheffield. Southey Green, Manor, and Burngreave were the most deprived areas with the lowest IMD ranks in Sheffield.

7.3. Are there areas in Sheffield that have high levels of medical contact made by school-age children for asthmatic and non-asthmatic conditions?

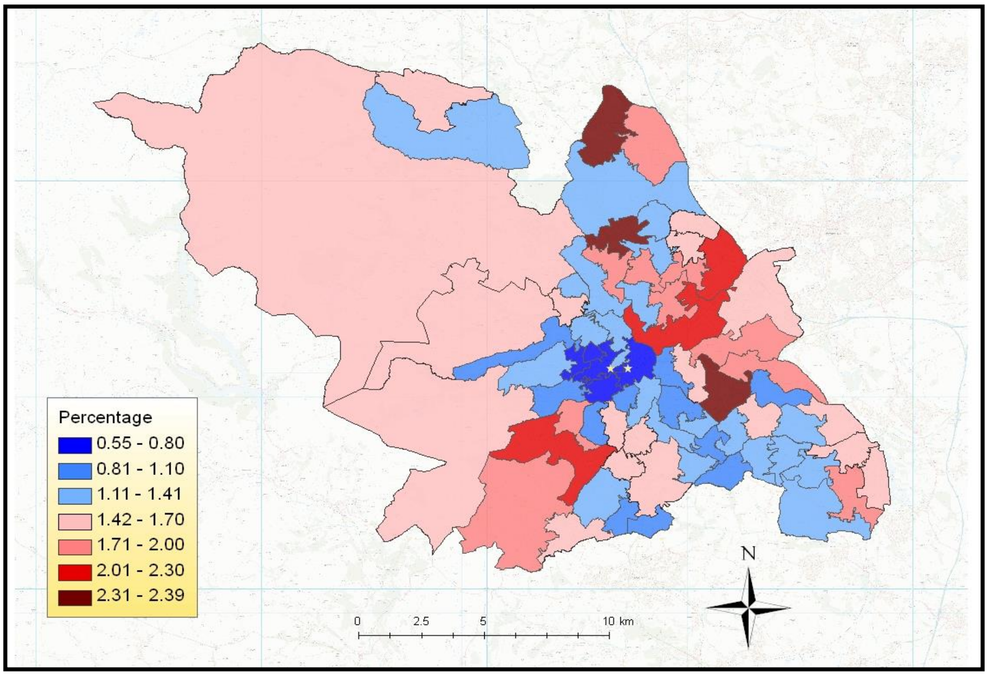


Figure 7.2: Sheffield population of children aged five to sixteen years (Percentage).

Between the years of 2002 to 2005, there were between 74,744 to 74,974 children aged 5 to 16 residing in Sheffield (data extracted for the number of persons according to age from ONS website). This equates to approximately 1,054 children per MSOA thus each MSOA hold around 1.41 percent of Sheffield's total population of 5 to 16 year olds. Figure 7.2 illustrates MSOAs with above or below the average percentage of children aged 5 to 16 years. Shades of blue indicate percentages below the mean whilst shades of red indicate percentages above the mean. MSOAs in the centre of the city exhibit the lowest percentages of children whilst the highest percentages were observed in the northeast/east.

7.3.1. Geographical distribution of the Logged Comparative Hospital Contact Ratios

a) Logged CHR for Asthmatics

b) P-values

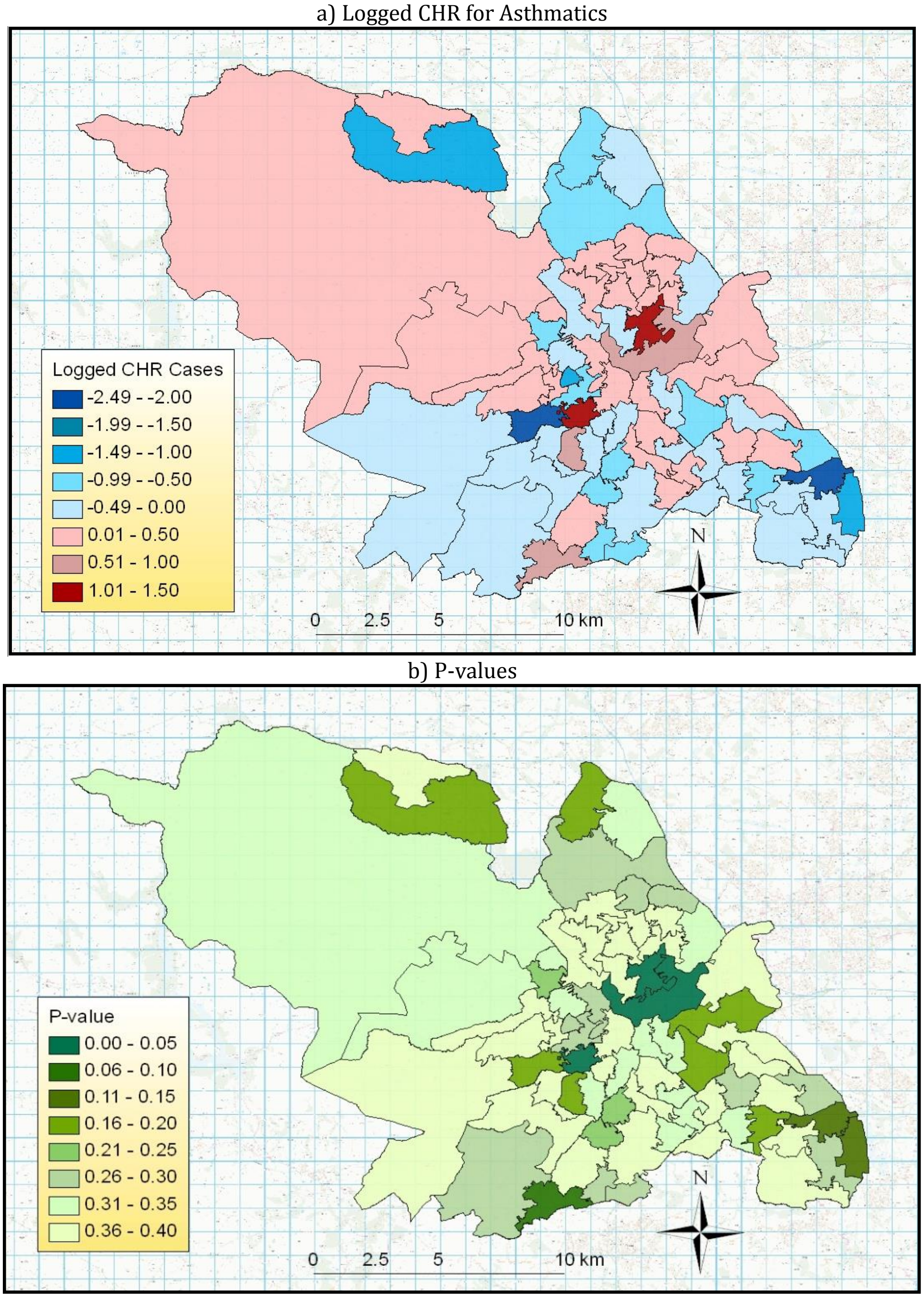
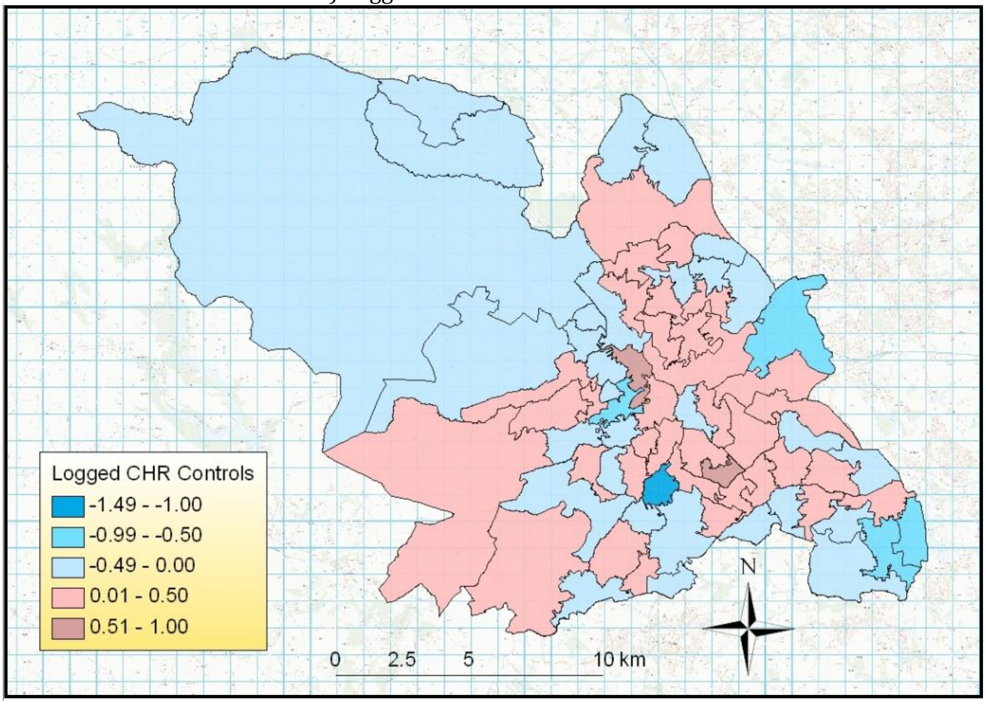


Figure 7.3: Map of the a) Logged CHR for Asthmatics and b) P-values.

The calculation for the Comparative Hospital Contact Ratios (CHRs) was documented in Chapter Four. CHRs are ratios of observed over expected numbers of medical contact. Figure 7.3a display the CHRs for asthmatics per MSOA in Sheffield. Areas shaded in blue indicate that the observed numbers of contacts were lower than expected whilst the areas shaded in red illustrate that observed numbers of contacts were higher than expected. Red areas were present in the northwest and east of Sheffield. Blue areas were present in the north, southwest, and southeast areas. Often, areas with a certain characteristic were surrounded by areas of the same if not similar characteristics; this is known as “spatial clustering” which was evident in this map. An exception to this characteristic, there was a dark red MSOA next to dark blue MSOA at the centre of Sheffield illustrating contrasting ratios. For asthmatics, only three MSOAs (two to the east and one in the centre) held statistically significant CHRs (Figure 7.3b), this inferred the ratio of observed over expected numbers were statistically significant.

a) Logged CHR for Non-asthmatics



b) P-values

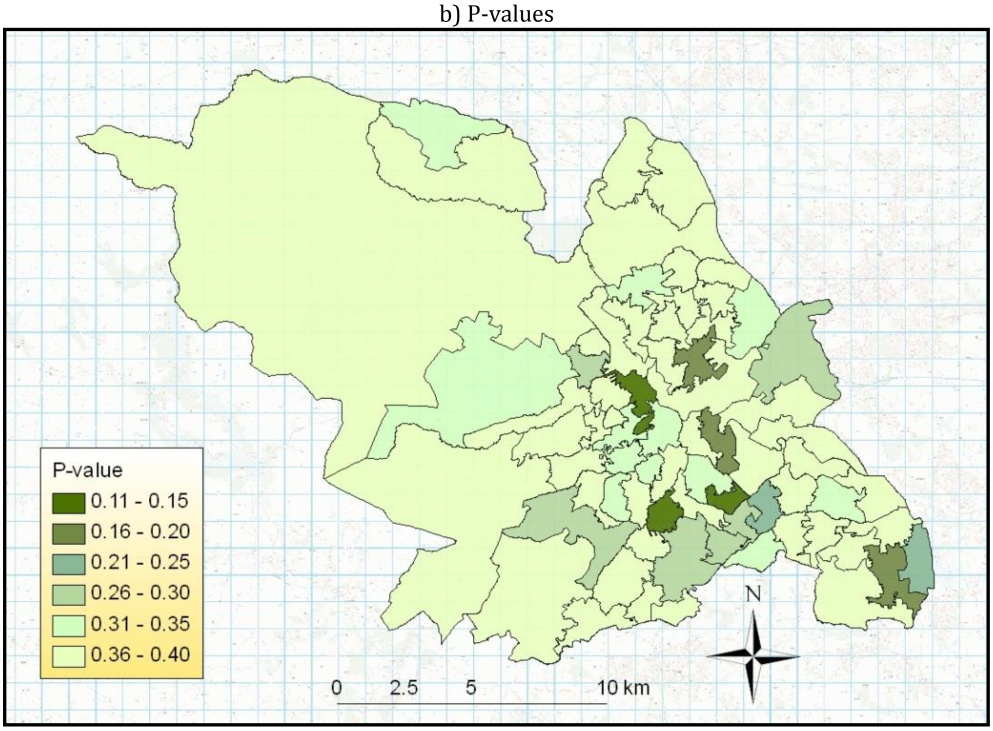
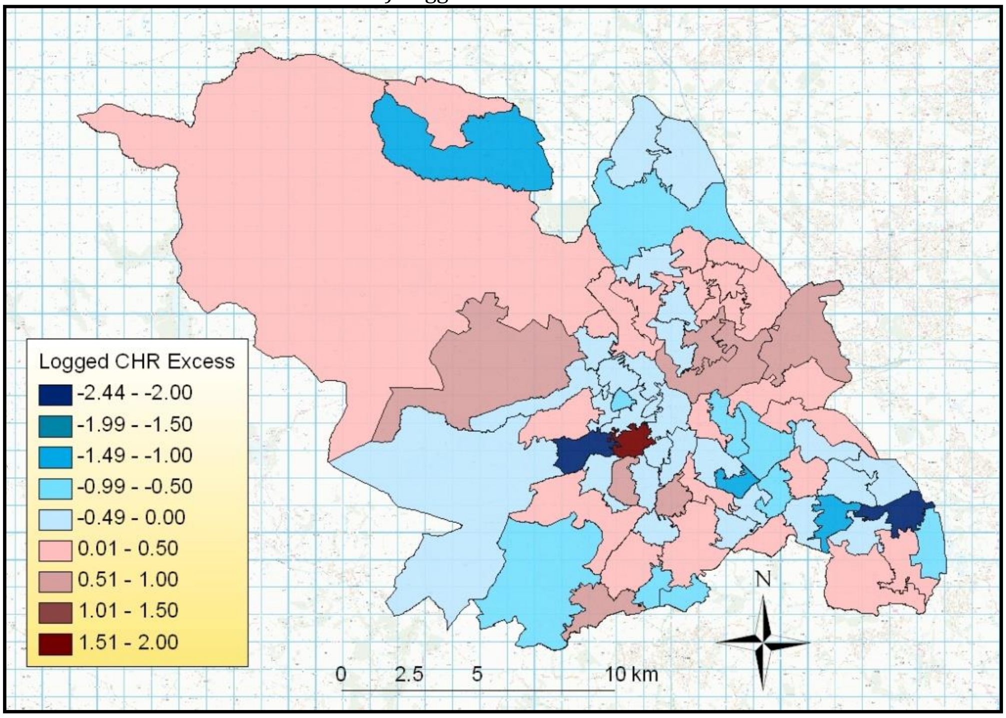


Figure 7.4: Map of a) Logged CHR for Non-asthmatics and b) P-values.

Figure 7.4a illustrates a slightly different geographical distribution of CHRs for non-asthmatics to asthmatics. Red areas were present in the northeast, east and in the southwest. Blue areas were observed in the northwest and scattered in the east and south of the city. There were no statistically significant CHRs for non-asthmatics (Figure 7.4b), this inferred that observed numbers were not significantly above or below expected.

a) Logged CHR for Excess



b) P-values

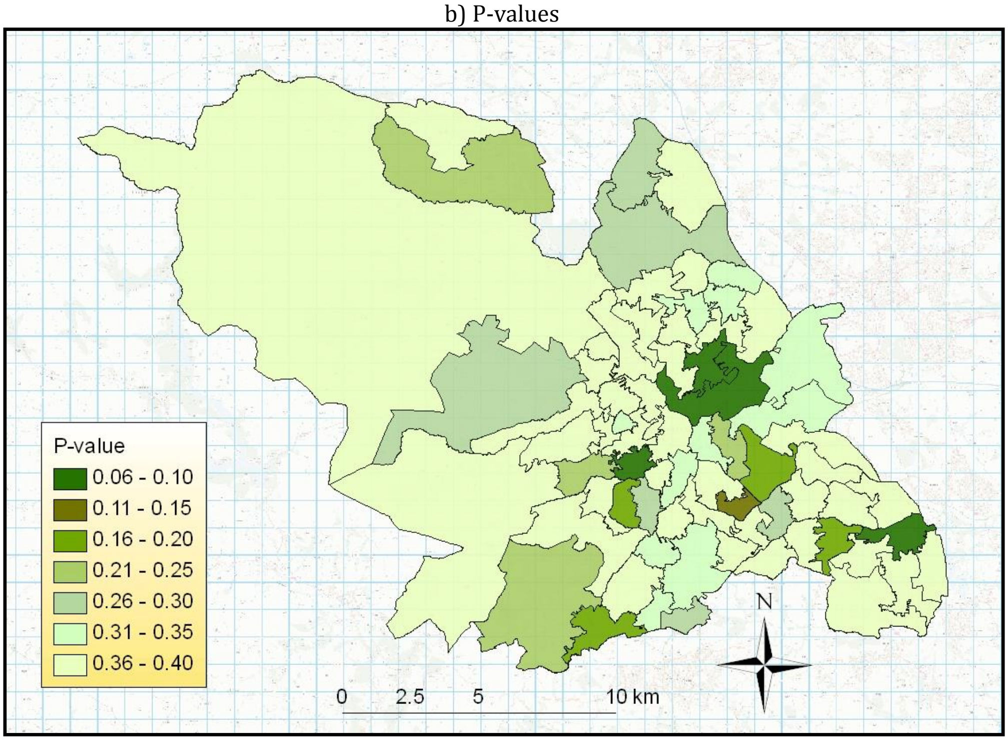


Figure 7.5: Map of the a) Logged CHR for the Excess of Asthmatics minus Non-asthmatics and b) P-values.

Figure 7.5a illustrates a map of the CHRs for the excess of asthmatics over non-asthmatics. Shades of red were more prevalent in the north of Sheffield whilst shades of blue were more abundant in the south. This infers the observed excess was higher than expected in the north and lower than expected in the south of the city. P-values for the CHR of the excess ranged from 0.06 to 0.4 thus were not significant (Figure 7.5b).

7.3.2. If there are areas with significantly high levels of asthmatic or non-asthmatic medical contacts, are these also near the children's hospital?

For asthmatics and non-asthmatics, it was hypothesised that MSOAs near to the SCH would be shaded in red suggesting higher than expected number of counts. This was based on the assumption that children in areas near hospital would attend more so than children (with asthma or other conditions) living away from the hospital. However, this was not fully illustrated in the maps. Significant hotspots of CHRs for asthmatics were situated in the centre near to the Children's hospital and towards the east near the Northern General hospital. Thus, hotspots of CHRs for asthma were close to hospitals but not specifically to close to the SCH. CHRs signifying higher than expected number of contacts for non-asthmatics or the excess do not cluster around any of the hospitals.

7.4. Is there an association between pollution measures and levels of asthmatic or non-asthmatic medical contacts in Sheffield?

Roadside and background spatial measures of air-quality as well as measures of air-emission categorised by source were used to investigate spatial pollutant associations with medical contacts. The following figures illustrate the geographical distribution of a selected number of pollutants. Geographical distributions of other pollutants not mentioned here can be found in Appendix C.

Generally, there were higher background and roadside scores of NO_2, $PM_{10,}$ and Benzene dispersed in the east of Sheffield. SO_2 exhibited a slightly different geographical pattern; there were higher scores of SO_2 in the eastern edge of Sheffield, southeast and one MSOA in the north. O_3 scores exhibit contrasting geographical characteristics to the other four pollutants: Figure 7.6 shows higher scores (three or above) in the majority of the city and only MSOAs in the east held lower levels of O_3. The production of O_3 is influenced by the presence of NO_2 and NO, NO_2 acts as the source of O_3 whereas NO destroys the O_3 by acting as a local sink (DEFRA, 2011). The maps suggest that areas in the east of Sheffield had higher levels of NO that inhibit levels of O_3.

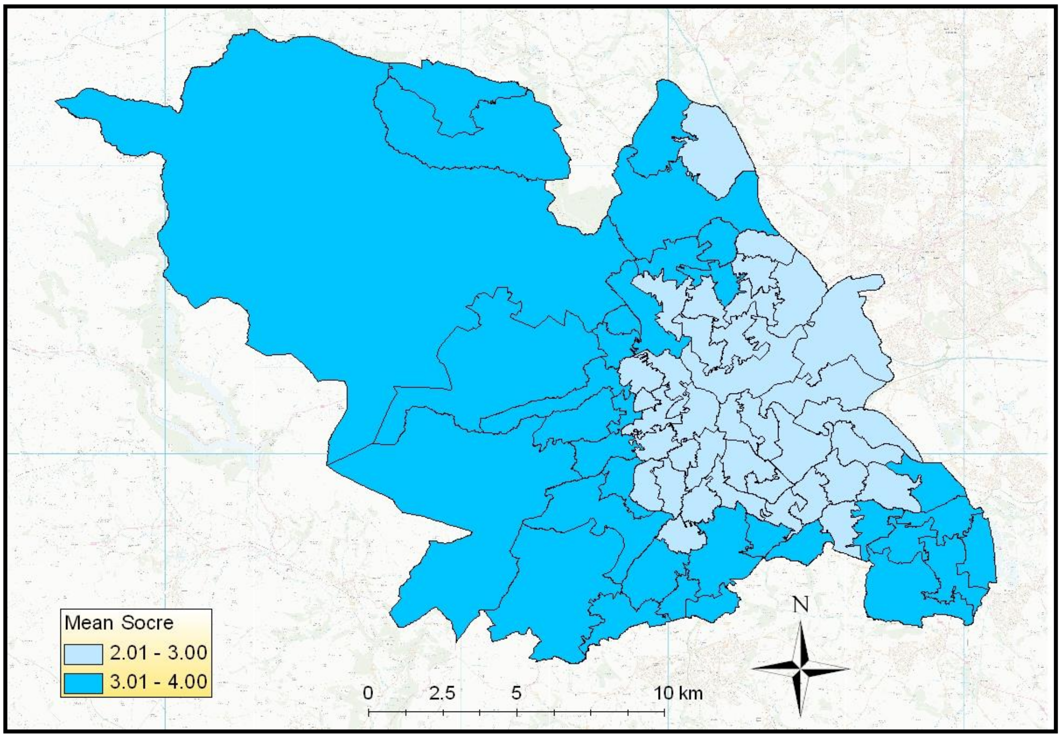
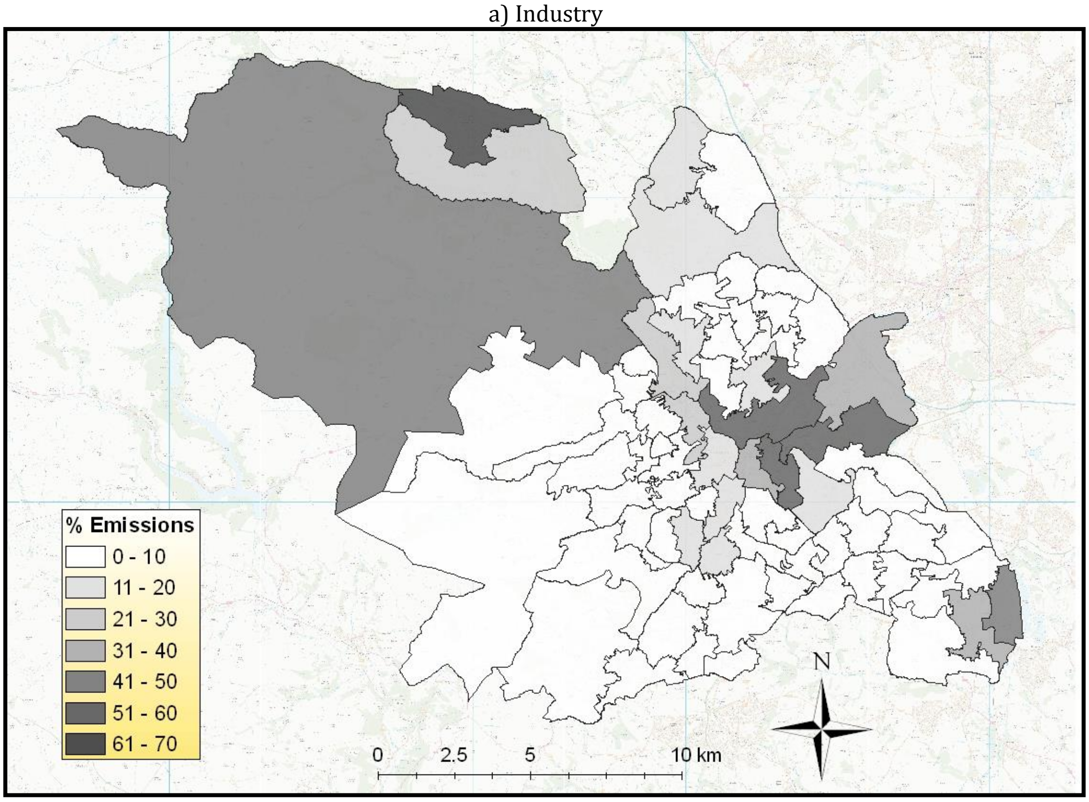
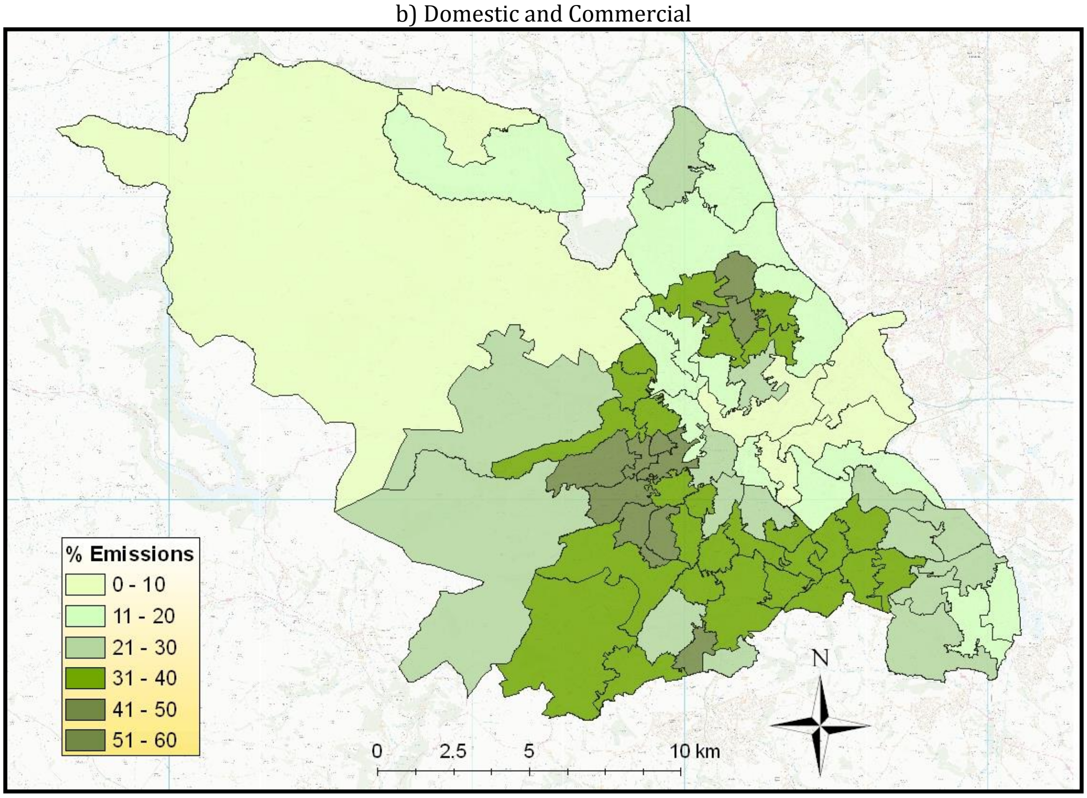


Figure 7.6: Map of O_3 Air Quality Scores for Background sources.

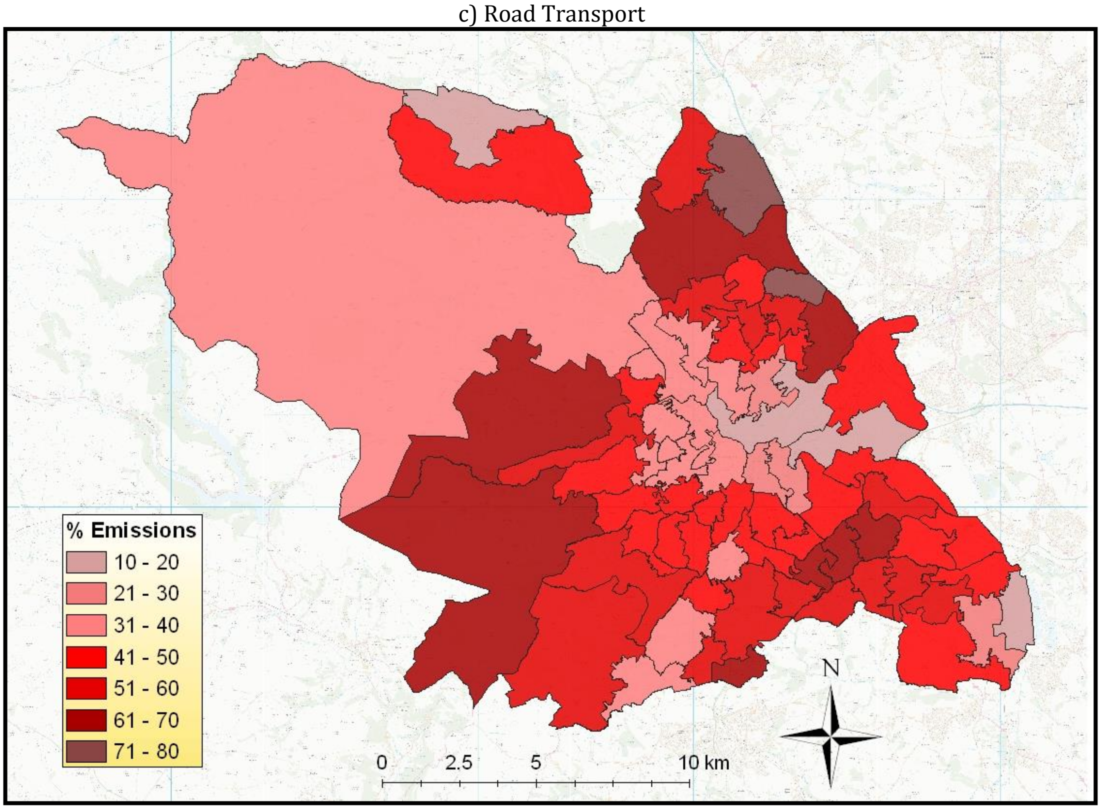
a) Industry



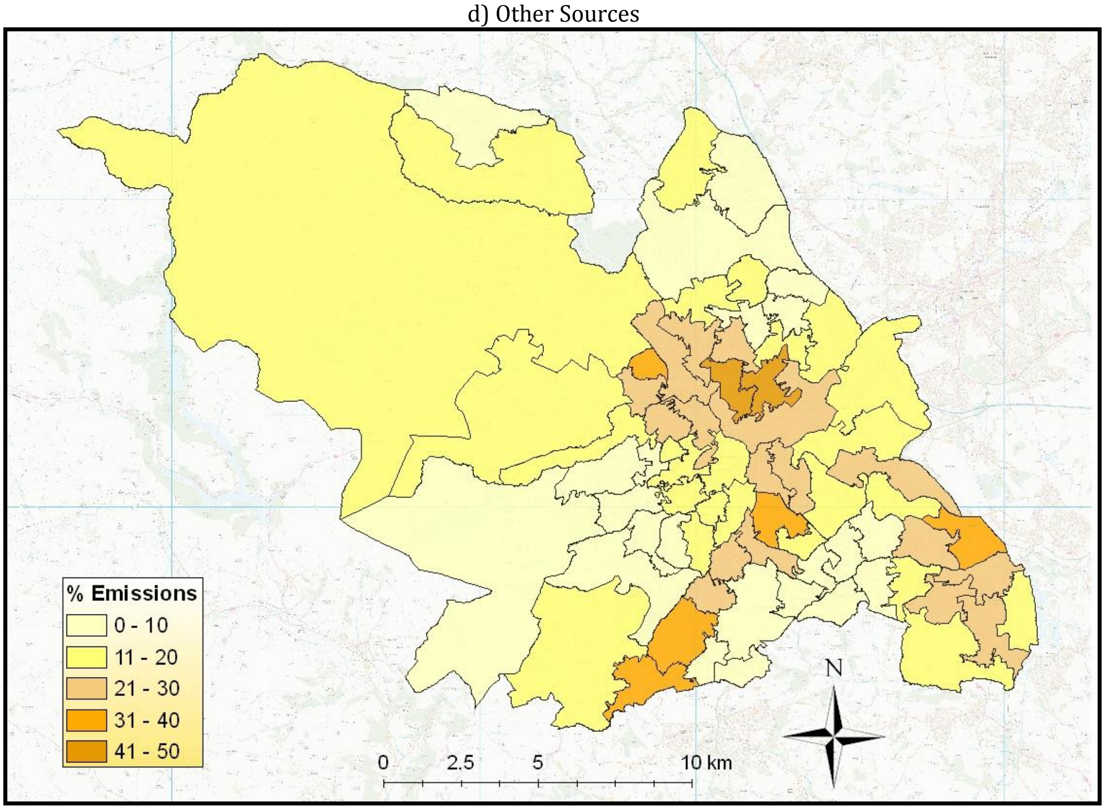
b) Domestic and Commercial



c) Road Transport



d) Other Sources



e) Score of Emission Intensity

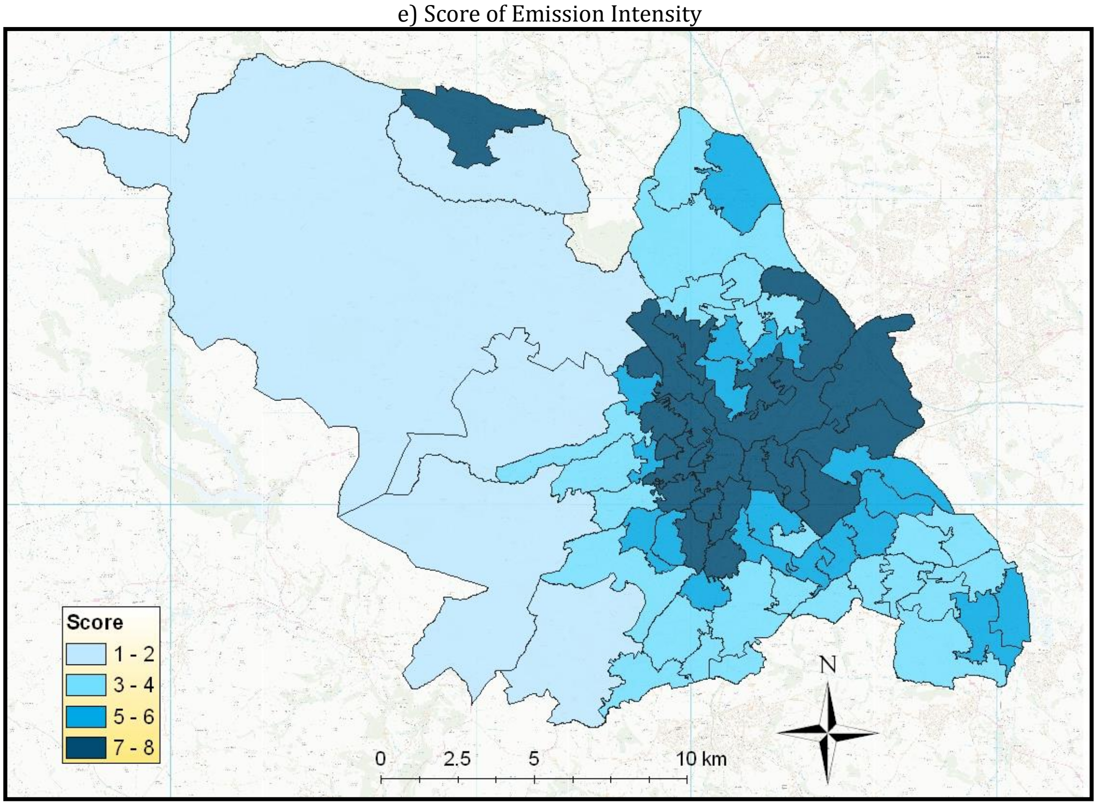


Figure 7.7: Map of NO_x emission percentage from a) Industry, b) Domestic and Commercial, c) Road Transport, d) Other Sources and e) the score of overall emission intensity.

Nitrogen Oxide (NO_x) is a collective term used describe emissions of Nitric Oxide (NO) and Nitrogen Dioxide (NO_2). Figure 7.7 show different patterns of NO_x emissions according to the source of the pollutant. NO_x emissions due to production from industry were higher in the northwest and in small pockets in the east (Figure 7.7a). Proportions of domestic and commercially sourced NO_x were higher in the centre and south of the city (Figure 7.7b). Proportions of road transport sourced NO_x were higher in the southwest, northeast and in small pockets in the southeast (Figure 7.7c) and other sourced NO_x were higher in the east of the city (Figure 7.7d). The scores for overall NO_x emissions were higher in the east and there was one MSOA with a high score in the north of the city (Figure 7.7e).

The geographical distributions of PM_{10}, SO_2, and Benzene emissions were similar to NO_2. Generally, higher proportions were observed in the east of the city.

Table 7.1: Mean percentage per source for Sheffield (n=71).

Measure	Score	Industry	Domestic and Commercial	Road Transport	Other Sources
NO_x	5.25	10.15	27.85	**45.52**	16.44
PM_{10}	5.04	14.20	12.28	**39.30**	34.21
SO_2	5.39	24.51	33.56	7.18	**34.87**
Benzene	5.62	18.65	19.73	**36.00**	25.62

Table 7.1 shows that road transport contributes the most NO_x, PM_{10} and benzene and other sources contribute the most SO_2.

To investigate the association between the pollutant exposures and logged CHRs, a comparative analysis was conducted to compare the results of Pearson and Spearman's analysis. Results were similar regardless of what method was used. The results from Pearson's correlation are presented.

Table 7.2: Correlations between Air Quality mean measures and log CHRs.

Mean Measures	Asthmatics		Non-asthmatics		Excess	
	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
NO_2 Roadside	0.24	0.062	0.04	0.774	0.20	0.113
NO_2 Background	0.27	*0.025	0.09	0.452	0.21	0.077
PM_{10} Roadside	0.22	0.083	0.15	0.236	0.13	0.309
PM_{10} Background	0.20	0.099	0.13	0.293	0.13	0.292
Benzene Roadside	0.25	0.046	0.18	0.161	0.15	0.251
Benzene Background	0.17	0.146	0.14	0.252	0.10	0.412
SO_2 Background	0.04	0.726	-0.11	0.369	0.10	0.430
O_3 Background	-0.27	*0.025	-0.16	0.194	-0.18	0.138

*statistically significant coefficient

Coefficients do not exceed ±0.27 (Table 7.2) suggesting that associations were weak. Coefficients were higher for asthmatics compared to non-asthmatics. There were two statistically significant correlations between the logged CHR for asthmatics and NO_2 (positive) or O_3 (negative) background scores. Positive correlations suggest that a higher X (for example NO_2) was associated with a higher Y (for example logged CHR). A negative association suggest that a higher X (O_3) was associated with a lower Y (logged CHRs). Scatterplots of the significant correlations were illustrated in Figure 7.8**.** No statistically significant correlations were found with the logged CHR for non-asthmatics or the logged CHR for excess between asthmatics and non-asthmatics. Road transport is the main contributor to pollution in the UK (DEFRA, 2007). Yet, no statistically significant relationships were observed with roadside scores of pollution.

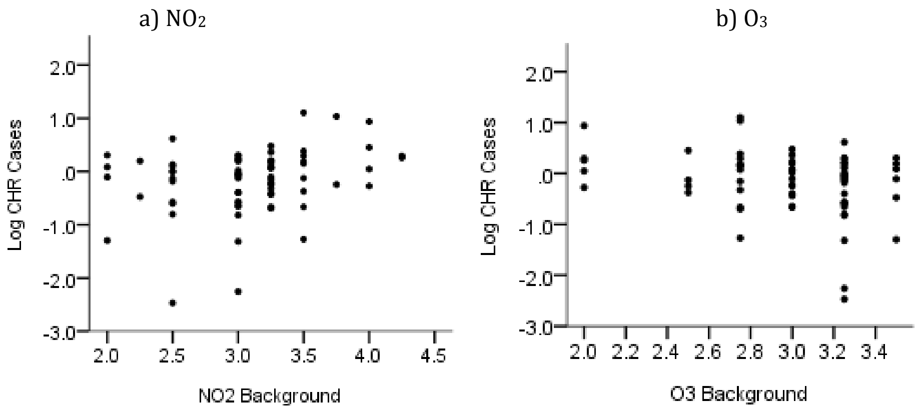


Figure 7.8: Scatterplot of between Mean Air Quality Scores a) NO_2 and b) O_3, and Logged CHR Asthmatics.

Table 7.3: Correlations between Air Emission measures and log CHRs.

		Asthmatics		Non-asthmatics		Excess	
Measure		**Coefficient**	**P-value**	**Coefficient**	**P-value**	**Coefficient**	**P-value**
Score of NO_x Emission Intensity		0.21	0.081	-0.03	0.821	0.21	0.072
% of NO_x from	Industry	0.09	0.452	-0.11	0.365	0.14	0.237
	Domestic and commercial	-0.11	0.364	0.01	0.927	-0.11	0.358
	Road Transport	-0.08	0.507	0.10	0.411	-0.13	0.292
	Other sources	0.11	0.373	0.02	0.838	0.09	0.450
Score of PM_{10} Emission Intensity		0.12	0.300	0.01	0.948	0.12	0.335
% of PM_{10} from	Industry	0.12	0.337	-0.13	0.292	0.18	0.144
	Domestic and commercial	-0.31	*0.009	0.05	0.704	-0.32	*0.006
	Road Transport	0.02	0.866	0.06	0.639	-0.01	0.942
	Other sources	0.13	0.269	0.05	0.675	0.10	0.394
Score of SO_2 Emission Intensity		-0.07	0.543	0.02	0.854	-0.08	0.497
% of SO_2 from	Industry	0.09	0.477	-0.08	0.534	0.12	0.317
	Domestic and commercial	-0.19	0.115	0.18	0.123	-0.27	*0.020
	Road Transport	0.16	0.171	0.01	0.938	0.15	0.201
	Other sources	0.06	0.618	-0.11	0.371	0.11	0.352
Score of Benzene Emission Intensity		0.05	0.668	-0.04	0.729	0.07	0.557
% of Benzene from	Industry	0.11	0.345	-0.09	0.452	0.15	0.197
	Domestic and commercial	-0.25	*0.038	-0.01	0.945	-0.23	*0.050
	Road Transport	0.12	0.324	0.07	0.573	0.08	0.506
	Other sources	0.15	0.214	0.07	0.549	0.11	0.372

*statistically significant coefficient.

In comparison with correlations conducted between logged CHRs and air quality scores (Table 7.3), coefficients with air emission measures were quite low; no coefficient exceeded ±0.32. Two correlations were statistically significant with the logged CHR for asthmatics and three correlations were significant with the logged CHR for the excess. Scatterplots of significant correlations were illustrated in Figure 7.9 and Figure 7.10. No correlations were found to be significantly associated with the logged CHR of non-asthmatics. All statistically significant results were conducted with emissions sourced from domestic and commercial production. These relationships were negatively correlated thus the lower the percentage of the pollutant, the higher the logged CHR. These relationships maybe proxy findings for underlying relationships with exposure sourced from the same place i.e. the home. No statistically significant relationships were identified with industrial, road transport, or other sources of pollution.

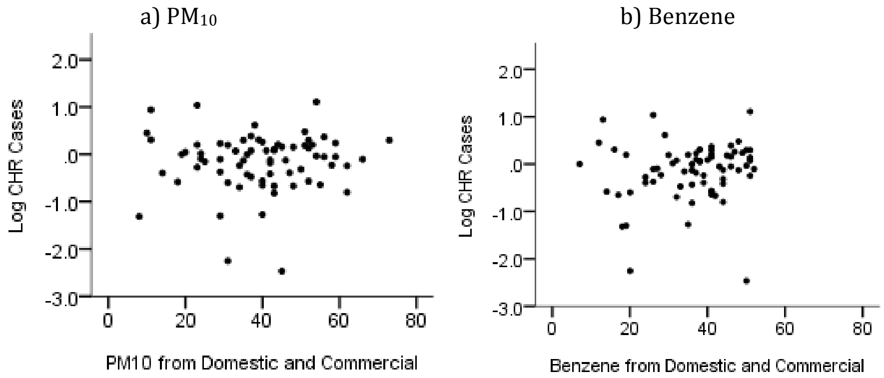


Figure 7.9: Scatterplot of Air Emissions Scores and Logged CHR Asthmatics for a) PM_{10} and b) Benzene.

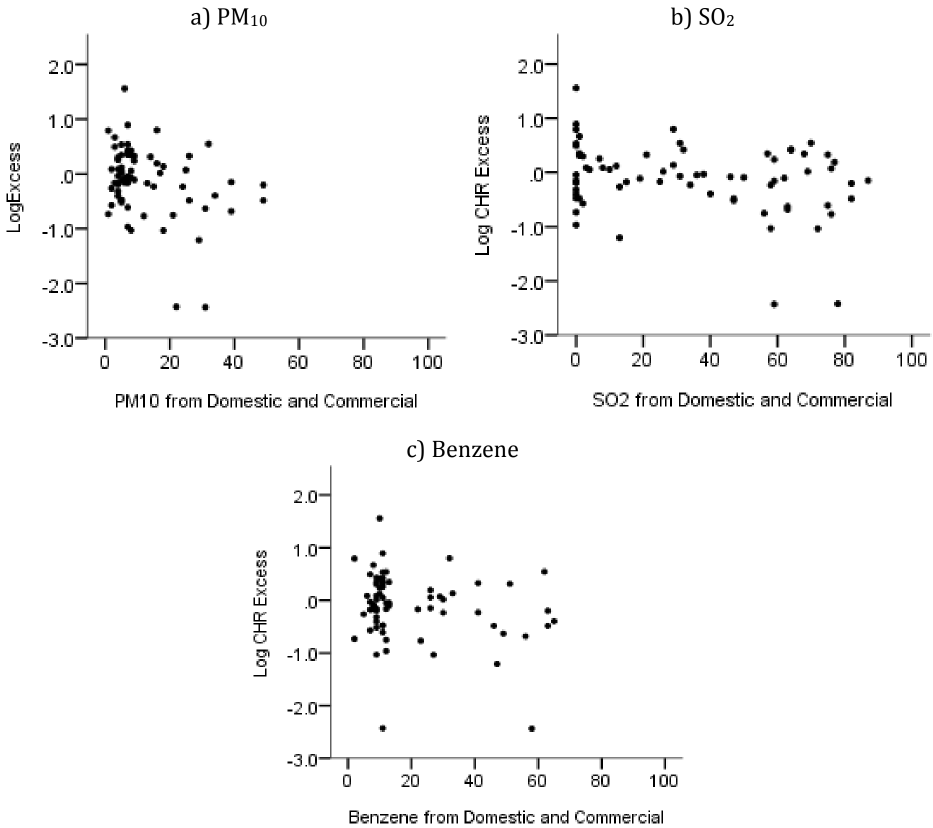


Figure 7.10: Scatterplot Air Emissions Scores and the logged Excess for a) PM_{10} b) SO_2 and c) Benzene.

Note that all proportions from the four sources contribute to the total emissions. Therefore, a negative relationship (as observed with domestic and commercial sourced PM_{10}, SO_2, and Benzene) may be confounded by another pollutant producing a higher proportion of emissions. If a negative relationship was observed with domestic and commercial sources, it is likely that a positive relationship would be observed with one or two of the other sources. For benzene and PM_{10}, domestic and commercial sources supplied the lowest proportions of emission (thus not major contributor) compared to the other three sources (industry, road transport, other sources). Thus, it was likely that a negative association would result from domestic and commercially sourced pollutants and positive associations result from road transport sourced pollutants.

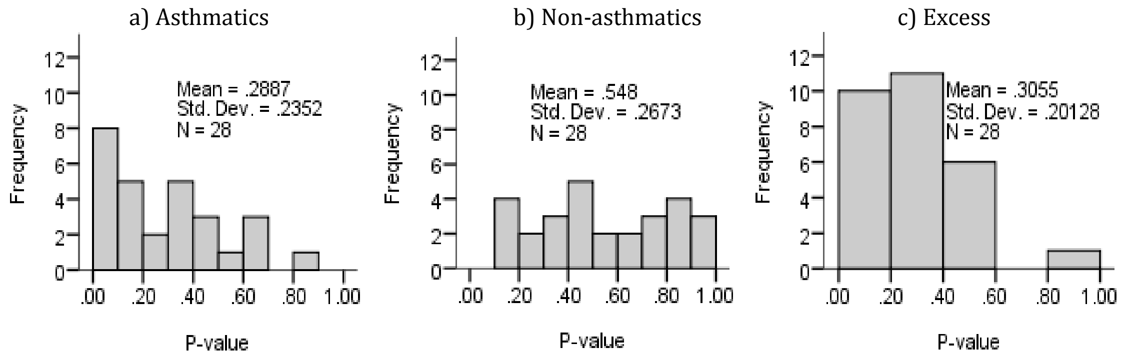


Figure 7.11: Correlation's P-value Histograms.

Consistent with the method used to examine the P-values in the time-series analyses in Chapter Six, Figure 7.11 illustrates the P-value distributions of the correlations. Asthmatics had a positively skewed distribution with a mean P-value less than 0.5 thus collectively; the pollutant measures were associated with the logged CHR for asthmatics. The same was inferred with the logged CHR for the excess. For non-asthmatics, the opposite was suggested, with a uniform distribution and a mean P-value above 0.5, pollutants were not associated with the logged CHR for non-asthmatics.

7.5. Summary

This chapter reported the results investigating the spatial relationship between pollutant exposures and the ratio of observed over expected daily counts of hospital contact.

Are there areas in Sheffield that have high levels of medical contact made by school-age children for asthmatic and non-asthmatic conditions?
There were areas in Sheffield that had high levels of medical contact made by school-age children for asthmatic and non-asthmatic conditions but there was no consistent pattern. Examining the geographical distribution of childhood asthma in Sheffield, there were asthma hotspots towards the east and centre of Sheffield. Only three MSOAs (east and centre) held statistically significant logged CHRs for asthmatics. There were no statistically significant CHRs for the non-asthmatic group and of the excess of asthmatics over non-asthmatics.

If there are areas with significantly high levels of asthmatic or non-asthmatic medical contacts, are these also near the children's hospital?
For asthmatics, significant hotspots of CHRs for asthmatics were situated in the centre near to the Children's hospital and towards the east near the Northern General hospital. Thus, hotspots of CHRs for asthma were close to hospitals but not specifically to close to the SCH. There were no significant CHRs for non-asthmatics and the excess near the hospitals in Sheffield.

Is there an association between pollution measures and levels of asthmatic or non-asthmatic medical contacts in Sheffield?
Examining the geographical distribution of pollutant measures showed that the east of Sheffield experienced poorer air quality with higher scores of emissions compared to the west. However, it was difficult to unravel potential relationships between the logged CHRs and pollutant exposures with pictorial information alone.

Using correlations, there were two (out of possible eight) statistically significant weak relationships found between air quality background measures (NO_2 and O_3) and asthmatics. Two (out of a possible twenty) significant relationships were found between air emission measures and asthmatics and three were found with the excess. Statistically significant relationships (asthmatics or the excess) with air emissions were domestic and commercial sourced. These relationships were negatively correlated thus the lower the proportion of exposure the higher the logged CHR.

There is limited evidence to support an association between pollution measures and levels of asthmatic or non-asthmatic medical contacts in Sheffield.

Issues relating to the method of analysis for this investigation and the time-series investigation will be addressed in Chapter Eight.

Chapter Eight

Discussion

8.1. Introduction

The seasonal characteristic of medical contacts made by school-age children with asthma is complex. The complexity arises for a number of reasons. The first reason is there are many environmental factors to consider. A second reason is that social factors, for instance the school calendar also have an effect on childhood asthma. Both social factors and environmental exposures have the potential to influence the seasonal pattern of childhood asthma events.

Chapter Two reported the findings from studies investigating the seasonality of childhood asthma related medical contacts, and environmental triggers of childhood asthma resulting in medical contact. It described evidence for and against the associations between pollutant, weather, or pollen exposures with daily counts of asthma related medical contact in children. It included evidence that inferred proximity to exposures is an important confounder of environmental-asthma associations. A number of studies reported seasonal patterns in the daily, weekly, or monthly number of medical contacts made for asthmatic symptoms (Blaisdell et al., 2002, Fleming et al., 2000b, Silverman et al., 2003). The seasonal characteristic is said (by a number of studies) to be influenced by the school calendar (Johnston et al., 2006, Storr and Lenney, 1989).

Though the seasonality and environmental triggers of childhood asthma have been heavily researched, there are a number of limitations of the current literature. The first is that the majority of the studies were set outside the UK. Environmental exposures vary greatly according the geographical location therefore, it may be unsuitable to generalise findings from non-UK studies onto a UK population.

The second limitation is that the majority of the studies did not use a comparison group thus, these studies could not assess whether the environmental effect was greater than or lower than that experienced by another population. Tying in with the first limitation, only one UK study was found to have adopted a comparison group in their design.

A further limitation is that no study analysed patterns of seasonality in different health care settings of primary and secondary care. Therefore, there was no evidence of cross-validating the environmental-association or seasonal patterns between primary and secondary care contacts.

The limitations in the literature gave rationale for this thesis: a retrospective matched asthmatic non-asthmatic design to examine the seasonal patterns of daily medical contacts made by school-age asthmatic and non-asthmatics in different health settings and geographies. In addition, this thesis investigated the time-series environmental association with daily counts of medical contact made by school-age asthmatic and non-asthmatic as well as the spatial pollutant association.

Chapter Three documented the source of the clinical datasets. The clinical data were collected from two separate sources, the General Practice Research Database (GPRD) and the Sheffield Children's Hospital (SCH).

For the GPRD dataset, school-aged asthmatics with a medical diagnosis of asthma were matched to non-asthmatics by age, gender, and general practice. Medical contacts were aggregated into six non-mutually exclusive categories. All Counts; Acute Visits; Emergency Consultations; Casualty Counts; Emergency Counts and Out of Hours Counts.

For the Sheffield Children's dataset, medical events made by school-age children for asthmatic symptoms were matched to non-asthma related medical contacts by age and gender.

In addition to assessing effects on school-age asthmatics and non-asthmatics, a second outcome called the excess was also investigated. The excess is the difference between the (daily or spatial (MSOA)) number of medical contacts made by asthmatics and the number of contacts made by non-asthmatics.

To investigate temporal relationships with data from geographical areas decreasing in size, the GPRD data were used to form the national (England and Wales) and regional (Trent Region) datasets and the SCH data were used to form the local (Sheffield) dataset. To investigate spatial relationships with pollutant measures, SCH data were also used to form a spatial dataset.

Chapter Three also documented the source of the environmental datasets. Daily measures of pollutant, weather, and pollen exposures were obtained mainly from the city of Sheffield and sourced from the National Air Archive, Met Office, and National Pollen Aerobiology Research Unit (NPARU). Daily counts of medical contact and daily environmental measures were analysed from 1st of January 1999 to 31st of December 2004. Spatially defined pollutant measures were obtained from the Office of National

Statistics. Annual measures of air emissions and air quality were obtained from 2002 to 2005 (2005 only for air quality measures).

Chapter Four described the time-series and spatial methodologies. The seasonality of daily counts was investigated via graphical examination. The environmental associations with daily counts were examined using firstly correlations and secondly, autoregressive techniques to account for confounding factors. The spatial investigation graphically examined logged Comparative Hospital contact Ratios (CHRs) of asthmatics, non-asthmatics, and the excess and correlated these outcomes with area based pollutant measures.

For the school-related seasonality investigation and the environmental-medical contact investigation, for the Trent Region and Sheffield, the results were consistent across outcomes and so for reasons of conciseness the results were only reported for All Counts.

Chapter Five documented seasonal patterns using aggregated mean daily counts and correlated patterns with the school calendar for England and Wales, the Trent Region and Sheffield. Chapter Six reported the results of the investigation examining the environmental association with medical contacts made by school-age asthmatics and non-asthmatics in England and Wales, the Trent Region and Sheffield. Chapter Seven reported the results of the spatial analyses of pollutant associations with medical contact in Sheffield. Chapter Eight's function is to address the aims set in sub-section 8.1.1.

8.1.1. Aims of the Chapter

The aims of this chapter are to:

1. Summarise the main findings from the time-series and spatial analyses by specifically addressing the questions listed in Chapter One
2. Compare findings with existing literature
3. Discuss the strengths and weaknesses of the thesis
4. Discuss the implication of the findings
5. Summarise ideas for further research

8.2. Summary of Results

8.2.1. Results from Time-series Analyses

8.2.1.1. Is there a peak in medical contacts associated with the return to school after the summer vacation in school-age asthmatic children?

Seasonal patterns were investigated using the GPRD data representing England and Wales and the Trent Region, and SCH data representing Sheffield.

This thesis presented evidence of the seasonality in average daily counts of medical contact made by school-age asthmatics and that peaks and troughs were related to the school calendar (Chapter Five). This evidence is in concordance with the majority of the literature investigating or commenting on the seasonal characteristic of childhood asthma related medical contacts (Johnston et al., 2005, Kimes et al., 2004). The severity of the seasonal characteristic weakened as the numbers of the daily counts decreased. Therefore, peaks and troughs were most apparent in the England and Wales dataset (larger sample size resulting in higher counts) and least apparent in the Sheffield dataset (small sample size resulting in low counts).

For England and Wales, and the Trent Region, within the average year, a pronounced drop in counts was consistently observed on New Year's Day. Daily counts remain relatively high in the first four months: dropped around Easter then counts increased slightly. A trough appeared at the beginning of June following an increase potentially related to the start of the pollen season. Another pronounced trough was present in August when children were on summer holiday. Daily counts increased from September until the end of the year.

For Sheffield, aggregated daily counts for asthmatics remained relatively stable until June then increased slightly and dropped in August to the same level witnessed in the first half of the year. The second (most prominent) peak was observed after the summer school return. Daily counts dropped slightly in October until the end of the year.

In similarity with this investigation's findings indicating lower counts during school holidays, two studies found significant increases in counts of medical contact after each school vacation (Lin et al., 2008c, Lincoln et al., 2006). Yet, school holidays from these two studies set in the US and Australia vary thus reasons for the decrease may not be comparable to the UK. One UK study reported low counts of medical contacts made by children during the school holidays and higher counts within school-term (Storr and Lenney, 1989). Another UK study reported similar patterns (Julious et al., 2011a). The results from this investigation corroborate these findings from UK based literature.

The small peak in medical contacts in May/June (as witnessed in the England and Wales dataset) may be related to increased exposure to pollen. It may also be associated with children's increased activity as longer and warmer days encourage more exercise. Exercise is one of the triggers know to exacerbate asthma (Pearlman et al., 2009, van Leeuwen et al., 2011). If climate change is to continue and instigate earlier starts in the pollen season, the small peak that is currently witnessed in May/June may shift into April.

The peak in medical contacts made by school-age asthmatics associated with the September school return mirror findings from a number of studies. In comparison with this investigation that provided evidence of a peak approximately two to three weeks after school return, taking in account all the studies that examined the delay in the peak of medical contacts after school return, on average, there was a 17.4 day delay in the peak in medical contacts.

One study found the largest peak in asthma-related admissions occurred after the English summer school holiday (Storr and Lenney, 1989). This finding is slightly different in comparison to the findings in this investigation; though a peak of sustainable magnitude begins from September and was associated with school return, the increase was not outstanding in comparison to other peaks found within the average year.

Supporting the hypothesis that the seasonality of asthma is largely governed by the school calendar; the decrease in counts in the Easter and the summer holidays is possibly related to children having less contact with other children. Less contact with other individuals is related to decreased risk of viral exposure. Viruses are thought to be a major cause of exacerbation in asthmatic children (Johnston et al., 1996, Khetsuriani et al., 2007, Rawlinson et al., 2003). Viruses are less likely to accumulate within the school-age population in the holiday period. The subsequent increase in medical contacts made by school-age asthmatics after the summer holiday is potentially attributed a child's opportunity to mix with other children thus increasing the likelihood of the transmission of infections.

The notion that children are more at risk of exacerbation at school because of the increased likelihood of the spread of infections has been investigated. Johnston et al (2005) found that respiratory viruses were present in the majority of children presenting at an emergency department due to asthmatic symptoms. Yet, one discussion paper investigates whether children with asthma are more prone to viral infection in comparison to other non-asthmatic children (Stempel, 2005). Stempel posited that a child with asthma is more at risk of viral infection in comparison to a non-asthmatic child and this may in turn exacerbate asthma symptoms. By comparing the seasonal pattern of medical contacts made by asthmatics to non-asthmatics and by investigating the excess, this investigation illustrates that as Stempel states, school-age children with asthma are prone to more illness compared to the average school population.

Another reason that may influence higher risk of exacerbation is the absence of taking routine medication. One study found that children whom presented at ED were less likely to have taken routine medication (Johnston et al., 2005). Another study found that children taking steroids who failed to get a prescription in August (school summer holiday) were more likely to become ill when they returned to school (Julious et al., 2011a).

Adding further support to the hypothesis that the seasonality of childhood asthma is governed by the school calendar, a graphical examination (reported in Appendix D) of daily counts of medical contact made by Scottish school-age asthmatics and non-asthmatics revealed an increase from mid-August. An increase of smaller magnitude occurred after the Scottish school return (mid-August). This result supports previous findings from a previous study (Julious et al., 2007).

8.2.1.2. Is there a peak in medical contacts associated with the return to school after the summer vacation in non-asthmatic children related medical contact?

Examining the daily patterns of medical contact in the non-asthmatic group, in comparison to the asthmatic group for England and Wales and the Trent Region, similar seasonal peaks and troughs were observed. The increase in the numbers of medical contacts made by non-asthmatic children (associated with school return) suggests that acute conditions were likely to accumulate within the average school population after school return. One US study documented a seasonal difference (between the warm and cold season) in the number of upper respiratory infection related medical contacts (Strickland et al., 2010). Yet, no studies were found documenting a seasonal pattern in the comparison group compared to school-age asthmatics.

Due to the small number of contacts, there was almost no seasonal variation observed with daily counts of non-asthmatics from Sheffield. Only a slight decrease and increase in daily counts was observed in August and September respectively. The slight seasonal findings for non-asthmatics within the Sheffield dataset mirror findings from a number of studies. Mohr et al (2008) and Blaisdell et al (2002) found that though seasonal characteristics were evident in the number of asthma related medical contacts, this was not replicated in the number of medical contacts made by the comparison group.

8.2.1.3. Is the peak associated with the return to school observed in asthmatic children in excess of those in non-asthmatic children (non-asthmatics)?

Daily excess represents the difference between the asthmatic cohort over and above the average (non-asthmatic) school population. Examining the daily pattern in the excess of counts, for England and Wales and the Trent Region, lower excess was observed in school holidays. In particular, a trough was observed within the summer school holiday (August) and a higher excess was observed within school terms. The most outstanding peak in excess accumulated from September and remained relatively high until the end of the year.

The seasonal pattern was less evident in the Sheffield dataset as the daily excess was extremely low. A trough in the summer holiday and accumulating increase in daily excess after school return was observed.

This evidence suggests that the effect of the "trigger" associated with the return to school is greater in school-age asthmatics than school-age non-asthmatics. After school return, children with asthma use the health services more than the average school population. The investigation of the excess brings additional information onto the childhood asthma scene as only one study (at least within the literature used for the review) was found illustrating the seasonal characteristic of the excess of asthmatics over non-asthmatics (Julious et al., 2011a).

8.2.1.4. Are environmental exposures associated with daily counts of medical contact made by school-age asthmatics or non-asthmatics?

Overall, inconsistent results from the correlational analyses (Appendix E) and autoregressive analyses (Chapter Six) were found. The conclusions drawn from the correlational analyses were not supported entirely by conclusions drawn from the autoregressive analyses. However, differences in the results from the two methodologies were to be expected, as the "naive" (correlational) analysis was not designed to recognise the effect of confounding factors whereas the regressive techniques considered other external confounders such as season that may influence the outcome. In context with the thesis, the correlational analysis was employed as an exploratory analysis to make an initial assessment of associations with environmental triggers. The regression analysis is the main analysis. Therefore, only a small number of correlational results are presented in Chapter Six with the results from the main analysis.

a) Results from the Correlations Investigation

Overall, when combining the results from all the environmental exposures, there is a weak but statistically significant relationship between environmental exposures and daily counts of medical contact. Mean coefficient P-values were lowest for England and Wales and highest for the Sheffield dataset. Therefore, collectively environmental associations were strongest with daily counts from England and Wales. However, the England and Wales dataset had more data (in terms of more contacts per day) compared to the Trent Region and Sheffield thus more significant P-values were to be expected. For the Trent Region and Sheffield, the overall environmental association was stronger with asthmatics compared to non-asthmatics. Asthmatics had stronger positively skewed P-value distributions and therefore, lower mean P-values (calculated from taken the mean of the coefficient P-values) compared to non-asthmatics. Overall, results from the correlational analyses suggested that environmental exposures were associated with daily counts of medical contact.

b) Results from the Autoregressive Investigation
Consistent with the significant results drawn from the correlational analyses, results from the autoregressive analysis conducted on England and Wales' All Counts illustrated an effect from environmental exposures on daily counts of medical contact for asthmatics and non-asthmatics accounting for confounding factors. For All Counts asthmatics and non-asthmatics, compared to the null model (including day of the week, bank holiday and season), 10 and 11 alternative models (respectively) including environmental exposures (1 per model) significantly improved the fit to the data. For both asthmatics and non-asthmatics, the most significant model included grass. Grass exposure was significantly associated with childhood asthma related medical contacts (CAMC) in a number of studies (Héguy et al., 2008, Lierl and Hornung, 2003, Zhong et al., 2006). Other environmental variables that significantly improved the fit of the data included minimum measures of NO, mean measures of NOD, $SO_{2,}$ and PM_{10} and maximum measures of temperature. These findings corroborate a number of studies suggesting an association between PM_{10} (Giovannini et al., 2010), SO_2 (Samoli et al., 2011) and temperature (Hashimoto et al., 2004) in relation to CAMC. Model and point-estimate P-value distributions inferred a significant but weak collective association between environmental exposures and medical contacts.

Comparing autoregressive results between asthmatics and non-asthmatics, results contradict the prior belief that environmental association would be stronger with asthmatics rather than non-asthmatics. In addition, autoregressive comparisons between asthmatics and non-asthmatics contrast with the differences observed from the correlational analysis. The number of statistically significant point-estimates, and the model and point-estimate mean P-values suggested a stronger effect on the comparison group. There were fewer significant results observed for the other types of medical contact.

For Trent Region's All Counts, compared to the null model, three alternative models including environmental exposures improved the fit to the data for asthmatics and non-asthmatics and were statistically significant. The same exposures contributed to statistically significant models for asthmatics and non-asthmatics. As with the results for England and Wales, the most statistically significant model included grass. The other two statistically significant models were minimum measures of NO or NOD. When comparing the effects between asthmatics and non-asthmatics, the results were not consistent within Trent. The F-values of the statistically significant models (higher for asthmatics than non-asthmatics) and the total number of statistically significant point-estimates (higher for asthmatics than non-asthmatics) inferred that the effect from environmental exposures was stronger on asthmatics. Yet, the results from model and point-estimate P-value distributions and mean P-values suggest that the effect from environmental exposures was stronger on non-asthmatics.

For the SCH dataset, All Counts (Admissions and A&E), four alternative models for asthmatics, and six models for non-asthmatics provided a statistically significant improved fit to the data in comparison to the null model. For asthmatics, models including (separately) pressure, grass (most statistically significant), sunlight, and minimum measures of SO_2 were statistically significant. These findings run parallel to findings from a number of studies, for example: Xiao-Mei et al (2009) found as pressure-CAMC association and Sunyer et al (2003) found a SO_2-CAMC association. Sunlight was relatively under-researched in comparison to the other exposures, one study found an association (Xirasagar et al., 2006) whilst another study found no association (Hashimoto et al., 2004). This investigation adds another piece of evidence to suggest that at local level, sunlight was associated with the daily counts of medical contact made by asthmatics. For non-asthmatics, models including minimum measures of PM_{10}, mean measures of NO_2, NOD, PM_{10} and CO, and grass (most statistically significant) were statistically significant. The total number of significant point-estimates, and the model and point-estimate mean P-values suggest a stronger effect from environmental exposures on non-asthmatics compared to asthmatics.

8.2.1.5. Are the environmental associations observed in school-age asthmatics in excess of those observed in school-age non-asthmatic children?

To answer this question, the results of two cohorts, asthmatics and non-asthmatics (this cohort was used to represent the average school population) were compared. To validate the potential differences between asthmatics and non-asthmatics, the results of the excess were examined. The excess represents the residual effect on the asthmatics cohort over and above (or below) the average school population (non-asthmatics). It follows that if a difference between asthmatics and non-asthmatics was observed, it was expected that results would be significant with the excess. If no difference between asthmatics and non-asthmatics was observed, it was expected that no or very few results would be significant with the excess.

Comparing the correlational and autoregressive results, inconsistent differences were observed when comparing environmental associations between asthmatics and non-asthmatics. This was most likely the result of the differences in the analytical techniques, one assessing crude associations and the other controlling for confounding factors. Examining the results from the correlational analysis, Trent Region and Sheffield results slightly favoured asthmatics (more significant results than non-asthmatics). Results from the autoregressive analysis conducted on England and Wales and Sheffield's datasets slightly favoured non-asthmatics (more significant results than asthmatics). Trent Region's results also showed slightly stronger environmental associations with non-asthmatics rather than asthmatics. The autoregressive analysis provides the most important results as it accounts for a number of confounding factors. Therefore, at national, regional, and local level, the evidence illustrates a stronger effect on non-asthmatics rather than asthmatics.

These findings contrast with a number of studies investigating the effects of environmental exposures on an asthmatic and a comparative group. Of the studies that report comparisons between asthmatics and non-asthmatics, the majority state a stronger effect on the asthmatic group compared to non-asthmatics. For instance, six studies found a greater effect from pollutant exposure on asthmatics than non-asthmatics (Chew et al., 1999, Lin et al., 2004b, Loyo-Berríos et al., 2007, Romieu et al., 1995, Tolbert et al., 2000, Wilson et al., 2005). One study found compared to asthmatics, there was a lower but statistically significant effect from pollutant exposures with the comparison group (Ponka and Virtanen, 1996). They commented that these findings may be attributed to a potential problem in the modelling or that findings were statistically coincidental. Ponka and Virtanen's comments may potentially be reflected in this thesis' analysis.

Inspecting the results using the daily excess of asthmatics over and above the average school population (represented by non-asthmatics) as an outcome, for two of the geographical regions, the correlational results for the excess illustrated similar findings in parallel with the inferences extracted by comparing asthmatics to non-asthmatics. For the Trent Region and Sheffield, overall environmental associations' slightly favoured asthmatics (more significant results) and the environmental association with the excess reflected that difference. The correlational analyses illustrated weak but statistically significant relationships between environmental exposures and the daily excess of All Counts.

Although the simple correlational results had more significant results than the autoregressive results, the autoregressive results account for confounding factors and is the main analysis. In the autoregressive analysis, when comparisons were made between asthmatics and non-asthmatics, little difference was observed with England and Wales All Counts; if there was a difference, the environmental association was stronger with non-asthmatics. This is in agreement with the autoregressive results conducted with England and Wales' All Counts excess whereby only 1 (out of possible 28) alternative model significantly improved the fit of the data compared to the null model. For the Trent Region and Sheffield, there was a slight difference in the results between asthmatics and non-asthmatics and results slightly favoured non-asthmatics (more significant). Only 4 models for Trent and 1 model for Sheffield significantly improved the fit of the data (excess) compared to the null model. No study was found reporting the environmental effect on the excess of asthmatics over and above the average school population. Thus, this investigation's results cannot be compared with other studies' findings.

To summarise the results of the daily excess (All Counts only), for England and Wales, compared to the null model, grass was the only exposure that significantly improved the fit of the data. For the Trent Region, exposures that significantly improved the fit of the data included minimum measures of NO and NOD, pressure, and grass (most statistically significant). For Sheffield, the only exposure that significantly improved the fit of the data was sunlight. Examining individual models, grass is commonly associated with medical contacts at national and regional level. Yet, the pollutant associations witnessed with medical contacts from the Trent Region were not associated with England and Wales or Sheffield signifying that these exposures had region-specific effects.

Even with the statistically significant results, the model and point-estimate P-value distributions were uniform. Therefore, the effects from environmental exposure were not strongly associated with the excess of asthmatics over non-asthmatics. This conclusion is in agreement with observations made by comparing asthmatics and non-asthmatics. As this investigation witnessed little difference between asthmatics and non-asthmatics, it was inferred that the environmental effect was similar for both cohorts. Consequently, less significant environmental associations were observed with the excess.

8.2.1.6. Are there any lagged environmental associations observed with school-age asthmatics and/or non-asthmatics?

To answer this question, firstly, comparative analysis was conducted to investigate whether an analysis investigating environmental variables lagged up to 14 days would provide more information (in terms of results that were more significant) compared to analysis investigating environmental exposures lagged up to 7 days only. This comparative analysis was instigated because, when examining associations between environmental variables lagged by 7 days and daily counts of medical contact, the most significant results often clustered on the seventh lagged day. In the comparative analysis, no difference was observed with the mean P-values between environmental exposures lagged by 7 or 14 days. Therefore, it is speculated that the reason for observing a high number of significant results on the seventh lag day is most likely attributable to the seventh order autocorrelation. The effect found on the first day (for example, Tuesday) was similar to the effect found seven days previously as this is the same day i.e. Tuesday. Yet the effect beyond seven lag days of exposure did not surpass the effects observed within the first seven lag days. This compared with studies that reported a lagged effect from exposure to medical contact. The majority of these studies report lagged associations of no more than 5 days (see Chapter Two). From studies that report lag effects, the average lagged effect for pollutant or pollen exposure ranged from 1.5 to 3 days.

Secondly, lagged environmental associations up to 7 days were examined by tallying the most significant point-estimates by lag day per environmental exposure. The results were not consistent between the two analyses (correlational and autoregressive analyses). With England and Wales, and the Trent Region All Counts, the correlational analysis showed no delayed associations from environmental exposure with daily counts of asthmatics or non-asthmatics. For Sheffield All Counts, highest numbers of most significant correlations fell on the current day and lag day 4 for asthmatics and non-asthmatics respectively.

With exception to the Trent Region and England and Wales' non-asthmatics, the lagged results from the correlational analyses contrast with the lagged results from the autoregressive analyses. For England and Wales, lag day 7 and current day had the highest number of most significant point-estimates for asthmatics and non-asthmatics respectively. For the Trent Region, current day had the highest number of most significant point-estimates for asthmatics and non-asthmatics. For Sheffield All Counts, highest numbers of most significant point-estimates fell on lag day 3 and 0 for asthmatics and non-asthmatics respectively. Overall, this implied that at national and local level, there was longer delayed environmental effect on asthmatics than non-asthmatics. This may reflect a result that is accurate due to its sample size and a result that is spatially accurate.

The collective assessment of a potential delayed effect from environmental exposures adds to few numbers of studies that examine a large number of environmental exposures in combination. One study was found collectively examining the lag effects from several exposures (Julious et al., 2011b). This study used the same technique adopted in this investigation to analyse evidence of a collective lagged effect from 28 exposures and found using the whole year's data that the highest number of most significant point-estimates fell on lag day 3 and 5 depending on location (Doncaster and Aberdeen, Great Britain). Comparing Sheffield's autoregressive lag results (lag day 3) from this investigation with Doncaster's lag results from Julious et al's paper, the delayed effect was the same.

Individuals are exposed to a multitude of exposures and the collective effect is plausibly more indicative than single exposure delayed effects.

A number of studies report delayed effects from environmental exposures on daily counts of asthma medical contacts. Hirshon et al (2008) reported that the relative risk of hospitalisation after a two day lag comparing high (>20.76ngm^3) to low (<8.63ngm^3) levels of zinc was higher when CO measures exceeded 0.4mgm^3. Romieu et al (1995) found the most suitable model to explain asthma medical contacts included O_3 levels with a one-day lag, SO_2 levels of the same day, minimum temperature of the same day, day of the week, and period of the year. This investigation's results cannot be compared to these studies, as the investigation did not examine individual environmental lagged effects. However, the collective assessment of a delayed association from the autoregressive analysis suggests that environmental exposures had more significant associations with asthmatics (England and Wales) after longer delays compared to the two studies.

One important point to address is that the lag effect may not reflect the actual delayed effects from exposures but may also be influenced by the timing of the parent or child's decision to seek medical attention. The decision to seek medical advice was most likely confounded by a number of factors such as severity of the attack and/or mother's perception of the condition. The onset of asthmatic symptoms and the severity of the symptoms vary from child to child. Thus, the urgency to receive medical attention is variable. One study found that a mother's decision to seek medical advice for their child was dependent on a number of factors including how long symptoms persisted and their choice of doctor (Osman and Dunt, 1995). The same study reported that factors for example education and whether the child was the first-born did not significantly affect likelihood of medical contact.

The possibility that the delayed association was not related to exposure was more important when observing associations with primary care contacts. Those who made primary care contact were more likely to have a mild to moderate rather than a severe asthmatic condition that may not require immediate attention. This may influence the parent/child to wait for treatment. Hospital related contacts were likely to reflect severe acute cases of asthma thus; contacts were likely to occur immediately after the onset of symptoms. In addition, hospital contacts were likely to reflect contacts made by persons at any time rather than those who were willing and able to wait for surgery hours.

8.2.1.7. Are environmental exposures predictors of daily counts of school-age asthmatics and/or non-asthmatics?

There was inconsistent evidence to suggest that environmental exposures were predictors of medical contact. This conclusion is consistent with another study that found inconclusive results to suggest that environmental exposures (28 exposures) were predictors of hospital admissions made by school-age children with asthma Julious et al. (2011b).

From the autoregressive analysis, though there were a number of statistically significant models including specific exposures in the autoregressive analyses, the model and point-estimate P-values illustrated mixed distributions. Focusing on the results from All Counts only (which included the largest number of medical contacts), grass was the only exposure to be commonly associated with medical contacts from all three geographical areas. It would be interesting to observe whether this association would also be apparent in a spatial analysis yet the spatial analysis did not have grass exposure data to evaluate a spatial relationship. Other exposures, for example, NO and NOD, PM_{10} were associated with daily counts but not at every geographical level. For England and Wales asthmatics, non-asthmatics, Trent and Sheffield All Counts non-asthmatics, the model P-value distributions were positively skewed inferring collective associations between environmental exposures and medical contact. Yet, the point-estimate P-value distributions were uniform inferring weak or no association. Therefore, the results were inconsistent.

Assessing the mean P-values, the null value 0.5 was the cut off signifying the presence of associations between environmental exposure (combined) and medical contact. This cut off was set as the mean of a uniform distribution with values that range from 0 to 1, which is 0.5; mean P-values below this value infers association and equal to or above this value infer no association. The evidence of an association was strongest for England and Wales All Counts, both the mean P-value from the model and point-estimates were lower than 0.5 for asthmatics and non-asthmatics. However, not all mean model and point-estimate P-values were lower than 0.5 for Trent and Sheffield All Counts. Collectively, the evidence signifies that environmental exposures were predictors of medical contact at national level but at regional or local level, evidence was less convincing. One point to consider is that the England and Wales dataset had more data (in terms of a bigger sample size contributing towards higher counts). Therefore, results that were more significant were to be expected in comparison to the Trent Region and Sheffield.

Examining summary statistics of the autoregressive point-estimate data, point-estimates were either positive or negative inferring either the higher the exposure, the higher the number of medical contacts or the lower the exposure, the higher the number of medical contacts. A number of studies support positive associations for example, Babin et al (2007) found a positive association between temperature and asthma medical contacts made by children and Strickland et al (2010) found a positive association between SO_2 and paediatric asthma medical contacts in the warm season. Likewise, negative associations are supported by some of the findings reported in the literature for example: one study reported negative associations between ozone and CAMC (Neidell, 2004); another study reported negative associations with temperature and CAMC (Xiao Mei et al., 2009) and that lower temperature was associated with higher CAMC. Further investigation is needed to confirm the association.

8.2.1.8. Environmental-Medical Contact Association: Comparison of Results by Geographical Area

Methodologically the consensus from a number of studies is that in order to accurately measure the relationship between environmental exposures, the units of geography that the sample and exposure is obtained from should be as small and as close to one another as possible. This theoretically enables better reflection of the sample's experience. Fuelled by this observation and that the time-series analysis used local exposure data against national clinical data, results were examined to evaluate if more accurate, more significant or consistent results were observed as the geographical area under investigation decreased.

In contrast to the literature, this investigation has been able to evaluate whether exposures are consistently associated with daily counts of medical contact from local up to national level. None of the studies referenced in the literature review evaluated the effect of the size of geography on exposure-medical contact associations adding to the distinctiveness of this investigation.

Grass was commonly associated with daily counts of asthma related medical contact from national through to local level. However, the other exposures were not consistently associated with daily counts from national, regional, and local level. Minimum measures of NO were associated with counts from England and Wales and the Trent Region. Mean measures of PM_{10} and NOD were associated with daily counts of medical contact made by non-asthmatics from England and Wales and Sheffield. Other exposures were associated with data from one geographical level or another suggesting geographically specific effects.

Results from autoregressive analysis on asthmatics and non-asthmatics highlight some consistent direction of significance according to geographical size. The Trent Region had the lowest number (asthmatics and non-asthmatics, n=3) whilst England and Wales had the highest number (asthmatics n=10, non-asthmatics n=11) of statistically significant models (that significantly improved the fit of the data compared to the null model). Results became more significant as the geographical region under investigation increased. Yet, the significant results were almost certainly affected by the observed total number of daily contacts that are in turn strongly influenced by the geographical region from which the sample is obtained. The likelihood of accruing a large number of daily contacts is greater if the geographical area is itself large (e.g. England and Wales) compared to a smaller unit of geography (e.g. Sheffield).

When accounting for spatially influenced relationships (such as the relationship between environmental exposures and asthma), a smaller unit of geography is preferred because often, studies use exposure measures obtained from fixed locations and this acts as a proxy for an individual/population's exposure. For this investigation, the environmental data were available local to Sheffield. This was a reason why local data (Sheffield, not originally available from the GPRD) were obtained to evaluate the consistency in the results with England and Wales and the Trent Region. As the variation in exposures can differ according to geographical area, it cannot be guaranteed that the measure taken from one location represents the actual measure for the individual or population. To increase the likelihood that the fixed measure is the actual level of exposure for the sample under investigation, small geographical areas are preferred. However, often, only small sample sizes can be accrued with small units of geography.

Though it is assumed that a large sample (that is representative of the population under investigation) produces more accurate results with less variability ((statssoft.com, 2011) [Accessed online 16.12.2011]), in this case especially in relation to spatially influenced exposures, results from a large sample may not reflect a spatially accurate relationship. With England and Wales data, results may be accurate because of its sample size. Yet, with Sheffield data, results may be spatially accurate.

8.2.2. Main Results from Spatial Analysis

8.2.2.1. Are there areas in Sheffield that have high levels of medical contact made by school-age children for asthmatic and non-asthmatic conditions?

The results for the spatial investigation were reported in Chapter Seven. Examining the geographical distribution of childhood asthma in Sheffield, there were asthma hotspots towards the east and centre of Sheffield. Only three MSOA's (east and centre) had statistically significant logged Comparative Hospital contact Ratios (CHRs) (ratios of observed over expected number of events) signifying that the observed number of asthmatics was significantly higher than expected. Clusters of children living in one area more so than another have been reported by other studies (for example, Grineski et al (2010) and Oyana and Rivers (2005)) and this possibly suggests that a spatially defined factor is associated with asthma related medical contacts. Hotspots of CHRs for non-asthmatics were situated in the northwest, east, and in the southwest, yet none was statistically significant. There were no significant CHRs for the excess of asthmatics over non-asthmatics.

8.2.2.2. Is there an association between pollution measures and levels of medical contact (for asthmatics or non-asthmatic conditions) in Sheffield?

The east of Sheffield experienced poor air quality with higher scores for emissions compared to the west. Higher pollution levels are often associated with increased population density (Cropper and Griffiths, 1994, Sarzynski, 2012). It follows that more persons living within a smaller geography facilitate the use of more energy thus creating more pollution in comparison to less populated areas. Thus, poorer air quality in the east is possibly related to higher population density and a higher concentration of major roads compared to the west. It may also be suggested that the spatial association between pollutant exposures and asthmatic medical contacts was influenced by deprivation, since the hotspots of asthmatic medical contacts and levels of pollutant were higher in areas of Sheffield that are more deprived. It was difficult to identify potential relationships between the logged CHRs and pollutant exposures using graphical information alone.

When investigating possible bivariate associations, two statistically significant weak relationships were found between asthmatics and air quality background scores of NO_2 and O_3. Yet, these two exposures proved insignificant within the time-series analysis from national to local level with the exception of England and Wales non-asthmatics where a significant association was found with mean NO_2 exposures. NO_2 was positively correlated such that MSOAs with higher levels of NO_2 were associated with higher logged CHRs for asthmatics. The positive relationship found with NO_2 is in concordance with some of the literature that suggests a positive relationship with NO_2 exposure (Burra et al., 2009, Yamazaki et al., 2009) and CAMC. O_3 was negatively correlated thus MSOAs with higher levels of O_3 were associated with lower logged CHRs for asthmatics. Existing evidence denotes varied associations with O_3 (Babin et al., 2008, Giovannini et al., 2010) thus within this investigation, it was not surprising to find a negative relationship between O_3 and logged CHRs for asthmatics. There was strong evidence from previous studies (Babin et al., 2008, Erbas et al., 2005) to suggest that O_3 associations were seasonally influenced thus the results from this investigation may reflect the fact that air quality measures were computed as an annual average. If pollutant measures were separated by season, positive associations may be observed with background scores of O_3 and rates of asthma in the summer.

Both the results from associations with air quality and emissions data suggest results that are more significant with asthmatics compared to non-asthmatics. Statistically significant negative associations were found with asthmatics (n=2) and the excess (n=3) and emissions that were domestically and commercially sourced. This finding corroborates findings from other studies that suggest associations between indoor home (NO_2 and PM_{10}) exposures in association with asthma (Breysse et al., 2010, McCormack et al., 2011). The negative domestic and commercially sourced emission exposure association infers directly that the lower the exposures, the higher the ratio of medical contacts.

Alternatively, it may be possible that the associations mimic underlying associations. Other exposures (that have not been investigated in this thesis) produced in or around the home may have an increased association with medical contacts made by children with asthma.

A point to consider is that the negative relationship is potentially influenced by the fact that the 4 measures were proportions of total emission (i.e. 4 proportions equal 100 percent). Thus, each source's measure is dependent on the other three sources. Another pollutant producing a higher or lower proportion of emissions can confound the association of one pollutant. If a negative relationship was observed with domestic and commercial sources, it was likely that a positive relationship would be observed with one or two other sources. Significant negative relationships were observed with benzene, PM_{10} and SO_2 supplied from domestic and commercial sources. It was likely that a negative association would result from domestic and commercially sourced pollutants if proportions of emissions from road transport or other sourced pollutants were higher. For benzene and PM_{10}, domestic and commercial sources supplied the lowest proportions of emission in comparison to the other three sources (industry, road transport and other sources).

The majority of the current literature examined proximity or distance to roads as a factor towards risk of exacerbation and advocate an association between proximity to major roads or amount of traffic and asthma medical contacts (Chang et al., 2009, English et al., 1999). Yet, this investigation found no significant correlations with pollutants produced from road transport. These non-significant findings may be partly due to Sheffield's lower levels of car ownership compared to England.

8.2.2.3. If there were hotspots (asthmatic and non-asthmatic), were these near the children's hospital?

To investigate potential issues relating to accessing services, the thesis assessed whether hotspots were near the Sheffield Children Hospital that is situated in the centre of Sheffield. It was hypothesised that the MSOAs surrounding the Children's hospital would appear as hotspots of medical contact for both asthmatics and non-asthmatics. This hypothesis is fuelled by the belief that children living closer to the hospital were more likely to seek its assistance in an emergency. One statistically significant asthmatic hotspot was situated south of the Children's hospital. In addition, two statistically significant MSOA hotspots of asthma were in the east, these were in close proximity to the Northern General Hospital. Hotspots for non-asthmatics were situated in the opposite direction to asthmatics to the southwest of the city. The majority of the MSOAs surrounding the Sheffield Children's Hospital also displayed hotspot characteristics for non-asthmatics but they were not significant.

One added factor that may influence the numbers of medical contacts made by people living on the outskirts of the city is that by living further away from Sheffield Children's hospital and the Northern General Hospital they may seek assistance from nearby hospitals in Doncaster or Rotherham. Thus, numbers of contacts made by children residing on the outskirts may appear lower than expected.

Whether distance to hospital was a factor towards seeking medical advice can be further investigated. Literature investigating distance to hospital as a factor towards influencing the risk of an outcome has been conducted on overall patient mortality (Nicholl et al., 2007) and breast cancer screening uptake (Maheswaran et al., 2006). The studies report increased and decreased risk of an outcome as distance from medical services increased respectively. It may be assumed that distance is not a major factor towards accessing health services in the UK. Sheffield is an urban city; transport services were more available than in rural settings thus distance should not prove a barrier to accessing healthcare.

8.2.3. Additional Analyses (not reported in the main body of the thesis)

As part of the work conducted for this thesis, a case-crossover study was also undertaken comparing daily counts on days where pollutant measures were above World Health Organisation (WHO) guidelines with days where pollutant measures were below WHO guidelines. The graphical examination revealed no difference between daily counts occurring on or after high pollution days compared to low pollution days. Therefore, this analysis provides no support for the WHO guidelines. The results of this analysis are given in Appendix H.

8.3. Strengths and Weaknesses

Along with the strengths, this thesis also holds a number of weaknesses. These weaknesses should be considered when interpreting the results and extracting the implications of this piece of research. This sub-section will discuss the strengths and weaknesses of the strategies used to investigate the seasonality and environmental triggers of medical contacts.

8.3.1. Clinical Datasets

This investigation is one of a small number of studies that use primary care data to analyse environmental associations with childhood asthma. The primary care data had information on all types of contact from routine checkups to hospital emergency contacts. This large and complex dataset was an invaluable source of data that permitted investigation at national and regional level.

This thesis uses primary care contacts as a proxy for capturing mild to moderate events of asthma exacerbation with a small proportion of the primary care contacts including severe events via Casualty Counts. This thesis also investigated a separate dataset (obtained from a secondary care data source) local to Sheffield that included hospital contacts representing severe events of asthma exacerbation. By investigating the effects in different healthcare settings, theoretically this thesis was able to observe environmental effects on differing severities of the asthmatic condition.

Concerning the GPRD dataset, this time-series investigation was interested in how many contacts were made by school-age children with a medical diagnosis of asthma and by school-age children with no medical diagnosis of asthma. This robust endpoint captured the level of service need (see Appendix C) by school-age asthmatics who used health care services approximately twice as much as non-asthmatics. However, though medical contacts were made by individuals diagnosed with asthma, those individuals could have made medical contact for other reasons, not just for assistance in relieving asthma exacerbation. Thus in the asthmatic cohort, the outcome of daily numbers of medical contacts may not fully represent asthmatic events. The decision to analyse the second outcome tackles this issue, by subtracting the number of non-asthmatics from the number of asthmatics, the contacts that were made potentially for "non-asthmatic" reasons were removed from the asthmatic cohort. Therefore, the excess fully represent asthmatics contacts only.

By using a retrospective matched asthmatic non-asthmatic design, the costs of collecting data were kept to a minimum. The main cost incurred was time and effort taken to apply for the GPRD data and to follow up the collection of the Sheffield Children's Hospital data. No financial costs were incurred when obtaining the clinical and environmental datasets. Another benefit is that the researcher did not collect the data thus they had no opportunity to introduce collection bias (that may have influenced results that were more favourable) in the collection the data.

On the other hand, using GPRD data had some limitations. The GPRD datasets included no residential information other than which region the general practice was located within. This investigation examined outcomes from the GPRD dataset aggregated by one region (Trent). Residential information at a more local level would have facilitated a more spatially accurate investigation. This was a reason why data from the SCH hospital were obtained. The two large datasets from the SCH contained residential data at MSOA level on all contacts that had been made from 1999 to 2009. Though only a small percentage of those contacts were asthma-related, this allowed for a more spatially accurate investigation.

As witnessed in the literature, no studies observed the environmental association with both primary and secondary care contacts. It was also observed that seasonality had been depicted using mainly secondary care data. To address this weakness, this is one of the first investigations to explore the seasonality and the association with environmental triggers on medical contacts from a primary and secondary care source and therefore, ascertained whether the seasonal pattern and the environmental association are both evident in mild-to-moderate (primary care) and severe events (secondary care).

Though the time-series investigation was conducted on data collected from geographical areas decreasing in size, spatial factors (for example, distance to pollutant sources, and changes in exposure according to location) were not considered in either the time-series or the spatial analyses. This was due to the limitations of both the GPRD and SCH datasets: as there was no information on accurate patient residence (only to the detail of which MSOA they resided for SCH) or changes in exposure thus these confounders were not accounted for within the time-series or spatial analyses. This would have made a valuable contribution of knowledge of how relationships are affected spatially and temporally. This limitation invites further investigation.

Another limitation is that when investigating lag effects, it cannot be ensured that delays in association are exclusively due to exposures taking time to activate symptoms in need of medical contact. Especially in relation to the GPRD datasets, lag effects may be confounded by when a parent or a child decides to seek medical advice. If the condition is perceived to be mild or moderate, a decision to seek medical advice maybe delayed. This is possibly the reason why studies mainly use hospital data to investigate environmental exposure effects on asthmatics as hospital data captures acute conditions in need of urgent attention. Thus, delayed effects are more likely to reflect triggers from exposure.

8.3.2. Sample: School-age Children

As we have described in Chapter Two, school return is thought to be an influential event that indirectly triggers a number of asthma related medical contacts. Thus, it was important to analyse school-age children as a single group to keep constant the school-associated effect. Also, obtaining only school-age children acted as a filter as the diagnosis of asthma in younger children or older adults is often less accurate (Townshend et al., 2007). This thesis only included children aged 5 to 16 years of age. The selection of a school-age sample was more suitable to investigate the causes of asthma exacerbation when part of the explanation involved school-associated effects.

8.3.3. Matched Asthmatic Non-asthmatic Design

The lack of studies that implement use of a comparison group matched to asthmatics by age and gender signified that there was limited evidence illustrating a difference in the environmental effect or association between asthmatics and non-asthmatics. For instance, three studies were found that matched asthmatics to non-asthmatics by age and/or gender (Migliaretti and Cavallo, 2004, Loyo-Berríos et al., 2007, Pereira et al., 2009). Symptoms of asthma can be influenced by age and gender, which gives incentive for the need to compare results to a comparable control group when investigating environmental issues on a clinical sample. The thesis' investigations (time-series and spatial) were able to determine whether effects from environmental exposures on asthmatics were different to the effects experienced by another population. The non-asthmatic group represents the average school-age population. By using a matched asthmatic non-asthmatic design, this investigation was able to determine that asthmatics were not especially vulnerable to environmental exposures.

By matching asthmatics to non-asthmatics by certain characteristics, it can be ensured that any differences between asthmatics and non-asthmatics were not the result of the matching variables (Bland and Altman, 1994). In the both datasets (though less stringently with the Sheffield Children's hospital dataset), asthmatics were matched to non-asthmatics by age and gender. For the time-series analyses, GPRD asthmatics were also matched to non-asthmatics by general practice whilst Sheffield Children's asthmatics were matched by MSOA. Thus, differences observed between asthmatics and non-asthmatics were not attributed to age, gender and to some extent, location. For the spatial investigation, Sheffield Children's hospital data were also matched by date of contact hence, the differences observed between asthmatics and non-asthmatics were not attributed to the date on which patients sought medical contact.

Allowing for factors that are known to effect outcome such as age and gender is a strength of the investigation's design. However, other possible factors such as socio-economic status were not directly accounted for and evidence suggests that socio-economic status is associated with asthma exacerbation. One study found that pollutant-asthma lag effects were subject to the socio-economic status of the children (Burra et al., 2009). Another US study found that the risk of admissions due to NO_2 exposure after a lag of one day was higher for children with no insurance and specifically Hispanic children with no insurance compared to children with Medicaid or private insurance (Grineski et al., 2010). Yet, by design, asthmatics were matched to non-asthmatics by general practice or MSOA (GRPD, SCH) and this acts as a proxy for controlling for deprivation markers.

Another criticism relating the matched design is that the analysis did not account for matching. The intent of the analysis was to replicate methods that had already been used in the literature. Yet, conducting an analysis that does not control for matching introduces the possibility that in our case, age and gender forms part of the residual variance and may increase the standard error of the difference in means (Bland and Altman, 1994).

Another weakness lies in the two methods used to match asthmatic to non-asthmatic individuals or contacts. Ideally, the same methods would have been used, however, for the Sheffield dataset; it was not possible to identify individuals in the dataset. Therefore, whilst for the GPRD datasets, individuals with a medical diagnosis of asthma were matched to individuals with no medical diagnosis of asthma, for the Sheffield dataset, hospital contacts made for asthmatic reasons were matched to contacts for non-asthmatic reasons. With the GPRD datasets, it was possible that not every individual had a medical contact; however, results were interpreted with reference to the “asthmatic population”. With the Sheffield dataset, it was not possible to quantify results with reference to an “asthmatic population”.

8.3.4. Sample Size

One of this thesis’ major strengths is its sample size from the GPRD dataset. A large sample size increases the power of the study and reduces the likelihood that results occurred by chance alone (Bailey et al., 2006). Over a six-year period (1999-2004), data were obtained from over 65,000 asthmatic patients for England and Wales; in total, this resulted in over 1,000,000 asthmatic medical contacts. With the additional gender characteristics (higher percentage of males) of the sample mirroring that of the general asthmatic population, this sample was highly representative of the population from which it was sourced hence findings can be extracted and generalised accordingly.

The sample represents persons that sought medical contact and were medically diagnosed with asthma. The representativeness of this sample is with exception to those who were able to control the symptoms of asthma without medical assistance and have not sought medical contact thus are not medically diagnosed with asthma. Whilst the strength of the GPRD dataset lies within the size of the sample, the quality of the data may not be as high quality as it does not represent fully the asthmatic population.

Few studies actually report the sample size of their study population. Instead, the majority of the studies indicate the number of medical contacts made to hospital or primary care service. Compared to the studies that used a comparison group in the review, this thesis had the largest sample of one-to-one asthmatics matched to non-asthmatics. This observation does not hold for studies that compare their asthmatic cohort to the remaining contacts within their dataset.

One shortcoming of this analysis lies within the techniques used to match asthmatics to non-asthmatics. With the Sheffield Children’s hospital dataset, it was not always possible to match asthmatics to non-asthmatics exactly by age, gender, and date or MSOA. In addition, road traffic accidents were not omitted from the potential non-asthmatics. These may have been matched to asthmatics and this as mentioned previously may confound the comparison of results between asthmatics and non-asthmatics. As vehicle related events, road traffic accidents may mimic the outcome of exposure to pollutants. Additionally, within the GPRD dataset, non-asthmatics with viral infections could have been selected and possibly removed: these contacts imitate the seasonality of asthma medical contacts (as found by Strickland et al).

8.3.5. Comparison of Sections of the Year

The method of analyses used to investigate the environmental-asthma association did not separate the data by season in comparison to other studies (Samoli et al., 2011, Strickland et al., 2010, Yamazaki et al., 2009). This investigation analysed the whole year's data thus did not detect seasonal differences in environmental associations with medical contact. However, unlike any other published study, the seasonal investigation did partition data into sections of the year governed by the school calendar and examined differences in medical counts in the Easter, summer and Christmas period in comparison to the whole year. Thus, the investigation was able to detect seasonal differences in the characteristics of the average daily counts potentially governed by the school calendar.

8.3.6. Efforts to reduce Autocorrelation when assessing the relationship between environmental exposures and childhood asthma

Autocorrelation is often encountered in time series data because the events made on different days were influenced by an external variable. The external variable can influence the number of events on two different days thus creating an element of dependence within the data. This thesis first used standard regression techniques as it was thought that the addition of covariates in the model with daily counts as the dependent variable would remove the autocorrelation. However, the autocorrelation was still high even with the inclusion of covariates. In order to minimise the autocorrelation, first order difference (defined in Chapter Four) was used. However, using first order difference made results difficult to interpret; one unit increase equalled a day-to-day change in daily counts. No study was found reporting the use of first order difference to describe the relationship between environmental exposures and childhood asthma. Therefore, it would have been difficult to compare and contextualise results alongside current evidence. Using daily counts as the outcome, autoregressive techniques were applied to investigate the environmental-medical contact relationships.

8.3.7. Collective Examination of Exposures

In reality, air pollutants, weather, and pollen exposures are not standalone exposures. Environmental exposures exist in conjunction with one another and potentially react in a variety of complex interactions. The method of collectively examining the results of all the environmental exposures in the time-series investigation is arguably an advantage of this thesis. Studies often examine interaction between two or three exposures yet these findings do not represent people's exposure to a multitude of environmental factors. In support of the use of this type of approach in analysing a large number of environmental associations with medical contact, one study was found to have investigated 28 environmental exposures with asthma related medical contacts (Julious et al., 2011b). This thesis captured the results (main effects) from a multitude of environmental exposures that arguably replicates the "real" effects of co-existing exposures.

Whether specific exposures inhibit or prohibit other exposures' effect on children with asthma is an additional question that this investigation has not answered. The main effects from environmental exposures in the time-series analyses were combined and the most significant exposure that had the largest effect on daily counts of medical contact was identified. However, another weakness of both the spatial and time-series analyses is that interactive effects between the environmental exposures in relation to the daily counts of medical contact were not identified unlike in other studies (Hirshon et al., 2008, Romieu et al., 1995).

8.3.8. Covariates in Time-series Analyses

Few studies (for instance Loyos-Berrios et al (2007) and Pereira et al (2009)) were found that matched asthmatics to non-asthmatics by age and gender. This investigation addresses this weakness by controlling for age and gender in the matching of asthmatics and non-asthmatics. Asthmatics were also matched to non-asthmatics by the general practice; often patients seek care or were registered to receive medical advice from a general practice that is situated reasonably close to their home. Thus, the non-asthmatic group was comparable to the asthmatic group by age, gender, and area of residence thus any differences between asthmatics and non-asthmatics were not influenced by these factors.

In the autoregressive analysis, the effects of day of the week, bank holiday, and seasonal effect were controlled in the model thus any associations are not the result of these confounding factors. These confounders were included in the analysis of a number of studies (Anderson et al., 1998, Strickland et al., 2010, Sunyer et al., 2003).

A potential shortfall of this investigation is that in light of the covariates referenced within the literature, the autoregressive analyses may have not included important confounding effects on daily counts of medical contact. In particular, covariates for viral epidemics were used in a number of studies (Andersen et al., 2007, Fusco et al., 2001) and arguably have a heavy influence on asthma exacerbation. If viral transmission were initiated after school return, the exposure would also surround non-asthmatic individuals. Thus, having a comparison group (as this thesis had included) potentially mitigates the effects of viral confounders.

8.3.9. Location

With relatively few studies investigating environmental exposures with childhood in the UK, this thesis provides additional UK based literature. Adding to the UK literature is particularly important because the application of environmental findings from the study sample to another population (particularly if that population resides in a different location) is conditional. The application of findings from one study to another population from a different location is dependent on whether the population and the environmental composition (you wish to generalise findings onto) are similar to the study sample and study environmental composition.

A large proportion of the literature examining environmental associations with childhood asthma related medical contacts was conducted in the US and Canada with few studies set in Europe and the UK. There is evidence highlighting spatial variation in the environmental exposures. Peel et al (2007) illustrates large variation in climate across the world using the Koppen-Gieger climate classification system. The WHO illustrates variation on PM_{10} measures worldwide (WHO, 1999). Pollen compositions and length of season vary within Europe (D'Amato et al., 2007) and most certainly worldwide. Therefore, there is a possibility that it may not be appropriate to generalise findings from the US or Canada onto a UK population. For this reason, investigating environmental exposures and applying those findings to a population that the sample and environmental exposures were sourced from is more valuable than attempting to generalise results from non-UK locations.

On the other hand, though country-to-country differences have been used as a motive for this piece of research, it must also be acknowledged that there are also within country variations in environmental compositions. Compared to the methods used in other studies, one potential weakness is that this thesis did not control for within country geographical variations in exposures that may confound the time-series relationship with daily medical contacts. This is particularly important for the analyses conducted on England and Wales and the Trent Region. However, the analysis was also conducted with clinical data from Sheffield thus allowing for comparisons in results between geographies. The appropriateness of using local environmental data against national patient data is further discussed in sub-section 8.3.10.

8.3.10. The Extrapolation of Environmental Exposures from Local to National level

The extrapolation of environmental variables from local (Sheffield) to national (England and Wales) level is an issue that needs to discussed. This thesis provided evidence to illustrate that urban background measures taken from one location (Sheffield) were similar to urban background measures taken from other locations from England and Wales. The Bland-Altman investigation provided some evidence of agreement between the measures collected from Sheffield and measures obtained from other England and Wales' locations. However, a small number plots illustrated unfavourable results. In particular, a number of the comparisons between Sheffield and Cardiff were not in agreement with one another.

It was important that measures from Wales were in agreement with Sheffield especially as medical contacts from Wales were included in a combined sample with England. Yet, the clinical sample obtained from Wales only contributed 12 percent to the total sample of England and Wales. Thus, the sample from Wales should not have made a significant impact on the overall results of England and Wales.

One key point is that the investigation was able to cross-validate our findings between the geographies and with several types of medical contact from within each region. The environmental data were analysed against clinical data at regional and local as well as national level and this allowed an evaluation of consistency in results. Therefore, conclusions were not solely based on results from the analysis on England and Wales' clinical data.

8.3.11. Pollutant Source

This thesis used urban background pollutant measures taken from a fixed site location in Sheffield as a proxy of pollutant exposure. Evidence supports and argues against the use of pollutant measures taken from fixed site locations as proxy markers for exposure. DEFRA states that the type of measure (urban background) should represent exposure across a few kilometres squared (see following link: http://uk-air..gov.uk/networks/site-types [Accessed online 03.10.2011]). Yet one paper adds criticism by stating that fixed site measures poorly relate to personal exposure (Janssen et al., 1998). An individual's personal environmental exposure can alter with taking a mere step. From this conclusion, fixed site measures should not be used to represent personal exposure.

Janssen's conclusion argues against the techniques used in a number of studies (Loyo-Berríos et al., 2007, Oyana and Rivers, 2005) and criticises the method used in this investigation. In this investigation's case, measuring personal exposure would have incurred resource and time related costs. Given time, knowledge and resource constraints, it was not feasible to adopt a technique that would measure personal exposure. Efficient use of fixed site data was made to obtain a degree of understanding of the spatial relationship between pollutant exposures and medical contacts.

8.3.12. Spatial Association

In contrast to the spatial studies included in the review, the second pollutant-asthma investigation was a simple analysis using geographical illustrations of pollutant exposures and childhood asthma medical contact rates followed by bivariate investigations. This thesis provided an insight into the spatial relationship between pollutant exposures and childhood asthma in the UK.

8.3.13. Spatial Specific Issues

Granularity (the degree to which a geographical area is divided) is an important issue particularly in relation to analysing spatial relationships between environmental exposures. As already mentioned (see sub-section 8.3.9), environmental composition varies across geographical locations. This is especially apparent for pollutant exposures where differences in the level of exposure can be observed metres apart. For the spatial investigation, analyses of annual aggregated data were conducted at MSOA level. The use of this spatial unit was governed by several reasons. Firstly, pollutant data at MSOA level from a free and accessible source was easily obtainable.

Secondly, though measures at MSOA level were arguably not spatially accurate (as 1 MSOA holds an average of 7,200 persons), alternative options to further aggregate the data into smaller spatial units were limited. There was a possibility of obtaining data from the National Air Emission Inventory where pollutant measures were estimated per one kilometre square yet clinical data would also need to have been obtained at that level. An argument against using pollutants measured per one kilometre square is that these spatial measures do not overlay contiguously over output areas. Therefore, to use measures aggregated per kilometre square, residential information that was more accurate would need to be have been obtained which raises the issue of patient identification. Regardless of what measures were used, area based measures are estimated and not actual measures of pollution. Thus, using smaller units of geography introduces more estimated measures that are potentially not beneficial to the analysis. In addition to constraints of the pollution data, by using yearly counts of medical contact, the clinical outcome already contained a number of MSOAs with zero annual events. Thus, in context of this thesis, seeking measures at a finer level would it seems add no value. For the exploratory aims of the spatial investigation, it was not therefore, deemed necessary to obtain patient data at such low spatial area measures.

8.3.14. Temporal and Spatial Bias

For the time-series investigation, this thesis cannot completely spatially and temporally verify that the cause or the independent variable occurred before the outcome. Spatially, the likelihood of confirming that asthmatics and non-asthmatics were exposed spatially to daily environmental measures (measured for one region only) diminishes as the spatial area (that the sample was sourced from) increases. Especially for England and Wales, and the Trent Region, spatial bias may have been potentially introduced. This thesis can temporally verify that daily measures of exposure were obtained before daily counts of medical contact though only for seven days to one day prior to contact. This thesis cannot confirm that measures taken on the same day (as medical contacts) occurred before the event was made, introducing the possibility of temporal bias.

8.3.15. Use of Minimum, Mean, and Maximum measures of Pollutants

Three types of measures (minimum, mean, and maximum measures) of pollutants were collectively examined. This may be interpreted as duplication of results by using several versions of the same measure. This contributes to the issue of multiplicity (mentioned in Chapter Four) whereby conducting multiple tests on variables of the same type of pollutant measures in addition to the weather and pollen variables increases the chance of producing false negative results. Although it is recognised that this strategy has a weakness, it is consistent with methods used by another study (Julious et al., 2011b).

8.3.16. Paradox: Sample Size versus Geographical Resolution

One weakness (attributed more so to the time-series investigation conducted on the GPRD datasets) is that results extracted at group level such as those attributed to analyses of England and Wales and the Trent Region may not hold at individual level. This concept is otherwise known as “Ecological fallacy” (Bailey et al., 2006) and is potentially present within this analysis. This should be considered in the interpretation of the results and especially of the results obtained for England and Wales.

Tying in with the previous paragraph, finding a balance between designing a study, which benefits from a large sample as well as being able to detect spatial relationships is difficult. The decision to accrue a large sample means the study gains the power to detect accurate relationships but loses is ability to detect fine spatial relationships. Yet, the choice to design a study that detects fine spatial relationships is more than likely to be weakened by small sample sizes thus results would prone to more variability and inaccuracy. By conducting separate analyses on geographies decreasing in size, this thesis has been able to demonstrate that results are more significant at national level but less spatially accurate whereas results at local level are not as significant but more spatially accurate.

Cost has not been an issue for this investigation but for further work, research examining both time and/or spatially related relationships between exposure and outcome has to consider the conflict between costs versus quantity. This issue runs parallel with designing a study that is spatially accurate against designing a study that accrues a “powerful” sample size. A dataset that has data that are more accurate normally incurs higher cost and often includes smaller samples. Less accurate data normally comes at a lower cost and often includes larger samples.

8.3.17. Summary of Strengths and Weaknesses

This thesis provides evidence supporting the seasonality of daily counts of medical contact made by school-age asthmatics and non-asthmatics. This thesis also provides some evidence to support the associations between environmental triggers and counts of medical contact. The thesis' strengths lies in:

- A matched asthmatic non-asthmatic design which allowed comparisons of effect to be made between an asthmatic and non-asthmatic cohort
- A large sample size used in the time-series investigation which potentially resulted in "more accurate" findings
- Its ability to detect simple spatial relationships within a local area (Sheffield)
- Its position to help fill several limitations in the UK literature.

There were also a number of weaknesses that have also been documented to highlight an awareness of this thesis' limitations. As a whole, however, this thesis has demonstrated a narrative of the seasonality and environmental triggers of medical contact.

8.4. The Implication of the Results

The purpose of this thesis was to increase the evidence found in the UK of potential relationships between environmental exposures and childhood asthma and use this evidence to inform the development of strategies to prevent asthma exacerbation in schoolchildren. The thesis found evidence of a seasonality pattern of counts of medical contact yet revealed inconsistent evidence to support an environmental-medical contact association. However, there are a number of conclusions that can be inferred from the results of this thesis that may inform future research. Suggestions are thus made towards avoiding, reducing, or preparing for the possible consequences of exposure.

Highlighting the seasonal patterns of daily counts of asthma can assist in the planning of treatment. Particularly, earlier uptake of routine medication taken prior to school return may reduce the peak in asthma related medical contacts thus alleviating the burden placed on the individual, their family and the health services.

The environmental results suggest that though exposures in the environment may increase a child's likelihood of having an asthma exacerbation, at population level, they were not a major trigger of asthma exacerbation. Ultimately, the triggers of asthmatic symptoms vary from child to child and this may be the reason why the literature had found a whole host of different environmental associations with childhood asthma.

In a recent Patient and Public Involvement (PPI) event, children with asthma and parents were interviewed via focus groups to explore their opinions on a proposed intervention. The intervention involves sending letters (from the GP) to parents/children with asthma in the summer holiday to encourage retaking regular medication in preparation for school return. This intervention aims to alleviate the September peak in medical contacts made by children with asthma. In the focus group interview, children referenced different times of the year when their asthmatic symptoms worsened and speculated different causes for their symptoms (Julious et al., 2011c). Another paper also found that children believed a number of different external triggers triggered their asthma (Williams et al., 2010). It may be more beneficial for parents and children to pinpoint potentially what triggers their asthma and pinpoint times of the year when the child's asthmatic symptoms are worse and prepare for those times in advance by taking regular medication.

This thesis found weak associations with environmental exposures and daily counts of medical contact. The suggestion that children with asthma may benefit from warnings of high pollution episodes such as the smog alert issued for the 23rd and 24th of April 2011 was reinforced. According to this thesis' results that highlight just as significant a relationship with non-asthmatics as with asthmatics, these warnings would also benefit non-asthmatic children. Other high pollution episodes include bonfire night (AEA Energy and Environment, 2008) and New Year's Eve where the heavy use of fireworks emits high quantities of particulate matter.

Asthmatics that were prone to worsening symptoms exacerbated by weather changes (i.e. temperature) could use daily weather forecasts as a "tool" to predict weather change and prepare for those changes in advance by taking regular medication. Currently, the Met Office advertises online "Health forecasts" documenting potential changes in weather (and pollen) that might affect health (http://www.metoffice.gov.uk/health/public [Accessed online 04.10.2011]). These warnings target specifically conditions including sunburn, hay fever, COPD, and seasonal affective disorder but could also be used to aid asthmatics. Online services can be used as a an information service for persons prone to exacerbation due to pollutant exposures (Kelly et al., 2012). The DEFRA website forecasts pollution levels that can be used to predict exposure (http://uk-air.defra.gov.uk/forecasting/ [Accessed online 04.10.2011]).

Strategies to avoid or reduce exposure may be considered as a method to attempt to reduce asthma exacerbation. Assessing an area's environmental composition can aid future decisions about the placement of new schools (considering that children spend a substantial amount of time at school). In addition, parents may consider moving from areas that are likely to accumulate exposures that trigger their child's asthma. Constructing "Environmental community health profiles" as suggested by one study can aid such decisions on more appropriate locations of residence for respiratory challenged individuals (Pine and Diaz, 2000).

This thesis adds some support towards strategies targeted at reducing pollutant emissions. As a consequence of these strategies, there may be a reduction or stabilisation of respiratory exacerbation especially in those who were pollution sensitive. Strategies targeted at reducing pollution may also have overarching benefits to stabilise climate change and pollen season (which is slowly lengthening as the climate changes).

8.5. Further Research

It is recognised that there is already a large amount of research but further research can always be justified. Ultimately, the generalisability of results stemming from research conducted in different parts of the globe is difficult due to the variation in environmental compositions. Thus, the replication of research topics is justified if the population differs from the population that the original research was investigated upon. Stemming from this piece of research, there are a number of suggestions for future research. These ideas arise from observed nuances in need of further work. These nuances may or may not have been researched by others in different settings. These suggestions include further work to be carried out on the existing dataset and future ideas for more recent datasets.

8.5.1. Further Analyses on the Current Datasets

Further analyses on the current datasets could be implemented bearing in mind the datasets are now slightly dated and therefore, may not model recent developments in environmental-asthma relationships. The following ideas may also be implemented on datasets that were collated more recently.

Investigation could be implemented on data partitioned by season for example, the wet and dry season or more appropriately for the UK, the warm and cool season separately. The data within the pollen season only could be examined to observe whether pollen effects were more significant within that time of year. It could also be possible to analyse factors like Ozone in just the summer months.

Another interesting investigation would be to omit September's measures and observe how this influences overall effects from environmental exposures. This investigation may reaffirm findings reported by Garty et al (1998) who found that with the omission of September's measures, the environmental association was weaker in comparison to the inclusion of the complete year's data.

Interactions could be investigated to see which exposures work together and amplify or hinder the environmental effect of daily counts of medical contact. This investigation may reaffirm interaction findings reported in the literature within a UK setting.

As noted in Chapter Three, the GPRD data were aggregated by region of practice: London, South East, South West, Eastern, West Midlands, Trent, North West, Northern and Yorkshire, Wales, Scotland and Northern Ireland. Yet, the investigation was conducted on the whole of England and Wales, and only two of the regions: Trent Region and Scotland (Scotland results reported in Appendix). Further analysis of the same time-series methodology could be applied to the remaining GPRD regions and results could be compared to the Trent Region.

Within the GPRD dataset, this thesis' outcome was daily number of medical contacts (for any reason) made by school-age asthmatics/non-asthmatics. Further investigation could be employed to look at sub-groups of respiratory related medical contact for example, by diagnosis or reason for contact.

In consistency with the GPRD dataset, the current investigation used Sheffield daily counts from 1999 to 2004. As Sheffield Children's hospital data were obtained until 2009, the data could be extended. If recent environmental measures were obtained, the same analysis could be applied to investigate more recent developments in the environmental-asthma association.

In the time-series and spatial investigation, the analysis did not allow for individual data. Thus, to improve on this investigation, future analysis may be able to consider the effect of individual data within the analysis that may in turn reduce the errors improving the accuracy of the results.

8.5.2. Future Ideas for Research

There is a large amount of research conducted worldwide on the pollutant associations with childhood asthma; therefore, the scope for further research in this area is somewhat restricted. Yet, research conducted on the environmental-asthma association within the UK is rather limited, which provides impetus for further research. This sub-section presents a number of ideas for future research.

This thesis did not eradicated the potential obstacle of the "ecological fallacy". This thesis' findings based on a large sample may not hold at an individual level. Further investigation is required to investigate environmental exposure effects at an individual level to validate findings extracted at group level. Drawing parallels with research conducted measuring indoor exposure (Krieger et al., 2000, Osman et al., 2008), one potential idea would be to combine an investigation examining both indoor and outdoor exposures. A small cohort of asthmatic and non-asthmatic school-age children could be allocated with individual measuring devices (measuring both indoor and outdoor pollutant levels, temperature, and other exposures) that document their whereabouts, exposure levels and potentially determine if indoor or outdoor exposures have a bigger part to play towards triggering exacerbation.

In the time-series investigation, the design was unable to deduce measures or daily counts lower than regional level as residence data were not provided within the GPRD dataset. Once more, the environmental measures were sourced from only three locations in Yorkshire. In addition, the datasets are quite old and there is room to speculate that the trends observed within those datasets do not represent current trends. To improve this investigation and draw parallels with research that considers spatial variations in environmental exposures, an idea for future research includes similar time-series analyses using more recent data. With this second attempt, data would include daily counts and environmental exposures measured at a finer spatial level to reduce the possibility of introducing spatial bias.

In contrast to the simple spatial analysis conducted within this investigation, further improved spatial research in the UK can be implemented considering buffering techniques from environmental sources and distance calculations, which could then be used to assess the risk of exacerbation due to proximity to pollutant sources. This would require accurate residential information of the asthmatic individuals. In addition, improved statistical analyses should support these maps and examine the dynamics of the spatio-temporal relationships between exposures and childhood asthma. These analyses should consider the interactive effects and account for spatial as well as time oriented autocorrelation.

To balance both the costs (resource, time, and efforts to obtain ethics) of obtaining spatially accurate data with the ability to detect spatially accurate associations, continuing the use of primary care information, it may be possible to obtain data at general practice level and link these data with pollutant exposure data potentially at MSOA level. This linkage would make efficient use of routinely collected data. In 2009, there were approximately 8,230 general practices in England (The Information Centre, 2009) and England had a population of over 52 million (ONS, 2011a). Assuming that every person was registered to a general practice, there are on average approximately 6,318 persons per general practice. Since 1 MSOA includes an average of 7,700 persons (ONS, 2011b), there is theoretically more than 1 general practice per MSOA. It is estimated that an analysis of general practice data and exposure data can be spatially accurate up to MSOA level. GPRD data with pollution data would provide an approximate 10% sample of these practices. However, one drawback to this idea is that GPRD practices are anonymised therefore, only a time series analysis would be possible.

From the results of this thesis, spatial relationships were found between CHRs and domestic and commercially sourced air emissions. These relationships were negative, suggesting that the lower the emissions, the higher the rate of contacts. Part of the reason why negative relationships were observed was that measures of emission were proportions of total emissions. Thus, measures were not independent of each other. Another pollutant producing a higher proportion of emissions can confound the association with one pollutant source. Further investigation is needed (with additional exposure data) to identify why this thesis found negative emission-CHR relationships and whether these relationships represent true associations or act as proxies for further exposures sourced from the same origins.

The impact of climate change will alter environmental exposure and may be considered as a rationale for further research. This will have repercussions on a number of conditions not least asthma. Therefore, in the future, research on the environmental-asthma associations would be necessary to evaluate change in exposures and their effects on asthmatic individuals.

The methodology used within this thesis can be implemented with other outcomes that are associated with environmental exposures. Using autoregressive methods accounting for confounding factors, the effect of environmental exposures could be investigated with daily counts of medical contact related to persons with cardiovascular disease or stroke or adults with asthma.

8.6. Summary

This chapter summarised the results of the time-series and spatial analyses by addressing the research questions set in Chapter One. A seasonal pattern in the daily number of asthmatic and non-asthmatic medical contacts and in the daily excess of medical contacts was detected. The seasonal pattern was more prominent in datasets with higher daily counts (England and Wales) compared to low daily counts (Sheffield). Peaks in daily counts tended to occur in periods that coincide with school term whilst troughs appeared in periods that coincided with school holidays. The most prominent peak occurred after the school summer holiday, counts after the peak were sustained until the end of the year. The seasonal pattern was stronger with asthmatics than non-asthmatics.

Examining the environmental-daily counts relationship, unfortunately, the results between the correlations and autoregressive analyses and within the autoregressive analyses were not consistent and some results signified no association. Correlational analysis provided results that were more significant in comparison to the autoregressive analysis. With the autoregressive analysis that considered confounding factors (day of the week, bank holiday and season), a number of exposures contributed to a statistically significant improved fit to the data compared to the null model. Higher numbers of exposures were found to be significant with England and Wales' daily counts of medical contact made by asthmatics and non-asthmatics compared to Trent and Sheffield. However, this is likely to be a function of the variation in sample size. Grass was commonly associated with daily counts of medical contact made by asthmatics and non-asthmatics from national through to local level and was associated with the daily excess of medical contacts sample at national and regional level. Other exposures that were found to be significant included PM_{10}, NOD, and sunlight however they were not consistently associated with daily counts from all three geographical levels.

Collectively, examining the autoregressive model or point-estimate P-values, a weak association was found between environmental exposures and daily counts. This association was strongest with daily counts taken from the largest geographical region (England and Wales).

Alongside the time-series investigation, a simple spatial investigation revealed weak associations between area based pollutant measures and CHRs (ratios of observed over expected numbers of medical contact) with asthmatics and the excess. No significant associations were found between pollutant measures and CHRs for non-asthmatics. These findings signify stronger spatial associations with asthmatics compared to non-asthmatics.

Strengths and weaknesses were discussed in depth. The strengths of this thesis include its matched asthmatic non-asthmatic design, sample size, and choice to include only school-age children to keep constant the school associated effects. One characteristic that adds to this investigation's distinctiveness is that the analysis observes seasonal and environmental associations with medical contacts made to primary and secondary care sources. Adding to this investigation's distinctiveness, this is one of the first investigations to examine the environmental associations with the excess as an outcome. Further adding to the uniqueness of this investigation, this is one of the first investigations to make cross-comparisons between geographical sizes (from local to national level) and explored the influence of size of the "polygon" on association. Weaknesses were also recognised, these include the potential introduction of the ecological fallacy, the simple spatial analysis and the inability to model both the time-series and spatial aspects of the environmental relationship in one model. The thesis separately investigates the time-series and spatial aspect of the environmental association. However, the two investigations depict a comprehensive picture of the associations between environmental exposures and medical contact.

This chapter had extracted possible implications of this piece of research and suggested further ideas for investigation. This piece of research suggests that at population level, environmental exposures may not rank highly towards triggering asthma exacerbation yet different exposures exacerbate asthma in different individuals thus strategies to avoid exposure or prepare for exposure should be taken.

This chapter finishes with a number of further research ideas. Though this topic has been explored previously, further work may involve developing a model that can explain both the time-series and spatial influences on the environmental-asthma association in the UK using routinely collected sources of data. A tool to facilitate public knowledge of the exposures associated with asthma maybe created by animating both time-series and spatial measures and outcome over time. Chapter Nine summarises the thesis' findings

Chapter Nine

Conclusion

The goal of this thesis was to understand what influences the time-series and spatial patterns of asthma in school-aged children. Influences that were under investigation included pollution, weather, and pollen exposures. It was hoped that the knowledge gained from the investigations would be used to inform or support the development of preventative strategies to reduce asthma morbidity in children.

The aims of the time-series investigation were firstly, to examine the presence of association between environmental exposures (collectively) and medical contacts by school-age asthmatic and non-asthmatic children. In parallel with the first aim, the investigation also examined delayed associations between environmental exposures and daily counts of medical contact. Secondly, to assess whether there is a peak associated with the return to school after the vacation in school-age asthmatic and non-asthmatic children. Within these two aims, relationships/effects were observed at national (England and Wales), regional (Trent Region), and local (Sheffield) level.

A final aim was to spatially investigate ward level contact rates of school-age asthmatics and non-asthmatics and observe if these rates were associated with ward level pollution data in Sheffield.

To address the aims, a retrospective matched asthmatic non-asthmatic design was used to investigate time-series and spatial relationships between counts of medical contact made by school-age asthmatics and non-asthmatics. For the time-series investigation, daily counts of medical contact made by school-age asthmatics and school-age non-asthmatics were investigated. A second outcome, the daily excess was also investigated (the daily number of medical contacts made by asthmatics over the daily number of medical contacts made by non-asthmatics); this outcome represented the residual effect on asthmatics over and above the average school population. To investigate the seasonal patterns of the clinical datasets, graphical examinations of the daily counts were employed. To investigate the environmental-medical contact association, daily counts were analysed alongside 28 pollutant, weather, and pollen exposures via autoregressive techniques allowing for confounders.

For the spatial investigation, comparative ratios of events made by school-age asthmatics, non-asthmatics and the excess between asthmatics and non-asthmatics were investigated. These ratios were correlated with area based pollutant measures.

This thesis provided evidence of a seasonal pattern in daily counts of medical contact made by school-age asthmatics and to a lesser extent, non-asthmatics. Seasonal patterns were also evident in the daily excess of asthmatics over and above the average school population. Seasonal patterns were heavily related to the school calendar – lower during the school vacations and higher upon the return to school. The seasonality of medical contacts made by school-age asthmatics and non-asthmatics, and its relation to the school calendar adds further support to the evidence given in the published literature.

The thesis' results provide inconsistent evidence on environmental associations with daily counts of medical contacts made by school-age asthmatics and non-asthmatics. Contrary to what was expected, the time-series evidence suggests that the environmental association maybe slightly stronger with the non-asthmatic group rather than asthmatics. These findings do not corroborate the evidence given in published literature, and therefore add a different interpretation of the relationship between environmental exposures and medical contacts. In comparison to evidence given in published literature, and contrary to this investigation's time-series evidence, spatial evidence suggests a stronger association with asthmatics compared to non-asthmatics. Further research needs to be undertaken to reaffirm these findings.

Alongside the time-series investigation, a spatial investigation revealed weak associations between pollutant exposures and ratios of observed over expected numbers of asthma related medical contacts. Significant associations were found between CHRs for asthmatics and air quality measures of NO_2 (a positive correlation) and O_3 (a negative correlation). Significant negative associations were also found between CHRs for asthmatics and the proportion of domestically and commercially sourced emissions.

The investigation has many strengths including: the use of an asthmatic non-asthmatic design; the sample size of the time-series thesis; the ability to detect simple spatial relationships and its position to help fill several of the gaps in the UK literature. Several characteristics contribute to the originality of this piece of work. Firstly, this is one of the first investigation's that analyse the environmental effects on the excess of asthmatics over and above the average school population. Secondly, this is one of the first investigation's that assesses the collective association of environmental exposures with medical contact. Thirdly, unlike the observations made within the literature that largely conclude results based on one location's findings, this investigation observes environmental-medical contact associations across three geographies thus the results were compared and reported. Fourthly, unlike previous studies that use a primary care or secondary care data source, this investigation utilises both primary and secondary care data thus increasing the likelihood of obtaining a more diverse asthmatic sample.

As a whole, this thesis had been able to demonstrate a comprehensive narrative of the seasonality of and environmental triggers of medical contacts in school age asthmatics across different health care settings and across different geographies.

There were also a number of weaknesses that have been documented including the potential introduction of the ecological fallacy, the simple spatial analysis and the inability to model both the time-series and spatial aspects of the environmental relationship in one model.

In summary, the evidence of an environmental association with daily counts is weak and further research is needed to support the inferences made in this thesis. Yet, in light of the evidence suggesting that there are a number of exposures that trigger asthma symptoms, this thesis supports the need to develop strategies to alleviate the burden of asthma and improve quality of life for children with asthma. Seasonal findings suggest that children with asthma are more likely to have medical contacts after school return and it is recommended that strategies should be constructed to help prevent medical contacts associated with the end of the school holidays

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Appendix

Appendix A

Search Strategies for Literature Review

Appendix A illustrates the five search strategies used to report findings from existing literature.

- The seasonality of asthma in children
- The associations between "school" exposures and asthma exacerbation in children
- The associations between pollutant exposures and asthma exacerbation in children
- The associations between weather exposures and asthma exacerbation in children
- The associations between pollen exposures and asthma exacerbation in children

The first search of the literature was conducted between March and September 2009. The results from the search strategy and the mini data extractions are reported. Another search was conducted in August 2011 to update the findings from new studies conducted in 2010 and 2011. The data extraction from the studies found are attached after the mini data extractions of studies found in the first search.

- Search Strategy from 2009
- Mini data extraction from studies found in 2009
- Mini data extraction from studies found in August 2011

A1. Search Strategy to Review Current Literature on the studies evaluating the Seasonality of Childhood Asthma Exacerbation resulting in Medical Contact

A1.1. Inclusion and Exclusion Criteria

Inclusion:

- all studies written in English langauge
- all studies with children (age zero to eighteen years) as the study sample (children and adult studies included if children's results are presented separately)
- all studies which investigate medical contact i.e. admissions or presentations to emergency department or presentations to general practice as the outcome of interest
- all studies studying seasonality, seasonal differences and asthma admissions in children

Exclusion:

- any studies where admissions/presentations/medical visits are not used as a measurement of asthma
- all none English language studies due to the difficulty in translating the content
- all studies not investigating the effects of humans

Same Inclusion and exclusion criteria applied to all studies in all reviews.

A1.2. Seasonality Databases and Search Terms

Searches were performed using Medline, CINAHL, Web of Science, EMBASE and Google scholar. Searches performed on the May 2009.

In the search, the terms "asthma", "child*", "pediatric", paediatric" and "admi*", "present", "attend*", "family physician", "general prac*", "hospital*", "diar*" and "out of hours"; "season*", "trend*" and "pattern*" were included using the Boolean terms "and" or "or". Whereas all the terms were mapped out completely, the terms "season*", "trend*" and "pattern*" were searched for as in the title only (Medline/EMBASE/Web of Science) to limit the number of results.

Table A. 1: Search Seasonality Medline.

	Search Terms	Results
1.	asthma/ or asthma.mp.	106398
2.	Child*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]	1537841
3.	Adolescent/ or Pediatrics/ or Child/ or paediatric.mp.	1173793
4.	2 or 3	1554048
5.	(admission or admit*).mp. [mp=title, original title, abstract, name of substance word, subject heading word]	1180296
6.	Present.mp. [mp=title, original title, abstract, name of substance word, subject heading word]	2027169
7.	Attend*mp. [mp=title, original title, abstract, name of substance word, subject heading word]	83788
8.	Hospital departments/ or Medical Records Department, Hospital/ or hospital*.mp. or Emergency Service, hospital/	828617
9.	general prac*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]	50499
10.	family physician*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]	15487
11.	Out of hours. Mp	705
12.	Diar*.mp.	85245
13.	5 or 6 or 7 or 8 or 9 or 10 or 11 or 12	3679685
14.	"Season*"m_titl.	17562
15.	"trend*"m_titl.	33276

16.	“pattern.m_titl.	104713
17.	14 or 15 or 16	154499
18.	1 and 4 and 13 and 17	217
19.	Limit 18 to (English Language and Humans)	203

Table A. 2: Search Seasonality CINAHL

	Search Terms	Results
1.	(ZU “asthma”)	15496
2.	Child*	227400
3.	Paediatric	4535
4.	Pediatric	34526
5.	2 or 3 or 4	235305
6.	Admi*	225490
7.	Present*	126127
8.	attend*	34546
9.	Hospital*	148249
10.	General prac*	7413
11.	family physician	520
12.	Diar*	11426
13.	Out of hours	257
14.	6 or 7 or 8 or 9 or 10 or 11 or 12 or 13	509482
15.	Season*	6218
16.	Pattern	39375
17.	Trend*	98616
18.	16 or 17 or 18	144202
19.	1 and 5 and 14 and 19	296

Table A. 3: Search Seasonality EMBASE.

	Search Terms	Results
1.	Mild Persistent Asthma/ or asthma.mp. or Moderate Persistent Asthma/ or Exercise Induced Asthma/ or Nocturnal Asthma/ or Asthma/ or Allergic Asthma/ or Severe Persistent Asthma/ or Mild Intermittent Asthma/	67426
2.	Child*.mp	511952
3.	Paediatric/ or pediatric/ or paediatric.mp	28502
4.	2 or 3	519616
5.	(admission or admit*).mp. [mp=title, original title, abstract, name of substance word, subject heading word]	606071
6.	Present*mp. [mp=title, original title, abstract, name of substance word, subject heading word]	1153189
7.	Attend*mp. [mp=title, original title, abstract, name of substance word, subject heading word]	367889
8.	hospital*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]	392782
9.	general practice/ or General Practitioner/	38662
10.	family physician*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]	5026
11.	Out of hours. Mp.	488
12.	Diar*.mp.	80096
13.	5 or 6 or 7 or 8 or 9 or 10 or 11 or 12	1736755
14.	“Season*”.m.titl.	6884
15.	“Pattern*m.titl	42616
16.	“Trend*”m.titl	13213
17.	14 or 15 or 16	62180
18.	1 and 4 and 13 and 17	65
19.	Limit 18 to (English language and Human)	61

Table A. 4: Search Seasonality Web of Science.

	Search Terms	Results
1.	TS = (asthma)	92692
2.	TS = (child*)	>100000
3.	TS = (paediatric)	21569
4.	TS=(pediatric)	>100000
5.	#2 OR #3 OR #4	>100000
6.	TS=(admi*)	>100000
7.	TS = (present*)	>100000
8.	TS = (attend*)	>100000

9.	TS = (hospital*)	>100000
10.	TS = (general pract*)	93490
11.	TS = (family physician)	7136
12.	TS = (Out of hours)	>100000
13.	TS = (diar*)	91007
14.	#6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13	>100000
15.	TI=(season*)	68389
16.	TI=(pattern*)	>100000
17.	TI=(trend*)	70707
18.	#15 OR #16 OR #17	>100000
19.	#1 AND #5 AND #14 AND #18	235

A1.3. Seasonality Search Results

These are the results from the second search.

- Medline: 203 titles - 20 abstracts - 20 studies selected for further reading
- CINAHL: 296 titles - 1 abstract - 1 study selected for further reading
- EMBASE: 61 titles - 16 abstracts - 9 studies selected for further reading
- Web of Science: 235 titles – 27 abstracts – 18 studies selected for further reading

A1.4. Critical Appraisal

The first two questions of the Critical Appraisal Skills Programme (CASP) checklist were used to evaluate the quality of the study.
The questions follow:

- Did the study address a clearly focused question?
- Did the authors use an appropriate method to answer the question/issue?

From the Critical Appraisal Skills Programme (CASP) 11 questions to help you make sense of a case control study. Public Health Research Unit, England.
And Critical Appraisal Skills Programme (CASP) 12 questions to help you make sense of a cohort study. Public Health Research Unit, England.

Same critical appraisal questions applied for every study in all reviews.

After using the screening questions, 29 studies were included via Medline, no studies from CINAHL, 7 from EMBASE and 17 from the Web of Science.

A1.5. Data Extraction

A small data collection form was compiled to extract information from each article.

Table A. 5: Example of extraction form.

Reference	
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): Sample size: GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	
Independent variable	
Dependent variable	
Method of Analysis	
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	

The same data extraction used for all studies.

A1.6. Seasonality Mini Data Extraction

Reference	Ashley (1983) Seasonal Trends in childhood asthma. BMJ. Vol287 p1721
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-14 Sample size: 11582 GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	UK 1976-81
Independent variable	
Dependent variable	
Method of Analysis	Tabulation, graphical presentation
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Distinct seasonal pattern.

Reference	Blaisdell et al (2002) using seasonal variations in asthma hospitalisation in children to predict to predict hospital frequency. Journal of Asthma. Vol39(7) 567-575
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-4, 5-14, 5-18 Sample size: 631,422 paediatric hospitalizations , 45,924 (7%) had a primary admission diagnosis of asthma GP or Hospital: H
Design (comparison group?)	Case-control
Setting (dates data collected)	US 1986-1999
Independent variable	
Dependent variable	Number of hospitalisations
Method of Analysis	Longitudinal analysis. Pearson's chi-squared used on asthmatic versus non-asthmatic hospitalisations stratified by age and gender. For predicting number of asthmatics, nureal network model used.
Covariates	age bands and race (black, white and other).
Results (if included a comparison group, was the effect greater/weaker?)	Asthmatic asthmatics accounted for a greater proportion of hospitalisations. Hospitalisation rates were comparable to national estimates. Frequency of hospitalization for asthma was lowest in the summer in all age groups, and highest in the fall. Seasonal variation in severe asthma episodes was least striking in children aged 15-18. The seasonal variability in asthma hospitalizations suggests that acute asthma is influenced by variables beyond socioeconomic factors and adherence to medical regimens. Baltimore had higher rates of asthma compared to Maryland as a whole. Attributed to poverty, race and urban living Seasonal trends not produced by non-asthmatics

Reference	Chavaria (2001) Short Report: Asthma admissions and weather conditions in Costa Rica. Archives of Disability on Childhood. 84 p514-515
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): <15 Sample size: GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Costa Rica, 1992-1998
Independent variable	Weather data collected. Max and min temperature, % of relative humidity, amount of rainfall were obtained on a monthly basis
Dependent variable	Number of admissions
Method of Analysis	Patient admissions data taken from the Documentos Medicos y Estaistica which proves 100% coverage for all children' hospital in San Jose. Pearson's correlation coefficient was used to 0.05 significance level.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Seasonal peaks in March and August, school holidays end in Feb and July. Average % variation of admissions was significantly related to the relative humidity and the amount of rainfall. Authors proposed that people spend a lot more time indoors when it rains increasing the risk of viral transmission plus exposure to indoor pollutants/triggers i.e. dust

Reference	Chew et al (1998) Time trends and seasonal variation in acute childhood asthma in tropical Singapore. Respiratory Medicine. Vol92 p345-350
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-12 Sample size: 3000 admissions, 9000A&E GP or Hospital: H
Design (comparison group?)	

Setting (dates data collected)	Singapore 1990-1996
Independent variable	
Dependent variable	Number of admissions
Method of Analysis	Rates calculated based on population estimates. 12-month moving average used to assess trend over time. ARIMA used to investigate seasonality.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Seasonal variation: peaks in Jan-Feb, May to August each year. Troughs in March, June-July, November- December. Seasonal variation only significant for 3 to 12 years old. Factors responsible for seasonality include changing weather, variation in mite allergen levels, viral infection, pollen, fungal spores, air pollution (Mao Y et al (1990) Seasonality in epidemics of asthma mortality and hospital admission rates, Ontario, 1979-86. Canadian Journal of Public Health. Vol81 p226-228.

Reference	Crighton et al (2001) A population based time series analysis on asthma hospitalisations in Ontario, Canada 1988 to 2000. BMC health services research. Vol 1(7)
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-4 5-9 10-19. Sample size: NR GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Canada 12-year period 1988-2000
Independent variable	
Dependent variable	
Method of Analysis	ARIMA
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Females all age groups: troughs in summer. Males aged 0-4 5-9: high peak in September and October. There was a strong seasonal pattern. Overall downward trend like that found by Fleming et al UK

Reference	Ehrlich and Weinberg (1994) Increase in hospital admissions in acute childhood asthma in Cape Town, 1978-1990. South African Medical Journal. Vol 84(5) p263-266
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): children no age Sample size: 9250 admissions (summing annual number of admissions) GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	South Africa 1978-1990
Independent variable	
Dependent variable	
Method of Analysis	Tabulation and graphical illustrations of asthma admissions were compared to total admissions for non-surgical causes and lower respiratory tract infection
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Sharp rise from 1978 to 84 then steepness of the increase declines and levels off towards the end of the period. Asthma admissions occurred throughout the year but showed seasonal peaks in May and November. During 1978-85, as a proportion of non-surgical admissions, asthma admissions increased more so than non-surgical admissions

Reference	Fleming et al (2000) Comparison of the seasonal patterns of asthma identified in general practitioner episodes, hospital admissions, and deaths. Thorax. Vol55 p662-665.
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-4, 5-14 Sample size: 15708 including adults GP or Hospital: GP
Design (comparison group?)	
Setting (dates data collected)	England 1990-97
Independent variable	
Dependent variable	Number of GP episodes
Method of Analysis	General practitioner episodes data, hospital admissions for asthma in England, deaths due to asthma examined. Age specific weekly rates of new episodes of asthma presenting to GP, number of hospital admissions and deaths analysed by using multiplicative decomposition methods to separate secular (long term non-periodic variation) from seasonal trends. Seasonal trend obtained were plotted as 3 wk moving averages.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	General practice episodes and hospital admissions congruent in timing and magnitude expect for September=high rates. Seasonal pattern evolves/changes with age.

Reference	Gergen et al (2002) Understanding the seasonal pattern of childhood asthma: results from the National Cooperative Inner-City Asthma Study (NCICAS). Journal of Pediatrics. Vol141 p631-636
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 4-12 Sample size: 1641, total of 1342 were participants in phase I, and an additional 299 were control subjects in the separate phase II intervention study GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	US 1993-7
Independent variable	
Dependent variable	Number of hospitalisations
Method of Analysis	Participants of NCICAS were tracked for approximately 4 years after allergen skin testing and determination of exposure to ETS, air pollution data obtained via EPA. Average rates for days of wheeze, hospitalisation and scheduled visits were computed as means of the incidence density approach. The number of events and number of days at risk for each calendar year were obtained by summing across individual estimates. Data collapsed to create overlapping calendar year. Final incidence densities for each month calculated by taking the ratio of total number of events by the total number of days at risk. Mixed effects models contrast comparing average annual rate to monthly assess by using asymptomatic f-test from repeated ANOVAs. Adjusted for multiple comparisons using a Holm step down bonferroni and tukey method respectively.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Asthma symptoms and health care utilisation (unscheduled visits and hospitalisation) had similar seasonal patterns with low points during the summer- June-Aug and peaks in September. Seasonal patterns similar were in children with no allergen skin test reactivity, those reactive only to indoor allergens and those reactive to outdoor allergens. Seasonal plots for the four pollutants (SO_2, PM_{10}, NO_2, O_3), only SO_2 mimicked asthma patterns.

Reference	Grech et al (2002) Seasonal variations in hospital admissions for asthma in Malta. Journal of Asthma. Vol39(9) p293-283
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-14yrs, Sample size: 2916 visits GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Malta 1994-98
Independent variable	
Dependent variable	
Method of Analysis	Retrospective analysis, asthma admissions, all ages. ARIMA
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Paediatric admissions show peak in January and trough in August. Seasonality in asthma admissions more pronounced in children than adults. With school children, end of school in June associated with a drop (91%) in admissions, restarting school Oct, was associated with a sharp rise (165%).

Reference	Harju et al (1997) seasonal variation in childhood asthma hospitalisations in Finland. 1972-1992. European Journal of Paediatrics. Vol156 p436-439
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-15 (0-4, 5-9,10-14) Sample size: 59264 treatment periods GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Finland 1972-92
Independent variable	
Dependent variable	
Method of Analysis	All hospital treatment periods caused by asthma were examined. Data obtained from hospital discharge register, all hospitalisations in Finland. Age group (5-year bands) and gender standardised rates were calculated. MA used to smooth series. Results further broken down to monthly averages. ARIMA Independent T Samples test.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Monthly variations peaked in May and autumn and early winter. Low variations in late winter, summer. Both sexes profile with seasonal variations. However, monthly counts were lower for boys than girls in the winter and higher in the summer. Average monthly deviation highest in the 0-4 yrs in may, 42.8% above the trend, highest in 5-9yrs October 53.9% above trend.

Reference	Hashimoto et al (2004) Influence of climate factors on emergency visits for childhood asthma attacks. Pediatrics International. 46 p48-52

Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 2-15 Sample size: 5559 visits GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Japan
Independent variable	
Dependent variable	
Method of Analysis	The number of children who visited emergency rooms in a hospital in Tokyo during 1998-2002 (5559) visits were retrieved retrospectively and compared with 45 climate parameters from the meteorological agency using multiple regression models with stepwise backward elimination approach. Best fit model built to fit until all variables had reached p<.10. Number of emergency admissions compared against data for calendar months, day of the week and time of visits using ANOVA. ROC curves.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	The number of visits (3.7=/-3.1) per night increased significantly when climate conditions showed a rapid decrease from higher barometric pressure, from higher air temperature, and from higher humidity as well as lower wind speed. The best-fit model demonstrated that 22% variation in the number in the number of visits was explained by the linear relationship with 12 climate variables. Multiple regression = the number of patients having asthma attack per night increased significantly when land barometric pressure, air temperature and relative humidity decreased rapidly within 3 days (P< 0.0001). Sunshine and precipitation not associated with asthma admissions. Wind speed negatively associated with asthma attacks. Results postulate that specific climate conditions and other seasonal factors have an effect on the number of asthma visits in Tokyo. Number of visits were higher on Saturday, Sunday and Monday and higher in September.

Reference	Kimbell-Dunn et al (2000) Seasonal Variation, asthma hospitalisations and deaths in New Zealand. Respiratory. Vol5 p241-246
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 5–14, 15–44, and those aged 45 years and older Sample size: 185307 hospitalisations, 33% paediatric. 3788 deaths, 3.1% by 5 to 14 years olds GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	New Zealand 1978–1995 admissions, 1976-1995 deaths
Independent variable	
Dependent variable	
Method of Analysis	Monthly mortality and hospital discharge rates were calculated for the age groups 5–14, 15–44, and those aged 45 years and older. Mean monthly rates was plotted along a linear timescale to observe the seasonal trend.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Among the younger age groups, mortality and hospitalizations showed seasonal patterns: peak in the number of hospitalizations occurred in the early autumn months (autumn = April to June), with peak mortality in the early summer months (Jan). Monthly variation of deaths among 5–14 years olds involved three distinct periods; deaths peaked between December and February, dropped in March, peaking again in May and dipping in July, then peaked once more in September. Conclusions: Seasonal variations in the asthma hospitalization and death rates in New Zealand are similar to those from the Northern Hemisphere. The peak mortality in summer for the younger age groups occurs at the same time as the reduction in hospitalizations. This indicates that the increase in mortality may be due to problems of access to medical care.

Reference	Kao et al (2001) Time trends and seasonal variations in hospital admissions for childhood asthma in Taiwan from 1990-1998. Asian Pacific Journal of Allergy and Immunology. Vol19(2) p63-68
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s) 2-4, 5-14 Sample size: GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	
Independent variable	
Dependent variable	
Method of Analysis	Asthmatics diagnosed with asthma or asthmatic bronchitis. Age-specific and sex specific asthma admissions were calculated for each calendar year. Admission rate = number of asthma admissions divided by the total number of paediatric admissions in a year. Poisson regression used to compare admissions rates between groups. Chi-

	square test was used to assess an association between two categorical variables; breslow test was used to test the difference between categorical variables in the third variables.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Seasonal admission rates revealed a statistically significant increase during October-December period, peak in November December of each calendar year (RR=1.84 P0.001). There was an increased prevalence and severity of asthma in Taiwan. Boys and younger children aged 2-4 with asthma had increased risk of admission for asthma (RR1.22 and 1.96). Girls among the older children with asthma tend to present with greater severity than boys signified by higher RR of readmission.

Reference	Khot et al (1984) Seasonal variation and time trends in childhood asthma in England and Wales 1975-81. BMJ. Vol289 p235-237
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-4, 5-14 Sample size: NR GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	UK 1975-81
Independent variable	
Dependent variable	
Method of Analysis	Time trend analysis. For each age group, the monthly admissions for each region were summed and estimates of the number of admissions per million for England and Wales (after adjusting for missing regions) obtained using mid-year estimates of the population. Isolated seasonal trends then the trend were estimated by means of ARIMA. The resulting values were averaged for each month over the whole period and expressed as percentages.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	England and Wales hospital admissions for childhood asthma almost trebled from 1975-81. Authors suggest that this may reflect a true increase in the incidence of acute asthma, a swing from primary to hospital care or both. The trend was not due to the change in diagnostic fashion. Monthly admissions showed a pronounced seasonal trend with fewest admission in winter, rising in spring, trough in August, peak in autumn.

Reference	Khot et al (1983) Seasonal trends in childhood asthma in southeast England. BMJ. Vol287 p1257-1258
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-4, 5-14. Sample size: NR GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	UK 1971-80.
Independent variable	
Dependent variable	
Method of Analysis	Hospital admission data for asthma obtained via hospital activity analysis, southeast Thames region. Used cumulated monthly admissions.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Admission rates low during January to April and rose in early summer. Admissions consistently fell in August and were followed by a peak in September and October.

Reference	Kimes et al (2004) Temporal dynamics of emergency department and hospital admissions of pediatric asthmatics. Environmental Research. Vol94 p 7-17
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0–4, 5–14, or 15–18 Sample size: GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	
Independent variable	
Dependent variable	
Method of Analysis	Examined seasonal and temporal trends in paediatric asthma ED (1997 -99) and hospital admission (1989-99) to identify periods of increased risk or urgent care by age group, gender and race.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Distinct peaks in paediatric ED and Hospital admissions in each year, winter, spring, autumn. Although the number and the timing of the peaks were consistent throughout the groups, the magnitude of the peaks altered with age and race. The same number

	and timing and relative magnitude of the major peaks in asthma occurred statewide.

Reference	Lin et al (2004) Childhood asthma hospitalisations and ambient air sulphur dioxide concentrations in Bronx County, New York. Archives of Environmental Health. Vol59(5) p266-275
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-4, 5-10, 11-14 Sample size: 2629 asthmatics, 2236 Non-asthmatics. GP or Hospital: H
Design (comparison group?)	Case-control
Setting (dates data collected)	NY. Jun 1991 – Dec 1993
Independent variable	SO_2
Dependent variable	Number of hospitalisations
Method of Analysis	Daily ambient SO_2 concentrations were categorised into quartiles of both average and max levels and various exposure windows (i.e. day of admission, 1, 2, 3 day lag).
Covariates	Race
Results (if included a comparison group, was the effect greater/weaker?)	Seasonal patterns were evident in asthma asthmatics but no significant seasonal fluctuation in Non-asthmatics. Asthmatics were exposed to higher daily average concentrations of SO_2 than Non-asthmatics. Authors compared the highest exposure quartile with the lowest. OR1.66 (same day) 1.90 (1day lag), 2.05 (2day lag), 2.21 (3day lag). With similar findings for SO_2 max concentrations. There were positive consistent associations between SO_2 and hospitalisations for asthma in children.

Reference	Mohr et al (2008) Influence of season and temperature on the relationship of elemental carbon air pollution to pediatric asthma emergency room visits. Journal of Asthma. Vol45(10) p936-43
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 2-5, 6-10, 11-17 Sample size: 281763 paediatric ED visits 12836 asthma visits. 268419 Non-asthmatics GP or Hospital: H
Design (comparison group?)	Compared to remaining ED visits
Setting (dates data collected)	US. Jun 1st 2001 to 31 May 2003
Independent variable	Elemental Carbon (EC = component of $PM_{2.5}$), NOx, SO_2, temperature, mould and tree, weed and grass pollen
Dependent variable	Number of ED visits
Method of Analysis	St Louis. Poisson generalised equations using 1-day lag between exposure and ED visits. Evaluated the interaction between EC and temperature examined differences between weekend exposure vs weekday exposure. Relative risks calculated using 1 SD increase in EC to facilitate comparability across studies. The max daily temperature included in analysis. Missing pollutant data resulted in the exclusion of 39 days from the analysis out of a possible 730 days. Separate models fitted for each season. Using priori assumption of a 1-day lag for air pollutant measurements, this translated into weekend exposure. In addition, previous studies indicate a difference in weekend and weekday exposures hence Mohr et al included a weekend/weekday indicator variable in the model. Poisson regression model with a log link function was fitted for each season using GEE analysis. EC = component of $PM_{2.5}$.
Covariates	controlled for season, weekend exposure, allergens and other pollutants known to exacerbate asthma
Results (if included a comparison group, was the effect greater/weaker?)	The number of ED visits for asthmatics showed seasonal variation not reflected in Non-asthmatics. Observed on average, higher admissions on Sundays and Mondays An interaction effect existed between EC and temperature for 11 to 17 year olds in summer and winter seasons. During the summer, a 0.10 mgm3 increase in EC resulted in a 9.45% increase in asthma ED visits among 11-17 yr olds at median seasonal temperature (86.5F). This risk increases with increasing temperature. During the winter, a 0.10 mgm3 increase in EC in 2.80% increase in asthma ED visits with 11-17 year olds at a median seasonal temperature (43.3F). This risk increased with decreasing temperature. Among 11-17 year olds, daily numbers of asthma ED visits is associated with increased levels of EC at higher temperature in the summer and low temperature in the winter. Adjusted RR and CIs for NOx, SO_2, O_3. In the spring, a 10pbb increase in NOx was associated with a 4% increase in asthma visits (RR1.04 CI 1.01, 1.09) among 2 to 5 year olds and an increase of 5% in ED visits made by all ages (2 to 17) (RR1.05 CI, 1.01 to 1.09). In the fall, a 10pbb increase in NOx was associated with a 7% increase in ED visits made by 6 to 10 year olds (RR1.07, CI 1.04, 1.15). There was also a marginally significant increase in 11 to 17 years. A 10pbb increase in O_3 was associated with a 7% increase in ED visits of all ages (RR1.07, CI 1,01, 1.14). SO_2 not statistically associated with ED visits.

Reference	Montealegre et al (2002) Age, gender and seasonal patterns of asthma in emergency departments of southern Puerto Rico. Puerto Rico Health Sciences Journal. Vol21(3) p207-212
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 45% of the sample 1-9 Sample size: 55547 ED records GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	
Independent variable	
Dependent variable	
Method of Analysis	55547 emergency department records of asthmatic patients over a period of 6 yrs.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	The analysis of the data revealed that mean age of the asthmatic asthmatics were 18.7 +/- 17.8 years, with 45% percent of the patients in the 1-9 years age range, and proportionally decreasing with age. In children 1-9 years the percent of males was 1.5 times that of females, and in 10-19 year-old group, admissions to the emergency room for males and females. The data demonstrated that there was a seasonal variation in the asthma attacks: peak in December and trough in June. In conclusion, in the city of Ponce, Puerto Rico, emergency department usage due to asthma attacks show a seasonal variation, and males are more affected by asthma at younger ages while females are more affected at older ages

Reference	Morris et al (1997) Childhood asthma Surveillance using computerised billing records: a pilot study. Public Health Reports. Vol112 p506-512
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-18 Sample size: 4220 ED visits and 1924 admissions in 1994 GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	US 1993 and 94
Independent variable	
Dependent variable	Number of admissions or ED visits
Method of Analysis	Authors organised a planning workshop to solicit information and ideas of asthma surveillance system. Based on recommendations of the workshop, a pilot study was implemented. ER visits and hospitalisations for asthma were taken from a computer based surveillance systems of the children's hospital Wisconsin. Retrospective data also sought from other hospitals to evaluate representativeness. Descriptive analyses used to determine a) the extent to which the data from the Children's hospital Wisconsin described emergency admissions care in Milwaukee county b) describe utilisation of inpatient/outpatient asthma care c) examine temporal patterns of asthma. Temporal patterns plotted and smoothed with a 7-day MA.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	20% of children with repeated asthma related emergency admissions accounted for 50% of all ED visits while 7% of children with repeated asthma related hospital admissions accounted for 38% of total admissions. One finding is that there was clear seasonality in asthma admissions, peak in fall, through in summer, small peak in spring.

Reference	Nastos et al (2008) The effect of weather variability on pediatric asthma admissions in Athens, Greece. Journal of Asthma. Vol45(1) p59-65
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-4, 5-14 Sample size: NR GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Greece 1978-2000
Independent variable	Temperature, humidity, pressure, cooling power, wind speed, discomfort index
Dependent variable	
Method of Analysis	Biometeorological indices were used in analysis: Thom's discomfort index (THI) and cooling power. The relationship between childhood asthma admissions and environmental parameters was calculated by the application of Pearson's x2 test, the most widely used method of independence control of groups in lines and columns in a table of frequencies. Applied generalised linear models with Poisson distribution. Harmonic analysis followed by cross spectrum analysis. Purpose of cross spectrum is to determine correlations between two different air pollutant concentrations.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Significant relationship among asthma hospitalisations and the investigated parameters especially for the children aged 0to4/. Authors found that admissions negatively correlated with the discomfort index, air temperature and absolute

	humidity whereas there is a positive correlation with cooling power, relative humidity and wind speed. Children 5 to 14 appear to be more vulnerable to exposure in the late spring. Seasonal variation in children's hospitalisations rising during the damp cold period in pre-schoolers and peaking in May for school children.

Reference	Newell and Swafford (1963) Epidemiology of Asthma in children, with particular reference to wind speed and wind direction. Pediatrics. Vol31(1) p134-143
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): Children no age Sample size: 2400 ED visits GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	US
Independent variable	
Dependent variable	
Method of Analysis	
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Outbreaks of asthma in children were not clearly related to wind speed and direction. Severity of attacks rose in fall and fell off during the summer. Duration of exposure could not be clearly related to frequency of attacks.

Reference	Pritis et al (1993) Time trends and seasonal variation in hospital admission for childhood asthma in the Athens region of Greece: 1978-88. Thorax. Vol48 p1168-1169
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-4, 5-14 Sample size: 9795 admissions GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Athens, Greece 1978-88
Independent variable	
Dependent variable	
Method of Analysis	Children admitted for asthma, asthmatic bronchitis, wheeze, cough included. Data expressed as admission rates per 100000 of the same age population. The population estimation aged 0-14 years for each year of the study period was based upon the 1981 census. Monthly admissions for asthma during each year were converted into percentages of mean monthly admissions for asthma during that year. The resulting values were averaged for each month over the whole study period
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Admission rates rose by 294%. Admissions among those aged 0-4 and 5-14 rose by 272% and 379% respectively. Monthly rates show pronounced seasonal variations, rising during the cold damp period in 0-4, peaking in may for 5-14.

Reference	Reeves et al (2006) Using Billing Data to Describe Patterns in Asthma-Related Emergency Department visits in children. Pediatrics. Vol 117. S106-7
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): <2, 2-5, 6-11, 12,17 and ≥ 18 Sample size: 1782 ED visits GP or Hospital:
Design (comparison group?)	
Setting (dates data collected)	US 2001 and 2002
Independent variable	
Dependent variable	
Method of Analysis	During 2001 and 2002, aggregate reports based on ED billing data from 3 hospitals in western Michigan were obtained from a single physician billing company. Data were tabulated and graphically illustrated to show trends in the monthly numbers of ED visits for asthma. Comparisons were made by age, gender, and site.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	The data illustrated strong seasonal trends, as well as marked differences in ED use according to age and gender. Rates were high in the autumn (Sep-Nov) and winter (Dec-Feb) and low in the summer (June to Aug). Slightly different pattern was observed with those living in the rural area. The total numbers of asthma ED visits were remarkably similar between the 2 years evaluated; however, the timing and duration of the seasonal peaks differed. The evaluation of the system found that it met many of the characteristics that define successful surveillance systems, including simplicity, flexibility, acceptability, sensitivity and positive predictive value, timeliness, and stability. However, the surveillance system's representativeness was limited by the inability to calculate valid population-based ED-visit rates. Despite this limitation, the data provided useful information by documenting the burden and demographic profile of children who use the ED for

	asthma care and in identifying seasonal and time-related trends.

Reference	Roux et al (1992) Seasonal and recurrent intensive care unit admissions for acute severe asthma in children. South African Medical Journal. Vol.83. p177-179
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s):0-15 Sample size: 415 admissions GP or Hospital: H
Design (comparison group?)	Case-control
Setting (dates data collected)	South Africa 1974 to 87
Independent variable	
Dependent variable	
Method of Analysis	ORs by two by two tables.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Patients with seasonal admissions came from families that were significantly better off. Patients with seasonal admissions formed a sub-group of children with severe asthma whom had a family history of the condition, less likely to outgrow the condition, more likely to require maintenance with steroid therapy.

Reference	Scheuerman et al (2009) The September epidemic of asthma in Israel. Journal of Asthma. Vol46 p652-655
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 1-2, 3-5, 6-14, 15-20 Sample size: N = 8011, adults = 4091, children = 3920 GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Israel, Jan 2003 to Dec 2005
Independent variable	
Dependent variable	
Method of Analysis	Monthly admission rate retrospectively evaluated in seven hospitals. Chi-square test.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	High rates in September 6% of total admissions especially by school children. High rates in September in adults also, viruses spreading from children to adults.

Reference	Silverman et al (2003) Age-related Seasonal patterns of emergency department visits for acute asthma in an urban environment. Annals of Emergency Medicine .Vol42 p577-583
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): <13, 14< Sample size: 274211 ED visits, children only. GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	US 1991-2000
Independent variable	
Dependent variable	Number of ED visits
Method of Analysis	Initially, weekly averages of the number of daily ED visits were computed to remove the effects of day of wk, this procedure also smoothed the data and allowed better visualisation of seasonal trends. The coefficient of variations (CV) of the weekly averages was used to quantify seasonal variation (i.e. measure the weekly swings in asthma visits). Excel and SAS.
Covariates	Day of the week
Results (if included a comparison group, was the effect greater/weaker?)	Seasonal fluctuations of ED visits were highest in children >13rs (coefficient of variation (CV) 37.8% with peak of CV (43.3%) in 7yr olds. Hippocrates described asthma exacerbations as most common in autumn (Adam F Aphorisms In: Adams F translator. The genuine works of Hippocrates, Baltimore, MD: Williams and Wilkins Co 1939. 308

Reference	Van Dole et al (2009) Seasonal patterns in health care and pharmaceutical claims for asthma prescriptions for preschool and school aged children. Annals of Allergy, Asthma and Immunology. Vol102(3) p182-204
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 2-5, 6-12 Sample size: NR GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	US 2002 -2004
Independent variable	
Dependent variable	Number of health care claims.

Method of Analysis	Ecological analysis conducted of data collected from records for children aged 2-12 years from 2002 -2004 from an automated research database of insurance claims from a large US health care plan. Seasonal patterns for health care use, estimates of prescription asthma controller and reliever use were determined for children. Rates constructed per wk + annual rates. Poisson regression models analysed data.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	ED and outpatient visits and hospitalisations were lowest during the summer; rates increased beginning of September, peaked in October, November. Asthma controller and reliever medication claims increased beginning of September, peaking in December. Rates were also high in February. Data suggest that children who reduce their asthma medications during the summer do not resume taking medications until signs or symptoms of asthma worsen. Summer hiatus and other factors may contribute to seasonal increases in health care use, and asthma medication prescription particularly in the fall.

Reference	Xirasagar et al (2006) Seasonality of pediatric admissions: the role of climate and environmental factors. European Journal of Paediatrics. Vol165 p747-752
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s):0-1, 2-5, 6-14 Sample size: 27,275 hospitalisations GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Taiwan 1998 to 2001
Independent variable	PM_{10}, NO_2, O_3, CO, SO_2, temperature, humidity, pressure, rainfall, sunshine.
Dependent variable	Number of admissions
Method of Analysis	Spearman's Correlations, ARIMA
Covariates	Time trends
Results (if included a comparison group, was the effect greater/weaker?)	One of the main findings is that seasonality varies by age.Children older than 2, rates lowest in January-February, highest in November, trough in June-July. Pre-schoolers: rates lowest in June-July, highest in November, 2 upsurges in August and March. School goers: rates lowest in June-August, upsurges in March and September. For school-goers, all air pollutants except NO_2 and CO, and all climatic factors except rainfall are significant. PM_{10}, SO_2, O_3, Pressure = positive association Sunshine, humidity, temperature = negative association

Reference	Yeh et al (2007) Increasing the hospitalisation of asthma in children not in adults – from a national survey in Taiwan 1996-2002. Pediatric Allergy and Immunology. Vol19 p13-19
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-18 Sample size: average annual number of admissions = 31,295 among 25,041 persons GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Taiwan 1996-2002
Independent variable	
Dependent variable	
Method of Analysis	National Health Insurance introduced in Taiwan in 1995. NHI data used to investigate admission rates, length of stay, cost, and readmission rate with primary diagnosis of asthma. Annual incidence of asthma used age-matched census population as the denominator. The change of differences among continuous variables was measured by a trend test. The difference in annual incidence among different age groups and the difference in seasonal distribution were measured with a chi-squared test. P< 0.05 indicated statistical significance.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Autumn was the most frequent admission season. Another peak in March April, authors speculate this could be related to high humidity during 2 seasons or to introduction back to school, viral infection or to poor adherence to medication during the holiday because symptoms seem less severe when children are not exposed to other children. Pollen not a factor leading to seasonal variation in Taiwan.

A2. Search Strategy to Review Current Literature investigating the Associations between School Exposures and Childhood Asthma Exacerbation resulting in Medical Contact

Inclusion and Exclusion Criteria, Critical Appraisal and Data extraction referenced in Appendix A1.

A2.1. School Databases and Search Terms

Searches were performed using Medline, CINAHL, Web of Science, EMBASE, and Google scholar. Searches performed in June 2009.

In the preliminary search, the terms "asthma", "child*", "pediatric", paediatric" and "admi*", "present", "attend*", "family physician", "general prac*", "hospital*", "diar" and "out of hours"; "school*" were included using the Boolean terms "and or "or". The term "school" was search for as in the title.

Table A .6: Search School Medline.

	Search Terms	Results
1	asthma/ asthma.mp.	106398
2	Child*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]	1537841
3	Adolescent/ or Pediatrics/ or Child/ or paediatric.mp.	1173793
4	2 or 3	1554048
5	(admission or admit*).mp. [mp=title, original title, abstract, name of substance word, subject heading word]	1180296
6	Present.mp. [mp=title, original title, abstract, name of substance word, subject heading word]	2027169
7	Attend*mp. [mp=title, original title, abstract, name of substance word, subject heading word]	83790
8	Hospital department/ or Medical Records department hospital/ or hospital*.mp. or Emergency Service, hospital	828617
9	general prac*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]	50499
10	family physician*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]	15487
11	Out of hours. Mp	705
12	Diar*.mp.	85245
13	5 or 6 or 7 or 8 or 9 or 10 or 11or 12	3679686
14	"School*".m_titl	60518
15	1 and 4 and 13 and 14	252
16	Limit 15 to (English language and humans)	228

Table A. 7. Search School CINAHL.

	Search Terms	Results
1	(ZU "asthma")	15496
2	Child*	227400
3	Paediatric	4535
4	Pediatric	34526
5	2 or 3 or 4	235305
6	Admi*	225490
7	Present*	126127
8	attend*	34546
9	Hospital*	148249
10	General prac*	7413
11	family physician	520
12	Diar*	11426
13	Out of hours	257
14	6 or 7 or 8 or 9 or 10 or 11 or 12 or 13	509482
15	School*	52636

16	1 and 5 and 14 and 15	306

Table A. 8: Search School EMBASE.

	Search Terms	Results
1	Mild Persistent Asthma/ or asthma.mp. or Moderate Persistent Asthma/ or Exercise Induced Asthma/ or Nocturnal Asthma/ or Asthma/ or Allergic Asthma/ or Severe Persistent Asthma/ or Mild Intermittent Asthma/	67426
2	Child*.mp	511952
3	Paediatric/ or pediatric/ or paediatric.mp	28502
4	2 or 3	519616
5	(admission or admit*).mp. [mp=title, original title, abstract, name of substance word, subject heading word]	606071
6	Present*mp. [mp=title, original title, abstract, name of substance word, subject heading word]	1153189
7	Attend*mp. [mp=title, original title, abstract, name of substance word, subject heading word]	367849
8	hospital*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]	392782
9	general practice/ or General Practitioner/	38662
10	family physician*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]	5026
11	Out of hours. Mp.	488
12	Diar*.mp.	80096
13	5 or 6 or 7 or 8 or 9 or 10 or 11 o 12	1736755
14	School*m.titl.	14623
15	1 and 4 and 13 and 14	87
17	Limit 15 to (English language and Human)	78

Table A. 9: Search School Web of Science.

	Search Terms	Results
1	TS = (asthma)	92692
2	TS = (child*)	>100000
3	TS = (paediatric)	21569
4	TS=(pediatric)	>100000
5	#2 OR #3 OR #4	>100000
6	TS=(admi*)	>100000
7	TS = (present*)	>100000
8	TS = (attend*)	>100000
9	TS = (hospital*)	>100000
10	TS = (general pract*)	93490
11	TS = (family physician)	7136
12	TS = (Out of hours)	>100000
13	TS = (diar*)	91007
14	#6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12OR 13	>100000
15	TI=(school*)	>100000
16	#1 AND #5 AND #14 AND #15	354

A2.2. Search Results

These are the results from the second search.

- Medline: 228 titles - 17 abstracts - 15 studies selected for further reading
- CINAHL: 306 titles - 0 abstract - 0 study selected for further reading
- EMBASE: 78 titles - 12 abstracts - 9 studies selected for further reading
- Web of Science: 354 titles – 15 abstracts – 15 studies selected for further reading

A2.1. School Mini Data Extraction

Reference	Grech et al (2002) Seasonal variations in hospital admissions for asthma in Malta. Journal of Asthma. Vol39(9) p293-283
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): >1, 1-4, 5-9, 10-14, 15-19 and adults Sample size: 2916 GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Malta 1994-98
Independent variable	Temperature

Dependent variable	Daily counts of hospital admissions
Method of Analysis	Age standardised rates for asthma admissions by mean of world standardisation method. Monthly admission rates for asthma calculated as percentage variation. Poisson method used to calculate CI 95%. Natural log transformation used in model. Possible associations with temperature tested with spearman's rank.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Peaks in January and trough in August. Seasonality in asthma admissions more pronounced in children than adults. School children, end of school in June associated with a drop (91%) in admissions, restarting school Oct, was associated with a sharp rise (165%).

Reference	Im and Schneider (2005) Effect of weed pollen on children's hospital admissions for asthma during the fall season. Archives of Environmental & Occupational Health. Vol60(5) p257-265
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-14 Sample size: 17902 visits GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	US 1993-95
Independent variable	Pollutants; O_3, weather; temperature, pollen; weed, ragweed
Dependent variable	Children's daily hospital admissions
Method of Analysis	Children's daily hospital admissions examined for seasonal pattern. 7-day moving average were used to smooth variations in data. Selected the annual peak period in children's asthma hospital admissions as this was the best time to explore the relationships between environmental triggers and daily asthma hospital admissions. Authors examined relationships with independent environmental variables using Pearson cross-correlation analysis. Explored the relationship between the number of asthma hospitalisations and the environmental variables using multiple regressions.
Covariates	Secular trends, meteorological variables
Results (if included a comparison group, was the effect greater/weaker?)	Authors report significant spikes in children's asthma hospital admissions in late Sep and Oct in each of the 3 yrs studied. In depth analysis of the fall peaks, to determine whether there was an association between children asthma admissions and environmental variables. Hospital admissions peaks approximately 3weeks after school started before heating systems were switched on in schools. Authors also preceded (before) the point at which school begins to report increase in absences that are due to infectious illnesses. Weed = highest correlation on L3. Max O_3 was highest in the summer. NO_2 was high in summer, low in winter and fall. Included 3 variables based in results of the exploratory analysis, O_3, weed pollen and ragweed. Initial model explained 34.1% of variance, O_3 itself explained 24.6%. Negative beta coefficient with ozone and ragweed. Final model = only weed pollen.

Reference	Johnston et al (2006) The September epidemic of asthma hospitalisation: school children as disease vectors. Journal of Allergy and Clinical Immunology. Vol117 p557-562
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 2-4, 5-15, 16-49 Sample size: 74361 admissions for asthma for 2 to 4 year olds; 82899 for 5 to 15 years and 99583 for 16 to 49 years. GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Canada 1990-2002
Independent variable	
Dependent variable	
Method of Analysis	Examined the geographic variations in the timing of the fall asthma epidemics and applied mathematical modelling to estimate their exact timing and magnitude in school children, preschoolers, adults in relation to school return. Poisson regression, ANOVA, Student T Test. Computed peaks timings and heights for data aggregated across the study years.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Labor day is the Monday prior to the start of school (Tuesday) in September. September asthma epidemic peak occurred in school age children each year on average 17.7 days after labor day. Similar epidemics of lesser magnitude were obtained in preschool children peaking 1.7 days later and in adults 6.3 days later that school age children. The epidemic peaked 4.2 days earlier in school age children in northernmost compared to southernmost latitudes. Speculate that children transmit agents responsible for the epidemic in adults. In relation to age, epidemic peak occurred earliest in children age 6years, progressively later with decreasing age down to 1 year and increasing until age 18

	years. Magnitude of the peak highest in 5 and 7 yrs old thus 5 to 7 yrs appear to the earliest and most seriously affected by epidemics.

Reference	Johnston et al (2005) The September epidemic of asthma exacerbations in children: a search for etiology. Journal of Allergy and Clinical Immunology. Vol115 p132-138
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 5-15 Sample size: 57 asthmatics, 157 Non-asthmatics GP or Hospital: H
Design (comparison group?)	Case-control
Setting (dates data collected)	Canada April 2001 to March 2002
Independent variable	
Dependent variable	Hospitalisations, questionnaire, nasal secretion collection and microbiological testing.
Method of Analysis	Aim: to find out whether children requiring emergency treatment after school return in September were more likely to have respiratory viruses present and less likely to have prescriptions for control medications those children with equally severe asthma not requiring emergent treatment. Rates of viral detection and characteristic of asthma management in 57 children between 5 to 15 years presenting at ED between 10 to 30 September 2001. Asthmatics were compared with 157 children age-matched volunteers with asthma of comparable severity, studied simultaneously as Non-asthmatics. Probabilities of the observed differences between Asthmatics and non-asthmatics occurring by chance were calculated by using the chi-square statistic.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Respiratory viruses were detected in the majority of children presenting in hospital with asthma during September, less viruses present in the children with asthma in the community and these were more likely to have anti-inflammatory medication. Such medication may reduce the risk of ED treatment/visits in September epidemic.

Reference	Johnston et al (1996) The relationship between upper respiratory infections and hospital admissions for asthma: a time trend analysis. American Journal of Respiratory and Critical Care Medicine. Vol154(3) p654-660
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): school-age Sample size: 108 children GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	UK. 1 year
Independent variable	
Dependent variable	Number of respiratory infections and number of admissions
Method of Analysis	Time trend analysis used to investigate the seasonal patterns of respiratory infection and hospital admissions for asthma in adults and children. 108 children monitored for detection of URTI, LRTI and PEFR were taken. Half-monthly rates of URTI compared to half monthly rates of hospital admissions for asthma. The relationship between URTI, hospital admissions for asthma and school attendances assessed.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Strong correlations were found between the seasonal patterns of upper respiratory infections and hospital asthma admissions. Relationship was observed to be stronger in children than in adults. Upper respiratory infections were more profound in children during periods of school attendance more so than school holidays. School attendance maybe a major factor in respiratory virus infection, = major confounding variable in children.

Reference	Julious et al (2007) Increases in asthma hospital admissions associated with the end of summer vacation for school-age children with asthma in two cities from England and Scotland. Public Health. Vol121 p482-484
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 5 to 16 Sample size: GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	England July 23rd to October 8th for years 1999–2004
Independent variable	
Dependent variable	Weekly total number of medical contacts
Method of Analysis	School age asthmatics, Weekly totals were calculated across the years for 7 days from 23-30 July through to 1st of October. Weekly totals presented graphically. Relative and actual weekly totals. Doncaster data moved 2wks to the left so that the week in September was presented as September the 3rd. Aberdeen and Doncaster presented together on one graph but rescaled to adjust for the higher number of

	admissions in Doncaster.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Study demonstrates peaks in admissions in school age children around the return back to school in 2 (Aberdeen, Doncaster) cities where different school return data were reflected in a 2 wk lag effect. Strong evidence that peaks in admissions are associated with the end of summer holidays.

Reference	Lin S et al (2008) The impact of returning to school on childhood hospital admissions for asthma in New York State. American Journal of Epidemiology. Vol167(11) pS41-S41 abstract161.
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 2–4, 5–11, and 12–17 Sample size: GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	
Independent variable	Daily number of admissions
Dependent variable	
Method of Analysis	Time-series study compared admissions on the first day of school to those on subsequent days in the school session following four school breaks (summer, Christmas, winter, spring). Data included hospital admissions for asthma from 1991–2001 in New York State. A generalized additive model assessed the risk associated with school return among different age groups (2–4, 5–11, and 12–17 years old) while adjusting for long term trends, day of- the-week, holidays, daily ozone level, temperature, and humidity. Adults (18–65 years) and elders (> 65 years) were the comparison groups.
Covariates	long term trends, day of- the-week, holidays, daily ozone level, temperature, and humidity.
Results (if included a comparison group, was the effect greater/weaker?)	Significant increase in asthma admissions (6% - 254%) associated with the return to school after each break for all children. Peak admissions occurred from 17–30 days after the first day of school. Stronger associations were found following summer vacation and for children aged 5–11 years. Smaller or no increases were observed in adults and elders. Returning to school after vacations substantially increases the risk of asthma admissions in children, especially among elementary school children. Intervention focused on the period of return to school may reduce the asthma burden in children.

Reference	Lincoln et al (2006) Childhood asthma and return to school in Sydney, Australia. Public Health. Vol120 p854-862
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 1-4, 5-14 Sample size: 20334 children with asthma 2-4. 13284 children with asthma aged 5 to 14. GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Australia 1994-2000
Independent variable	
Dependent variable	Mean daily number of admissions
Method of Analysis	Generalised additive model with a log-link modelled using penalised regression splines.
Covariates	long term trends, holidays, week days, influenza epidemics
Results (if included a comparison group, was the effect greater/weaker?)	Australian summer is from December to February. Peak in admissions during February. Mean daily admissions for asthma highest in 1-4 in all school periods and weekdays. There is peak in admissions during February. After adjusting for potential confounding, the risk of asthma admission increased to a peak between 2 and 4 wks after the first day of school return in each term and varied from 1.5 to 3 times the risk prior to return to school in both groups. Largest increase in asthma risk occurring in term one after the long summer holiday (5-14). Return to school strongly associated with increased childhood asthma admissions in Australia, particularly after long summer holiday.

Reference	Silverman et al (2005) The relationship of fall school opening and emergency department asthma visits in a large metropolitan area. Archives of Pediatric and Adolescent Medicine. Vol159 p818-823
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): All ages, groups, 2-4, 5-11, 12-17, 22-45 Sample size: 532 826 asthma ED visits among the 4 age groups during the years 1991 to 2002. The number of visits was as follows: age 2 to 4 years=91 496; age 5 to 11 years=133 141; age 12 to 17 years=55 143; and age 22 to 45 years=253 046. GP or Hospital: H
Design (comparison group?)	

Setting (dates data collected)	US 1991-2002
Independent variable	
Dependent variable	Daily number of ED visits.
Method of Analysis	Time series study of daily asthma ED visits taken from administrative claims databases for the years 1991-2002. Outcome: rate of asthma ED visits after the September school opening compared to before opening.
Covariates	Regression model adjusted for day of week variable, year indicators, ozone, temperature and alternative adjustment for other temporal confounding variables. Based on preliminary results, the average 0- and 1 day lagged ozone was included as a linear continuous variable. Temperature modelled non-linearly: natural cubic spline smoothing term of lag 0 day daily mean temperature with 3df to model the immediate temperature effect, as well as a natural cubic spline smoothing term of the average of 2 and 3 day lagged temperature to model the lagged temperature effects. Also included were indicator variables for holidays in the study window.
Results (if included a comparison group, was the effect greater/weaker?)	Asthma ED visits for children aged 5-11 significantly associated with school opening day, highest lagged rate ratio = 1.46. Rate Ratio highest on L4. For 12-17 year old, lag ratio = 1.13, smaller than the younger age group, highest on L6.

Reference	Storr and Lenney (1989) School holidays and admissions with asthma. Archives of disease in Childhood. Vol64 p103-107
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-3, 4-10, 11-16, 0-16 Sample size: GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	UK 1975-1985.
Independent variable	
Dependent variable	Rate of admissions
Method of Analysis	To examine seasonal trends, the rate of admissions with asthma was plotted daily as five day MA. The association with school holidays examined year by year. The pattern linking admissions with asthma to school holidays was first determined by inspection then subjected to statistical analysis. The combined 11 years, mean starting days of holidays and terms graphically presented. To examine the short-term variation in the rate of admissions with asthma, 11 year period was divided into three segments starting on 1st January 1975. A prediction for the number of periods within which asthma admissions had occurred was determined from the Poisson distribution. This was calculated separately for each month of the year to exclude any influence of longer-term trends. In a similar analysis, data were stratified by area of residence into three broad groups: coast, down and other to observe any local influences that may operate in the short term. Short-term influence may include the release of fungal spores and a seas mist or the storm or airborne allergens created by ploughing or harvesting. Significant difference between actual and predicted clustering was determined by the x2 test. To avoid random inflation of significance, an appropriately smaller critical p-value – 0.017 was used. Difference in rates of admission with holiday periods were assessed by the Wilcoxon sign rank test, the suitability of a two peak/term model was tested by least squares regression for longitudinal data and by x2 test for summated data.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Admission rates varied unpredictably over periods of days, but there was a repeated yearly pattern of peaks and troughs with an interval of several weeks. Short-term variation could be attributed to chance effect alone, excluding any important role for short term influences e.g. weather changes- in precipitating asthma admissions. There was a definite association between longer-term variation and school holidays. Admission rates fell during school holidays and there were two or more peaks during the term. Authors postulate that school holidays disrupt the spread of viral infections in the community with synchronisation of subsequent attacks. However, travel in the school holidays may facilitate acquisition of new viral strains.

*Additional studies found in the 2011 search.

Reference	Lin et al (2011) Impact of the return to school on childhood asthma burden in New York State. International Journal of Occupational and Environmental Health. Vol17(1) p9-16
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-17, age groups preschool (2-4), elementary (5-11), middle/high (12-17), college (18-22). Adults (23-65) = control Sample size: 23899 all admissions GP or Hospital: H

Design (comparison group?)	Case-control (adults – control)
Setting (dates data collected)	US 1991-2001
Independent variable	
Dependent variable	Risk of admissions
Method of Analysis	GAM used to assess the risk associated with school return in children compared to adults. Authors developed model exposure parameters to reflect the time from holidays by assigning negative values to school vacations days and positive values for school days. Admissions on the first day of school return were compared to days following. Exceedance admissions and both length of cost of hospital stay estimated. Summer break = June-August Holiday break = 2wks in December/January Winter break = 1wk in Feb Spring break = 1wk in April Analyses were stratified into age, gender, race, ethnicity, geographical region and school demographic characteristics to examine the potential statistical interaction between these factors. Assessed the public health impact of school return after that fall
Covariates	Adjusted for long-term trends, holidays, day of the week and environmental factors such as O_3, temperature and humidity.
Results (if included a comparison group, was the effect greater/weaker?)	A significant increase in admissions was observed (20 to 300%) associated after each school break. Strongest associations were observed following summer break and in children 5-11yrs (after 17 days) followed by preschool (after 19days) then middle/high school children (after 21 days). For adults, observed very small increase in admissions after school holidays. There was no statistically significant interaction between gender, race, ethnicity, student density, geographical region. There was a three-day delay in the average time of peak in admissions in the NYC (18 days peak) compare to upstate (15 days to peak).

A3. Search Strategy to Review Current Literature of the Associations between Pollutant Exposures and Childhood Asthma Exacerbations resulting in Medical Contact

Inclusion and Exclusion Criteria, Critical Appraisal and Data extraction referenced in Appendix A1.

A3.1. Pollution Databases and Search Terms

Searches were performed using Medline, CINAHL, Web of Science, EMBASE, Cochrane and Google scholar. Searches performed in April 2009.

In the search the terms "asthma", "pollution" “nitr*”, sulphur”, “dioxide”, “carbon monoxide”, “particulate matter”, “PM”, “ozone”, "child*", “pediatric”, paediatric” and "admi*", “present*”, “attend*”, “family physician”, “hospital*” “out of hours” “diar” and “general prac*” were included using the Boolean terms “and” or “or”.

Table A. 10: Search Pollution Medline.

	Search Terms	Results
1	asthma/ or asthma.mp	106398
2	Child*.mp. [mp=title, original title, abstract, name of substance word, subject heading	1537841
3	Adolescent/ or Pediatrics/ or Child/ or paediatric.mp.	1173793
4	2 or 3	1554048
5	(admission or admit*).mp. [mp=title, original title, abstract, name of substance word, subject heading word]	1180296
6	Present.mp. [mp=title, original title, abstract, name of substance word, subject heading word]	2027169
7	Attend*mp. [mp=title, original title, abstract, name of substance word, subject heading word]	85442
8	Hospital departments/ or Medical records department/ or hospital*.mp. or Emergency Service or hospital/	828617
9	general prac*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]	50499
10	family physician*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]	15487
11	Out of hours. Mp	705
12	Diar*.mp.	85245
13	5 or 6 or 7 or 8 or 9 or 10 or 11 or 12	3679685
14	Pollution.mp. or air pollution/ or Environmental pollution/ or water pollution	70064
15	Ozone.mp. or Ozone/	10394
16	Nitrogen Dioxide/ or Nitrogen/ or Nitrogen Oxides/ or nitrogen.mp. or Nitrogen Compounds. Or nitr*/	400709
17	Nitrogen Dioxide/ or Carbon Dioxide/ or Sulfur Dioxide/ or dioxide.mp.	105621
18	Sulphur Dioxide/ or Sulfur Compounds/ or Sulfur/ or Air Pollution/ or sulphur.mp.	33387
19	Carbon monoxide/	21349
20	Particulate matter.mp. or Particulate matter/	47237
21	Air pollutants/ or Particulate Matter/ or PM.mp	54876
22	14 or 15 or 16 or 17 or 18 or 19 or 20 or 21	622096
23	1 and 4 and 13 and 22	1031
24	Limit 23 to (English language and humans)	991

Table A. 11: Search Pollution CINAHL.

	Search Terms	Results
1	(ZU “asthma”)	15496
2	Child*	227400
3	Paediatric	4535
4	Pediatric	34526
5	2 or 3 or 4	235305

6	Admi*	225490
7	Present*	126127
8	attend*	34543
9	Hospital*	148249
10	General prac*	7413
11	family physician	520
12	Diar*	11426
13	Out of hours	257
14	6 or 7 or 8 or 9 or 10 or 11 or 12 or 13	509482
15	Pollut*	6199
16	Nitr*	7891
17	Sulphur	82
18	Dioxide	2371
19	PM	0
20	Particulate Matter	600
21	Carbon Monoxide	1323
22	Ozone	436
23	15 or 16 or 17 or 18 or 19 or 20 or 21 or 23	17141
24	1 and 2 and 14 and 24	157

Table A. 12: Search Pollution Cochrane Library.

	Search Terms	Results
1	Asthma (search all text)	
2	Pollution (search all text)	
3	Child* (search all text)	
4	Admi* (search all text)	
5	1 and 2 and 3 and 4	19
6	Keep 7, 14 and 17	3

Table A. 13: Search Pollution EMBASE.

	Search Terms	Results
1	Mild Persistent Asthma/ or asthma.mp. or Moderate Persistent Asthma/ or Exercise Induced Asthma/ or Nocturnal Asthma/ or Asthma/ or Allergic Asthma/ or Severe Persistent Asthma/ or Mild Intermittent Asthma/	67426
2	Child*.mp	511952
3	Paediatric/ or pediatric/ or paediatric.mp	28502
4	2 or 3	519616
5	(admission or admit*).mp. [mp=title, original title, abstract, name of substance word, subject heading word]	606071
6	Present*mp. [mp=title, original title, abstract, name of substance word, subject heading word]	1153189
7	Attend*mp. [mp=title, original title, abstract, name of substance word, subject heading word]	367889
8	hospital*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]	392782
9	general practice/ or General Practitioner/	38662
10	family physician*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]	5026
11	Out of hours. Mp.	488
12	Diar*.mp.	80096
13	5 or 6 or 7 or 8 or 9 or 10 or 11 or 12	1736755
14	Pollution/ or pollut*.mp./ or pollutant/	88167
15	Ozone.mp. or Ozone/	9489
16	Nitrogen Dioxide/ or Nitrogen/ or Nitrogen Oxides/ or nitrogen.mp. or Nitrogen Compounds. Or nitr*/	253567
17	dioxide.mp. or oxide	62757
18	Sulfur/ sulphur.mp.	10159
19	Carbon monoxide/	11774
20	Particulate matter.mp. or Particulate matter/	6920
21	Air pollutants/ or Particulate Matter/ or PM.mp	45785
22	14 or 15 or 16 or 17 or 18 or 19 or 20 or 21	410770
23	1 and 4 and 13 and 22	626
24	Limit 22 to (English language and Human)	541

Table A. 14: Search Pollution Web of Science.

	Search Terms	Results
1	TS = (asthma)	92692
2	TS = (child*)	>100000
3	TS = (paediatric)	21569
4	TS=(pediatric)	>100000
5	#2 OR #3 OR #4	>100000
6	TS=(admi*)	>100000
7	TS = (present*)	>100000
8	TS=(attend*)	>100000
9	TS = (hospital*)	>100000
10	TS = (general pract*)	93490
11	TS = (family physician)	7136
12	TS = (Out of hours)	>100000
13	TS = (diar*)	91007
14	#6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13	>100000
15	TI = (pollut*)	54363
16	TI = (nitr*)	>100000
17	TI = (sulphur)	8424
18	TI = (dioxide)	59489
19	TI = (ozone)	26067
20	TI = (particulate matter)	4896
21	TI = (PM)	10617
22	TI = (carbon monoxide)	17915
23	#15 OR #16 OR #17 OR #18 OR #19 OR #20 OR #21 OR #22	>100000
24	#1 AND #5 AND #14 AND #23	435

A3.2. Search Results

These results are produced from the second search

- Medline: 991 titles - 30 abstracts - 24 studies selected for further reading
- CINAHL: 157 titles - 14 abstracts - 9 studies selected for further reading
- Cochrane: 3 titles - 3 abstracts - 0 selected for further reading
- EMBASE: 541 titles - 10 abstracts - 7 studies selected for further reading

Web of Science: 435 titles - 158 abstracts - 68 studies selected for further reading

A3.3. Pollution Mini Data Extraction

Reference	Abe et al (2008) The relationship of short-term air pollution and weather to ED visits for asthma in Japan. American Journal of Emergency Medicine. Vol27 p153-59
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-15 and adults Sample size: 781 children GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Tokyo January 1 to December 31, 2005
Independent variable	Meteorological data included minimum temperature, maximum barometric pressure, maximum relative humidity, and precipitation. Measured air pollutants included sulphur dioxide, nitrogen monoxide, nitrogen oxides, suspended particulate matter, and carbon monoxide. ARIMA
Dependent variable	Asthma exacerbation requiring emergency transport
Method of Analysis	Time series analysis using multivariable-adjusted autoregressive integrated moving average model. The 4 seasons in Tokyo were defined by the Japanese meteorological classification: spring (March through May), summer (June through August), autumn (September through November), and winter (December through February).
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Among children, there were no significant associations between exacerbation of asthmas requiring emergency transport and air pollutants or meteorological factors. The highest number of transports was found on October 11, the day after the National Sports Day in Japan.

Reference	Andersen et al (2008) Size distribution and total number concentration of ultrafine and accumulation mode particles and hospital admissions in children and the elderly in Copenhagen, Denmark. Occupational and Environmental Medicine. Vol65 p458-466
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 5-18 and elderly adults Sample size: mean* number of days = 4071 children with asthma GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Denmark May 2001 to Dec 2004.
Independent variable	PM_{10}, $PM_{2.5}$ and ambient gasses (CO, NO_2, NOx, O_3).
Dependent variable	
Method of Analysis	Andersen et al studied the association between urban background levels of the total number concentration of particles (NCtot, 6–700 nm in diameter) (15 May 2001 to 31 December 2004) and hospital admissions due to cardiovascular (CVD) and respiratory disease (RD) in the elderly (age >65 years), or due to asthma in children (age 5–18 years). Authors examined these associations in the presence of PM_{10}, $PM_{2.5}$ and ambient gasses (CO, NO_2, NOx, O_3). Authors utilised data one size distribution to calculate NC tot for four modes with median diameters 12, 23, 57 and 212 nm, and NC100 (number concentration of particles ,100 nm in diameter) and examined their associations with health outcomes. Time series Poisson generalised additive model adjusted for overdispersion, season, day of the week, public holidays, school holidays, influenza, pollen and meteorology, with up to 5 days' lagged exposure.
Covariates	Overdispersion, season, day of the week, public holidays, school holidays, influenza, pollen and meteorology, with up to 5 days' lagged exposure.
Results (if included a comparison group, was the effect greater/weaker?)	For paediatric asthma, accumulation mode particles, NC100 and nitrogen oxides (mainly from traffic related sources) were relevant, whereas PM_{10} appeared to have little effect. Results suggest that particle volume/mass from long-range transported air pollution is relevant for CVD and RD admissions in the elderly, and possibly particle numbers from traffic sources for paediatric asthma. No NO_2 significant associations were detected with paediatric asthma but adverse effects of NCtot were stronger than those of PM_{10}. NCa212 was significantly associated with all three outcomes in one-pollutant models and this was robust in the presence of other size fractions (table 4), whereas NCa57 was associated with RD only. The effects of NCa212 on CVD and RD admissions diminished in the presence of PM_{10} but remained robust in the presence of PM_{10} for paediatric asthma. No statistically significant lagged effects.

Reference	Andersen et al (2007) Ambient particle source apportionment and daily hospital admissions among children and elderly in Copenhagen. Journal of Exposure Science and Environmental Epidemiology. Vol17(7) p625-636
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 5-18 Sample size: number of days times mean number of admissions for asthma = 6576 GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Denmark 1999 to 2004
Independent variable	PM_{10}, CO, NO_2, O_3
Dependent variable	number of days times mean number of admissions for asthma
Method of Analysis	Poisson GAM. Looked at lags until day 5. 6 day average pollutants.
Covariates	Day of the week, season, holidays, influenza epidemics, grass pollen, school holidays and meteorology (temperature and humidity)
Results (if included a comparison group, was the effect greater/weaker?)	O_3 excluded from analyses due to large amounts of excluded data. For asthma, an IQR increase in 5 or 6-day averages was associated with a 7.7% (0.4-15.5) increase in hospital admissions the next day. These associations remain robust in the presence of NO_2 and CO. CO showed a positive correlation with asthma in a single pollutant model (10.4% increase CI 1.8-19.8%) but a much weaker effect in the two-pollutant model. NO_2 showed strong positive effects with asthma in a single pollutant model (12.8%, CI2.9 to 23.5%) but the effect weakened in the presence of PM_{10}. 4 to 5 day delay PM_{10}. 2, 4 and 5 day delay with CO and NO_2. The vehicle source showed the strongest yet non-significant association with asthma admissions, followed by positive association with oil.

Reference	Anderson et al (1998) Air pollution, pollens and daily admissions for asthma in London 1987-92. Thorax. Vol53 p842 848

Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-14, 15-16, 65+. Sample size: number of days time mean number of admissions for asthma = 35022 GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	London, UK. 1987-92
Independent variable	Daily number of admissions
Dependent variable	BS, NO_2, O_3, SO_2, temperature, humidity, grass, birch, oak pollen
Method of Analysis	1st stage: Poisson regression used to estimate RR of daily admissions Last stage: log-linear modelling with Poisson errors Independent effects on individual pollutants and interactions with aeroallergens were explored using two pollutant models and models included pollen. Priori hypothesis was that the exposure pollution had an effect on the same or previous days. Authors also examined the cumulative effects over three days. Season separated into warm (April to Sep) and cold (October to Match). Authors examined the interaction between pollen and pollution.
Covariates	1st stage: seasonal factors, time trends, Calendar effects Last stage: also corrected for overdispersion and autocorrelation
Results (if included a comparison group, was the effect greater/weaker?)	NO_2 significantly associated with 0-14 age group (whole year and warm season suggesting the effect is more apparent in the warm temps). Significant seasonal differences were observed in ozone for 0-14, ozone had negative associations in the whole year especially in the cool season. Suggesting the effect is more apparent in cooler temperatures. General cumulative lags of up to 3 days showed stronger effect than single day lags. In the two-pollutant model, associations were most robust with ozone and least robust with NO_2. There was no evidence that associations with air pollutants were confounded with pollen. There was little evidence of an interaction between pollution and pollen except for the synergy between SO_2 and grass pollen in children. Grass pollen negatively correlated with black smoke. Oak pollen positively related to ozone and NO_2. There is a significant positive effect of birch pollen in the 0–14 and 15–64 age groups, a significant negative effect of grass pollen in the 0–14 age group, and a significant negative effect of oak pollen in the 0–14 and 15–64 age groups. Grass pollen alone on 0-14 = negative effect. Birch pollen alone = positive effect. Grass and O_3 positively correlated. Lag: cumulative lag: All year. NO_2 (3), SO_2 (3) O_3(2) Lag: single lag. All year = NO_2 (2), SO_2(1), Warm season= O_3(0) Lag: warm season. Pollen. Birch(2), Grass(0) Oak(0)

Reference	Atkinson et al (2001) Acute Effects of Particulate Air Pollution on respiratory admissions. American Journal of Respiratory and Critical Care Medicine. Vol164 p1860-1866
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-14, 15+ Sample size: NR GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	8 cities in Europe, Birmingham, Barcelona, London, Milan, the Netherlands (small pop' classed as city), Paris, Rome, Stockholm. Time frame data were collected varies from city to city. 1992 to 1997
Independent variable	Daily 24-h average background concentrations of PM_{10} or total suspended particles (TSP), BS, and sulphur dioxide (SO_2) were used. For ozone (O_3) and carbon monoxide (CO) an 8-h average was used and for nitrogen dioxide (NO_2) the daily maximum 1-h measure
Dependent variable	Daily admissions
Method of Analysis	First, for each time series, a statistical model was constructed that included terms to describe the seasonal patterns in the admissions, their dependence on temperature and humidity, their association with holiday periods and influenza episodes, and finally air pollution measures. Autoregressive log-linear Poisson analysis
Covariates	Holiday periods and influenza episodes, and air pollution measures.
Results (if included a comparison group, was the effect greater/weaker?)	Particle-effect estimates varied substantially between centres. For PM_{10} and PM13, associations ranged from a decrease (-0.9%) in admissions to an increase of 2.8% in admissions. Two pollutant models for children, daily PM_{10} levels were reduced from 1.2% to 0.1% after the inclusion of NO_2 in the city specific models. The inclusion of SO_2 in the models only modified PM_{10} associations in children. Day to day confounding suggests of NO_2 suggests that PM was sourced from the same place as NO_2 i.e. traffic. In second stage of analysis, annual mean levels of NO_2 not associated with the city specific particle effect sizes suggesting that NO_2 has no role in the formation of PM.

Reference	Babin et al (2007) Pediatric patient asthma-related emergency department visits

	and admissions in Washington, DC, from 2001–2004 and associations with air quality, socio-economic status and age group. Environmental Health. Vol6
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 1-4, 5-12, 13-17, 1-17 Sample size: NR GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	US 2001 to 2004
Independent variable	O_3, $PM_{2.5}$, Temperature, pollen, mould.
Dependent variable	
Method of Analysis	Poisson regression
Covariates	Cubic spline used to control for long-term seasonality.
Results (if included a comparison group, was the effect greater/weaker?)	There were two annual peaks in ED admissions for asthma: between September and November and between March and May. Seasonal summer peaks in ozone and $PM_{2.5}$. Associations between paediatric asthma ED visits and outdoor ozone concentrations were significant and strongest for the 5–12 year-old age group (Lag0), for which a 0.01-ppm increase in ozone concentration indicated a mean 3.2% increase in daily ED visits and a mean 8.3% increase in daily ED admissions. However, the 1–4 yr old age group had the highest rate of asthma related ED visits. For 1–17 yr olds, the rates of both asthma-related ED visits and admissions increased logarithmically with the percentage of children living below the poverty threshold, slowing when this percentage exceeded 30%. Observed real increase in RR of asthma ED visits for children living in higher poverty zip codes. Weed pollen and temperature showed statistically significant associations with 5-12 and 1-17 age groups. Significant effects of tree pollen and ambient temperature were also seen for the 5–12 yrs age group. No statistically significant relationship observed with $PM_{2.5}$ and admissions. Lagged associations with the 1-17 age-group and grass pollen. 5-12 age group largest increase, O_3 (lag 4), grass (lag3), tree (Lag2). No statistically significant interactions between exposures identified.

Reference	Babin et al (2008) Medicaid patient asthma-related acute care visits and the associations with O_3 and particulates in Washington DC, 1994-2005. International Journal of Environmental Health Research. Vol18(3) p209-221
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-4, 5-12, 13-20 and adults. Sample size: 9970 visits 0-4, 7841 visits 5-12, 4449 visits 13-20 GP or Hospital: Medicaid service provided
Design (comparison group?)	
Setting (dates data collected)	US Oct 1994 to Nov 2005
Independent variable	O_3, PM_{10}, $PM_{2.5}$, pollen – tree, grass, weed, spores, min and max temperature and average dew point.
Dependent variable	Number of acute visits by Medicaid patients
Method of Analysis	MacFaddens R2 and Bayesian Information Criteria used to model long-term trends. Poisson regression analyses
Covariates	Day of the week, Medicaid eligibility changes, seasonal effects, long term trend curve fitting to control for strong seasonal variations.
Results (if included a comparison group, was the effect greater/weaker?)	For same associations, Poisson output revealed statistically significant associations with age stratified GAC visits and ozone, $PM_{2.5}$, PM_{10}, tree, grass and weed pollen mould, temperature and dew point. The two highest peaks in medical contacts were found from September to November and March to May. $PM_{2.5}$, PM_{10}, O_3 were highest in spring and summer months. Highest visits observe on Monday, Tuesdays lowest on sat and sun. Largest effect observed with O_3 in children 5-12. Significant associations were observed with both O_3 (spring and summer) and $PM_{2.5}$ (all season) and 5-12 year old. No statistically significant associations with other pollutants. No statistically significant association found with 5-12 year olds and pollens (tree, weed) except grass pollen Also looked at difference across different wards and found no statistically significant differences in PM_{10} and $PM_{2.5}$ and acute visits. There were some spatially statistically significant observations made with O_3. In ward 8 (ward with highest Medicaid enrolment), there was statistically significant associations between O_3 and age group 13-20. Looked at interactions between O_3, PM_{10}, $PM_{2.5}$, pollens and spores and found no statistically significant interactions. Whilst poor air quality is related to asthma exacerbations where Medicaid enrolment = high, the strongest associations were not always observed in areas with high medical enrolment.

Reference	Barnett et al (2005) Air pollution and Child Respiratory Health; A case-crossover study in Australia and New Zealand. American Journal of Respiratory and Critical Care. Vol171 p1272-1278
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): >1, 1-4, 5-14 Sample size: NR GP or Hospital: H
Design (comparison group?)	Case crossover
Setting (dates data collected)	5 cities in Australia and 2 in New Zealand. 1998 to 2001
Independent variable	NO_2, SO_2, CO, O_3 $PM_{2.5}$, PM_{10}, light-scattering by nephelometry, O_3
Dependent variable	Daily hospital visits
Method of Analysis	random effects meta-analysis, and the differences (heterogeneity) between cities was quantified using the I-squared statistic. Authors tested whether pollutant effects were dependent on season. Significant effects of pollutants were analysed separately because some pollutants e.g. ozone peak significantly in the warm seasons because of the formation of photochemical smog and these "smogs" impact results. Effect modification: different impacts found in different cities. Reasons for different results include some cities have more pollution than others do; having a larger proportion of children in the population, being hotter or colder. Effect modifiers examined the following: average pollutant levels, number of monitors, temperature and percentage of the population as children.
Covariates	current minus previous day's temperature, relative humidity, pressure, extremes of hot and cold (coldest and warmest 1% of days), day of the week, public holiday, and day after a public holiday.
Results (if included a comparison group, was the effect greater/weaker?)	Multiple pollutant models showed that the results for NO_2 were often independent of other pollutants, although some impacts caused by SO_2 and particles could not be separated from those found for NO_2. Authors found the only differences between cities could be related to climate. To examine whether some of the impacts were interrelated, multi-pollutant models were conducted using a matched case-crossover method, a traditional approach to control for potential confounding in epidemiology. By choosing control days for each subject that are both nearby in time, the effect estimate cannot be confounded by another pollutant (Schwartz J, 2004). Statistically significant increases were found for $PM_{2.5}$, PM_{10}, bsp, NO_2 and SO_2 but not for CO or O_3. The significant association with PM_{10} disappeared after matching on NO_2, indicating that this result could not be separated from NO_2. However, the associations with NO_2 remained after matching on PM_{10}. For respiratory admission in 1-4 years, the effects of PM_{10} and $PM_{2.5}$ (only for Australian cities) became larger when matched with each other, indicating separate effects. Also, the $PM_{2.5}$ and SO_2 impacts could not be separated and may indicate pollution from the same emission source. No significant associations found confounded with temperature, because associations matched to 1C of temperature changed very little compared with the unmatched result. Hence the pollutant impacts are not related to temperature effect but are separate and different impacts. However, both of the associations with PM_{10} increased by approximately 50% when matched on temperature. The largest association found was a 6% increase in asthma admissions for 5 to 14 year olds in relations to a 5.1-ppb increase in 24 hour NO_2. However, different impacts between cities with different climates (impacts higher in warmer climates) and season. No lags reported.

Reference	Bates et al (1990) Asthma attack periodicity: a study of hospital emergency visits in Vancouver. Environmental Research. Vol 51(1) p51-70
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-14 and adults Sample size: 1357ED visits GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Canada July 1984 to Oct 1986
Independent variable	SO_2, NO_2, O_3, aerosol sulphates, temperature, coefficients of haze
Dependent variable	Number of visits
Method of Analysis	Day by day plots. Pearson correlation
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	There was a peak in the number of childhood asthma attendances from the last week of September. Pollution levels dropped over observed period. SO2 L1 day in warm season showed a weak significant association with childhood asthmatics. No other associations found for this age group.

Reference	Burra et al (2009) Social disadvantage, air pollution, and asthma physician visits in Toronto, Canada. Environmental Research. Vol109 p567-574
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 1-17 and adults Sample size: approx 888038 visits GP or Hospital: physician ambulatory visits
Design (comparison group?)	
Setting (dates data collected)	Canada 1992 to 2001
Independent variable	NO_2, SO_2, O_3, $PM_{2.5}$, socioeconomic status
Dependent variable	Daily counts
Method of Analysis	GAM, smooth function to control for seasonality
Covariates	Season, temperature, humidity, pressure, day of week
Results (if included a comparison group, was the effect greater/weaker?)	A socioeconomic gradient in the number of physician visits was observed among children, adults and both sexes. SO_2, NO_2, and $PM_{2.5}$ had positive associations with physician visits. With models including SO_2 and $PM_{2.5}$, RRs for the low socioeconomic group were significantly greater than RRs for the high socioeconomic groups. For male and female children, a statistically significant positive association between asthma visits and SO_2 was observed for the 1-day, 2-day, and 3-day cumulative average exposure (Lag2 = strongest effect). The Q1/Q5 ratio was also significant using the single-day exposure period. A positive association was also observed for $PM_{2.5}$ for the single day and most other exposure periods in quintile one, with a significant difference in the Q1/Q5 risk ratio using the 5-day cumulative average exposure for males and single-day exposure for females. Statistically significant negative relationships between O_3 and asthma visits were observed for both males and females. There were significant positive associations for the 1–4-day (lag1 strongest) cumulative average exposures to NO_2 in both income quintiles, but no significant Q1/Q5 ratios for male or female children.

Reference	Chew et al (1999) Association of ambient air-pollution levels with acute asthma exacerbation among children in Singapore. Allergy. Vol54. p320-329.
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 3-12, 13-21 Sample size: 6000 admissions, 23000 ED GP or Hospital: H
Design (comparison group?)	Case-control
Setting (dates data collected)	Singapore. 1990-94
Independent variable	SO_2, NO_2, TSP, max 1hr average for O_3
Dependent variable	Daily hospital admissions
Method of Analysis	Relationship between independent daily air pollution levels and hospital admissions was initially investigating using Pearson's correlation coefficient, followed by categoric analysis by generalised linear models. Multivariate analysis was built to adjust for putative effects of pollution to those of other confounders (meteorological variables).
Covariates	Meteorological variables, day/wk, ER visits lag1 to remove AC
Results (if included a comparison group, was the effect greater/weaker?)	Positive correlations between levels of each of these pollutants and daily ER visits for asthma observed in 3-12 yr olds but not older. Association with SO_2 and TSP persisted after standardisation for meteorological and temporal effects. Adjusted increase in 2.9 ER visits for every 20ugm3 increase in atmospheric SO_2 levels, 1-day lag was observed on days when levels exceeded 68ugm3. TSP: adjusted increase in 5.80 ER visits for every 20ugm3 increases in its daily atmospheric levels – 1 day lag. Similar results obtained after controlling for autocorrelation by time-series analysis. Analysis on control group found statistically significant correlations but no statistically significant effects in multiple regressions. Effect on asthmatics is stronger than non-asthmatics.

Reference	English et al (1998) Childhood asthma along the United States/Mexico border: hospitalisations and air quality in two California counties. Pan American Journal of Public Health. Vol3(6) p392-399
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): <14 Sample size: NR GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	US/Mexico. 1983-94
Independent variable	O_3 and PM_{10}
Dependent variable	Hospitalisations rates
Method of Analysis	Time trends
Covariates	-
Results (if included a comparison group, was the effect greater/weaker?)	2 locations equal in size share a border with Mexico but differ in social and demographic characteristics. San Diego predominantly white, relatively wealthy whereas Imperial county = agricultural based economy. Imperial county had the

	highest hospitalisation rates in California for non-Hispanic whites and African-Americans, and 2nd highest in Hispanics. San Diego had rates below state average. Over period examined, rates for Imperial county increased 59%, San Diego county decreased by 9%. Max O_3 levels increased 64% in Imperial county, but decreased 46% in San Diego. PM levels 4 times as high in Imperial county than in San-Diego. High rates in Imperial county may be associated with poverty and worsening air conditions.

Reference	**Erbas et al (2005) Air pollution and childhood asthma emergency hospital admissions: Estimating intra-city regional variations. International Journal of Environmental Health Research. Vol15(1) p11-20**
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 1-15 Sample size: 2855 visits GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Australia Jan 2000 to Dec 2001
Independent variable	
Dependent variable	Daily ED presentations
Method of Analysis	Daily ED presentations in children studied in year Jan 2000 to Dec 31st 2001. Estimates of local air pollutant (PM_{10}, NO_2, O_3) levels obtained using simulation modelling techniques. Generalised additive models were used to examine associations between combined local air pollutants and childhood ED presentations adjusting for seasonal variation, day of wk, meteorological variables (Temperature, Humidity).
Covariates	seasonal variation, day of wk, meteorological variables (temperature, Humidity)
Results (if included a comparison group, was the effect greater/weaker?)	Consistent associations between childhood ED presentations and regional concentrations of PM_{10}, strongest association of RR = 1.17 (95% CI 1.05- 1.31) in Melbourne. NO_2 had a negative effect in Inner Melbourne and O_3 were also associated with increased childhood ED presentations but these can vary geographically. Evidence of deviations from linearity, NO_2, PM_{10}, O_3, different lagged associations in different regions.

Reference	Farhat et al (2005) Effect of air pollution on pediatric respiratory emergency room visits and hospital admissions. Brazilian Journal of Medical and Biological Research Vol38 p227-235.
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-13 Sample size: 43,635 ER visits. 6785 admissions, not sure how many asthma related GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Brazil Aug 1997 to Aug 1998
Independent variable	PM_{10}, SO_2, NO_2, ozone, and CO
Dependent variable	
Method of Analysis	Generalized additive Poisson regression models were fitted, controlling for smooth functions of time, temperature and humidity, and an indicator of weekdays.
Covariates	Time, temperature and humidity, and an indicator of weekdays.
Results (if included a comparison group, was the effect greater/weaker?)	All pollutants were negatively correlated with temperature and humidity. NO_2 was positively associated with all outcomes. NO_2 MA = 31.4% increase (95% CI = 7.2-55.7) in hospital admissions due to asthma or bronchiolitis. Air pollutants increased asthma or bronchiolitis hospital admissions and although these effects were not statistically significant, except for NO_2. The inclusion of PM_{10} and SO_2 did not reduce the effect of NO_2.

Reference	Fauroux et al (2001) Ozone: a trigger for hospital pediatric asthma emergency room visits. Pediatric Pulmonology. Vol30 p41-46
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 1-15 with doctors diagnosis of asthma Sample size: 1094 visits GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Paris, Jan 1- Dec 31 1988
Independent variable	black smoke, SO_2, NO_2, O_3
Dependent variable	
Method of Analysis	Multiple linear regressions used taking into account temporal changes and autocorrelation in the data. No of ER visits for acute asthma = outcome. "Core" model structured the association of the daily no of ER visits with all potential confounders. Monthly patterns were controlled for by using 11 dummy variables. To adjust for trend, linear and quadratic prediction equations were examined. After seasonal trends eliminated, short-term effects from influenza pandemics, pollen

	counts, weather temperature and humidity examined. Days of wk and holidays investigated. Significance of contributions on how well the model fitted was assessed using an F-test. After variables had been selected for the core model, residuals of the ER visits plotted against time to check for cyclical and long-term patterns. Next stage involved pollutants and time lags into the model. Lags of 0-3 days for every 1-day measurement, and an average of 2-4 days for evaluation of the effects of prolonged exposure were tests. Final stage: Poisson auto-regressive models allowing for overdispersion and residual correlation applied. Results presented at RR associated with a 100ugm3 increased in air pollutant exposure.
Covariates	Meteorological data (temperature, humidity), influenza epidemics and pollen season, day of the week. Month of the year
Results (if included a comparison group, was the effect greater/weaker?)	A positive statistically significant association was found between daily visits and daily variations of ozone levels (1 day of exposure, RR 1.52 (95% CI 1.06-2.19)) after controlling for monthly and weekly variations, influenza epidemics, pollen exposure, daily mean temperature (2day lag). Found a significant positive association between BS, SO_2, NO_2 and PM13. Found a negative association between temperature and relative humidity. After adjusting for meteorological data, pollen periods, influenza epidemics, and time-related variables, levels of ozone were significantly associated with emergency room visits for asthma with a lag of 1 day (Table 4). The relative risk of emergency room visits for acute asthma 1 day after an increase in ozone of 100 mgm3 was almost 1.52 (CI, 1.06–2.19). Interestingly, positive coefficients were observed for all the pollutants on all 3 lags studied, except for SO_2 at a lag of 2 days. In this small time-series study, the effect of NO_2 on the day of an increase in NO_2 reached almost statistical significance (relative risk of 1.91; CI, 0.97–3.77) Lag: O_3 (L1) other pollutants presented with insignificant lag effects. Borderline associations were also observed for other pollutants which can act synergistically or potentiate the effect of ozone. No seasonal effect on acute asthma.

Reference	Fusco et al (2001) Air Pollution and hospital admissions for respiratory conditions in Rome, Italy. European Respiratory Journal. Vol17(6) p1143-1150
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-14 and adults Sample size: 1.8 daily asthma admissions were recorded among children x 1035 (no of days is study) = 1863* GP or Hospital:
Design (comparison group?)	
Setting (dates data collected)	Italy, 1st Jan 1995 to 31st Oct 1997
Independent variable	NO_2, SO_2, O_3, CO, PM_{10}
Dependent variable	
Method of Analysis	Semi-parametric Poisson regression.
Covariates	Mean temperature, mean humidity, influenza epidemics, and indicator variables for day of the week and holidays.
Results (if included a comparison group, was the effect greater/weaker?)	The effect of NO_2 was stronger on asthma among children (lag 1, 10.7% increase). CO was also associated with asthma (8.2% increase, lag 1). As among the entire population, no effect of particles O_3, or of SO_2 was detected. Moreover, no effect was found at lag 3 or 4 and no significant effect modification by season was detected. Among children, NO_2 and O_3 lost statistical significance when both were present in the same model for all respiratory conditions and asthma.

Reference	Garty et al (1998) Emergency room visits of asthmatic children, relation to air pollution, weather and airborne allergens. Annals of Allergy, asthma and immunology. Vol81(1) p563-570
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 1-18 Sample size: 1076 visits GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Israel. Jan 1st to Dec 31st 1993
Independent variable	Air pollutants (NOx, SO_2), O_3, PM), weather conditions (Temperature, humidity, pressure), selective airborne allergens (Artemisia (daisy), cupressus, Olea, Parietaria (nettle), Poaceae (grass) (pollen as one group), and spores)
Dependent variable	Number of ER visits
Method of Analysis	Data analysis performed in Statistix 3.5 software package. Pearson's analysis was used to establish the correlations (r) between the number of ER visits and each environmental parameters. Multiple correlation coefficients (R) (multiple regression analysis) were used to explain how much of the variance in the ER visits

	could be explained by a given set of environmental parameters. Partial correlations were used to evaluate the contribution of each environmental parameter to the improvement in the estimation of variance in the number of patients. Running means gives a better estimate of the regression relationship at each time period. P values (for F-statistics) were calculated to determine the significance of the regression relationships.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	No significant associations were found between pollen and emergency room visits. ER visits significant correlated positively with concentrations of NOx, SO_2 and with high barometric pressure and negatively correlated with O_3, humidity. Rates of visits were high at the beginning of school year. Correlations between ER visits and environmental triggers increased significantly when the September peak was excluded. When the variables for this month were omitted from annual calculation, the correlation coefficients changed dramatically: ER visits correlated even more strongly with NO_2(r=074), SO_2 (r=0.64) and barometric pressure (r=0.65), not with min temperature (r=-0.45) max temperature (r=-0.41) and O_3 (r=-0.52). PM level fluctuated throughout the year and with no outstanding peaks or troughs and not correlated with asthma morbidity. The dependence of the ER visits of asthmatic children on a combined set of environmental triggers was expressed as the multiple regression coefficient R. The value R for NOx, SO_2 and O_3 was 0.45 meaning that 45% of the variances of the ER visits can be explained by the regression relationships with the combination of NOx, SO_2 and O_3. Correlations of environmental factors significantly increased when September peak was excluded in analysis. 61% variance in ER visits was explained by NOx, SO_2 and O_3 concentrations; 46% by weather parameter and 66% by NOx, SO_2 and barometric pressure; 69% by combination of air pollutants and weather parameters.

Reference	Goldsmith and Abramson (1996) Association between health and air pollution in time-series analysis. Archives of environmental health. Vol51(5) p359-367
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s):<16 Sample size: GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Australia 1989 to 1991
Independent variable	O_3, Particles, NO_2, SO_2, temperature, humidity, pressure
Dependent variable	
Method of Analysis	Poisson regression.
Covariates	Day of the week
Results (if included a comparison group, was the effect greater/weaker?)	The results of the final model accounted for 57% of the variance in admissions. The contribution of pollution with all periodic patterns estimated by Poisson ANOVA was 14% even though no pollutant alone made a significant contribution to explained variance. No autocorrelation present.

Reference	Halonen et al (2008) Urban air pollution and asthma and COPD hospital emergency room visits. Thorax. Vol63 p635-641
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-15 Sample size: 4807 visits GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Helsinki Finland. 1998 to 2004
Independent variable	particulate air pollution, NO_2 and CO
Dependent variable	Number of visits
Method of Analysis	Poisson regression. Generalised additive models. 4hr median number counts for ultrafine particles and nucleation, aitken and accumulation mode particles used as of the rightly skewed distribution of particles. For particulate mass and NO_2 authors used 24hr average concentrations, and for CO and O_3 max 8hr moving average. Lag 0 was defined as the 24hr period from midnight to midnight of the day of the visits and lag1 as the preceding 24hr period and so on lag up to 5 days tested. Basic model was built controlling for time trend, weekdays, general holidays, weather variables and influenza and pollen episodes.
Covariates	time trend, weekdays, general holidays, weather variables and influenza and pollen episodes
Results (if included a comparison group, was the effect greater/weaker?)	Among children, traffic related $PM_{2.5}$ had delayed effects. NO (lag 4), CO (Lag 5), aitken mode (size of particle (0.03 to 0.1) (lag3), accumulation mode (0.1 to .029) (lag 3) associated with asthma visits children. The traffic related $PM_{2.5}$ had a strong and lagged effect (7.8% (95% CI 3.5 to 12.3) at lag 4) on the asthma visits of children. In analysis: the effect of ultrafine particles disappeared when analysed together

	with NO_2 (-0.89% for ultrafine particles at lag 4). Overall, NO_2 was independent of other pollutants. The estimate of the association between CO and asthma visits was reduced when CO was adjusted for NO_2 or ultrafine particles but $PM_{2.5}$ did not confound the association. Correlations of ultrafine particles with NO_2, CO and traffic related $PM_{2.5}$ = moderate to high. Correlations between ozone and other pollutants low, hence not included in two pollutant models. All particle fractions below 250nm and NO_2 and CO were associated with ED visits are lag 3.5days. Traffic related $PM_{2.5}$ had a strong and lagged effect on the asthma visits in children.

Reference	Hirshon et al (2008) Elevated Ambient Zinc Increase Pediatric Asthma morbidity. Environmental Health Perspectives. Vol116 p826-831
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s):0-17 Sample size: The number of day included in the models were 1,813 (no-lag model), 1,819 (1-day lag model) and 1,784 (2-day lag model). Total visits (5416). 3843 visits GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Baltimore, US. Jun to Nov 2002
Independent variable	Zinc (component of $PM_{2.5}$)
Dependent variable	Health care utilisation in children
Method of Analysis	Poisson regression mixed effects regression models used to estimate association. Overdispersion Poisson mixed-effects regression models with a log link were used to estimate the association between zinc and daily counts of urgent health care utilisation. Zinc levels split into tertiles as explanatory analysis revealed a non-linear association between zinc levels and log-number of visits. Random effects for intercept and zinc slopes to account for heterogeneity among ZIP codes including spatial distance from the pollution monitor and demographic variation. Estimated the autocorrelation function (ACF) of model residuals to assess whether observations were independent, given the model because independence between ZIP codes over time is a key assumption of the model.
Covariates	Long-term, seasonal, and daily trends (i.e., weekend/ weekday), weather (temperature, barometric pressure, and precipitation), and other pollutants (nickel, chromium, iron, sulfate, ozone, carbon monoxide, elemental carbon, nitrogen dioxide, iron, and $PM_{2.5}$) were explored as potential confounders
Results (if included a comparison group, was the effect greater/weaker?)	Previous day medium levels of zinc (8.63-20.76ugm3) are associated with risks in paediatric asthma exacerbation 1.23 (95% CI 1.07-1.41) times as higher that those with previous day low levels of zinc (<8.63ng/m3) after accounting for time varying potential confounders. 2 day lag for zinc exposure singly and in conjunction with CO.

Reference	Holmen et al (1997) Frequency of patients with acute asthma in relation to ozone, nitrogen dioxide and other pollutants of ambient air and meteorological observations. International Archives of Occupational and Environmental Health. Vol69 p317-322
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-15, adults also Sample size: 1137 visits from children GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Sweden. Jan 1990 to May 1993
Independent variable	NO_2, SO_2, O_3, Toluene, wind, temperature, humidity, rain
Dependent variable	Number of visits
Method of Analysis	Pearson correlation coefficient was used for the analysis of linear relationship and the t test for testing the differences between groups. ANOVA used for analysing the effect of the independent variables such as meteorological and pollutant data of the frequencies of asthma visits, allowing for the type of data (working days vs. non-working days i.e. sat, sun and bank holidays). Two sided p-values were used P < = 0.05
Covariates	working days vs. non-working days i.e. sat, sun and bank holidays
Results (if included a comparison group, was the effect greater/weaker?)	There were many statistically significant correlations between meteorological parameters and air pollution. There were many causes for these findings. Emission pattern were different in the winter compared to summer owing to temperature differences, road traffic and social life differences. Wind direction also a factor, altering distribution of air pollution. etc Statistically significant effect on asthma visits in children of low temperature and high NO_2 levels. Strong correlations between temperature and air pollution and between levels of ozone and NO_2 made the true relation between asthma, temperature and air pollution hard to evaluate statistically. Children asthma was associated with high NO_2, low O_3 and high temperature. Negative association

	between ozone and asthma in children were lost in the effect of temperature added in the multivariate statistical analysis, indicates that ozone effect is confounded by temperature. No association found with SO_2, wind, humidity, toluene.

Reference	Jalaludin et al (2008) Air pollution and ED visits for asthma in Australian children: a case-crossover analysis. International Archives of Occupational and Environmental Health. Vol81 p967-974
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s):<1, 1-4, 5-9, 10-14 Sample size: 317724 visits GP or Hospital: H
Design (comparison group?)	Case-crossover
Setting (dates data collected)	Sydney, Australia. 1997 to 2001
Independent variable	PM_{10}, $PM_{2.5}$, NO_2, SO_2, CO, O_3
Dependent variable	Number of ED visits
Method of Analysis	Time stratified = divides time into strata and uses remainder of the days in each strata as referent for asthmatics in stratum, calendar month used in strata e.g. a asthmatics on Monday the 1th of April would be compared to another asthmatics on Monday in that month. Case-crossover design (case-crossover increasingly used in epidemiological studies to investigate acute effects of ambient air pollution and obviates – the need to adjust for medium to long term varying covariates as well as autocorrelation) and conditional logistic regression to the model association between air pollutants and ED visits. Estimated RR calculated for an exposure corresponding to the IQR in pollutant level. Authors included same day average temperature, same day relative humidity, daily temperature range, school holidays, public holidays in all models. Authors examined exposure's cumulative lag effects. Lags of strongest single day effect included in 2-pollutant model. Public holiday, same day temperature, a school holiday, day of the week = covariate. Looked at lagged exposure + cumulative lag up t 2 days. Also conducted separate analysis for warm and cool seasons.
Covariates	Public holiday, same day temperature, a school holiday, day of the week
Results (if included a comparison group, was the effect greater/weaker?)	Associations between ambient air pollutants and ED visits were most consistent for all 6 pollutants in 1-4 yrs, for PM and CO in 5-9yrs and for CO in 10-14. Greatest effects were most consistently observed for lag 0 and effects were greater in the warm months for PM, O_3 and NO_2. Correlation between pollutants: particulates highly correlated, O_3 + particulates moderately correlated, NO_2 + all air pollutants moderately correlated. Weak moderate correlation between SO_2 + other pollutants. Authors investigated differences in associations between air pollutants and ED visits in warm and cool months. 1-4yrs, increased ED visits observed for PM_{10}, O_3 and NO_3 in the warm months and CO in the cool months. 5-9yrs, increased ED visits observed for particulates, O_3 and NO_2 in the warm months and CO in the cool months. For all the air pollutants, Authors were more significant associations in the warm months than the cool months. In 2-pollutant models, effects were generally smaller compared to those derived from single pollutant model: 1-4yrs: the particulate effect was reduced when O_3, NO_2, and CO were added to the model. 5-9yrs: particulate effect was reduced when O_3 and CO were added. 5-9yrs: statistically significant associations were observed mainly between particulates, O_3 and CO. 10-14 years: few statistical associations. In two pollutant models, the point estimates for particulates were attenuated when CO, NO_2 and O_3 were added. Lag effect: greatest absolute effects (generally adverse) in all three age groups were seen for same day air pollutants. The likelihood of presenting for asthma on the same day as ozone exposure may be reduced in comparison to other pollutants because ozone does not peak until late in the day in Sydney.

Reference	Ko et al (2007) Effects of air pollution on asthma hospitalisation rates in difference age groups in HK. Clinical and Experimental Allergy Vol37 pp1312-1319
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-14 and adults. Sample size: 69176 hospitalisations for asthma, 23596 children 0-14 GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	HK, Jan to Dec 2005
Independent variable	SO_2, NO_2, O_3, PM_{10}, $PM_{2.5}$ and meteorological variables
Dependent variable	Number of hospitalisations
Method of Analysis	AHPEA method of analysis, generalised additive model using a Poisson distribution with log-link function was used to construct a core model

Covariates	Day of the week, temperature, humidity, holidays, season.
Results (if included a comparison group, was the effect greater/weaker?)	The levels of PM_{10}, $PM_{2.5}$ and NO_2 were significantly higher in the cold season than during the warm season. The RR for each 10 mgm3 increase in NO_2, PM_{10} and $PM_{2.5}$ were higher in the younger age group (0–14 years) when compared with the older age group (15–65 years). However, the elderly aged +65 years appeared to have a shorter number of lag days (best lag) for developing asthma exacerbations that required hospitalization than those aged 15–65 years. RR for age group 0-14: NO_2 (L0-4) 1.039 (1.028-1.051) PM_{10} (L0-5) 1.023 (1.015-1.031) $PM_{2.5}$ (L0-4) 1.024 (1.013-1.034) O_3 (L0-5) 1.039 (1.030-1.048)

Reference	Kuo et al (2002) Respiratory effects of air pollutants among asthmatics in central Taiwan. Archives of Environmental Health. Vol57(3) p194-200
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 13-16 Sample size: 12926 subjects from 8 schools. GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Taiwan 1 year
Independent variable	PM_{10}, O_3, SO_2, NO_2
Dependent variable	Frequency subjects purchased medication and respiratory symptoms recorded by clinic and hospital personnel
Method of Analysis	Data included how frequently subjects purchased medication and respiratory symptoms recorded by clinic and hospital personnel. The monthly hospital admissions for respiratory illness for these asthma sufferers was calculated with the records from the National Insurance Bureau and were based on medication purchases from the hospitals and clinics. Pulmonary function tests were administered to 20% of total population that were selected randomly. Statistical Analysis: SAS/PC+ software used to conduct analysis. Analysis of variance used to compare the QOL of asthmatics based on residential areas. Pearson's correlation coefficient used to demonstrate relationship between asthma prevalence or monthly hospital admissions for respiratory illness and air pollutant levels. Multiple logistic regression showed the correlation between air pollutant levels as prevalence of asthma; adjusted for gender, age, residential area
Covariates	gender, age, residential area
Results (if included a comparison group, was the effect greater/weaker?)	Prevalence of asthma higher was in urban areas that rural. Hospital admissions were higher in winter than summer. Levels of NO_2, SO_2 and PM_{10} were significantly positively correlated with monthly hospital admissions. No consistent correlations found with O_3.

Reference	Lee JT et al (2002) Air pollution and Asthma among children in Seoul, Korea. Epidemiology Vol13(4) p481-484
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): <15 Sample size: 6436 asthma related hospital admissions GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	S Korea. 1st Dec 1997 to 31st Dec 1999
Independent variable	PM_{10}, NO_2, SO_2, O_3, CO.
Dependent variable	Asthma related hospital admissions
Method of Analysis	Calculated relative risks of hospitalisation associated with an IQR increase in pollutant concentrations and applied time series analysis of the counts by means of the generalised additive Poisson model. Loess smoothing applied to remove long-term trend in meteorological and pollution data. AIC used to determine best span for LOESS. Auto-regressive terms also added in the model to remove the serial correlation and residuals. Lag effects investigated also informed by AIC.
Covariates	Temperature, humidity
Results (if included a comparison group, was the effect greater/weaker?)	Levels of PM_{10} decreased over period under investigation. PM_{10} correlated with gaseous pollutants indicating potential confounding of one another. Estimated RR of hospitalisation for asthma was 1.07 (95% CI =1.04-1.11) for PM_{10} (1day lag effect): 1.11 (95% CI+ 1.06-1.17) for SO_2 (2-3 days lag): 1.15 (CI=1.10-1.20) for NO_2: 1.12 (CI=1.07-1.16) for ozone (1 day lag effect): 1.16 (CI=1.10-1.22) for CO (2-3 day lag). Exposure to gaseous air pollutants exacerbates risk of asthma hospitalisation. Control for multi-pollutant models did not change the estimated effect size for O_3 and NO_2.

Reference	Lee SL et al (2006) Association between air pollution and asthma admission

	among children in Hong Kong. Clinical and Experimental Allergy. Vol36. p1138-1146
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): ≤ 18 Sample size: 23663 hospitalisations GP or Hospital:
Design (comparison group?)	
Setting (dates data collected)	Hong Kong. 1997 to 2002
Independent variable	$PM_{2.5}$, PM_{10}, NO_2, O_3, SO_2
Dependent variable	Admission rate for asthma
Method of Analysis	Pearson's correlation was used to determine the correlation between stations for daily concentrations of each air pollutant and so for the correlation between daily concentrations of air pollutants and meteorological variables. Semi parametric Poisson's regression with generalised additive models for adjustment of overdispersion using SAS was used to model the daily counts of asthma admissions. Before adding the air pollutant variables to the model, the effect of temperature and humidity on day of admissions and up to 5 days before admission (L0,L1,L2,L3,L4,L5) were investigated and modelled using minimisation of Akaike's Information Criteria (AIC) and lack of over- or under-fitting in the residual correction for autocorrelation. Both mean daily temperature and relative humidity on the day of admission were selected in the subsequent model as Authors had the best-combined fit. After building the core regression model for temperature and relative humidity related hospital admissions, single pollutant entered into regression and the effects of the pollutant on the day of admissions and previous 5 days were examined. Multi-pollutant models were conducted for pollutants that were significant in single pollutant analysis.
Covariates	yearly trend, temperature, humidity, day of week effect, holiday, influenza admissions and total hospital admissions.
Results (if included a comparison group, was the effect greater/weaker?)	Marked seasonal variation concentrations of PM_{10}, NO_2, O_3. Lowest in warm season. No seasonal fluctuations for SO_2, strong correlations between PM_{10}, $PM_{2.5}$, NO_2, O_3, SO_2. Single pollutant models results, an increase of an IQR in daily mean concentration of PM_{10} = 7.45% lag 4; NO_2, 9.8% Lag 3; $PM_{2.5}$ 6.59% Lag 4; O_3 5.97% Lag 3; SO_2 1,46%, Association between asthma admission with NO_2, PM_{10}, $PM_{2.5}$, O_3 levels remained significant after adjustment for multi-pollutants effect and confounding variables. Increase in asthma admission rate of 5.64% (3.21-8.14) at lag 3 for NO_2, 3.67% (1.52-5.86) at lag 4 for PM_{10}, 3.24% (0.93-5.60) at lag 4 for $PM_{2.5}$ and 2.63% (0.64-4.67) at lag 2 for 03. Effect for SO_2 was lost after adjustment. Ambient levels of PM_{10}, $PM_{2.5}$, NO_2 and O_3 are associated with childhood asthma hospital admissions in HK.

Reference	Lee et al (2006) Effect of air pollution on asthma related hospital admissions for children by socioeconomic status associated with area of residence. Archives of Occupational and environmental health. Vol61(3) p123-130
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-15 Sample size: number of days in study times mean number of admissions =2952 GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Korea 1st of Jan to 31st Dec 2002
Independent variable	SO_2, CO, NO_2, O_3, PM_{10} measured from 27 monitors
Dependent variable	number of admissions
Method of Analysis	Analysed data on air pollution, asthma-related hospital discharge, weather conditions and SES collected from 25 sub regions throughout Seoul. GAM Weather variables are generally non-linearly associated with pollutants so these authors introduced as covariates using a nonparametric method – smoothing.
Covariates	Long term trends, seasonal patterns in pollution, weather conditions and date.
Results (if included a comparison group, was the effect greater/weaker?)	Exposure to IQR increase of PM_{10}, SO_2, NO_2 associated with lower SES. The estimated % increase in hospitalisation for children with asthma = 31% to 29%. SES confounds the relationship between pollutant exposures and childhood asthma hospitalisation rates. PM_{10}, NO_2, SO_2, and O_3 pose greater risk in low SES but no CO. When the pollutant concentration increase by 1 IQR, the estimates RR for O_3 were 1.12 (CI1-1.25), 1.24 (CI1.08-1.43) and 1.32 (CI1.11-1.58) for high, intermediate and low SES groups respectively. The RR for PM_{10}, SO_2, and NO_2, did not show a significant trend like O_3 comparing high and low SES. Results of the 2-pollutant regression model indicated that the estimated risk associated with PM_{10}, NO_2, SO_2 and O_3 were consistent and independent whereas the effect of CO was confounded by the presence of other air pollutants.

Reference	Lierl and Hornung (2003) Relationship of outdoor air quality to pediatric

	asthma exacerbations. Annals of Allergy, Asthma and Immunology. Vol90(1) p1-2
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): NR Sample size: NR GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	US. 1996-97 April to October
Independent variable	PM_{10}, O_3 pollen and spores.
Dependent variable	Number of hospitalisations or ER visits
Method of Analysis	To examine seasonal variation in exposure data, monthly means were plotted. After preliminary analyses, multiple regression models were developed to examine all potential exposure measures as predictors of the number of daily asthma visits. Independent variables entered: pollen counts, fungal counts, PM_{10} as daily average and O_3 concentrations. Variables entered in stepwise fashion. Poisson regression modelled the daily number of asthma visits as a function of air quality data and temporal variables. Poisson regression assumes that after removing the effects of any explanatory variables, the counts follow a Poisson distribution as opposed to a normal distribution as required in the least squares regression. To account for serial correlation, GEE with an autocorrelation structure for the variance-covariance was used. Overdispersion was handled by scaling standard errors up to the magnitude of the overdispersion factor.
Covariates	Seasonal trend
Results (if included a comparison group, was the effect greater/weaker?)	Significant association found between the number of asthma visits and daily pollen counts. Effect for pollen was stronger after 1 day lag. High PM_{10} counts were synergistic with pollen count as a predictor of asthma. Analysis indicated a synergistic effect between two pollutant, exposure response for pollen was moderately high on days when PM_{10} were low and significantly higher on days when PM_{10} was higher than 33units No association for ozone and fungal spores.

Reference	Lin M et al (2002) The influence of ambient coarse particulate matter of asthma hospitalisation in children: Case-crossover and time series analyses. Environmental Health Perspectives. Vol10(6) p575-581
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 6-12 Sample size: 7319 hospitalisations GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	US. 1981 to 93
Independent variable	PM_{10}, $PM_{2.5}$, PM_{10}-2.5, CO, NO_2, SO_2, O_3
Dependent variable	Number of asthma hospitalisations
Method of Analysis	Exposures over periods averaged over 1-7 days used to assess the effects of particulate matter on asthma hospitalisations. Estimated RR of asthma hospitalisation adjusted for daily weather conditions (max and min temperature, humidity) for an incremental exposure corresponding to the IQR in PM. Bi-directional case-crossover and time series analysis. Asthmatics crossover used to compare levels of air pollutant of the time of asthma hospitalisation to a level obtained before or after the event. Gender studied separately. Calculated 1 to 7 day exposure averages ending on the admission date as control period. In method, for time series analysis, generalised additive model was used to estimate the relationship between air pollution and asthma hospitalisation in a non-parametric manner. To account for overdispersion of daily hospital admissions, quasi-likelihood estimation was used. Researchers characterised the appropriate span by minimal autocorrelation in the residuals and examined them by Bartlett's Test.
Covariates	Temperature, humidity, day of the week.
Results (if included a comparison group, was the effect greater/weaker?)	Coarse PM exposure over 5-6 days is significantly associated with asthma hospitalisation in males and females. Magnitude of effect increases with increasing numbers of days of exposure, with estimated RR stabilising at 6days. Bi-directional case-crossover: estimated RR were 1.14 (95% CI1.02-128) for males: 1.18 (1.02-136) for females for an increment of 8.4ugm3 in 6 days average for PM_{10}-2.5. Corresponding estimated RR were 1.10 (males) and 1.18 (females) respectively when using time series analysis. Effect of PM_{10}-2.5 remained positive after adjustment for the effects of gaseous pollutants CO, NO_2, SO_2, O_3. No significant effect found for $PM_{2.5}$ or PM_{10}. RR more pronounced using uni-directional analysis but less consistent, over-estimated the effect when data contained time trends. Minimum and maximum temperature both positively correlated with PM_{10}-2.5

	and PM_{10} and to a lesser degree for $PM_{2.5}$. Relative humidity was negatively correlated with PM_{10}-2.5.

Reference	Lin M et al (2003) Effect of short-term exposure to gaseous pollution on asthma hospitalisation in children: a bi-directional case-crossover analysis. Journal of Epidemiology and Community Health. Vol57 p50-55
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 6-12 (boys n=4629, girls n=2690) Sample size: 7319 hospitalisations GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	US. 1981 to 93
Independent variable	O_3, CO, SO_2, NO_2, PM.
Dependent variable	Asthma hospitalisation
Method of Analysis	Conditional logistic regression models were fitted to the data for boys and girls separately. Exposures averaged over periods ranging from 1-7days were used to assess the effects of gaseous pollutants on asthma hospitalisation. Control periods of 2 wks before and after the admission date were used in the analysis. 1-7 day averages ending on the date 2wks prior to or after the admission date were calculated for each pollutant and matched the case periods. Intervals of 2wks were used to minimise autocorrelation between case and control exposures as well as to control for seasonal effects. Short-term autocorrelation (within past 5-7 days) in air pollution exposures could be concerned with the interval being too short and season trends could not be controlled if the interval is too long. Case crossover analysis requires asthma hospitalisation data to be matched to environmental data before and after asthma admission. Estimated RR for asthma hospitalisation were calculated for an incremental exposure corresponding to the IQR in pollutant levels, adjusted for daily weather conditions and concomitant exposure to PM.
Covariates	Temperature, humidity.
Results (if included a comparison group, was the effect greater/weaker?)	Correlations between pollutants and weather exposures. Gaseous pollutants positively correlated except O_3. Significant acute effect of CO on asthma hospitalisation was found in boys and SO_2 showed significant effects of prolonged exposure in girls. NO_2 was positively associated with asthma admissions in both sexes. Lag time for certain gaseous pollutant effects seemed to be shorter in boys (2-3 days for CO, NO_2) as compared with girls (6-7days with SO_2 and NO_2). Effects of gaseous pollutants on asthma hospitalisation remain after adjustment of PM. NO association between O_3 and asthma hospitalisation rates.

Reference	Lin S et al (2008) Ambient ozone concentration and hospital admissions due to childhood respiratory diseases in New York State 1991-2001. Environmental Research. Vol108 p42-47
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-17 Sample size: 134099 admissions. but 1% admitted for asthma in those 5 to 17 yrs old GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	US. Jan 1st 1991 to 31st Dec 2001
Independent variable	O_3. PM_{10}
Dependent variable	Number of hospitalisations
Method of Analysis	Two stage Bayesian hierarchical model used to assess the exposure-disease relationship within 11 geographic regions. O_3 levels with different single day lags. Analysis: 1st stage - The relationship between O_3 levels and respiratory admissions on subsequent days were examined using the GAM model at various lags ranging from 0-3 days prior to admission. Case-crossover analysis, asthmatics served as their own Non-asthmatics by comparing that exposure on or before the day of admission to the exposure on the same day during control period. Time stratified design was used. Sensitivity analysis used to assess the effects of adjusting for PM_{10} in the GAM and case-crossover design. 2nd stage: pooled estimates from 1st stage were applied to generate a statewide estimate of the association between O_3 and respiratory admissions. These analyses adjusted for PM_{10}, meteorological conditions, day of wk, seasonality, long-term trends and demographic characteristics.
Covariates	Weather, season, temporal trends controlled for in 1st analysis. PM_{10}, meteorological conditions, day of wk, seasonality, long-term trends and demographic characteristics controlled for in 2nd analysis.
Results (if included a comparison group, was the	Of the 5 to 17 year olds, almost 100% of respiratory hospital admissions were asthma. In 5 states, 1st stage: an IQR increase with 2 days lag corresponded with an

effect greater/weaker?)	increase of 1.75% in daily admissions. Increase varied from 2 to 7%. 5 of the 11 regions, positive associations were found between respiratory hospital admissions and ambient O_3 levels 2 days prior to the admission.

Reference	Lin S et al (2004) Childhood asthma hospitalisations and ambient air sulphur dioxide concentrations in Bronx County, New York. Archives of Environmental Health. Vol59(5) p266-275
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-4, 5-10, 11-14 Sample size: 2629 asthmatics, 2236 Non-asthmatics. GP or Hospital: H
Design (comparison group?)	Case-control
Setting (dates data collected)	NY. Jun 1991 – Dec 1993
Independent variable	SO_2
Dependent variable	Number of hospitalisations
Method of Analysis	Daily ambient SO_2 concentrations were categorised into quartiles of both average and max levels and various exposure windows (i.e. day of admission, 1, 2, 3 day lag).
Covariates	Race
Results (if included a comparison group, was the effect greater/weaker?)	Seasonality were present in asthma asthmatics but no significant seasonal fluctuation were observed in non-asthmatics. Asthmatics were exposed to higher daily average concentrations of SO_2 than non-asthmatics. Authors compared the highest exposure quartile with the lowest and ORs were: OR1.66 (same day) 1.90 (1day lag), 2.05 (2day lag), 2.21 (3day lag). There were positive consistent associations between SO_2 and hospitalisations for asthma in children.

Reference	Lin et al (2004) Gaseous Air Pollutants and Asthma Hospitalization of Children with Low Household Income in Vancouver, British Columbia, Canada. American Journal of Epidemiology. Vol 159(3) p294-303
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 6-12 Sample size: 3754 hospitalisations GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Canada 1987 and 1998.
Independent variable	carbon monoxide, sulphur dioxide, nitrogen dioxide, and ozone, socioeconomic status
Dependent variable	
Method of Analysis	GAM quasi-likelihood estimation. locally weighted smoothing functions (LOESS) with default convergence criteria and by using natural cubic splines with a more stringent setting
Covariates	daily maximum and minimum temperatures as well as average relative humidity.
Results (if included a comparison group, was the effect greater/weaker?)	Exposures to NO_2 were found to be significantly positively associated with asthma hospitalization for males in the low socioeconomic group but not in the high socioeconomic group. For females, this same pattern of association was observed for exposures to SO_2. No significantly positive associations were found between CO and O_3 and asthma hospitalization in either low or high socioeconomic groups. The relative risk estimates for males were 1.16 (95 percent CI: 1.06, 1.28) for 1-day NO_2 exposure and 1.18 (95 percent CI: 1.03, 1.34) for 4-day NO_2 exposure. For NO_2, the relative risk estimates for females were 1.17 (95 percent CI: 1.00, 1.37) for a 4-day average and 1.19 (95 percent CI: 1.00, 1.42) for a 6-day average.

Reference	Magas et al (2007) Ambient air pollution and Daily Paediatric Hospitalisations for asthma. Environmental Science and Pollution Research. Vol14(1) p19-23
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-14 Sample size: 1270 hospitalisations GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	US, 2001 to 2003
Independent variable	NO_2, $PM_{2.5}$, O_3
Dependent variable	Number of hospitalisations
Method of Analysis	NO_2 Main effects in chi-square test. Studied other variables i.e. pollen, mould, $PM_{2.5}$ and O_3 (Low concentrations) no significant difference towards children's hospital admissions. Analysis: because time series was used, there may be serially correlated with values subsequent in time dependent on values occurring earlier from a temporal standpoint. The existence of serial correlation violates assumptions of independence among observation and can result in over dispersion. Therefore Authors applied negative binomial regression. In order to test for autocorrelation, after the model was estimated, an x2 test for independence was computed to test

	for association between errors in the current period and the errors in the immediately preceding time period. Autocorrelation did exist in the Oklahoma city data. Thus the number of admissions lagged by 1 day was added to remove this issue.
Covariates	Gender, age, season, temperature, humidity, solar radiation, day of admission
Results (if included a comparison group, was the effect greater/weaker?)	Significant relationship was found between NO_2 hourly measures and total number of hospitalisation. Unadjusted L2=6.12 df=1 p=0.0132. Adjusted L2= 60.63 df=4 p<0.0001 NO_2: df=1: estimate=6.2067: SE=2.8212: Wald 95% CLimits 0.6773-11.7361: p<x2=0.278. No significant findings observed with $PM_{2.5}$ or O_3. Yet, concluded that air pollution were not significant predictors of asthma children hospitalisation.

Reference	Medina et al (1996) Air pollution and doctors house calls, results from the ERPURS system for monitoring the effects of air pollution on public health in greater Paris, France, 1991-1995/ Environmental Research. Vol75 pp73-84
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-14 and adults Sample size: NR, daily count min=0, mean=2, max=11 (no exact dates over four years (n=1581) potentially 3162 visits for children with asthma) GP or Hospital: GP
Design (comparison group?)	
Setting (dates data collected)	Paris 1991 to 95
Independent variable	BS, PM13, SO_2, NO_2, O_3
Dependent variable	Number of Dr's house calls, look at other respiratory conditions other than asthma
Method of Analysis	GAM, Poisson regression fitted as a sum of a nonparametric smooth (LOESS) function. Lag functions up to 5 days
Covariates	Temperature, humidity, season, influenza epidemic, pollen counts, day of the week, holidays
Results (if included a comparison group, was the effect greater/weaker?)	Home visits present a weekly cycle with higher activity during the weekend, holidays, and summer season. Pollutants = seasonal. Asthma visits for 0-14 year olds showed the strongest association with air pollution. An increase in BS from the 5^{th} to the 95^{th} percentile was associated with a RR=1.32 (CI 1.17-1.47). No immediate effects were seen between asthma and ozone. Closer inspection, ozone only had an effect on asthma if min temperature in summer on previous day was higher than 10°C. At 10°C, there is no relationship betweenO_3 and asthma but at 20°C, there is a relationship. Lag 0-3 for BS 24 hour, PM13, SO_2, NO_2, Lag 0 for ozone.

Reference	Magliaretti and Cavallo (2004) Urban Air pollution and asthma in children. Pediatric Pulmonology Vol38 p198-203
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-4, 5-15 Sample size: age matched 1060 asthmatics and 25523 Non-asthmatics GP or Hospital: H
Design (comparison group?)	Case-control
Setting (dates data collected)	Italy 1997-99
Independent variable	NO_2, TSP
Dependent variable	Number of admissions
Method of Analysis	Simple and multiple logistic regression models used. Association between asthma emergency admission and exposure was shown as % or risk modification for a 10ugm3 increment of exposure to each exposure and 95%CI.
Covariates	Controlled for sex and age of patient, season, temperature, humidity, solar radiation, day of admission = principal confounders.
Results (if included a comparison group, was the effect greater/weaker?)	Number of emergency admissions increased significantly with increased exposure to each pollutant: 2.8% (95% CI 0.7-4.9%) and 1.8% (0.3-3.2) for a 10ugm3 increment of exposure to NO_2 and TSP respectively. Two pollutant models, when NO_2 was added with TSP the effect of TSP was removed.

Reference	Mohr et al (2008) Influence of season and temperature on the relationship of elemental carbon air pollution to pediatric asthma emergency room visits. Journal of Asthma. Vol45(10) p936-43
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 2-5, 6-10, 11-17 Sample size: 281763 paediatric ED visits 12836 asthma visits. 268419 Non-asthmatics GP or Hospital: H
Design (comparison group?)	Compared to remaining ED visits
Setting (dates data collected)	US. Jun 1^{st} 2001 to 31 May 2003

Independent variable	Elemental Carbon (EC = component of $PM_{2.5}$), NOx, SO_2, temperature, mould and tree, weed and grass pollen
Dependent variable	Number of ED visits
Method of Analysis	St Louis. Poisson generalised equations using 1-day lag between exposure and ED visits. Evaluated the interaction between EC and temperature examined differences between weekend exposure vs. weekday exposure. Relative risks calculated using 1 SD increase in EC to facilitate comparability across studies. The max daily temperature included in analysis. Missing pollutant data resulted in the exclusion of 39 days from the analysis out of a possible 730 days. Separate models fitted for each season. Using priori assumption of a 1-day lag for air pollutant measurements, this translated into weekend exposure. In addition, previous studies indicate a difference in weekend and weekday exposures hence Mohr et al included a weekend/weekday indicator variable in the model. Poisson regression model with a log link function was fitted for each season using GEE analysis. EC = component of $PM_{2.5}$.
Covariates	controlled for season, weekend exposure, allergens and other pollutants known to exacerbate asthma
Results (if included a comparison group, was the effect greater/weaker?)	The number of ED visits for asthmatics showed seasonal variation not reflected in Non-asthmatics. Observed on average, higher admissions on Sundays and Mondays An interaction effect existed between EC and temperature for 11 to 17 year olds in summer and winter seasons. During the summer, a 0.10 mgm3 increase in EC resulted in a 9.45% increase in asthma ED visits among 11-17 yr olds at median seasonal temperature (86.5F). This risk increases with increasing temperature. During the winter, a 0.10 mgm3 increase in EC in 2.80% increase in asthma ED visits with 11-17 year olds at a median seasonal temperature (43.3F). This risk increased with decreasing temperature. Among 11-17 year olds, daily numbers of asthma ED visits is associated with increased levels of EC at higher temperature in the summer and low temperature in the winter. Adjusted RR and CIs for NOx, SO_2, O_3. In the spring, a 10pbb increase in NOx was associated with a 4% increase in asthma visits (RR1.04 CI 1.01, 1.09) among 2 to 5 year olds and an increase of 5% in ED visits made by all ages (2 to 17) (RR1.05 CI, 1.01 to 1.09). In the fall, a 10pbb increase in NOx was associated with a 7% increase in ED visits made by 6 to 10 year olds (RR1.07, CI 1.04, 1.15). There was also a marginally significant increase in 11 to 17 years. A 10pbb increase in O_3 was associated with a 7% increase in ED visits of all ages (RR1.07, CI 1,01, 1.14). SO_2 not statistically associated with ED visits.

Reference	Moore K et al (2008) Ambient Ozone concentrations cause increased hospitalisations for asthma in children: An 18 year study in southern California. Environmental Health Perspectives Vol 116, p1063-1070
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-19 Sample size: 1719 discharges GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	US 1983 to 2000
Independent variable	O_3, SO_2, NO_2, PM_{10}, CO
Dependent variable	Quarterly hospital discharge rates
Method of Analysis	Used standard association and causal statistical analysis.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	O_3 correlated with PM_{10}. O_3 the only pollutant associated with increased hospital admissions over the study period. Inclusion of a variety of demographic and weather variables accounted for all non O_3 temporal changes in hospitalisations. Time independent, constant effect of ambient levels of O_3 and quarterly hospital discharge rates for asthma.

Reference	Morgan et al (199) Air Pollution and hospital admissions in Sydney, Australia 1990 to 1994. American journal of public health. Vol88 p1761-66
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 1-14 Sample size: 28303 visits (mean number of visits = 15.5 * number of days in study) GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Australia 1990 to 94
Independent variable	O_3, NO_2, PM_{10}
Dependent variable	Quarterly hospital discharge rates
Method of Analysis	Poisson regression models accounting for overdispersion and autocorrelation
Covariates	Meteorological variables, season

Results (if included a comparison group, was the effect greater/weaker?)	An increase in daily max 1hr concentrations of NO_2 from the 10th to 90th percentile = associated with a 5.29% increase in childhood asthma admissions. No significant associations were found between asthma and ozone. No lagged effects observed. The size of effect from NO_2 was slightly larger in multiple pollutant model.

Reference	Nastos et al (2008) Do the maxima of air pollutants coincide with the incidence of childhood asthma exacerbations in Athens, Greece? Global Nest Journal. Vol10(3) p453-460
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-4, 5-14 Sample size: NR GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Greece 1987 to 2000
Independent variable	CO, BS, NOx, SO_2 and O_3
Dependent variable	Monthly mean number of admissions
Method of Analysis	Harmonic analysis of the annual variation of the asthma admissions and the concentrations of the aforementioned ambient air pollutant, using monthly mean values formula used (see paper).
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Analysis performed revealed that there was a pronounced seasonal variation of asthma admissions among Athenian children. Peak in May for school children. Asthma admissions are associated with ambient air pollution at different frequencies. Asthma in the younger age groups 0-4 was strongly associated with winter air pollution whereas school children appeared to be more vulnerable to the exposure of primary air pollutants mainly in late spring. Weather conditions such as sea breeze mainly happen at the late spring or early summer in association with air pollution episodes could affect childhood asthma exacerbation. Younger children show strong relationship between CAA and ambient air pollution during the wintertime – possible interpretation is that the immune system of these pre-school children show a type of hyper-reactivity related to the frequent viral infections developed during the cold period of the year. Increase ambient air pollution exacerbates CAA.

Reference	Neidell MJ (2004) Air pollution, health, and socio-economic status: the effect of outdoor air quality on childhood asthma. Journal of health economics. Vol23. p1209-1236
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s):1-18 Sample size: GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	US 1992 to 1998
Independent variable	PM_{10}, O2, NO_2, CO
Dependent variable	
Method of Analysis	Analysis incorporates changes in population overtime. 1st: to approximate a monthly time-series of pollution at the zip code level, first author calculated the coordinates for the centroid of each zip code in California. 2nd: many monitors were added or removed over the period studied. 3rd: there are many factors that affect how pollutants travel, such as wind, rain, and the size of the pollutant particle, and this may affect how well measures the actual pollution concentration. 4th: while it is crucial to control for multiple pollutants simultaneously, trying to identify the effect of each pollutant can be difficult if pollutants are highly correlated. 5: since monitors tend to exist in more polluted and populated areas, it is important to understand how the characteristics of the population in these areas differ from those that are excluded from the analysis.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Strong pattern was found between asthma and CO, peaks and trough occurring at roughly the same time throughout the entire period. Asthma and O_3 appear negatively correlated, with O_3 peaked in the summer. While at times asthma follows the patterns of PM_{10} and NO_2, the pattern tends not to persist for the entire period. O_3 has a negative effect on admissions, and this applies for ages 6–12. NO_2 and PM_{10} are generally positively correlated with asthma, but NO_2 is only significant for ages 6–12 CO has a significant effect on asthma; if 1998 levels were at the 1992 levels, there would be a 5-14% increase in asthma admissions. Also, households respond to information about pollution with avoidance behaviour, suggesting it is important

	to account for these endogenous responses when measuring the effect of pollution on health. Finally, the effect of pollution is greater for children of lower socio-economic status (SES), indicating that pollution is one potential mechanism by which SES affects health. CO had a positive effect in older children. In terms of the control variables, temperature and precipitation were negatively correlated with asthma. Influenza has a positive although insignificant effect on asthma admissions.

Reference	Norris et al (1999) An association between fine particles and asthma emergency department visits for children in Seattle. Environmental Health Perspectives Vol107(6) p489-493
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-18 Sample size: mean number of visits per day = 1.8. 1.8*486 (no of days in study) = 875 GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	US. 1st Sep 1995 to 31st Dec 1996.
Independent variable	PM, CO, SO_2, NO_2.
Dependent variable	Number of ED visits
Method of Analysis	Semi-parametric poison regression models. ED visits assumed to be precipitated by either the same day air pollution levels or levels up to 4 days before visits. Multi-pollutant models conducted with a 1-day lag. GEE
Covariates	Day of the week, time trends, temperature, dew point.
Results (if included a comparison group, was the effect greater/weaker?)	Significant positive associations were found for PM (lag1) and CO (Lag1), not SO_2, NO_2 and O_3. No difference between the hospitals with high utilisation compared to hospitals with low utilisation.

Reference	Paliatsos et al (2006) Association between ambient air pollution and childhood asthma in Athens, Greece. Fresenius Environmental Bulletin. Vol15(7) p614-618
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-4, 5-14 Sample size: 21463 admissions GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Greece 1984 to 2000
Independent variable	CO, NO, NO_2, SO_2, and O_3
Dependent variable	Daily number of admissions
Method of Analysis	Simple linear stepwise regression analysis increased the linear correlation coefficient and corresponding amount of variance of childhood asthma, explained by air pollution. Associations between monthly admission rates for each age group with air pollutant concentrations were investigated using Pearson's correlation coefficients. Associations between asthma childhood admission rates and monthly mean values of pollutant concentrations assessed using stepwise regression analysis.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Admissions for childhood asthma mainly dependent on black smoke, SO_2, CO. % found 43% in 0-4yrs, 50% for 5-14yrs. Air pollution statistically significant factor on childhood asthma exacerbation Pearson's correlation coefficient 1994-2000 (ug or mgm3) 0-4yrs: BS=0.381: S=2 0.312: CO=0.624: NO_2=0.123: O_3=-0.785. 5-14yrs: BS=0.058: SO_2=<u>0.288</u>: CO=0.159: NO_2=<u>0.362</u>: O_3=-0.188 bold= statistically significant

Reference	Peel et al (2005) Ambient Air Pollution and respiratory Emergency Department visits. Epidemiology. Vol16(2) 164-174
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-1, 2-18, 19< Sample size: 113956 (mean(39) x number of days in study (2922) including adults GP or Hospital: H
Design (comparison group?)	Made comparisons to finger wound group
Setting (dates data collected)	US 1993 to 2000
Independent variable	NO_2, CO, SO_2, PM_{10}, $PM_{2.5}$
Dependent variable	Number of ED visits
Method of Analysis	Poisson generalised estimating equations
Covariates	Long term trends, day/wk, public holiday, hospital entry and exit
Results (if included a comparison group, was the effect greater/weaker?)	Single pollutant models examined 3 day moving averages of pollutants; SD increase of O_3, NO_2, CO and PM_{10} were associated with 1-3% increases URI visits; a 2ugm3 increase of $PM_{2.5}$ organic carbon was associated with a 3% increase in pneumonia

	visits; SD of NO_2 and CO were associated with 2-3% increases in COPD visits. Positive associations persisted 1 wk for asthma. Not sure exact of lags for each pollutant. Exploratory models assessed the lag structure between pollutant levels and ED visits. The risk ratios for asthma visits were generally positive – 5-8 day lags. The association with ozone appeared to have a shorter lag structure with the strongest positive associations at lags 1-2. PM L1-2 procured negative associations whilst L3-4 procured positive associations. Weak or no associations were observed for the finger wound group (control). Age specific analyses: children aged 2 to 18, associations in relation to PM_{10} (RR 1.016 per 10 g/m3; 95% CI 0.998 –1.034), NO_2 (1.027 per 20 ppb; 1.005–1.050), and CO (1.019 per ppm; 1.004 –1.035) stronger than that for adults. Associations for asthma tended to be stronger in the summer especially for ozone and $PM_{2.5}$. Multi-pollutant models, for asthma NO_2 estimates were generally not attenuated in multi-pollutant models whereas estimates for the other pollutant suggested weaker or no associations in the multi-pollutant model. Cumulative lags ((C) 0 to 3) compared to unconstrained lag (uc) 0 to 13). PM_{10} c=not sign, uc=sign; NO_2 c=not sign, uc=sign; O_3 c=not sign, uc=sign; CO c= not sign, uc=sign; SO_2 c=sign, uc=sign Issues: single pollutant results are likely to be confounded at least in part by correlated pollutants, multi-pollutant models are typically used to address confounding by correlating pollutants but results from multi-pollutant models can be misleading. Pollutants are measured with differing levels of error. A pollutant that exhibits are particularly strong association in the multi-pollutant model may be acting as a surrogate for an unmeasured or poorly measured pollutant.

Reference	Ponka and Virtanen (1996) Asthma and ambient air pollution in Helsinki. Journal of epidemiology and community Health. Vol50(supp1) S59-S62
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-14 and adults Sample size: 961 visits for asthma children GP or Hospital: H
Design (comparison group?)	Case-control
Setting (dates data collected)	Helsinki 1987 to 89
Independent variable	NO_2, SO_2, O_3, TSP.
Dependent variable	
Method of Analysis	Poisson regression taking into account potential confounding factors using the standardised protocol of the APHEA project.
Covariates	Season, day of the week, holidays, temperature, humidity.
Results (if included a comparison group, was the effect greater/weaker?)	Positive associations with admissions were observed for O_3 levels in all children under 14 years, Significant associations were also seen between admissions for digestive tract diseases (control group) and O_3 levels. A rise in temperature was associated with low numbers of admissions due to asthma in the 0-14. This suggests that maybe the modelling was unsatisfactory, or it may be a statistical coincidence. A rise in temperature was associated with a low number of admissions for asthma among 0-14 year olds and among 15-64 year olds, whereas humidity did not have a significant effect on the number of admissions. Current day effects for O_3.

Reference	Ponka A (1991) Asthma and low level air pollution in Helsinki. Archives of Environmental Health. Vol46(5) p262-270
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-14 and adults Sample size:1359 children admissions GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Finland 1987 to 1989
Independent variable	SO_2, NO_2, NO, CO, TSP, O_3.
Dependent variable	Number of admissions
Method of Analysis	Correlations and partial correlations accounting for temp. Temperature standardised because it was strongly associated with frequency of asthma attacks. Correlations also calculated for one and two day lag. Multiple regression results reported for all admissions including adults.
Covariates	Temperature
Results (if included a comparison group, was the effect greater/weaker?)	Correlation Children, only O_3, CO correlated with admissions $p<.05$.

Reference	Romieu et al (1995) Effect of Urban Air pollutants on emergency visits for childhood asthma in Mexico City. American Journal of Epidemiology. Vol141(6) p546-553
Sample (age range (age groups)	Age group(s): 0-16

and size, data source Hospital or GP)	Sample size: 15698 total visits, 395 asthma visits GP or Hospital: H
Design (comparison group?)	3 groups: asthmatics, respiratory related visits, total visits.
Setting (dates data collected)	Mexico. Jan to Jun 1990
Independent variable	SO_2, NO_2, O_3
Dependent variable	Number of emergency visits
Method of Analysis	Poisson regression
Covariates	Weekdays-weekend, month.
Results (if included a comparison group, was the effect greater/weaker?)	Ozone and sulphur dioxide significant associated with number of emergency visits to for asthma. Exposure to high levels of ozone (>110ppb) for 2 consecutive days is associated with an increase the number of emergency visits by 68 per cent. O_3 correlated positively with levels of NO_2.

Reference	Rosas et al (1998) Analysis of the relationship between environmental factors (aeroallergens, air pollution, and weather) and asthma emergency admissions to a hospital in Mexico city. Allergy. Vol53 p394-401
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): Sample size: 903 admissions GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Mexico. 1991
Independent variable	NO_2, SO_2, O_3, PM_{10}, TSP, temperature and humidity, spores and pollen
Dependent variable	Number of emergency admissions
Method of Analysis	Generalised linear models were fitted with Poisson distribution.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Asthma in Mexico had a seasonal pattern with more admissions during the wet season (may to October) than dry season (November to April). Larger proportion of paediatric asthmatics presented from July to November. Amongst their findings, grass pollen was associated with child admissions in both wet (humid) and dry seasons. Based on biological grounds, variables have a short-term effect. Analysis suggests response to environmental triggers may have been delayed or have accumulated overtime – 1 to 2 days (do not know what variables this lag applies to). Wet season model explained 35% of the variance whilst the dry season model explained 18% of the variance. For children, the best model for the wet season included grass, with positive effects of ascospores and negative effects from temperature and rainfall. In the dry season, the best model had dueteromycetes as the major factor with grass pollen. The lag could be the consequence of a sensitisation period, or the time it takes for symptoms to increase or could partly be due to a delay in the patients seeking medical advice. Pollen had an increased effect in the wet season. There was no evidence to support association between air pollution and asthma admissions. Weather not generally associated with asthma admissions except wet season when there were lower daytime temperatures. Weather could be indirectly associated with asthma in that in the dry season, conditions generally promote the release of airborne pollen. Wet seasons, high humidity and rain often associated with the development of fungi-aeroallergens. In conclusion, results suggest the aeroallergens may be statistically associated more strongly with asthma hospital admissions than air pollutants and can confound results in epidemiological studies

Reference	Sunyer et al (2003) Respiratory effects of sulphur dioxide: a hierarchical multicity analysis in the APHEA 2 study. Occupational and Environmental Medicine. Vol60(8) p1-3
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-14, 15+ Sample size: NR GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	London, Milan, Paris, Rome, Stockholm, and Netherlands for varying durations of time between 1988 and 1997
Independent variable	SO_2, PM_{10}, CO
Dependent variable	Number of admissions
Method of Analysis	Time series of daily counts of hospital emergency admissions were constructed for asthma at 0-14 and 15-64 years. COPD and asthma and all respiratory admissions at ages 64+. Two stage hierarchical modelling approach used. First, generalised additive model Poisson regression models used to fit each city controlling for weather and season. Second stage, the results were combined using a meta regression analysis.
Covariates	Day/wk, public, holidays, outbreaks of respiratory infection, age, gender,

	temperature, humidity
Results (if included a comparison group, was the effect greater/weaker?)	Effect modification among cities by levels of other air pollutants or temperature not found. SO_2 increase of 10ugm3 the daily admissions for asthma in children increased by 1.3%. The SO_2 effect disappeared after controlling for PM_{10} of CO but the correlation among these pollutants was v high. Depleted effect in conjunction with other pollutants. The high correlation between SO_2, PM_{10} and CO did not allow the effects of these pollutants to be separated in the multi-pollutant regression model.

Reference	Sunyer et al (1997) Urban air pollution and emergency admissions for asthma in four European cities: the APHEA Project. Thorax. Vol52 p760–765
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-14, 15+ Sample size: NR GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Four cities; Helsinki, Paris, Barcelona, London. 1886-92
Independent variable	NO_2, SO_2, BS, O_3
Dependent variable	Number of admissions
Method of Analysis	As previous study
Covariates	Day/wk, public, holidays, outbreaks of respiratory infection, age, gender
Results (if included a comparison group, was the effect greater/weaker?)	In children, daily admissions increased significantly with SO_2 (RR 1.075, 95% CI 1.026 to 1.126) and non-significantly with black smoke (RR 1.030, 95% CI 0.979 to 1.084) and NO_2, though the latter only in cold seasons (RR 1.080, 95% CI 1.025 to 1.140). No association was observed for O_3. The associations between asthma admissions and NO_2 in adults and SO_2 in children were independent of black smoke.

Reference	Szyszkowicz et al (2008) Ambient Air Pollution and daily ED visits for asthma in Edmonton, Canada. International Journal of Occupational Medicine and Environmental Health. Vol21(1) p25- 30.
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s):0-10 and adults Sample size: 18,891 visits 0-10 years of age GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Canada 1992 to 2002
Independent variable	CO, NO_2, SO_2, O_3, PM_{10}, $PM_{2.5}$.
Dependent variable	
Method of Analysis	GLM
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	For only 0-10 year old patients, higher proportion of visits made in September and on Sundays. Largest effects: A % increase in daily ED visits for asthma was 17.8 (CI 7.1-29.5) and 13.8 (CI 3.3-25.3) for females below 10 for current day O_3 and L1 O_3 respectively in warm season (April to September). The % increase was 19.2 (CI 11.4-27.6) for males <10 for L2 NO_2 in warm season. Statistically significant associations found. CO, NO_2, PM_{10} statistically significant after L2 and stronger in warm season. Current day and L1 O_3 associated with ED visits.

Reference	Tecer et al (2008) Particulate Matter ($PM_{2.5}$, PM_{10}-2.5) and PM_{10}) and children's hospital admissions for asthma and respiratory disease: a bi-directional case-crossover study. Journal of Toxicology and environmental health part A current issues. Vol71(8) p512-520
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-14 Sample size: 2779 all respiratory admissions. 187 asthmatic, 463 asthmatic with allergic rhinitis GP or Hospital: H
Design (comparison group?)	Bi-directional case crossover.
Setting (dates data collected)	Turkey Dec 2004 to Oct 2005
Independent variable	PM_{10}, $PM_{2.5}$, PM_{10}-2.5
Dependent variable	
Method of Analysis	Bi-directional case-crossover design was used to calculate ORs for admission rates adjusted for daily meteorological parameters. Studied lags up to 4 days pervious. Levels of PM on the day of the event were compared to levels before and after. Control periods selected two weeks before and after. Logistic regression
Covariates	Meteorological parameters, season
Results (if included a comparison group, was the effect greater/weaker?)	Significant increases were observed in hospital admissions in children for asthma. All fraction of PM in children showed significant positive associations with asthma admissions. The highest association noted 18% rise in asthma admissions

	correlated with a 10ugm3 increase in PM_{10}-2.5 on the same day of admission. Adjusted OR for exposure to $PM_{2.5}$ with and increment of 10mugm3 were 1.15 for asthma. PM_{10} had significant effects on hospital admissions for all outcomes including asthma. Greater effect of fine and coarse PM on admissions rather than PM_{10}.

Reference	Tolbert et al (2000) Air Quality and Pediatric Emergency Room Visits for asthma in Atlanta, Georgia. American Journal of Epidemiology. Vol151(8) p798-810
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-16 Sample size: 6000 visits out of 13000 visits (remainder used as Non-asthmatics) GP or Hospital: H
Design (comparison group?)	Case control
Setting (dates data collected)	US. 1993 to 95
Independent variable	pollen, mould, PM_{10}, NO_2, O_3, temperature, wind speed
Dependent variable	Number of visits
Method of Analysis	Spatio-temporal investigation. ArcInfo. Generalised estimating equations, logistic regression and Bayesian models were fitted to the data. Logistic regression compared estimating exposures of asthma asthmatics to those with non-asthma patients, controlling for temporal and demographic covariates and using residential zip code to link patients to spatially resolved ozone levels. GEE includes autocorrelation. Based on similar studies, 1-day lag applied to each pollutant and meteorological variable.
Covariates	Temporal (day of the week, year, and demographic (age and race)
Results (if included a comparison group, was the effect greater/weaker?)	Demographic distributions exhibited expected patterns: relative to the non-asthma asthmatics, the asthma asthmatics had higher proportions of males, higher proportions of African Americans, and higher proportions of patients using Medicaid. Higher number of admissions on weekend compared to weekday. Estimated RR per 20 parts per billion (ppb) increase in the max 8hr ozone levels was 1.04 ($p<0.05$). Estimated RR for PM_{10} was 1.04 per 15ugm3. Exposure response trends ($p<0.01$) were observed for ozone (>100ppb vs <50ppb OR1.23 $p<0.003$) and PM_{10} (<60ugm3 vs 20ugm3 OR 1.26 $p<0.004$). In models with ozone and PM_{10}, both terms became non-significant because of collinearity (indicates a set of points on a single straight line) the variables (r-0.75). PM_{10}=L1, O_3=L0. Multivariate analysis showed that temperature and ozone had independent associations with associations with asthma visits but elevated temperature also prohibits the formation of O_3. Positive association between ED visits and ozone as a single exposure or with temperature. Same with PM_{10}.

Reference	Thompson et al (2001) Acute asthma exacerbations and air pollutants in children living in Belfast, Northern Ireland. Archives of Environmental Health. 56(3) p234-241
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): Sample size: 1095 visits GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	N Ireland. Jan 1993 to Dec 1995
Independent variable	PM_{10}, SO_2, NO_2, NO, oxides of nitrogen, O_3, CO, benzene,
Dependent variable	Number of admissions
Method of Analysis	Spearman's rank correlation coefficient used to provide an initial assessment of the associations between pollution and weather variables and these variables with admissions. Authors removed potential confounding effects of seasonal variation and long-term trends using a parametric approach. Authors fitted cyclic (sine and cosine) terms representing between 1 and 6 cycles in a yr to capture short-term fluctuations. The residuals obtained in these multiple regression analyses of temperature and pollutants were subsequently included as explanatory variables in a Poisson regression analysis. Likelihood-ratios (x2) test used to test significance. Preliminary models fitted incorporating lagging and averaging temperature data current day and up to 3 days before. The main analysis fitted each pollutant separately and temperature was retained in each model even if not significant. Authors were cautious in the interpretation because the correlations between pollutants are high. Results from Poisson regression expressed as RRs.
Covariates	temperature, rainfall
Results (if included a comparison group, was the effect greater/weaker?)	Individually small associations were seen for PM_{10} (RR=1.10), SO_2 (RR=1.09), NO_2 (RR=1.11), NO (RR=1.07) oxides of nitrogen (RR=1.10) CO (RR=1.07). No associations were noted for meteorological factors or ozone and asthma admission. The partial autocorrelation function of the residuals revealed that all autocorrelations at short lags were small suggesting that autocorrelation was not a

	strong feature in the attendance data. Although there was some variation, most pollutants showed the strongest relationship with admissions when authors considered both the current and previous day's measurements (i.e. average of days 0-1) with the exception of O_3. Benzene gave the highest relative risk at this lag time. PM_{10} had a stronger association in the warm compared to the cold season. O_3 had a stronger association in the cold season – contrasts with other reports – ozone, temperature and sunshine.

Reference	Tseng et al (1992) Particulate air pollution and hospitalisations for asthma. Annals of asthma. Vol68(3) p425-432
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): <1. 1-4, 5-14 and adults Sample size: 18948 visits children GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	HK, 1983 to 89
Independent variable	SO_2, O_3, TSP, Respiratory suspended particles (RSP), NO_2, NOx
Dependent variable	
Method of Analysis	Correlation, Stepwise multiple regression
Covariates	Season, annual trend in asthma
Results (if included a comparison group, was the effect greater/weaker?)	Correlations indicate a strong correlation between quarterly mean TSP and hospital discharge rates for 1-4 year children (r=.62 p<.001). In the 5-14, there was an inverse relationship between hospital discharge and rate and SO_2 (r=-38, p<.05). There were no statistically significant relationships between hospitalisation rates and O_3, NO_2, RSP. Stepwise regression confirmed results, highly significant linear regression equation was derived between hospitalisation rates for 1-4 and TSP (p<.001). Combined SO_2 and NOx =inverse relationship with 5-14 not adjusting for covariates.

Reference	Villeneuve et al (2007) Outdoor air pollution and emergency department visits for asthmae among children and adults: A case-crossover study in northern Alberta, Canada Vol6
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 2-4, 5-14 Sample size: 57,912 visits, 20392 = children 2-14 GP or Hospital:
Design (comparison group?)	
Setting (dates data collected)	Canada 1992 and 2002
Independent variable	CO, NO_2, PM_{10}, $PM_{2.5}$, O_3. Mould, pollen
Dependent variable	
Method of Analysis	Odds ratios and their corresponding 95% confidence intervals were estimated using conditional logistic regression with adjustment for temperature, relative humidity and seasonal epidemics of viral related respiratory disease.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	For the most part, there were no statistically significant associations between air pollution levels and ED visits for asthma in the period between October and March (fall/winter). Positive associations for asthma visits with outdoor air pollution levels were observed between April and September. Effects were strongest among young children. Namely, an increase in the interquartile range of the 5-day average for NO_2 and CO levels between April and September was associated with a 50% and 48% increase, respectively, in the number of ED visits among children 2 – 4 years of age ($p < 0.05$). NO_2 and PM_{10} were the pollutants for which the strongest positive associations were observed among children 5–14 years of age. In general, associations were strongest for the air pollution metric constructed using the 5-day average. Association with $PM_{2.5}$ or O_3 observed using 3 or 5-day MA. No association found with SO_2. The addition of aeroallergens to the age-specific model did not produce a material change in the air pollution risk estimates shown.

Reference	White et al (1994) Exacerbation of childhood asthma and ozone pollution on Atlanta. Environmental research. Vol65. Pp 56-68
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 1-16 Sample size: 609 visits GP or Hospital: emergency clinic.
Design (comparison group?)	
Setting (dates data collected)	US Jun 1st to Aug 31st 1990
Independent variable	O_3
Dependent variable	

Method of Analysis	Statistical variability tested using Krustal-wallis. To measure the relationship between O_3 and number of visits, dichotomized days according to max 1hr and 8 hr averages and tested the difference in the average number of visits. After tested for equal variances, authors used a pooled estimate of variance in the calculation of 95% CIs for the difference. Association represented as a rate ratio. Poisson regression. GEE
Covariates	Day of the week, temperature, SO_2, PM_{10} levels on previous day, pollen, humidity,
Results (if included a comparison group, was the effect greater/weaker?)	Boys outnumbered girls 2 to 1. Predominantly black population. The number of visits for asthma was slightly higher on Tuesday and Sunday and lowest on Saturday. Ozone levels highest between 11am and 7pm peaking between 2 and 3pm. Highest levels of Tuesday, lowest on Sunday. Monitoring data indicated that maximum O_3 levels equalled or exceeded 0.11ppm on 6 days during the study. Average number of visits was 37% higher after those six days (from 6pm to 6am the next day) compared to other days.

Reference	Wilson et al (2005) Air pollution, weather, and respiratory emergency room visits in two northern New England cities: an ecological time-series study. Environmental research. Vol92 p312-321
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-14 and adults Sample size: NR GP or Hospital: H
Design (comparison group?)	Control group, gastroenteritis.
Setting (dates data collected)	US 1996 to 2000 Manchester, 1998-2000 Portland
Independent variable	SO_2, O_3, $PM_{2.5}$ (not used)
Dependent variable	
Method of Analysis	Multiple regressions, LOWESS used to remove low frequency variability. The filtering parameter used to remove seasonal variability was selected by minimizing autocorrelation of residuals, reviewing residual plots, and minimizing the Akaike Information Criterion (AIC) (Cakmak et al., 1998). The AIC is essentially a measure of goodness of fit that penalizes for model complexity. It was assumed that the residual variance was proportional to the expected number of ER visits, thus accounting for over and underdispersion of the Poisson distribution. Log-relative risks were estimated using generalized additive models.
Covariates	Seasonality, temperature, humidity
Results (if included a comparison group, was the effect greater/weaker?)	SO_2 levels were highest in the winter. Asthma ER visits experienced pronounced seasonal variation in both cities, with 20–30% fewer admissions in the summer than in the winter in both cities In Portland, elevated levels of SO_2 are associated with significant increases in ER visits for most age groups in both diagnoses. In Manchester, no significant relationships were identified in this analysis. Portland paediatric asthma visits were almost significant with a 7% increase No associations found with control group. Single pollutant models for O_3 also revealed a significant association (Fig. 8). Since O_3 was only collected in the spring–summer months (typically April–September), all models including O_3 are restricted to those months. Limiting the analysis in summer months led to no significant change in relative risk estimates. In Portland, O_3 is associated with a 5% (95% CI 1–10%) increase in asthma ER visits. Portland paediatric asthma visits were almost significant with a 7% (95% CI 2–17%).

Reference	Wong et al (2001) Temporal relationship between air pollution and hospital admissions for asthmatic children in Hong Kong. Clinical and Experimental Allergy. Vol31 p565-569
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-15 Sample size: 1217 admissions GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Hong Kong. 1993 to 94
Independent variable	NO_2, SO_2, PM_{10}
Dependent variable	Number of admissions
Method of Analysis	Poisson regression allowing for overdispersion and autocorrelation was used to determine the percentage change in the mean number of asthma admissions associated with as increase in the pollutant models. The possibility of a lag effect of each pollutant was explored by significance test and plotting residuals against each variable lagged 1.2.3.4 or 5 days as well as cumulative lag calculated as the mean of lags 0 and 1, lags 0-2 and lags 0-3. For each pollutant, the most significant single day and cumulative lag was selected for reporting purposes.
Covariates	Season, meteorological conditions

Results (if included a comparison group, was the effect greater/weaker?)	Mean PM_{10}, NO_2 and SO_2 levels were 44.1ugm3, 43.3ugm3 and 12.2ugm3 respectively. Daily admission rates increased significantly with increased ambient level of NO_2 (RR=1.08 per 10ugm3 increase), SO_2 (RR=1.06) and inhaled particles PM_{10} (RR=1.03). No association was found between hospital admissions and humidity, temperature, atmospheric pressure. Lags: daily admissions increased significantly with increasing ambient levels PM_{10} =L5, NO_2=L0, SO_2=L3

Reference	Xirasagar et al (2005) Seasonality of pediatric admissions: the role of climate and environmental factors. European Journal of Paediatrics. Vol165 p747-752
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s):0-1, 2-5, 6-14 Sample size: 27,275 hospitalisations GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Taiwan 1998 -2001
Independent variable	PM_{10}, NO_2, O_3, CO, SO_2, temperature, humidity, pressure, rainfall, sunshine.
Dependent variable	Number of admissions
Method of Analysis	Spearman's Correlations, ARIMA
Covariates	Time trends
Results (if included a comparison group, was the effect greater/weaker?)	One of the main findings is that seasonality varies by age. >2,: rates lowest in January-February, highest in November, trough in June-July. Pre-schoolers: rates lowest in June-July, highest in November, 2 upsurges in August and March. School goers: rates lowest in June-August, upsurges in March and September For school-goers, all air pollutants except NO_2 and CO, and all climatic factors except rainfall are significant. PM_{10}, SO_2, O_3, Pressure = positive association Sunshine, humidity, temperature = negative association

Reference	Yamazaki et al (2009) Modifying Effect of Age on the Association between Ambient Ozone and Night time Primary Care Visits Due to Asthma Attack. Journal of Epidemiology. Vol19(3) p143-51
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s):0-14 (0-1, 2-5, 6-14) and adults Sample size:308 children, 42 younger than 2, 176 pre-school GP or Hospital: Primary care clinic
Design (comparison group?)	
Setting (dates data collected)	Japan. Sep 2002 to Oct 2003
Independent variable	Data on hourly concentrations of particulate matter with a 50% cut-off aerodynamic diameter ≤2.5μm ($PM_{2.5}$), ozone, and nitrogen dioxide (NO_2) were obtained.
Dependent variable	Number of visits
Method of Analysis	All visits made between 7pm and 12am. Conditional logistic regression use to estimate Ors per unit increment of pollutant. Lagged hour exposure.
Covariates	Temperature,
Results (if included a comparison group, was the effect greater/weaker?)	Authors found an association between O_3 and nighttime primary care visits due to asthma attack among children aged 0 to 14 years—especially those aged 2 to 5 years—in warmer months. authors also found an association between $PM_{2.5}$ and primary care visits among children 0 to 14 years in warmer months (resulting in decreased ORs), among children 0 to 1 years in colder months (resulting in increased ORs), and among children 6 to 14 years in colder months. Moreover, authors found an association between NO_2 and primary care visits in warmer months among children 0 to 14 years (resulting in increased ORs). Among children, the ORs in warmer months per 10 ppb increment of the 24-hour mean concentration of ozone were 1.16 (95% confidential interval [CI], 1.00–1.33) adjusted for temperature, and 1.29 (95% CI, 1.08–1.55) adjusted for $PM_{2.5}$, NO_2, and temperature. An association was found between O_3 and asthma visits, this effect was stronger on younger children and in the warmer months. Also found an association between $PM_{2.5}$ and NO_2 and night time visits in warm season. No lag effect found between 0 to 6 hours (all after 6 hours). Thus, although O_3 effects may appear immediate, presentation for medical evaluation may occur somewhat later. With respect to $PM_{2.5}$, authors observed an association between nighttime primary care visits due to asthma attack and $PM_{2.5}$ among children in warmer months at lag 6–12, and in daytime 8-hour mean concentration among children, but not adults. With respect to NO_2, authors found an association between nighttime primary care visits due to asthma attack and NO_2 in warmer months at lag 12–18hr among children but not adults. Among children aged 6 to 14 years, authors noted elevated ORs for night time primary care visits due to asthma attack at lag 6–12 and in 24-hour mean concentration of O_3, using a multi-pollutant model; the ORs were 1.36 (95% CI,

	1.05–1.77) and 1.47 (95% CI, 1.08–2.01), respectively. No other significant associations were observed. For example, the ORs of night time primary care visits due to asthma attack for 24-hour mean concentration of O_3 using a multi-pollutant model among children 0 to 4 years and 6 to 14 years were 1.06 (95% CI, 0.63–1.78) and 1.27 (95% CI, 0.88–1.84), respectively. In the colder months, among children aged 6 to 14 years, authors found a significant inverse association between $PM_{2.5}$ and night time primary care visits due to asthma attack in colder months. The ORs of nighttime primary care visits due to asthma attack at lag 12–18 using a multi-pollutant model, and for 24-hour mean concentration of $PM_{2.5}$ using a single pollutant model, were 0.56 (95% CI, 0.31–1.00) and 0.62 (95% CI, 0.40–0.98), respectively.

*Additional studies found in the 2011 search.

Reference	Giovannini et al (2010) Hospital admissions for respiratory conditions in children and outdoor air pollution in Southwest Milan, Italy. Acta Paediatrica. Vol99 p1180-1185
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-14 Sample size: 782 respiratory, 110 asthma admissions. GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Italy 2007 to 08
Independent variable	PM_{10}, O_3, CO, NO_2
Dependent variable	Number of asthma admissions, other respiratory conditions also.
Method of Analysis	Pollutants lagged by five days. Poisson uni-variate and multiple regression..
Covariates	Month of year, temperature, humidity, rainfall.
Results (if included a comparison group, was the effect greater/weaker?)	No seasonal fluctuation in asthma contacts (low numbers). Seasonal variation were observed with pollutants. Number of asthma admission positively correlated with CO (lag0 and 1), PM_{10} (Lag0) and NO_2 (Lag 1). No significant association found with O_3. In single-pollutant models, CO and NO_2 associated with asthma. Multi-pollutant models, pollutant lost effects on asthma.

Reference	Grineski et al (2010) Children's asthma hospitalizations and relative risk due to nitrogen dioxide (NO_2): Effect modification by race, ethnicity, and insurance status. Environmental Health. Vol110 p178-188
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-14 Sample size: approx 4316* (taken from added total black, Hispanic and white) GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	US 2001 to 2003
Independent variable	PM_{10}, NO_2, $PM_{2.5}$, CO, SO_2
Dependent variable	Asthma hospitalisations
Method of Analysis	The generalized logit regression model for nominal categorical data within a multinomial likelihood framework was used. This model is specifically suited to small counts and the reporting of 95% confidence intervals for the odds ratio of hospital admission for one group as compared to another. The odds ratio is known to approximate relative risk for rare events.
Covariates	Seasonality, day of the week
Results (if included a comparison group, was the effect greater/weaker?)	For clarity, only the findings for nitrogen dioxide (NO_2) are presented here. NO_2 is thought to cause respiratory and cardiovascular disease (EPA, 2000) and is an important precursor to ground level ozone. It has been linked to asthma in time-series studies. Several significant findings were found for race, ethnicity, and insurance status as modulators for the effect of NO_2 on children's risk for asthma hospitalization: (1) children without insurance have 1.4 (95%CI:1.1–1.8) times higher risk of asthma admissions than those with private insurance at exceedances of 0.02parts per million (ppm)of NO_2 above the seasonal mean; the same finding holds for children without insurance as compared to those with Medicaid; (2)black children have 2.1(95%CI: 1.3–3.3) times higher risk of hospitalization than Hispanic children at seasonal mean NO_2 levels, but this disproportionate risk shrinks to1.7with exceedances of 0.02 ppm of NO_2 above the seasonal mean. Specific to finding (1) among those children without health insurance, Hispanic children have 2.1(95% CI: 1.1–3.8) times higher risk of hospitalization than white children. Among all Hispanic children, those without health insurance have 1.9(95%CI:1.3–3.0) times greater risk than those with private insurance; the same finding holds for Hispanic children without insurance as compared to Hispanic children with Medicaid. Specific to finding (2), among children with private

	insurance, the disproportionate risk of black children as compared to Hispanic children is magnified by a factor of 1.3 (95%CI:1.0–1.8) for exceedances of 0.02ppm of NO_2 above the seasonal mean.

Reference	Lee et al (2010) Relationship between ambient ozone concentrations and daily hospital admissions for childhood asthma/atopic dermatitis in two cities in Korea during 2004-2005. International journal of environmental health. Vol20(1) 1-11
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s):0-15 Sample size: Seoul =7807 Ulsan=1140 mean daily admissions * number of days in study GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Korea 2004 to 2005, 731 days
Independent variable	O_3 16hr, 8hr measures
Dependent variable	Daily number of admissions
Method of Analysis	Generalised additive models by means of non-parametric smoothing approach allowing for the flexible fitting of seasonality, long-term trends and non-linear associations between hospital admissions and weather variables. Poisson distribution. LOESS used to control the seasonal and long term trends
Covariates	Temperature, humidity, long term trends, seasonality, day of the week
Results (if included a comparison group, was the effect greater/weaker?)	Clear seasonal patterns with asthma and ozone levels. Increase in levels of O_3 from one quartile to the next had a significant effect on the relative risk of asthma. Ulsan RR = 1.21, CI 1.10 - .34. Seoul RR 1.05, CI 0.99-1.11 lag1+2

Reference	Nastos et al (2010) Outdoor particulate matter and childhood asthma admissions in Athens, Greece: a time-series study. Environmental Health. Vol9(45).
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-4, 5-14 Sample size: 3602 admissions GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Greece 2001-2004
Independent variable	PM_{10}
Dependent variable	Number of admissions
Method of Analysis	The relationship between CAA and PM_{10} concentrations was investigated using the Generalized Linear Models with Poisson distribution and logistic analysis.
Covariates	rain
Results (if included a comparison group, was the effect greater/weaker?)	In sample, higher proportion of males to females. Asthma exacerbations occur in the cold months and peak in march (0-4) and May (5-14).. There was a statistically significant (95% CL) relationship between CAA and mean daily PM_{10} concentrations on the day of exposure (+3.8% for 10 μg/m3 increase in PM_{10} concentrations). While a 1-day lag (+3.4% for 10 μg/m3 increase in PM_{10} concentrations) and a 4-day lag (+4.3% for 10 μg/m3 increase in PM_{10} concentrations) were observed for older asthmatic children (5-14 year-old). High mean daily PM_{10} concentration (the highest 10%; >65.69 μg/m3) doubled the risk of asthma exacerbations even in younger asthmatic children (0-4 year-old).

Reference	Pereira et al (2010) A case-crossover analysis of traffic related air pollution and ED presentations for asthma in Perth, Western Australia. Medical journal of Australia. Vol193(9) p511-514
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-19, age groups, 0-4, 5-9, 10-19 Sample size: 603 GP or Hospital: H
Design (comparison group?)	Case-crossover
Setting (dates data collected)	Australia 1st Jan 2002 to 31 Dec 2006
Independent variable	NO_2, CO, O_3, PM_{10}.
Dependent variable	ED presentation with asthma
Method of Analysis	Case-crossover analyses were performed using log regression that implemented hazard procedure. A 2wk exclusion period was constructed by removing from analyses patient who had experiences multiple ED presentations within control period. Patients who represented during their reference period were also removed from analyses. Analyses subsequently age group and sex stratified for lag period with elevated risk was observed.
Covariates	Age group, sex, season
Results (if included a comparison group, was the effect greater/weaker?)	57% were boys in sample. Most presented to ED on Sundays and in autumn and winter. Statistically significant associations observed for only CO and NO_2. 0-4 with 1day lag exposure to NO_2 and CO showed the most significant risk of ED

	presentations for asthma. An IQR increase in NO_2 = OR 1.70, CI 1.08-1.2.69. IQR increase in CO = OR .1.40 CI 1.06 to 1.84. When boys and girls were analysed separately, only boys analyses separately procured statistically significant results. Effect sizes observed in this study were larger than those observed in previous studies.

Reference	Samoli et al (2010) Acute effect of air pollution on pediatric asthma exacerbation: evidence of association and effect modification. Environmental Research. Vol111 p418-424
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-14 Sample size: 3601 asthma admissions GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Greece 2001 to 2004
Independent variable	Particulate matter with aerodynamic diameter o10 mg/m3 (PM_{10}), sulphur dioxide(SO_2), nitrogen dioxide (NO_2) and ozone (O_3)
Dependent variable	
Method of Analysis	Authors used daily time-series data provided by the children's hospitals and the fixed monitoring stations. The associations were investigated using Poisson regression models controlling for seasonality, weather, influenza episodes, day of the week and holiday effects. Dust events
Covariates	Day of the week, humidity, temperature, holidays, influenza epidemics
Results (if included a comparison group, was the effect greater/weaker?)	72% admissions were with children under 5 years of age. Distinct seasonal pattern was observed with higher admissions in the winter and lower in summer. A 10 mgm3 increase in PM_{10} was associated with a 2.54% increase (95%CI: 0.06%, 5.08%) in the number of paediatric asthma hospital admissions, while the same increase in SO_2 was associated with a 5.98% (95%CI: 0.88%, 11.33%) increase. O_3 was associated with a statistically significant increase in asthma admissions among older children in the summer. The findings provide limited evidence for association between NO_2 exposure and asthma exacerbation. Statistically significant PM_{10} effects were higher during winter and during desert dust days, while SO_2 effects occurred mainly during spring. In the case of NO_2, its effect decreased by 50% after controlling for PM_{10}. There was some indication of confounding between SO_2 and PM_{10} since the effect of the latter was decreased in by 30% while the former by only 20% when both pollutants are included in the model. Regarding O_3 effects in the summer, there was indication of confounding by NO_2 levels since it decreased by 30%. Gender differences: air pollutant effects stronger on males, almost null for females. Age, effects of PM_{10}, summer O_3, and SO_2 were stronger on the 5-14 age group but not significant. O_3 = statistically significant effect stronger on 5-14. Higher effects were observed on dust days. Lag effects: PM_{10}, SO_2 O_3 summer strongest effects observed on the same day. NO_2 no statistically significant lagged effect.

Reference	Silverman et al (2010) Age-related association of fine particles and ozone with severe acute asthma in New York City. Journal of Allergy and clinical immunology. Vol125 p367-373
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s):<6, 6-18 and adults. Sample size: 75,383 asthma hospitalizations, 69,375 general hospital and 6008 ICU admissions GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	US, data collected for April to August from 1996 to 2006.
Independent variable	$PM_{2.5}$ and O_3
Dependent variable	Poisson generalised linear model. 0-day or 1-day lagged exposures
Method of Analysis	
Covariates	Temporal trends, weather (temperature, humidity), day of the week.
Results (if included a comparison group, was the effect greater/weaker?)	Age was a significant effect modifier for hospitalizations, and children age 6 to 18 years consistently had the highest risk. Among children age 6 to 18 years, there was a 26% (95% CI, 10% to 44%) increased rate of ICU admissions and a 19% increased rate of general hospitalizations (95% CI, 12% to 27%) for each 12-mgm3 increase in $PM_{2.5}$. For each 22 ppb increase in ozone, there was a 19% (95% CI, 1% to 40%) increased risk for ICU admissions and a 20% (95% CI, 11% to 29%) increased risk for general hospitalizations. The simultaneous inclusion of both pollutants reduced both pollutants' risk estimates slightly, and the pattern of age-dependent associations remained

	unchanged. The model fit in the 2-pollutant models generally improved over that in single-pollutant models, suggesting that both pollutants have independent contributions to the associations. Greatest effects were seen on current day for $PM_{2.5}$ and lag day 2 for ozone.

Reference	Strickland et al (2010) Short-term associations between ambient air pollutant and pediatric asthma ER visits. American Journal of Respiratory and Critical Care Medicine. Vol182. p307-316.
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 5 -17 Sample size: 91386 GP or Hospital: H
Design (comparison group?)	Case-crossover
Setting (dates data collected)	US. 1993–2004
Independent variable	CO, NO_2, SO_2, PM_{10}, PM_{10}-2-5, $PM_{2.5}$elemental carbon, pollen,
Dependent variable	ED visits
Method of Analysis	Ambient concentrations of gaseous pollutants and speciated particulate matter were available from stationary monitors during this period. Rate ratios for the warm season (May to October) and cold season (November to April) were estimated using Poisson generalized linear models in the framework of a case-crossover analysis. Used 3-day MA for pollutant concentrations.
Covariates	Year, month, day of the week, hospital, lag temperature (L1).
Results (if included a comparison group, was the effect greater/weaker?)	Lower mean number of counts in the warm season (may to October) than cold season. Both ozone and primary pollutants from traffic sources ($PM_{2.5}$, PM_{10}, CO, EC) + SO_2, were associated with emergency department visits for asthma or wheeze in the warm season; evidence for independent effects of ozone and primary pollutants from traffic sources were observed in multi-pollutant models. Ozone association was stronger in the summer. PM_{10}-2.5 association was stronger in the cold season. These associations tended to be of the highest magnitude for concentrations on the day of the emergency department visit and were present at relatively low ambient concentrations. Even at relatively low ambient concentrations, ozone and primary pollutants from traffic sources independently contributed to the burden of emergency department visits for paediatric asthma. No lagged associations for SO_2, CO. For PM_{10}, $PM_{2.5}$ EC, lag RR were uniformly distributed across the lag days (8).

Reference	Yeh et al (2011) The association of seasonal variations of asthma hospitalization with air pollution among children in Taiwan. Asian Pacific Journal of Allergy and Immunology. Vol29. p34-41.
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): <18 years Sample size: GP or Hospital: H
Design (comparison group?)	Case-crossover
Setting (dates data collected)	US. 1993–2004
Independent variable	nitrogen dioxide (NO2), carbon monoxide (CO), ozone(O3), sulphur dioxide (SO2), and particles with aerodynamic diameter < 10 μm (PM10)
Dependent variable	hospitalisations
Method of Analysis	Using the National Health Insurance database, seasonal variations in hospitalization trends in children with a primary diagnosis of asthma (International Classification of Disease 9th revision, code 493) for patients aged < 18 years from 2001 to 2002 were investigated. Data on the average concentration of nitrogen dioxide (NO2), carbon monoxide (CO), ozone(O3), sulphur dioxide (SO2), and particles with aerodynamic diameter < 10 μm (PM10) for each month were obtained from the Environmental Protection Department through 71 stations of air quality monitor distributed nationwide. PSI value (pollutants standard index) > 100 was considered poor air quality. Seasonal variations in asthma admissions were compared to the air pollution quality data using Spearman's rank correlation
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Asthma hospitalization was not related to the number of days when the PSI was > 100 during the 24-months period (r = -0.361; p = 0.083). However, it was significantly associated with seasonal changes in the concentration of each pollutant. No association between humidity and asthma admission pattern of children in general (r = -0.37, p = 0.08). However there was a negative association among school age children (r = -0.46,p = 0.023),Temperature in all seasons were not related to asthma hospitalization. there was a prominent negative association of asthma admission and rainfall in children (r = -0.56, p =0.006), with a similar trend among all three subgroups (preschool: r = -0.56, p = 0.007, school-age: r = -0.65, p = 0.001;

	and adolescents: r =-0.43 p = 0.038). 6-12 year olds: SO_2 r=0.63, P=0.001 : CO r=0.51, P=0.011: O_3 r=0.21, P=0.336, PM_{10} r=0.55 P=0.006, NO_2 r=0.57, P=0.004. None of the pollutants were associated with seasonal variations in admission rate for adolescents. Conclusion: Seasonal variations of asthma hospitalization among preschool children are associated with concentration of air pollutants.

A4. Search Strategy to Review Current Literature of the spatial associations between Pollutant (or other environmental) Exposures and Childhood Asthma Exacerbations resulting in Medical Contact

A4.1. Proximity Databases and Search Terms

Searches were performed using Medline, CINAHL, Web of Science, EMBASE, Cochrane and Google scholar. Searches performed in April 2009.

In the search the terms "asthma", "pollution" “nitr*”, sulphur”, “dioxide”, “carbon monoxide”, “particulate matter”, “PM”, “ozone”, "child*", “pediatric”, paediatric” and "admi*", “present*”, “attend*”, “family physician”, “hospital*” “out of hours” “diar” and “general prac*”, “proximity*”, “locat*”, “vicinity*” were included using the Boolean terms “and” or “or”.

A3.4. Proximity Databases and Search Terms

Searches were performed using Medline, CINAHL, Web of Science, EMBASE, Cochrane and Google scholar. Searches performed in April 2009.

In the search the terms "asthma", "pollution" “nitr*”, sulphur”, “dioxide”, “carbon monoxide”, “particulate matter”, “PM”, “ozone”, "child*", “pediatric”, paediatric” and "admi*", “present*”, “attend*”, “family physician”, “hospital*” “out of hours” “diar” and “general prac*” were included using the Boolean terms “and” or “or”.

Table A. 15: Search Pollution and spatial variation Medline.

	Search Terms	Results
1	asthma/ or asthma.mp	106498
2	Child*.mp. [mp=title, original title, abstract, name of substance word, subject heading	1539841
3	Adolescent/ or Pediatrics/ or Child/ or paediatric.mp.	1178793
4	2 or 3	1554048
5	(admission or admit*).mp. [mp=title, original title, abstract, name of substance word, subject heading word]	1190296
6	Present.mp. [mp=title, original title, abstract, name of substance word, subject heading word]	2027169
7	Attend*mp. [mp=title, original title, abstract, name of substance word, subject heading word]	85542
8	Hospital departments/ or Medical records department/ or hospital*.mp. or Emergency Service or hospital/	828717
9	general prac*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]	50589
10	family physician*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]	15499
11	Out of hours. Mp	709
12	Diar*.mp.	85251
13	5 or 6 or 7 or 8 or 9 or 10 or 11 or 12	3679843
14	Pollution.mp. or air pollution/ or Environmental pollution/ or water pollution	70064
15	Ozone.mp. or Ozone/	10394
16	Nitrogen Dioxide/ or Nitrogen/ or Nitrogen Oxides/ or nitrogen.mp. or Nitrogen Compounds. Or nitr*/	400717
17	Nitrogen Dioxide/ or Carbon Dioxide/ or Sulfur Dioxide/ or dioxide.mp.	105633
18	Sulfur Dioxide/ or Sulfur Compounds/ or Sulfur/ or Air Pollution/ or sulphur.mp.	33377
19	Carbon monoxide/	21359
20	Particulate matter.mp. or Particulate matter/	47240
21	Air pollutants/ or Particulate Matter/ or PM.mp	54878
22	14 or 15 or 16 or 17 or 18 or 19 or 20 or 21	623097
23	Proximity.mp.	25732

24	Environmental Exposure/ or Air Pollution/ or vicinity.mp.	85381
25	"distan*".mp	174295
26	Air Pollution/ or Environmental Exposure/ or Air Pollutants/ or personal exposure.mp	86525
27	"locat*".mp.	23129
28	22 or 23 or 24 or 25 or 26 or 27	320701
29	1 and 4 and 13 and 22 and 2*	361
30	Limit 23 to (English language and humans)	334

Table A. 16: Search Pollution and spatial variation Web of Science.

	Search Terms	Results
1	TS = (asthma)	92692
2	TS = (child*)	>100000
3	TS = (paediatric)	21569
4	TS=(pediatric)	>100000
5	#2 OR #3 OR #4	>100000
6	TS=(admi*)	>100000
7	TS = (present*)	>100000
8	TS=(attend*)	>100000
9	TS = (hospital*)	>100000
10	TS = (general pract*)	93490
11	TS = (family physician)	7136
12	TS = (Out of hours)	>100000
13	TS = (diar*)	91007
14	#6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13	>100000
15	TS= (pollut*)	185838
16	TS = (nitr*)	>100000
17	TS = (sulphur)	24896
18	TS = (dioxide)	185703
19	TS = (ozone)	58158
20	TS = (particulate matter)	27370
21	TS = (PM)	10617
22	TS = (carbon monoxide)	54,585
23	#15 OR #16 OR #17 OR #18 OR #19 OR #20 OR #21 OR #22	>100000
24	TS = (proximity)	58401
25	TS = (vicinity)	68993
26	TS = (cluster)	495911
27	TS = (distance)	435388
28	#24 OR #25 OR #26 OR #37	>100000
29	#1 AND #5 AND #14 AND #23	331

A4.2. Search Results

These results are produced from the second search

- Medline: 334 titles - 15 abstracts - 8 studies selected for further reading
- Web of Science: 331 titles - 13 abstracts - 8 studies selected for further reading

A4.3. Proximity Mini Data Extraction

Reference	Chan et al (2009). Spatiotemporal analysis of air pollution and asthma patient visits in Taipei, Taiwan. International Journal of Health Geographics. Vol8(21)
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-15 and adults Sample size: 724,025 asthma visits, 34274 emergency. GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Taiwan 2000 to 2002
Independent variable	PM_{10}, SO_2, NO_2, O_3
Dependent variable	Number of emergency or outpatient visits
Method of Analysis	Buffer analysis with data from air monitoring stations and proximity analysis to ambient pollution sources near the highways or busy roads are also frequently used. However, little is known about how air pollutants affect health outside a defined buffer. Therefore, authors hypothesized that the localized level of air pollution concentration might have different effects on asthma visits. Although different

	districts in Taipei City might have different concentrations, it was not feasible to set up the air monitoring stations in each district. In order to make an exposure assessment for the whole of Taipei City, authors linked the daily exposure level by geostatistical method and corresponding asthma visits to estimate the impact on asthma visits by air pollutants.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	In general, children (aged 0–15 years) had the highest number of total asthma visits. There were a slightly higher percentage of male visits in the sample. Children had the highest number of total visits (48.8% outpatient, 58.5% emergency) Seasonal changes of PM_{10}, NO_2, O_3 and SO_2 were evident. In single pollutant model: with outpatients, children were more sensitive to elevations of NO_2 SO_2, PM_{10} and O_3(1-2 days). Emergency significant associations with PM_{10} (2 day lag).

Reference	Chang et al (2009) Repeated respiratory hospital encounters among children with asthma and residential proximity to traffic. Occupational and Environmental Medicine. Vol66 p90-98
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 6-18 Sample size:3297 GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	South California
Independent variable	Road traffic encounters 300m for residence
Dependent variable	Number of repeated hospital events
Method of Analysis	Recurrent event proportional hazards analysis. Buffering techniques used to estimate the hazards of repeated hospital encounters. Association between repeated hospital encounters and road traffic were stronger for females than males and for those who had no or state insurance. Gender disparity was most notable in <5. Adjusted all models for confounding factors.
Covariates	Gender, age
Results (if included a comparison group, was the effect greater/weaker?)	Highest risk was children in the top quintile of traffic density (HR1.21 95% CI 0.99-1.49) and those who had a 750m< more of arterial road or freeway within 300m of residence (HR1.18 CI: 0.99-1.41).

Reference	Delfino et al (2009) Repeated hospital encounters for asthma in children and exposure to traffic near the home. Annals of Allergy, Asthma and Immunology. Vol102(2) p138-144
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s):0-18 Sample size: 2768 children GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	California Jan 2000 to Dec 2003
Independent variable	
Dependent variable	Number of repeated hospital events
Method of Analysis	Built a line source dispersion model. Recurrent proportional Hazards analysis used to estimate risk of exposure adjusting for age, sex, gender and so on. The adjustment variables and census derived median household income for effect modification. Uses GIS based exposure evaluation methods and air dispersion models.
Covariates	Age, gender
Results (if included a comparison group, was the effect greater/weaker?)	Adjusted Hazard ratios for interquartile range increases in nitrogen oxides and CO were 1.10 (95%CI 1.03-1.16) and 1.07 (1.01-1.14). Associations strongest for girls and infants. Stronger associations in children from higher-income block groups may be have been due to data that were more accurate.

Reference	English et al (1999) Examining Associations between Childhood Asthma and Traffic Flow Using a Geographic Information System, Environmental Health Perspectives. Vol107(9) p761-767
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-14 Sample size: 5,996 asthmatic children. 2284 Non-asthmatics selected randomly GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	US 1993
Independent variable	Traffic flow
Dependent variable	Area based number of children
Method of Analysis	14 years of age who were diagnosed with asthma in 1993 and compared them to a random control series of non-respiratory diagnoses (n = 2,284). Locations of the children's residences were linked to traffic count data at streets within 550 ft. Authors also the number of medical care visit in 1993 for children with asthma to determine if

	the number of visits was related to traffic flow.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Asthmatics were more likely to be male and black, and less likely to be Hispanic. Asthmatics were also older, more likely than Non-asthmatics to be seen in a physician's office, and less likely than Non-asthmatics to have hospital outpatient visits. Asthmatics and non-asthmatics had similar block group census characteristics such as unemployment, poverty level, and household income, confirming similar low socioeconomic status at the neighbourhood level. Authors observed no significant differences between Asthmatics and non-asthmatics in the census block group prevalence of home heating methods. Non-asthmatics were more likely than asthmatics to live closer to the street with the highest traffic flow within the 550-ft buffer region ($p < 0.01$) and were more likely to have higher average traffic volume at the nearest street ($p = 0.03$). Authors saw no statistically significant difference between Asthmatics and non-asthmatics in average traffic volume of the street with the highest traffic flow or in average traffic volume at all streets combined in the 550ft buffer region. A large percentage of Non-asthmatics were RTA patients that may have swayed the results. Analysis of the distribution of Asthmatics and non-asthmatics by quintiles and by the 90th, 95th, and 99th percentiles of traffic flow at the highest traffic street, nearest street, and total of all streets within a 550-ft buffer region did not show any significantly elevated odds ratios. However, among asthmatics, those residing near high traffic flows (measured at the nearest street) were more likely (than those residing near lower traffic flows) to have two or more medical care visits for asthma during the year. The results of this exploratory study suggest that higher traffic flows may be related to an increase in repeated medical visits for asthmatic children. Repeated exposure to particulate matter and other air pollutants from traffic exhaust may aggravate asthmatic symptoms in individuals already diagnosed with asthma.

Reference	Lin S et al (2002) Childhood asthma hospitalisation and residential exposure to state route traffic. Environmental Research Section. Vol88 p73-81
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-14 Sample size: 417 children, white, 461 Non-asthmatics non-traffic related. GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	US 1990-93
Independent variable	Traffic, vehicle miles travelled (VMT), distance from road
Dependent variable	Area base number of hospitalisations
Method of Analysis	Subject's addresses obtained and linked to traffic information. Logistic regression models used to examine the relationship between the asthma admissions and the measures, traffic density after adjustments for potential confounders.
Covariates	Age, socio-economic status
Results (if included a comparison group, was the effect greater/weaker?)	After adjustments for age and poverty levels, children hospitalised for asthma were more likely to live on roads with the highest tertile of vehicles miles travelled (VMT) OR 1.93 (95% CI 1.13-3.29) within 200m and were more likely to have trucks or trailers running within 200m of residence OR 1.43 1.03-1.99 compared with Non-asthmatics. However, childhood asthma hospitalisations were not significantly associated with residential distance to state roads, annual VMT within 500m or whether trucks or trailers passed near residence.

Reference	Loyo-Berrios et al (2006) Air pollution sources and childhood asthma attacks in Catano, Puerto Rico. American Journal of Epidemiology. Vol165 p927-935
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-17 Sample size: Density sampling 1:5 matched by age, sex and insurance company + event date GP or Hospital:
Design (comparison group?)	Case-control
Setting (dates data collected)	US 1997-2001
Independent variable	
Dependent variable	
Method of Analysis	Nested case-control to evaluate proximity to air pollution sources was associated with increased risk of asthma attacks. 1997-2001, 1382 medical visits in children under 17 identified through health insurance claims. Non-asthmatics=children with no asthma attacks who were randomly selected. Density sampling ratio 1:5 matched by age, sex and insurance company + event date. Distance from point source to the subject's residence area represented a surrogate exposure measurement. OR for a 1km decrease in distance were obtained via conditional logistic regression. Analysis: First, data from the environmental data warehouse classifies air pollution points sources as major (>100tons/yr) or minor (<100tons/yr) of air emissions.

	Classification was used to estimate mean distance from the residence to major or minor air emissions sources for each child. Second, classified point sources according to types of industries that have been related to respiratory problems. Third, distance measurement was developed to account for wind direction.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Risk of asthma was associated with residing near a grain mill (OR1.35), petroleum refinery (OR1.44), asphalt plant (OR1.23) or power plant (OR1.28) (all p<0.05). Residence near major air emission sources (>100tons/yr) increased the risk of asthma attack by 1.08%.

Reference	Meliker et al (2001) Spatial Clustering of ED visits by asthmatic children in an urban area: southwestern Detroit, Michigan. Ambulatory Child Health. Vol7 p297-312
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-15 Sample size: 2067 GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	US Jan 1st 1993 and June 30th 1998
Independent variable	Distance to pollution industry
Dependent variable	Number of admissions
Method of Analysis	Data obtained from 5 hospitals with ED admissions for asthma. Selection of region of analysis with good geographical representation was based on the catchment areas of the hospitals in the study. 2067 asthmatics reported between Jan 1st 1993 and June 30th 1998. Data on racial characteristics, population density and household income were obtained for the neighbourhood blocks included from census data from 1999. Locations of major polluting industries within the study area are obtained from the Toxic release inventory.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Spatial analysis indentified a local asthma cluster roughly 2km east of the 2nd and 3rd largest air polluters (situated predominantly downwind direction). Using a focused cluster test, Screen 3 air pollution model and windrose figures displayed a weak association between ED asthma admissions and estimated levels of outdoor air pollution from these two facilities. Neighbourhood block groups in the local asthma cluster are more closely correlated with high proportions of African Americans and low median household income. Study highlights the strengths and weaknesses of GIS in the public health arena. The technique highlights the difficulty of disentangling the effect of exposure to outdoor air pollutants and socio-economic factors on ED asthmatics (reflecting asthma severity) among the urban population. Also illustrates the need for population based as opposed to hospital based asthma data and the need for block groups as opposed to zip codes, as a spatial unit of analysis.

Reference	Newcomb and Jianling (2008) Predicting Admissions for childhood asthma based on proximity to major roadways. Journal of Nursing Scholarship. Vol40(4) p319-325
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s):1-12 Sample size: 2357 children GP or Hospital: H
Design (comparison group?)	Case-control
Setting (dates data collected)	US January 1, 2004 to December 31, 2005.
Independent variable	
Dependent variable	
Method of Analysis	Student t test used to compare groups with and without primary asthma diagnosis on admissions in respect to distance from major roadways. Logistic regression used to model relationships between asthma admission, patients' characteristics, traffic exposure and social environment. GIS mapping.
Covariates	Controlled for several demographic factors
Results (if included a comparison group, was the effect greater/weaker?)	On average, patients who had asthma lived closer to major roadways than patients who did not have asthma. Patients with asthma tended to live in neighbourhoods with more roads than did those who did not have asthma: ¾ of children admitted for asthma during the study and less than 1/3 of children admitted for non-asthma diagnoses lived within 1500m of a major roadway. Every metre increase in proximity to major roadways produced 0.1% increase likelihood of admission.

Reference	Oyana and Rivers (2005) Geographic variations of childhood asthma hospitalization and outpatient visits and proximity to ambient pollution sources at a U.S.-Canada border crossing. International Journal of health Geographics Vol11 p1-11
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-18 Sample size:6425 children with asthma, 5132 Non-asthmatics GP or Hospital:

Design (comparison group?)	Case-control
Setting (dates data collected)	US 2000-2002
Independent variable	PM
Dependent variable	
Method of Analysis	This study focuses on children under 18 years of age diagnosed with asthma during a three-year period (2000–2002). In order to determine the effects of particulate air pollution on public health, authors conducted an ecologic study of childhood asthma and point-source respirable particulate air pollution in patients diagnosed with asthma (n = 6,425). Patients diagnosed with gastroenteritis (n = 5,132) were used as Non-asthmatics.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Although the results of this study show spatial patterns similar to the ones observed in the adult study, a multiple-comparison test shows that EPA-designated focus sites located in Buffalo's east side are statistically ($p < 0.008$) more linked to childhood asthma than sites located elsewhere.

Reference	Pantea et al (2008) Chronic Exposure to Ambient Ozone and asthma hospital admissions among children in NY State. Epidemiology Vol19(6) pS292 (Conference proceeding)
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): Sample size: 1,201327 children born in NYS whom were followed to the first admission for asthma. GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	US 1995-9
Independent variable	O_3
Dependent variable	
Method of Analysis	Retrospective cohort. Used a unique integrated child health information system combining data from birth and death certificates, immunisation registry and hospital discharge data to provide longitudinal information with respect to a birth cohort. Geocoded home addresses of entire birth cohort. NYS divided into 10 O_3 regions, each case assigned to a region. For each child, the number of days where O_3 measures between 10am and 6pm exceeded EPA levels of 104pp6 (considered unhealthy for sensitive groups) was indentified. Chronic exposures were defined as a cumulative monthly proportion of these high O_3 concentrations.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Median follow up of 11mths for children hospitalised with asthma and 30 months for children not hospitalised. In New York City, authors found significantly elevated adjusted hazard ratios. However in nine other regions, no significant results found. Selected maternal and birth characteristics considered: Mother's age (HR =.97 CI0.98-0.99); female (HR0.44 CI 0.42-0.53); black (HR2.01 CI1.77-2.29); maternal smoking (HR =1.56 CI1.38-1.78); low birth weight (HR1.75 CI 1.45-2.11) : pre-term birth (HR=1.33 CI 1.12-1.57)

Reference	Pereira et al (2009) Residential traffic exposure and children's emergency department presentation for asthma: a spatial study. International Journal of Health Geographics. Vol8(63)
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-19 Sample size: 603 asthma ED visits. GP or Hospital: H
Design (comparison group?)	Case-control 1:2
Setting (dates data collected)	Australia 2002 to 06.
Independent variable	Traffic data, average annual weekday traffic counts = estimates average 24 hour traffic volume on weekdays excluding public hols. Adjusted for season, day of the week.
Dependent variable	
Method of Analysis	To each case, two Non-asthmatics assigned (gender and age group (-04, 5-9, 10-14, 15-19) matched). To estimate exposure to traffic emissions, authors used 4 contrasting methods and 2 independently derived sources of traffic data (video-monitored traffic counts and those obtained from the state government road authority). The following estimates of traffic exposure were compared: (1) a point pattern method (kernel smoothing), (2) a distance-weighted traffic exposure method, (3) a simple distance method and (4) a road length method. Conditional log regression. ArcGIS.
Covariates	Socioeconomic status
Results (if included a comparison group, was the effect greater/weaker?)	Risk estimates were sensitive to socio-economic gradients and the type of exposure method that was applied. Unexpectedly, a range of apparent protective effects was observed for some exposure metrics. For instance, the length of road and distance

	weight traffic density was associated with a statistically significant decrease in the risk of asthma. The kernel density measure demonstrated more than a 2-fold (OR 2.51, 95% CI 2.00 - 3.15) increased risk of asthma ED presentation for the high exposure group compared to the low exposure group. Non-asthmatics differed asthmatics in respect to SES.

Reference	Wilkinson et al (1999) Case control study of hospital admission with asthma in children aged 5-14 years: relation with road traffic in north west London. Thorax 54 p1070-1074
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 5-14 Sample size: asthma n=1380, with respiratory disease including asthma=2131. Non-asthmatics=5703 GP or Hospital: H
Design (comparison group?)	Case-control
Setting (dates data collected)	UK April 1992 to March 1994
Independent variable	
Dependent variable	
Method of Analysis	Non-asthmatics comprised of all other children with an emergency admission during the study period (but not for respiratory illness) with the exclusion of admissions for accidental injuries and poisoning (ICD-9 800–999), the latter being excluded because of possible association between road accidents and residence close to a main road. Simple and multiple logistic regression + GIS mapping. Adjustments made for age, sex, admitting to hospital, deprivation score.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Asthma and respiratory asthmatics tended to be younger than the Non-asthmatics with a higher proportion of boys. Adjusted odds ratio of hospital admission for asthma and respiratory illness for children living within 150m of a main rd compared with those living further way were 0.93 (95%CI 0.82-1.06) and 1.02 (95%CI 0.92 to 1.14). No association was found between risk of hospital admission for asthma and proxy markers of road traffic pollution.

A5. Search Strategy to Review Current Literature on the Associations between Weather Exposures and Childhood Asthma Exacerbation resulting in Medical Contact

A5.1. Weather Databases and Search Terms

Searches were performed using Medline, CINAHL, Web of Science, EMBASE and Google scholar. Searches performed on the May 2009.

In the search, the terms "asthma", "weather", “season”, "Child*", “pediatric”, paediatric” and "admi*", “present”, “attend*”, “family physician”, “hospital*”, “out of hours” “diar*” and “general prac*”, “humid*”, “rain*”, “temp*”, “wind*” and “pressure” were included using the Boolean terms “and” or “or”.

Table A. 17: Search Weather Medline.

	Search Terms	Results
1	asthma/ asthma.mp.	106398
2	Child*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]	1537841
3	Adolescent/ or Pediatrics/ or Child/ or paediatric.mp.	1173793
4	2 or 3	1554048
5	(admission or admit*).mp. [mp=title, original title, abstract, name of substance word, subject heading word]	1180296
6	Present.mp. [mp=title, original title, abstract, name of substance word, subject heading word]	2027170
7	Attend*mp. [mp=title, original title, abstract, name of substance word, subject heading word]	83778
8	Hospital department/ or Medical Records department hospital/ or hospital*.mp. or Emergency Service, hospital	828617
9	general prac*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]	50499
10	family physician*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]	15487
11	Out of hours. Mp	705
12	Diar*.mp.	85245
13	5 or 6 or 7 or 8 or 9 or 10 or 11 or 12	3679687
14	Climate/or Temperature/ or Tropical Climate/ or Humidity/ or humid*.mp.	342979
15	Temp*.mp	708202
16	Rain/ or Acid Rain/ or rain*.mp.	107429
17	Pressure.mp. or atmospheric pressure/or Air pressure/ or Pressure	728967
18	Wind.mp. or Wind/	234078
19	Weather.mp. or weather/	5534
20	14 or 15 or 16 or 17 or 18 or 19	472740
21	1 and 4 and 13 and 20	298
22	Limit 21 to (humans and English language)	266

Table A. 18: Search Strategy CINAHL.

	Search Terms	Results
1	(ZU “asthma”)	15496
2	Child*	227400
3	Paediatric	4535
4	Pediatric	34526
5	2 or 3 or 4	235305
6	Admi*	225490
7	Present*	126127
8	attend*	34546
9	Hospital*	148249
10	General prac*	7413

11	family physician	520
12	Diar*	11426
13	Out of hours	257
14	6 or 7 or 8 or 9 or 10 or 11 or 12 or 13	509482
15	Weather	1265
16	Humid*	1140
17	Temp*	21861
18	Rain*	548
19	Wind*	3345
20	Pressure	46058
21	Season	5977
22	15 or 16 or 17 or 18 or 19 or 20 or 21	75280
23	1 and 5 and 14 and 22	104

Table A. 19: Search Strategy Cochrane Library.

	Search Terms	Results
1	Asthma	
2	Child*	
3	Weather OR temperature OR wind OR pressure OR rainfall OR humid	
4	Admi* OR present*	
5	1 and 2 and 3 and 4	20
6	Keep	0

Table A. 20: Search Strategy EMBASE.

	Search Terms	Results
1	Mild Persistent Asthma/ or asthma.mp. or Moderate Persistent Asthma/ or Exercise Induced Asthma/ or Nocturnal Asthma/ or Asthma/ or Allergic Asthma/ or Severe Persistent Asthma/ or Mild Intermittent Asthma/	67426
2	Child*.mp	511952
3	Paediatric/ or pediatric/ or paediatric.mp	28502
4	2 or 3	519616
5	(admission or admit*).mp. [mp=title, original title, abstract, name of substance word, subject heading word]	606071
6	Present*mp. [mp=title, original title, abstract, name of substance word, subject heading word]	1153189
7	Attend*mp. [mp=title, original title, abstract, name of substance word, subject heading word]	367869
8	hospital*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]	392782
9	general practice/ or General Practitioner/	38662
10	family physician*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]	5026
11	Out of hours. Mp.	488
12	Diar*.mp.	80096
13	5 or 6 or 7 or 8 or 9 or 10 or 11 or 12	1736755
14	Weather.mp. or weather/	4382
15	Temperature Measurement/ or Water Temperature/ or High Temperature/ or Low Temperature/ or Air Temperature/ or Temperature/ or temperature.mp. or Environmental Temperature/	164276
16	Climate/ or Tropics/ or Humidity/ or humid*.mp. or Environmental Temperature/	22705
17	Wind*.mp or Wind/	27560
18	Rainfall*mp or rain/	4769
19	pressure / or Atmospheric Pressure/ or pressure*.mp	285461
20	14 or 15 or 16 or 17 or 18 or 19 or 20	474488
21	1 and 4 and 13 and 21	344
22	Limit 21 to (Human and English Language)	299

Table A. 21: Web of Science.

	Search Terms	Results
1	TS = (asthma)	92692
2	TS = (child*)	>100000
3	TS = (paediatric)	21569
4	TS=(pediatric)	>100000
5	#2 OR #3 OR #4	>100000
6	TS=(admi*)	>100000
7	TS = (present*)	>100000
8	TS = (attend*)	>100000

9	TS = (hospital*)	>100000
10	TS = (general pract*)	93490
11	TS = (family physician)	7136
12	TS = (Out of hours)	>100000
13	TS = (diar*)	91007
14	#6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13	>100000
15	TI = (weather)	14555
16	TI = (climate)	39136
17	TI = (humid*)	3342
18	TI = (temp*)	>100000
19	TI = (pressure)	>100000
20	TI = (wind*)	83620
21	TI = (rain*)	48593
22	#15 OR #16 OR #17 OR #18 OR #19 OR #20	>100000
23	#1 AND #5 AND #14 AND #22	58

A5.2. Search Results

These results were produced from the second search

- Medline: 266 titles - 43 abstracts - 20 studies selected for further reading
- CINAHL: 104 titles - 3 abstracts - 2 studies selected for further reading
- Cochrane: 0 titles - 0 abstracts - 0 selected for further reading
- EMBASE: 299 titles - 16 abstracts - 9 studies selected for further reading
- Web of Science: 58 titles – 19 abstracts - 11 studies selected for further reading
- Google scholar: 3 studies

Other sources using reference lists from articles selected.

A5.3. Weather Mini Data Extraction

Reference	Abe et al (2008) The relationship of short-term air pollution and weather to ED visits for asthma in Japan. American Journal of Emergency Medicine. Vol27 p153-59
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-15 and adults Sample size: 781 children GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Tokyo January 1 to December 31, 2005
Independent variable	Meteorological data included minimum temperature, maximum barometric pressure, maximum relative humidity, and precipitation. Measured air pollutants included sulphur dioxide, nitrogen monoxide, nitrogen oxides, suspended particulate matter, and carbon monoxide. ARIMA
Dependent variable	Asthma exacerbation requiring emergency transport
Method of Analysis	Time series analysis using multivariable-adjusted autoregressive integrated moving average model. The 4 seasons in Tokyo were defined by the Japanese meteorological classification: spring (March through May), summer (June through August), autumn (September through November), and winter (December through February).
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Among children, there were no significant associations between exacerbation of asthmas requiring emergency transport and air pollutants or meteorological factors. The highest number of transports was found on October 11, the day after the National Sports Day in Japan.

Reference	Babin et al (2007) Pediatric patient asthma-related emergency department visits and admissions in Washington, DC, from 2001–2004 and associations with air quality, socio-economic status and age group. Environmental Health. Vol6
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 1-4, 5-12, 13-17, 1-17 Sample size: NR GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	US 2001 to 2004
Independent variable	O_3, $PM_{2.5}$, Temperature, pollen, mould.
Dependent variable	
Method of Analysis	Poisson regression

Covariates	Cubic spline used to control for long term seasonality.
Results (if included a comparison group, was the effect greater/weaker?)	Two annual peaks in ED admissions were observed for asthma: Sep to Nov and March to May. Known seasonal summer peaks in ozone and $PM_{2.5}$. Associations between paediatric asthma ED visits and outdoor ozone concentrations were significant and strongest for the 5–12 year-old age group (Lag0), for which a 0.01-ppm increase in ozone concentration indicated a mean 3.2% increase in daily ED visits and a mean 8.3% increase in daily ED admissions. However, the 1–4 yr old age group had the highest rate of asthma related ED visits. For 1–17 yr olds, the rates of both asthma-related ED visits and admissions increased logarithmically with the percentage of children living below the poverty threshold, slowing when this percentage exceeded 30%. Observed real increase in RR of asthma ED visits for children living in higher poverty zip codes. Weed pollen and temperature showed statistically significant associations with 5-12 and 1-17 age groups. Significant effects of tree pollen and ambient temperature were also seen for the 5–12 yrs age group. No statistically significant relationship observed with $PM_{2.5}$ and admissions. Lagged associations were found with 1-17 age group and grass pollen. 5-12 age group largest increase, O_3 (lag 4), grass (lag3), tree (Lag2). No statistically significant interactions between exposures identified.

Reference	Beer et al (1991) Acute exacerbation of bronchial asthma in children associated with afternoon weather changes. American Review of Respiratory Disease. Vol144(1) p31-35
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 015 Sample size: 3064 GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Israel March 1982 to May 1985
Independent variable	
Dependent variable	
Method of Analysis	Studied the effect of weather on acute exacerbations of bronchial asthma in children comparing records.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Admission rates linked to afternoon weather changes and some respiratory infections.

Reference	Chavaria JF (2001) Short Report: Asthma admissions and weather conditions in Costa Rica. Archives of Disability on Childhood. Vol84 p514-515
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): <15 Sample size: GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Costa Rica, 1992-1998
Independent variable	Weather data collected. Max and min temperature, % of relative humidity, amount of rainfall were obtained on a monthly basis,
Dependent variable	Number of admissions
Method of Analysis	Patient admissions data taken from the Documentos Medicos y Estaistica = 100% coverage for all children' hospital in San Jose. Pearson's correlation coefficient was used with 0.05 significance level.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Seasonal peaks in march and august, school holidays end in Feb and July. Average % variation of admissions was significantly related to the relative humidity and the amount of rainfall. Proposes that people spend a lot more time indoors when it rains increasing the risk of viral transmission plus exposure to indoor pollutants/triggers i.e. dust.

Reference	Dales et al (2003) The roles of fungal Spores in Thunderstorm asthma. Chest. Vol123(3) p745-750
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): Children Sample size: 9413* (thunderstorm days (n=151)* mean admissions (10) plus non-thunderstorm day (n=919) * mean admissions (8.6)) GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Canada 1993-97
Independent variable	
Dependent variable	

Method of Analysis	Authors assessed the relationship between thunderstorms, air pollutants, aeroallergens and asthma admissions over a 6 yr period. Non-parametric regression. Analyses of aeroallergens restricted to periods surrounding their peaks, i.e. Associations tested between Apr 1st and Jun 30th for tree pollen, Jun 1st and Aug 31st for grasses etc. Air pollutants, viral epidemics etc could confound results, to remove this effect, locally weighted non-parametric regression and smoothing plots (LOESS) were applied to each variable. 90 day filter minimised the autocorrelation within series. Lags between exposures and emergency visit data were assessed. Days of the week effect accounted for in analysis. Final analysis was adjusted for the day-to-day changes in meteorological variables and air pollution variables which may change in respiratory-related visits.
Covariates	Air pollutants, viral epidemics etc could confound results, to remove this effect, locally weighted non-parametric regression and smoothing plots (LOESS) were applied to each variable. Days of the week
Results (if included a comparison group, was the effect greater/weaker?)	During thunderstorm days (n=151 days) compared to days without thunderstorms (n=919 days), daily admission rates increased from 8.6 to 10 ($p<0.05$). Air concentrations of fungal spores doubled. Pollutant levels were higher on thunderstorm days but not enough to create statistically significant effect. Out of all the pollutants, ozone had the largest effect but not statistically significant. There were relatively small changes in pollen and air pollutants between thunderstorm and non-thunderstorm activity. Irrespectively of the thunderstorm, increase in total number of fungal spores was associated with a 2.2% increase in asthma visits.

Reference	Grech et al (2002) Seasonal variations in hospital admissions for asthma in Malta. Journal of Asthma. Vol39(9) p293-283
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): >1, 1-4, 5-9, 10-14, 15-19 and adults Sample size: 2916 GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Malta 1994-98
Independent variable	Temperature,
Dependent variable	Daily counts of hospital admissions
Method of Analysis	Age standardised rates for asthma admissions by mean of world standardisation method. Monthly admission rates for asthma calculated as percentage variation. Poisson method used to calculate CI 95%. Natural log transformation used in model. Possible associations with temperature tested with spearman's rank.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Shows peak in January and trough in August. Seasonality in asthma admissions more pronounced in children than adults. With school children, end of school in June associated with a drop (91%) in admissions, restarting school Oct, was associated with a sharp rise (165%).

Reference	Gyan et al (2005) African dust clouds are associated with increase paediatric asthma accident and emergency admission on the Caribbean island of Trinidad. International Journal of Biometeorology. Vol49 p371-376
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-15 Sample size: 2655 A&E visits for acute asthma. GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Trinidad 23 May 2001 to 13 May 2002
Independent variable	Saharan dust visibility and other climate variables
Dependent variable	
Method of Analysis	Retrospective ecological study of the paediatric asthma patients who attended the A&E department in relation to Saharan dust visibility and other climate variables for the period 23 May 2001 to 13 May 2003 was undertaken to see if there was an association. Time series plots. Poisson regression model was used to determine the statistical relationship between acute paediatric asthma A&E visits and Saharan dust cloud with or without other variables such as climatic parameters and month.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	There was an association between increased paediatric asthma admissions and increased Saharan dust cover. Best fitting model estimated that in one month such as June, a deterioration of visibility due to increased Saharan dust cover from no dust (visibility= 16km) to very dusty (visibility=7km) would increase a daily admission rate of 7.8 patients to 9.25 patients when climate variables like barometric pressure were kept constant. Suggests that the effect of dust is influenced by climate variables. Lags of more than 2 days had no impact hinting that Lag0 and Lag1 had an effect. No specification as to what exposures the lag applied

	to.

Reference	Garty et al (1998) Emergency room visits of asthmatic children, relation to air pollution, weather and airborne allergens. Annals of Allergy, asthma and immunology. Vol81(1) p563-570
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 1-18 Sample size: 1076 visits GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Israel. Jan 1st to Dec 31st 1993
Independent variable	Air pollutants (NOx, SO_2), O_3, PM), weather conditions (Temperature, humidity, pressure), selective airborne allergens (Artemisia (daisy), cupressus, Olea, Parietaria (nettle), Poaceae (grass) (pollen as one group), and spores)
Dependent variable	Number of ER visits
Method of Analysis	Data analysis performed in Statistix 3.5 software package. Pearson's analysis was used to establish the correlations (r) between the number of ER visits and each environmental parameters. Multiple correlation coefficients (R) (multiple regression analysis) were used to explain how much of the variance in the ER visits could be explained by a given set of environmental parameters. Partial correlations were used to evaluate the contribution of each environmental parameter to the improvement in the estimation of variance in the number of patients. Running means gives a better estimate of the regression relationship at each period. P values (for F-statistics) were calculated to determine the significance of the regression relationships.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	No significant associations were found between pollen and emergency room visits. ER visits significant correlated positively with concentrations of NOx, SO_2 and with high barometric pressure and negatively correlated with O_3, humidity. Rates of visits were high at the beginning of school year. Correlations between ER visits and environmental triggers increased significantly when the September peak was excluded. When the variables for this month were omitted from annual calculation, the correlation coefficients changed dramatically: ER visits correlated even more strongly with NO_2(r=074), SO_2 (r=0.64) and barometric pressure (r=0.65), not with min temperature (r=-0.45) max temperature (r=-0.41) and O_3 (r=-0.52). PM level fluctuated throughout the year and with no outstanding peaks or troughs and not correlated with asthma morbidity. The dependence of the ER visits of asthmatic children on a combined set of environmental triggers was expressed as the multiple regression coefficient R. The value R for NOx, SO_2 and O_3 was 0.45 meaning that 45% of the variances of the ER visits can be explained by the regression relationships with the combination of NOx, SO_2 and O_3. Correlations of environmental factors significantly increased when September peak was excluded in analysis. 61% variance in ER visits was explained by NOx, SO_2 and O_3 concentrations; 46% by weather parameter and 66% by NOX, SO_2 and barometric pressure; 69% by combination of air pollutants and weather parameters.

Reference	Hashimoto et al (2004) Influence of climate factors on emergency visits for childhood asthma attacks. Pediatrics International. Vol46 p48-52
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 2-15 Sample size: 5559 visits GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Japan 1998-2002
Independent variable	
Dependent variable	
Method of Analysis	The number of children who visited emergency rooms in a hospital in Tokyo during 1998-2002 (5559) visits were retrieved retrospectively and compared with 45 climate parameters from the meteorological agency using multiple log regression models with stepwise backward elimination approach. Best-fit model built including all variables had reached p<.10 to clear problems of collinearity. The number of emergency admissions cleared compared against data for calendar months, day of the week and time of visits using ANOVA. ROC curves.
Covariates	calendar months, day of the week and time of visits
Results (if included a comparison group, was the effect greater/weaker?)	The number of visits (3.7=/-3.1) per night increased significantly when climate conditions showed a rapid decrease from higher barometric pressure, from higher air temperature, and from higher humidity as well as lower wind speed. The best-fit model demonstrated that 22% variation in the number in the number of visits was explained by the linear relationship with 12 climate variables. Multiple regression =

	the number of patients having asthma attack per night increased significantly when land barometric pressure, air temperature and relative humidity decreased rapidly within 3 days ($P< 0.0001$). Sunshine and precipitation not associated with asthma admissions. Wind speed negatively associated with asthma attacks. Results postulate that specific climate conditions and other seasonal factors have an effect on the number of asthma visits in Tokyo. Number of visits higher on Saturday, Sunday and Monday and higher in September.

Reference	Higham et al (1997) Asthma and thunderstorms: description of an epidemic in general practice in Britain using data from a doctor's deputising service in the UK. Journal of Epidemiology and Community Health. Vol51 p233-238
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): Sample size: GP or Hospital: GP
Design (comparison group?)	
Setting (dates data collected)	UK 1994
Independent variable	Thunderstorm
Dependent variable	
Method of Analysis	29 office with deputising services for general practitioners out of house calls. Patients who called requesting home visits categorised based on their complaint. Number of calls on the night 24/25 June 1994 (thunderstorm) compared to 17/18 June 1994 (no thunderstorms). Statistical Analysis: OR with 95% CIs were calculated for the risk of asthma on the night of a thunderstorm relative to the control night for each office of the deputising service. A nominal value of 0.5 was given to all 5 areas with no asthmatics of asthma to allow ORs with 95% CIs to be calculated. Areas affected by epidemic asthma were defined as those where the lower limit of the 95% CI around the OR was greater than 1. Pooled Mentel-Hanzel estimated with 95% CIs were calculated for grouped analysis.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Authors give conclusions on whole population in general. Some figures given for children aged 0-9 thunderstorms m=50 f=20, no thunderstorms m=44 f=28. 10-19 years thunderstorms m=39 f=17. No thunderstorms m=11 f=7. Under certain circumstances, thunderstorms are associated with asthma.

Reference	Ivey et al (2001) Associations between climate variables and asthma visits to accident and emergency facilities in Trinidad, West Indies. Allergology International Vol50 p29-33
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-16 and adults Sample size: 27848 asthma visits, 12158 children GP or Hospital:
Design (comparison group?)	
Setting (dates data collected)	Trinidad 1st Jan to 31st of Dec 1997
Independent variable	rainfall, temperature, relative humidity, wind speed
Dependent variable	
Method of Analysis	Statistical Analysis: Multiple regressions. Mann Whitney U test used for significance. Asthma visits from the 5 study centres were aggregated into total weekly visits. Because of the number of visits and climatic variables = not normal distribution, authors were described using the median and IQR. Differences between wet and dry season for the number of visits as well as for the climatic variables were examined using the Mann Whitney U text. Dry season=Jan to mid-May. Best subset regression was used to identify those climatic variables that were independent predictors of asthma visits. The independent variables included all climate variables. Before regression analysis, the number of visits and the climate variables were log-transformed to normalise their distributions. All analyses were repeated with a data disaggregated by gender and age group. For the latter analyses, age groups defined as <16, 16-64 and 65<. Data analysed in Mintab Statistical Software.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	In paediatric population, there was decrease in wks 5 to 36 in the year followed by sharp increase in next 3wks coinciding with the start of school. Results from multiple regression indicated that paediatric visits were positively associated with temperature and wind speed.

Reference	Kashiwabara et al (2002) High frequency of emergency room visits of asthmatic children on misty or foggy nights. Journal of Asthma. Vol39(8) p711-7
Sample (age range (age groups)	Age group(s): 0-16

and size, data source Hospital or GP)	Sample size: 754 visits GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Israel April 1998 to march 2000
Independent variable	Temperature, pressure, rain, wind, humidity, fog, mist
Dependent variable	
Method of Analysis	Retrospective study, 754 visits were by children with asthma to the emergency room at night (between 18.00pm and 9.00am) during 2 yr period (April 1998 to march 2000). Meteorological data were taken from local fire station and meteorological office. Statistical Analysis: Data expressed as mean +/- SD in tables and means +/- SE in figures. The differences between 2 independent samples were tested using Mann-Whitney U test. One-way factorial analysis of variance and multiple comparison test applied to compare 3 < independent parameters. Analysis of categorical data was performed using chi-squared. The cut off points were median values for each of the meteorological data. OR and 95% CIs were calculated based on these values. A relation between independent samples was tested with multivariate analysis. P value of less than 0.05 was considered to indicate a significant difference.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	198 nights had no mist or fog, 410 misty nights, 123 foggy nights. Mean number of asthmatic children who visited the emergency room was higher on misty or foggy nights compared to clear nights (1.2=/- 1.2 people/night vs. 0.8=/-0.9 people/night p0.0001. Increased OR of emergency room visits of asthmatic children 1.74. OR for high temperature = 4.39. Multivariate analysis showed mist and fog, average atmospheric temperature and day-to-day change in temperature were related to the number of asthmatic children but not humidity. Authors suggest the presence of mist or fog causes asthma exacerbation in children, airborne droplets or meteorological conditions that cause mist and fog.

Reference	Kashiwabara et al (2003) Airborne water droplets in mist and fog may affect nocturnal attacks in asthmatic children. Journal of Asthma. Vol40(4) p405-411
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-16 Sample size: 971 visits GP or Hospital:
Design (comparison group?)	
Setting (dates data collected)	Israel April 1st 98 to March 31, 2001
Independent variable	
Dependent variable	
Method of Analysis	Retrospective study. 971 visits made by children with bronchial asthma to the ED at nighttime (18.00pm – 09.00am) during a 3-year period (April 1st 98 to March 31, 2001). Meteorological data were obtained at a local fire station and regional observatory. Authors divided nighttime into 5 3hr periods to evaluate the relationship between chronological changes in the frequency of the ED visits of asthmatic children and of meteorological conditions. Statistical Analysis: Data expressed as mean +/- SD in tables and means +/- SE in figures. Difference between 2 independent samples was tested using Mann-Whitney U test. One-way factorial analysis of variance and multiple comparison test applied to compare 3 < independent parameters. Analysis of categorical data was performed using chi-squared. The cut off points were median values for each of the meteorological data. OR and 95% CIs were calculated based on these values. A relation between independent samples was tested with multivariate analysis. P value < 0.05 was considered to indicate a significant difference.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	In 4/5 periods multivariate analysis showed that mist and fog, average atmospheric temperature and barometric pressure were related to the number of ED visits (n=1096, r=0.165-0.263 p0.0001). The year was divided into 4 seasons to get rid of differences between atmospheric temperature and barometric pressure on clear and misty nights. The mean number of ED visits was higher on misty or foggy nights than clearer nights in each seasonal period. Plus, average atmospheric temperature on misty or foggy nights with the ED visits was higher than that on misty or foggy nights without visits (p<0.01). The lowest temperature, humidity, wind speed found between the hours of 3 to 6am. There was no difference between average wind speed, atmospheric temperature or pressure on clear or non-clear nights. Asthmatic children frequently visited the ED on misty and foggy nights especially during midnight to dawn with high atmospheric temperature. Because of the higher atmospheric temperature on misty and foggy nights indicates a larger saturated amount of airborne water droplets, the results suggest that mist and fog and in particular, a saturated amount of airborne water droplets may stimulate bronchoconstriction.

Reference	Khot et al (1988) Biometeorological triggers of childhood asthma. Clinical Allergy. Vol18(4) p351-358
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): Age range eighteen months to 16 years Sample size: 748 admissions (210 female, 558 male). GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	UK August 1982 to November 1983
Independent variable	wind speed and wind direction, humidity, rainfall, temperature, pressure, spores and pollen
Dependent variable	
Method of Analysis	The relationship between childhood asthma admissions and biometeorological factors were investigated over a 16mth period. Correlation and multiple Poisson regressions. The response variable was lagged by one day to remove autocorrelation.
Covariates	Response variable lagged by one day
Results (if included a comparison group, was the effect greater/weaker?)	Seasonal pattern observed in admissions. Day of the week effect observed: high on Sunday and Saturday, lowest on Friday. No relationship was found with many commonly suspected precipitants such as temperature, humidity and wind. There was a strong association found with rainfall. Associations with low barometric pressure and counts of basidiospores and algae but no associated with grass pollen.

Reference	Mireku et al (2009) Changes in weather and the effects on pediatric asthma exacerbations. Annals of Allergy, Asthma and Immunology. Vol103 p220-224
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 1 to 18 Sample size: 25401 pediatric asthma admissions GP or Hospital:
Design (comparison group?)	
Setting (dates data collected)	US, Jan 1st 2004 to Dec 31st 2005
Independent variable	
Dependent variable	Daily number of admissions
Method of Analysis	Daily measures of climatic factors, air pollutants and aeroallergens were used. Examined changes in meteorological measures within a day and between days. Time series semi-parametric regression with GAM used to model daily counts of asthma admission to ED. GAM used to model environmental exposures. Controlled for pollutants and aeroallergens.
Covariates	pollutants and aeroallergens
Results (if included a comparison group, was the effect greater/weaker?)	Asthma morbidity increased in Feb, Sep and Oct in both years. Daily mean temperature varied from 7°F to 87°F. Daily relative humidity varied from 30 to 100% and barometric pressure from 29.39 to 32.39mmhg. Model 1: examined pollutant and climatic factors together. Within day and between day humidity changes 2 days prior the examined admission date = highly significant a decrease in humidity of 10% from lag day 3 to lag day 2 correlated with 1.3 additional admissions. 10% increase in humidity on day 2 was associated with 1.1 additional visits. Within day temperature change on the day of asthma admission = highly significant. A 10 % difference within a day was associated with 1.1 additional visits. A 10% increase on lag day 1 from lag day 0 was associated with 1.8 additional visits. Model 2: included climatic, pollutant and aeroallergen factors together. Results coincide with model 1. Between day observations: humidity changes from lag 3 to 2 and within day changes the day prior to admission were significantly associated with increased admissions. A 10°F increase within day was associated with 1.5 additional admissions.

Reference	Mohr et al (2008) Influence of season and temperature on the relationship of elemental carbon air pollution to pediatric asthma emergency room visits. Journal of Asthma. Vol45(10) p936-43
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 2-5, 6-10, 11-17 Sample size: 281763 paediatric ED visits 12836 asthma visits. 268419 Non-asthmatics GP or Hospital: H
Design (comparison group?)	Compared to remaining ED visits
Setting (dates data collected)	US. Jun 1st 2001 to 31 May 2003
Independent variable	Elemental Carbon (EC = component of $PM_{2.5}$), NOx, SO_2, temperature, mould and tree, weed and grass pollen
Dependent variable	Number of ED visits
Method of Analysis	St Louis. Poisson generalised equations using 1-day lag between exposure and ED visits. Evaluated the interaction between EC and temperature examined differences

	between weekend exposure vs weekday exposure. Relative risks calculated using 1 SD increase in EC to facilitate comparability across studies. The max daily temperature included in analysis. Missing pollutant data resulted in the exclusion of 39 days from the analysis out of a possible 730 days. Separate models fitted for each season. Using priori assumption of a 1-day lag for air pollutant measurements, this translated into weekend exposure. In addition, previous studies indicate a difference in weekend and weekday exposures hence Mohr et al included a weekend/weekday indicator variable in the model. Poisson regression model with a log link function was fitted for each season using GEE analysis. EC = component of $PM_{2.5}$.
Covariates	controlled for season, weekend exposure, allergens and other pollutants known to exacerbate asthma
Results (if included a comparison group, was the effect greater/weaker?)	The number of ED visits for asthmatics showed seasonal variation not reflected in Non-asthmatics. Observed on average, higher admissions on Sundays and Mondays An interaction effect existed between EC and temperature for 11 to 17 year olds in summer and winter seasons. During the summer, a 0.10 mgm3 increase in EC resulted in a 9.45% increase in asthma ED visits among 11-17 yr olds at median seasonal temperature (86.5F). This risk increases with increasing temperature. During the winter, a 0.10 mgm3 increase in EC in 2.80% increase in asthma ED visits with 11-17 year olds at a median seasonal temperature (43.3F). This risk increased with decreasing temperature. Among 11-17 year olds, daily numbers of asthma ED visits is associated with increased levels of EC at higher temperature in the summer and low temperature in the winter. Adjusted RR and CIs for NOx, SO_2, O_3. In the spring, a 10pbb increase in NOx was associated with a 4% increase in asthma visits (RR1.04 CI 1.01, 1.09) among 2 to 5 year olds and an increase of 5% in ED visits made by all ages (2 to 17) (RR1.05 CI, 1.01 to 1.09). In the fall, a 10pbb increase in NOx was associated with a 7% increase in ED visits made by 6 to 10 year olds (RR1.07, CI 1.04, 1.15). There was also a marginally significant increase in 11 to 17 years. A 10pbb increase in O_3 was associated with a 7% increase in ED visits of all ages (RR1.07, CI 1,01, 1.14). SO_2 not statistically associated with ED visits.

Reference	Nastos et al (2008) The effect of weather variability on pediatric asthma admissions in Athens, Greece. Journal of Asthma. Vol45(1) p59-65
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-4, 5-14 Sample size: NR GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Greece 1978-2000
Independent variable	Temperature, humidity, pressure, cooling power, wind speed, discomfort index
Dependent variable	
Method of Analysis	Biometeorological indices were used in analysis: Thom's discomfort index (THI) and cooling power. The relationship between childhood asthma admissions and environmental parameters was calculated by the application of Pearson's x2 test. Applied generalised linear models with Poisson distribution. Harmonic analysis followed by cross spectrum analysis.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Significant relationship among asthma hospitalisations and the investigated parameters especially for the children aged 0 to 4. Authors found that admissions negatively correlated with the discomfort index, air temperature, absolute humidity whereas there is a positive correlation with cooling power, relative humidity and wind speed. Children 5 to 14 appeared to be more vulnerable to exposure in the late spring. Seasonal variation in children's hospitalisations rising during the damp cold period in pre-schoolers and peaking in may for school children.

Reference	Newell and Swafford (1963) Epidemiology of asthma in children, with particular reference to wind speed and wind direction. Pediatrics. Vol31(1) p134-143
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): Children as referenced in title Sample size: 2400 ED visits GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	US
Independent variable	
Dependent variable	
Method of Analysis	
Covariates	
Results (if included a comparison	Outbreaks of asthma in children were not clearly related to wind speed and

group, was the effect greater/weaker?)	direction. Severity of attacks rose in fall and fell off during the summer. Duration of exposure could not be clearly related to frequency of attacks.

Reference	Newson et al (1997) Effect of thunderstorms and airborne grass pollen on the incidence of acute asthma in England, 1990-94. Thorax Vol52 p680-685
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-14 Sample size: NR GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	UK 1990-94
Independent variable	Pollen, thunderstorm
Dependent variable	
Method of Analysis	Statistical analysis: Log linear auto-regression model for time series, estimation of model parameters was carried out using SAS program. This uses procedures GENMOD and NLIN of the SAS/STAT system. Dummy variables for day of the week, public holiday and sinusoid terms or quadratic spline added to model. Five RHAs had fairly complete pollen count series, further model was fitted to the data which contained all the above x variates, one for high MA pollen counts in the presence of zero sferic density and one for high MA pollen counts in the presence of non-zero-density. Threshold of 50 gr/m3/day was chosen because experience in clinical trials has shown that, at this concentration, most people who are allergic to grass pollen have symptoms.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Elevated pollen counts after thunderstorms amplifies the thunderstorm associated asthma effect. RR of high pollen averages without sferics is 1.00 and with sferics = 1.16 in 0 to 14 years. The RR ratio (with/without sferics) is 1.16

Reference	Newson et al (1998) Acute asthma epidemics, weather and pollen in England, 1987-1994. European Respiratory Journal Vol11 p694-711
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-14, 15< Sample size: NR GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	UK 1987-1994
Independent variable	
Dependent variable	
Method of Analysis	Epidemics defined as combinations of dates, age, RHA with exceptionally high asthma admission counts compared to the predictions of a log-linear autoregression model, 8 autoregressive lag terms. Authors were compared with control days 1 wk before and after regarding 7 meteorological variables. Meteorological data for a day were matched to hospital admissions data for the midnight-midnight day on which the meteorological day ended, so that the wind speed data were lagged by 24h; sferics, temperature and rainfall were lagged by 15h, pressure and humidity data were lagged by 15-39h. This was thought to be the most likely match to lead predictive power as it allowed time for acute asthma attacks. Alternative match was considered, in which meteorological data for a day were matched to hospital admissions data for the day in which the meteorological day began i.e. wind speed data was L0h, sferics, temperature and rainfall were lagged -9h, and pressure and humidity were lagged by -9-15h.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Mean density of sferics (lightning flashes), temperature, and rainfall on epidemic days were greater than those on control days. High sferic densities were overrepresented in epidemics. Simultaneously high sferics and grass pollen further increased the probability of an epidemic. 2/3 of epidemics were not preceded by thunderstorms.

Reference	Palusci et al (1998) Does the weather trigger pediatric asthma emergency department visits? Ambulatory Child Health. Vol3(4) p357-363
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-18 Sample size: 6741 visits, of which 1180 were admitted GP or Hospital:
Design (comparison group?)	
Setting (dates data collected)	US Mar 1991 to Aug 1995
Independent variable	
Dependent variable	
Method of Analysis	Information obtained from emergency department patient log books for each visit. Repeat visits for asthma within 7 days excluded. Controlling for day in the week and month in year, studied the correlation of the daily number of emergency visits

	with changes in temperature, dew point, barometric pressure, precipitation, wind velocity and direction, relative humidity and wind chill. These factors analysed as day differences over the prior 1 and 2 days before visit because of the reported lag times in the development of asthma symptoms. Multiple regressions applied to study the effects of these parameters on the dependent variable of total number of ED visits per day. Given the high level of autocorrelation of meteorological variables, model formulated using a lagged variable of the dependent number of ED visits as one of the independent variables. Model relates today's number of ED visits with yesterday's number of ED visits and the effects of the month of the year, day of the wk and holidays. Next weather variables and their changes over 1 and 2 days were added in a forward stepwise regression technique. The Durbin-Watson statistic and residual analysis were used to examine autocorrelation in the model.
Covariates	the month of the year, day of the wk and holidays
Results (if included a comparison group, was the effect greater/weaker?)	No significant autocorrelation was found using the Durbin-Watson statistic and residual. More visits were noted on Mondays than Fridays or Saturdays. Barometric pressure, day of the week and month of the year were independently associated with paediatric asthma emergency visits.

Reference	Pritis et al (2005) Association of weather conditions with childhood admissions for wheezy bronchitis or asthma in Athens. Respiration Vol73 p783-790
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-4, 5-14 Sample size: 25,412 asthma admissions during the entire study period; 18,950 were among the 0- to 4-year olds GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Athens 1973-2000
Independent variable	Monthly values of humidity; pressure; min, mean and max temp; precipitation; vapour pressure
Dependent variable	
Method of Analysis	Whole study period was divided into 3 periods. Multiple regression analysis. Associations between monthly admission rates for childhood asthma and meteorological variables investigated using Pearson's correlation coefficient, stepwise regression used after. All trends tested using Mann Kendall Rank Statistics.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Results from multiple regression analysis revealed that relative humidity and atmospheric pressure were predictors of up to 56.7% (between 1988-93) and 59.2% (between 1994-2000) monthly asthma admissions in children. No relations were found for any other meteorological variable – mean temperature, max temperature, min temperature, temperature range, vapour pressure, total precipitation.

Reference	Prospero et al (2008) Relationship between African dust carried in the Atlantic trade winds and surges in pediatric asthma attendances in the Caribbean. International Journal of Biometeorology. Vol52 p823-832
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-18 Sample size: 15742 visits GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Caribbean 1996 and 1997
Independent variable	Wind, dust
Dependent variable	
Method of Analysis	It is widely believed that African dust, transported in high concentrations in the trade winds every year is a major causative factor. Link between asthma and dust is largely based on anecdotal evidence associated sharp increases in the occurrence of asthma symptoms with hazy conditions often caused by dust. 2-year study of the relationship between the daily concentrations of dust measured in on shore trade winds at Barbados and paediatric attendances rates. Compared daily paediatric asthma attendances during strong surge events in 1996 and 1997 with rates obtained when little dust was present both immediately and after it had event. Tested for significance using Mann-Whitney rank sum.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	No obvious relationship found. Authors suggested more subtle effects from dust, different health threat producing less obvious symptoms than those of asthma.

Reference	Rosas et al (1998) Analysis of the relationship between environmental factors (aeroallergens, air pollution, and weather) and asthma emergency admissions to a hospital in Mexico city. Allergy. Vol53 p394-401
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): Sample size: 1095 asthmatics GP or Hospital:
Design (comparison group?)	
Setting (dates data collected)	Mexico. 1991
Independent variable	NO_2, SO_2, O_3, PM_{10}, TSP, temperature and humidity, spores and pollen
Dependent variable	Number of emergency admissions
Method of Analysis	Generalised linear models were fitted with Poisson distribution
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Asthma in Mexico had a seasonal pattern with more during the wet season (may to October) than dry season (November to April). Larger proportion of pediatric asthmatics presented from July to November. Amongst their findings, grass pollen was associated with child admissions in both wet (humid) and dry seasons. Based on biological grounds, variables have a short-term effect. Analysis suggests response to environmental triggers may have been delayed or have accumulated overtime – 1 to 2 days (do not know what variables this lag applies to). Wet season model explained 35% of the variance whilst the dry season model explained 18% of the variance. For children, the best model for the wet season included grass, with positive effects of ascospores and negative effects from temperature and rainfall. In the dry season, the best model had dueteromycetes as the major factor with grass pollen. The lag could be the consequence of a sensitisation period, or the time it takes for symptoms to increase or could partly be due to a delay in the patients seeking medical advice. Pollen had an increased effect in the wet season. There was no evidence support for air pollution and asthma admissions. Weather not generally associated with asthma admissions except wet season when there were lower daytime temperatures. Weather could be indirectly associated with asthma in that in the dry season, conditions generally promote the release of airborne pollen. Wet seasons, high humidity and rain often associated with the development of fungi-aeroallergens. In conclusion, results suggest the aeroallergens may be statistically associated more strongly with asthma hospital admissions than air pollutants and can confound results in epidemiological studies.

Reference	Villeneuve et al (2005) Frequency of emergency room visits for childhood asthma in Ottawa Canada: the role of weather. International Journal of Biometeorology.Vol50 p48-56
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 2 and 15 years Sample size: 18970 asthma visits GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Canada 1992-2000
Independent variable	Meteorological variables: wind speed, temperature, atmospheric pressure, relative humidity and visibility
Dependent variable	Daily counts of emergency room asthma related visits
Method of Analysis	Case crossover study. Hospital emergency department visits for asthma between 1992 and 2000 were identified. Particular emphasis was placed on exploring asthma visits and fog, thunderstorms, snow and liquid and freezing forms of precipitation. Number of visits and weather characteristics were grouped into 6-hour case and control intervals. Stratified analysis. Statistical differences were determined by using multivariate analysis of variance adjusting for whether visits occurred during the wk, weekend or holidays.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	The occurrence of fog and liquid precipitation was associated with an increased number of asthma visits; snow was associated with a decreased number of visits. Stratified analyses between season found no association in any of the four calendar intervals between the number of asthma visits, visibility, relative humidity and change in temp. Contrast, summertime thunderstorm activity was associated with OR1.35 relative to summer periods with no activity. Suggesting seasonal relationship/component to thunderstorm. There were a higher number of visits on Sunday and Mondays. Interestingly the mean number of daily visits was higher on the holidays than non-holidays but "holiday"= working population holidays i.e. bank holidays, weekends and public holidays. Authors inferred that parents had more time to take their child to hospital. There were higher counts in September. Attempted to explore the temporal sequence between thunderstorm occurrence and asthma visits by looking at variations across different time lags- 6hrs, 12hrs,

	18hr and 24hr. Child visits to the emergency room were highest within 6hrs lag after thunderstorm.

Reference	Wong et al (2001) Temporal relationship between air pollution and hospital admissions for asthmatic children in Hong Kong. Clinical and Experimental Allergy. Vol31 p565-569
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-15 Sample size: 1217 children GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Hong Kong. 1993 to 94
Independent variable	NO_2, SO_2, PM_{10}
Dependent variable	Number of admissions
Method of Analysis	Poisson regression allowing for over dispersion and autocorrelation was used to determine the percentage change in the mean number of asthma admissions associated with as increase in the pollutant models. The possibility of a lag effect of each pollutant was explored by significance test and plotting residuals against each variable lagged 1.2.3.4 or 5 days as well as cumulative lag calculated as the mean of lags 0 and 1, lags 0-2 and lags 0-3. For each pollutant, the most significant single day and cumulative lag was selected for reporting purposes.
Covariates	Season, meteorological conditions
Results (if included a comparison group, was the effect greater/weaker?)	Mean PM_{10}, NO_2 and SO_2 levels were 44.1ugm3, 43.3ugm3 and 12.2ugm3 respectively. Daily admission rates increased significantly with increased ambient level of NO_2 (RR=1.08 per 10ugm3 increase), SO_2 (RR=1.06) and inhaled particles PM_{10} (RR=1.03). No association was found between hospital admissions and humidity, temperature, atmospheric pressure. Lags: daily admissions increased significantly with increasing ambient levels PM_{10} =L5, NO_2=L0, SO_2=L3

Reference	Xirasagar et al (2005) Seasonality of pediatric admissions: the role of climate and environmental factors. European Journal of Paediatrics. Vol165 p747-752
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s):0-1, 2-5, 6-14 Sample size: 27,275 hospitalisations GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Taiwan
Independent variable	PM_{10}, NO_2, O_3, CO, SO_2, temperature, humidity, pressure, rainfall, sunshine.
Dependent variable	Number of admissions
Method of Analysis	Spearman's Correlations, ARIMA
Covariates	Time trends
Results (if included a comparison group, was the effect greater/weaker?)	One of the main findings is that seasonality varies by age. Children younger than 2: rates lowest in January-February, highest in November, trough in June-July. Pre-schoolers: rates lowest in June-July, highest in November, 2 upsurges in August and March. School goers: rates lowest in June-August, upsurges in March and September. For school-goers, all air pollutants except NO_2 and CO, and all climatic factors except rainfall are significant. PM_{10}, SO_2, O_3, Pressure = positive association Sunshine, humidity, temperature = negative association

A6. Search Strategy to Review Current Literature investigating the Associations between Pollen Exposures and Childhood Asthma Exacerbation resulting in Medical Contact

A6.1. Pollen Databases and Search Terms

Searches were performed using Medline, CINAHL, Web of Science, EMBASE, Cochrane and Google scholar. Searches performed in June 2009.

In the search, the terms "asthma", "pollen", "child*", "pediatric", paediatric" and "admi*, "present*", "attend*", "family physician", "hospital*", "out of hours" and "general prac*" were included using the Boolean terms "and" or "or".

Table A. 22: Search Pollen Medline

	Search Terms	Results
1	asthma/ asthma.mp.	106398
2	Child*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]	1537841
3	Adolescent/ or Pediatrics/ or Child/ or paediatric.mp.	1173793
4	2 or 3	1554048
5	(admission or admit*).mp. [mp=title, original title, abstract, name of substance word, subject heading word]	1180297
6	Present.mp. [mp=title, original title, abstract, name of substance word, subject heading word]	2027170
7	Attend*mp. [mp=title, original title, abstract, name of substance word, subject heading word]	83788
8	Hospital department/ or Medical Records department hospital/ or hospital*.mp. or Emergency Service, hospital	828617
9	general prac*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]	50499
10	family physician*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]	15487
11	Out of hours. Mp	705
12	Diar*.mp.	85245
13	5 or 6 or 7 or 8 or 9 or 10 or 11 or 12	3679687
14	Pollen/ or pollen.mp.	16163
15	1 and 4 and 13 and 14	320
16	Limit 14 to (English language and Humans)	258

Table A. 23: Search Pollen CINAHL.

	Search Terms	Results
1	(ZU "asthma")	15496
2	Child*	227400
3	Paediatric	4535
4	Pediatric	34526
5	2 or 3 or 4	235305
6	Admi*	225490
7	Present*	126127
8	attend*	34546
9	Hospital*	148249
10	General prac*	7413
11	family physician	520
12	Diar*	11426
13	Out of hours	257
14	6 or 7 or 8 or 9 or 10 or 11 or 12 or 13	509482
15	Pollen	439
16	1 and 5 and 14 and 15	24

Table A. 24: Search Pollen Cochrane Library.

	Search Terms	Results
1	Asthma	
2	Pollen	
3	Child*	
4	Admi*	
5	1 and 2 and 3 and 4	54
6	Keep	0

Table A. 25: Search Pollen EMBASE.

	Search Terms	Results
1	Mild Persistent Asthma/ or asthma.mp. or Moderate Persistent Asthma/ or Exercise Induced Asthma/ or Nocturnal Asthma/ or Asthma/ or Allergic Asthma/ or Severe Persistent Asthma/ or Mild Intermittent Asthma/	67426
2	Child*.mp	511954
3	Paediatric/ or pediatric/ or paediatric.mp	28502
4	2 or 3	519617
5	(admission or admit*).mp. [mp=title, original title, abstract, name of substance word, subject heading word]	606071
6	Present*mp. [mp=title, original title, abstract, name of substance word, subject heading word]	1153189
7	Attend*mp. [mp=title, original title, abstract, name of substance word, subject heading word]	367679
8	hospital*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]	392782
9	general practice/ or General Practitioner/	38662
10	family physician*.mp. [mp=title, original title, abstract, name of substance word, subject heading word]	5026
11	Out of hours. Mp.	488
12	Diar*.mp.	80096
13	5 or 6 or 7 or 8 or 9 or 10 or 11 or 12	1736756
14	Pollen/ or pollen germination/ or Fossil pollen/ or pollen extract/ or pollen allergy/ or grass pollen extract/ or grass pollen/ or ragweed pollen/ or pollen.mp.	7977
15	1 and 4 and 13 and 14	273
16	Limit 15 to (English language and Humans)	220

Table A. 26: Search Pollen Web of Science.

	Search Terms	Results
1	TS = (asthma)	92692
2	TS = (child*)	>100000
3	TS = (paediatric)	21569
4	TS=(pediatric)	>100000
5	#2 OR #3 OR #4	>100000
6	TS=(admi*)	>100000
7	TS = (present*)	>100000
8	TS = (attend*)	>100000
9	TS = (hospital*)	>100000
10	TS = (general pract*)	93490
11	TS = (family physician)	7136
12	TS = (Out of hours)	>100000
13	TS = (diar*)	91007
14	#6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13	>100000
15	TS = (pollen)	44815
16	#1 AND #5 AND #14 AND #15	354

A6.2. Pollen Search Results

These results were produced from the second search.

- Medline: 258 titles - 17 abstracts - 10 studies selected for further reading
- CINAHL: 24 titles - 1 abstract - 1 study selected for further reading
- Cochrane: 54 titles - 0 abstracts - 0 selected for further reading
- EMBASE: 220 titles - 5 abstracts - 5 studies selected for further reading

- Web of Science: 324 titles - 32 abstracts - 6 studies selected for further reading
- Google scholar: 0 studies

A6.3. Pollen Mini Data Extraction

Reference	Anderson et al (1998) Air pollution, pollens and daily admissions for asthma in London 1987-92. Thorax. Vol53 p842 848
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-14, 15-16, 65+. Sample size: number of days time mean number of admissions for asthma = 35022 GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	London, UK. 1987-92
Independent variable	Daily number of admissions
Dependent variable	BS, NO_2, O_3, SO_2, temperature, humidity, grass, birch, oak pollen
Method of Analysis	1st stage: Poisson regression used to estimate RR of daily admissions Last stage: log-linear modelling with Poisson errors Independent effects on individual pollutants and interactions with aeroallergens were explored using two pollutant models and models included pollen. Priori hypothesis was that the exposure pollution had an effect on the same or previous days. Authors also examined the cumulative effects over three days. Season separated into warm (April to Sep) and cold (October to Match). Authors examined the interaction between pollen and pollution.
Covariates	1st stage: seasonal factors, time trends, Calendar effects Last stage: also corrected for overdispersion and autocorrelation
Results (if included a comparison group, was the effect greater/weaker?)	NO_2 significantly associated with 0-14 age group (whole year and warm season suggesting the effect is more apparent in the warm temps). Significant seasonal differences were observed in ozone for 0-14, ozone had negative associations in the whole year especially in the cool season. Suggesting the effect is more apparent in cooler temperatures. General cumulative lags of up to 3 days showed stronger effect than single day lags. In the two-pollutant model, associations were most robust with ozone and least robust with NO_2. There was no evidence that associations with air pollutants were confounded with pollen. There was little evidence of an interaction between pollution and pollen except for the synergy between SO_2 and grass pollen in children. Grass pollen negatively correlated with black smoke. Oak pollen positively related to ozone and NO_2. There is a significant positive effect of birch pollen in the 0–14 and 15–64 age groups, a significant negative effect of grass pollen in the 0–14 age group, and a significant negative effect of oak pollen in the 0–14 and 15–64 age groups. Grass pollen alone on 0-14 = negative effect. Birch pollen alone = positive effect. Grass and O_3 positively correlated. Lag: cumulative lag: All year. NO_2 (3), SO_2 (3) O_3(2) Lag: single lag. All year = NO_2 (2), SO_2(1), Warm season= O_3(0) Lag: warm season. Pollen. Birch(2), Grass(0) Oak(0)

Reference	Babin et al (2007) Pediatric patient asthma-related emergency department visits and admissions in Washington, DC, from 2001–2004 and associations with air quality, socio-economic status and age group. Environmental Health. Vol6
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 1-4, 5-12, 13-17, 1-17 Sample size: NR GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	US 2001 to 2004
Independent variable	O_3, $PM_{2.5}$, Temperature, pollen, mould.
Dependent variable	
Method of Analysis	Poisson regression
Covariates	Cubic spline used to control for long-term seasonality.
Results (if included a comparison group, was the effect greater/weaker?)	There were two annual peaks in ED admissions for asthma: between September and November and between March and May. Seasonal summer peaks in ozone and $PM_{2.5}$. Associations between paediatric asthma ED visits and outdoor ozone concentrations were significant and strongest for the 5–12 year-old age group (Lag0), for which a 0.01-ppm increase in ozone concentration indicated a mean 3.2% increase in daily ED visits and a mean 8.3% increase in daily ED admissions. However, the 1–4 yr old age group had the highest rate of asthma related ED visits. For 1–17 yr olds, the rates of both asthma-related ED visits and admissions increased logarithmically with the percentage of children living below the poverty threshold, slowing when this percentage exceeded 30%. Observed real increase in RR of asthma ED visits for children living in higher poverty zip codes.

	Weed pollen and temperature showed statistically significant associations with 5-12 and 1-17 age groups. Significant effects of tree pollen and ambient temperature were also seen for the 5–12 yrs age group. No statistically significant relationship observed with $PM_{2.5}$ and admissions. Lagged associations with the 1-17 age-group and grass pollen. 5-12 age group largest increase, O_3 (lag 4), grass (lag3), tree (Lag2). No statistically significant interactions between exposures identified.

Reference	Garty et al (1998) Emergency room visits of asthmatic children, relation to air pollution, weather and airborne allergens. Annals of Allergy, asthma and immunology. Vol81(1) p563-570
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 1-18 Sample size: 1076 GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Israel. Jan 1st to Dec 31st 1993
Independent variable	Air pollutants (NOx, SO_2), O_3, PM), weather conditions (Temperature, humidity, pressure), selective airborne allergens (Artemisia (daisy), cupressus, Olea, Parietaria (nettle), Poaceae (grass) (pollen as one group), and spores)
Dependent variable	Number of ER visits
Method of Analysis	Data analysis performed in Statistix 3.5 software package. Pearson's analysis was used to establish the correlations (r) between the number of ER visits and each environmental parameters. Multiple correlation coefficients (R) (multiple regression analysis) were used to explain how much of the variance in the ER visits could be explained by a given set of environmental parameters. Partial correlations were used to evaluate the contribution of each environmental parameter to the improvement in the estimation of variance in the number of patients. Running means gives a better estimate of the regression relationship at each period. Two purposes of this was to: 1. Identify the pattern of the relationship between environmental effect and the ER visits without subjectively fixating on as artificial period. 2. Explore the possibility that the relationship between effect or and results is not instantaneous. Running mean defined as variable of n days as follows: let x_1, x_2 x_3 be the values of the variable x measured on the 1st, 2nd and 3rd day and so on then the running mean (rx) for n days of the variable consists of equations (look at paper) E.g. n=7, the running mean of a variable in the mean from Monday to Sunday, then form Tuesday to Monday and so on. The dependent variable was the running mean of the number of ER visits. Various sets of independent variables were formed from the corresponding running means of each of the environmental parameters. P values (for F-statistics) were calculated to determine the significance of the regression relationships.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	No significant associations were observed between pollen and emergency room visits. ER visits significant correlated positively with concentrations of NOx, SO_2 and with high barometric pressure and negatively correlated with O_3, humidity. High rates of visits at the beginning of school year. Correlations between ER visits and environmental triggers increased significantly when the September peak was excluded. When the variables for this month were omitted from annual calculation, the correlation coefficients changed dramatically: ER visits correlated even more strongly with NO_2(r=074), SO_2 (r=0.64) and barometric pressure (r=0.65), not with min temperature (r=-0.45) max temperature (r=-0.41) and O_3 (r=-0.52). PM level fluctuated throughout the year and with no outstanding peaks or troughs and not correlated with asthma morbidity The dependence of the ER visits of asthmatic children on a combined set of environmental triggers was expressed as the multiple regression coefficient R. The value R for NOx, SO_2 and O_3 was 0.45 meaning that 45% of the variances of the ER visits can be explained by the regression relationships with the combination of NOx, SO_2 and O_3. Correlations of environmental factors significantly increased when September peak was excluded in analysis. 61% variance in ER visits was explained by NOx, SO_2 and O_3 concentrations; 46% by weather parameter and 66% by NOX, SO_2 and barometric pressure; 69% by combination of air pollutants and weather parameters.

Reference	Heguy et al (2008) Association between grass and weed pollen and emergency department visits for asthma among children in Montreal. Environmental Research. Vol106 p203-211
Sample (age range (age groups)	Age group(s): 0-9

and size, data source Hospital or GP)	Sample size: 43780 visits GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	Canada (Quebec Health Insurance plan database). April to October from 1994 to 2004
Independent variable	Grass, weed and ragweed
Dependent variable	ED visits
Method of Analysis	Time series analysis, log linear over-dispersed Poisson models adjusted for temporal variations.
Covariates	Temporal variation. pollutants (SO_2, CO, NO_2, O_3) temperature, pressure
Results (if included a comparison group, was the effect greater/weaker?)	Positive associations were found between emergency department visits and concentrations of grass pollen 3 days after exposure. The effect of grass pollen exposure was stronger in emergency department readmissions in comparison to initial visits. Weak negative associations were detected for weed pollen including ragweed pollen and emergency department visits 2 days after exposure.

Reference	Im and Schneider (2005) Effect of weed pollen on children's hospital admissions for asthma during the fall season. Archives of Environmental & Occupational Health. Vol60(5) p257-265
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-14 Sample size: 17902 visits GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	US 1993-95
Independent variable	Pollutants; O_3, weather; temperature, pollen; weed, ragweed
Dependent variable	Children's daily hospital admissions
Method of Analysis	Children's daily hospital admissions examined for seasonal pattern. 7-day moving average were used to smooth variations in data. Selected the annual peak period in children's asthma hospital admissions as this was the best time to explore the relationships between environmental triggers and daily asthma hospital admissions. Authors examined relationships with independent environmental variables using Pearson cross-correlation analysis. Explored the relationship between the number of asthma hospitalisations and the environmental variables using multiple regressions.
Covariates	Secular trends, meteorological variables
Results (if included a comparison group, was the effect greater/weaker?)	Authors report significant spikes in children's asthma hospital admissions in late Sep and Oct in each of the 3 yrs studied. In depth analysis of the fall peaks, to determine whether there was an association between children asthma admissions and environmental variables. Hospital admissions peaks approximately 3weeks after school started before heating systems were switched on in schools. Authors also preceded (before) the point at which school begins to report increase in absences that are due to infectious illnesses. Weed = highest correlation on L3. Max O_3 was highest in the summer. NO_2 was high in summer, low in winter and fall. Included 3 variables based in results of the exploratory analysis, O_3, weed pollen and ragweed. Initial model explained 34.1% of variance, O_3 itself explained 24.6%. Negative beta coefficient with ozone and ragweed. Final model = only weed pollen.

Reference	Khot et al (1988) Biometeorological triggers of childhood asthma. Clinical Allergy Vol18(4) p351-358
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 18mths to 16 years Sample size:748 admissions (210 female, 558 male) GP or Hospital:
Design (comparison group?)	
Setting (dates data collected)	UK. Aug 1982 to Dec 1983
Independent variable	wind speed and wind direction, humidity, rainfall, temperature, pressure, spores and pollen
Dependent variable	Hospital admissions
Method of Analysis	Correlation and multiple Poisson regression. Response variable was lagged by one day to get rid of autocorrelation.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Seasonal finding was observed in pattern of admissions. Day of the week effect was observed: high on Sunday and sat, lowest on Friday. No relationship was found with many commonly suspected precipitants such as temperature, humidity and wind. There was a strong association found with rainfall. Associations with low barometric pressure and counts of basidiospores and algae but no associated with grass pollen.

Reference	Lierl and Hornung (2003) Relationship of outdoor air quality to pediatric asthma exacerbations. Annals of Allergy, Asthma and Immunology. Vol90(1) p1-2
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): NR Sample size: NR GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	US. 1996-97 April to October
Independent variable	PM_{10}, O_3 pollen and spores.
Dependent variable	Number of hospitalisations or ER visits
Method of Analysis	To examine seasonal variation in exposure data, monthly means were plotted. After preliminary analyses, multiple regression models were developed to examine all potential exposure measures as predictors of the number of daily asthma visits. Independent variables entered: pollen counts, fungal counts, PM_{10} as daily average and O_3 concentrations. Variables entered in stepwise fashion. Poisson regression modelled the daily number of asthma visits as a function of air quality data and temporal variables. Poisson regression assumes that after removing the effects of any explanatory variables, the counts follow a Poisson distribution as opposed to a normal distribution as required in the least squares regression. To account for serial correlation, GEE with an autocorrelation structure for the variance-covariance was used. Overdispersion was handled by scaling standard errors up to the magnitude of the overdispersion factor.
Covariates	Seasonal trend
Results (if included a comparison group, was the effect greater/weaker?)	Significant association found between the number of asthma visits and daily pollen counts. Effect for pollen was stronger after 1 day lag. High PM_{10} counts were synergistic with pollen count as a predictor of asthma. Analysis indicated a synergistic effect between two pollutant, exposure response for pollen was moderately high on days when PM_{10} were low and significantly higher on days when PM_{10} was higher than 33units No association for ozone and fungal spores.

Reference	Newson et al (1997) Effect of thunderstorms and airborne grass pollen on the incidence of acute asthma in England, 1990-94. Thorax Vol52 p680-685
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-14 Sample size: NR GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	UK 1990-94
Independent variable	Pollen, thunderstorm
Dependent variable	
Method of Analysis	Statistical analysis: Log linear auto-regression model for time series, estimation of model parameters was carried out using SAS program. This uses procedures GENMOD and NLIN of the SAS/STAT system. Dummy variables for day of the week, public holiday and sinusoid terms or quadratic spline added to model. Five RHAs had fairly complete pollen count series, further model was fitted to the data which contained all the above x variates, one for high MA pollen counts in the presence of zero sferic density and one for high MA pollen counts in the presence of non-zero-density. Threshold of 50 gr/m3/day was chosen because experience in clinical trials has shown that, at this concentration, most people who are allergic to grass pollen have symptoms.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Elevated pollen counts after thunderstorms amplifies the thunderstorm associated asthma effect. RR of high pollen averages without sferics is 1.00 and with sferics = 1.16 in 0 to 14 years. The RR ratio (with/without sferics) is 1.16

Reference	Newson et al (1998) Acute asthma epidemics, weather and pollen in England, 1987-1994. European Respiratory Journal Vol11 p694-711
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 0-14, 15< Sample size: NR GP or Hospital: H
Design (comparison group?)	
Setting (dates data collected)	UK 1987-1994
Independent variable	
Dependent variable	
Method of Analysis	Epidemics defined as combinations of dates, age, RHA with exceptionally high asthma admission counts compared to the predictions of a log-linear autoregression model, 8 autoregressive lag terms. Authors were compared with control days 1 wk before and after regarding 7 meteorological variables. Meteorological data for a day were matched to hospital admissions data for the

	midnight-midnight day on which the meteorological day ended, so that the wind speed data were lagged by 24h; sferics, temperature and rainfall were lagged by 15h, pressure and humidity data were lagged by 15-39h. This was thought to be the most likely match to lead predictive power as it allowed time for acute asthma attacks. Alternative match was considered, in which meteorological data for a day were matched to hospital admissions data for the day in which the meteorological day began i.e. wind speed data was L0h, sferics, temperature and rainfall were lagged -9h, and pressure and humidity were lagged by -9-15h.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Mean density of sferics (lightning flashes), temperature, and rainfall on epidemic days were greater than those on control days. High sferic densities were overrepresented in epidemics. Simultaneously high sferics and grass pollen further increased the probability of an epidemic. 2/3 of epidemics were not preceded by thunderstorms.

Reference	Rosas et al (1998) Analysis of the relationship between environmental factors (aeroallergens, air pollution, and weather) and asthma emergency admissions to a hospital in Mexico city. Allergy. Vol53 p394-401
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): Sample size: 1095 asthmatics GP or Hospital:
Design (comparison group?)	
Setting (dates data collected)	Mexico. 1991
Independent variable	NO_2, SO_2, O_3, PM_{10}, TSP, temperature and humidity, spores and pollen
Dependent variable	Number of emergency admissions
Method of Analysis	Generalised linear models were fitted with Poisson distribution and log link models assumes that the counts of patients on each day follow Poisson distribution with logged means described by a linear equation involving various explanatory variables. Exploratory models investigated with Generalised additive model filled with smooth splines. Smooth curves constructed from segments of cubic polynomial, providing a very flexible way to model nonlinear relationships. Plots of the splines indicated that the pollen, spore, particle count also needed to be log transformed to achieve a linear relationship. Similar transformations but with logarithms to base 10 are often used to analyse the effects of drug doses in bioessays. It is clear that some patients will be affected by their conditions not only on the day of admission but on days prior to admission. Therefore, models were calculated using running means from the available data from the previous 7 days.
Covariates	
Results (if included a comparison group, was the effect greater/weaker?)	Asthma in Mexico had a seasonal pattern with more during the wet season (may to October) than dry season (November to April). Larger proportion of paediatric asthmatics from July to November. Amongst their findings, grass pollen was associated with child admissions in both wet (humid) and dry seasons. Based on biological grounds, variables have a short-term effect. Analysis suggests response to environmental triggers may have been delayed or have accumulated overtime – 1 to 2 days (do not know what variables this lag applies to). Wet season model explained 35% of the variance whilst the dry season model explained 18% of the variance. For children, the best model for the wet season included grass, with positive effects of ascospores and negative effects from temperature and rainfall. In the dry season, the best model had dueteromycetes as the major factor with grass pollen. The lag could be the consequence of a sensitisation period, or the time it takes for symptoms to increase or could partly be due to a delay in the patients seeking medical advice. Pollen had an increased effect in the wet season. There was no evidence to support for air pollution and asthma admissions. Weather not generally associated with asthma admissions except wet season when there were lower daytime temperatures. Weather could be indirectly associated with asthma in that in the dry season, conditions generally promote the release of airborne pollen. Wet seasons, high humidity and rain often associated with the development of fungi-aeroallergens. In conclusion, results suggest the aeroallergens may be statistically associated more strongly with asthma hospital admissions than air pollutants and can confound results in epidemiological studies

Reference	Zhong et al (2006) Analysis of short term influences of ambient aeroallergens on pediatric asthma hospital visits. Science of the Total Environment. Vol370 p330-336
Sample (age range (age groups) and size, data source Hospital or GP)	Age group(s): 1-18 Sample size: GP or Hospital: H

Design (comparison group?)	
Setting (dates data collected)	US April through October 2002
Independent variable	Pollen, fungal spores,
Dependent variable	
Method of Analysis	Poisson multiple regressions. Generalised additive models used to examine robustness of the regression coefficients.
Covariates	season, day of the week, temperature, humidity, ozone and $PM_{2.5}$
Results (if included a comparison group, was the effect greater/weaker?)	Aeroallergens that had a significant impact on asthma hospital visits were ragweed, oak/maple and pineceae pollen. The RR on asthma visits with respect to a 100 count/m3 increase in concentration were in the range of 1.23 to 1.54. The lag effects in causing asthma exacerbation were 3 to 5 days. Oak/maple L3, Pinaceae L5, Ragweed L5

Appendix B

Supporting documentation for Data Collection

B1. ISAC Application Form

ISAC APPLICATION FORM:
PROTOCOLS FOR RESEARCH USING THE GPRD DATA

ISAC use only: Protocol Number Date submitted		**IMPORTANT** **If you have any queries, please contact ISAC Secretariat:** ISAC@gprd.com

1. Study Title
Seasonality of and Environmental Triggers of Asthma Episodes

2. Does this protocol describe a purely observational study using GPRD data (this may include the review of anonymised free text or access to anonymised data via the GPRD data linkage scheme)?

Yes ☒ No ☐

3. Does this protocol involve requesting any additional information from GPs?

Yes ☐ No ☒

If yes, please indicate what will be required:

Completion of questionnaires by the GP*	Yes ☐	No ☐
Provision of anonymised records (e.g. hospital discharge summaries)	Yes ☐	No ☐
Other (please describe)		

*any questionnaire for completion by GPs needs to be approved by ISAC before being sent out for completion.

GUIDANCE ON ANSWERING QUESTIONS 4-6:
These questions must be completed by all applicants. You should note the following:

(i) **if you have answered NO to question 2, you will have to seek separate ethics approval from an NHS Research Ethics Committee for this study**

(ii) **if you have answered YES answered to question 2 above and you will be using data obtained from the GPRD Group at the MHRA, this study does not require separate ethics approval from an NHS Research Ethics Committee.**

If you will be using data obtained from EPIC, you will need to consult the data provider regarding their arrangements for obtaining ethics approval for the study.

NB: Answering YES to question 2 means that the answers to questions 4-6 should all be NO. If any of the answers below are YES please review your answer to question 2 as it should be NO.

4. Does the study involve linking to patient *identifiable* data from other sources?	Yes ☐	No ☒
5. Does this study require contact with patients in order for them to complete a questionnaire?	Yes ☐	No ☒
6. Does this study require contact with patients in order to collect a sample? If yes, please state what will be collected	Yes ☐	No ☒

7. Type of Study *(please tick one box below)*

Adverse Drug Reaction	☐	Drug Use	☐	Disease Epidemiology	☐
Pharmacoeconomic	☐	Drug Effectiveness	☐	Other	☐

8. Data source *(please tick one box below)*

GPRD Division at MHRA

Full Feature on-line access	☐
Ad hoc dataset	☐
MRC dataset	☒
Other commissioned study	☐

Other *(please specify)* ☐

ISAC v1.0: 31/03/2008

9. Financial Sponsor of study

MRC* ☐
Government / NHS *(please specify)* ☐
None ☐

Pharmaceutical Industry *(please specify)* ☐
Other *(please specify)* ☒ University of Sheffield PhD studentship

* Tick this box if you wish to access GPRD data under the MRC licence with GPRD. It is expected that if you use the MRC licence, no other direct commercial/public sector funding for this study will be sought/has been applied for or is in place. If funding is in place, but does not cover the use or extraction of GPRD data, please tick the boxes for relevant funding sources (including MRC) and provide details in the protocol of why funding under the MRC licence is required.

10. Is the study intended for

Publication in peer reviewed journals ☒
Presentation at company/institutional meetings ☐
Presentation at scientific conference ☒
Other **PhD**

11. Principal Investigator (full name, job title, organisation & e-mail address for correspondence regarding this protocol)

Dr Steven A. Julious, Senior Lecturer in Medical Statistics, University of Sheffield, S.A.Julious@Sheffield.ac.uk

12. Affiliation (full address)

Medical Statistics Group, ScHARR, University of Sheffield, Regent Court, 30 Regent Street, Sheffield, S1 4DA

13. Type of Institution *(please tick one box below)*

Academia	☒	Research Service Provider	☐	Pharmaceutical Industry	☐
NHS	☐	Government Departments	☐	Others	☐

14. Experience/expertise available

Please complete the following questions to indicate the experience/expertise available within the team of researchers actively involved in the proposed research, including analysis of data and interpretation of results

	Previous GPRD Studies	Publications using GPRD data
None	☐	☐
1-3	☒	☐
> 3	☐	☐

	Yes	No
Is statistical expertise available within the research team? *If yes, please outline level of experience*	☒	☐
Is experience of handling large data sets (>1 million records) available within the research team? *If yes, please outline level of experience*	☒	☐
Is UK primary care experience available within the research team? *If yes, please outline level of experience*	☐	☒

15. Other collaborators (if applicable: *please list names and affiliations of all collaborators*)

Dr Sue Mason, University of Sheffield, Dr Jennifer Freeman, University of Sheffield, Jennifer Lai, University of Sheffield

16. Protocol's Author (if different from PI)

ISAC v1.0: 13/03/2008

PROTOCOL CONTENT CHECKLIST

In order to help ensure that protocols submitted for review contain adequate information for protocol evaluation, ISAC have produced instructions on the content of protocols for research using GPRD data. These instructions are available on the GPRD website (www.gprd.com/ISAC). All protocols using GPRD data which are submitted for review by ISAC must contain information on the areas detailed in the instructions. IF you do not feel that a specific area required by ISAC is relevant for your protocol, you will need to justify this decision to ISAC.

Applicants must complete the checklist below to confirm that the protocol being submitted includes all the areas required by ISAC, or to provide justification where a required area is not considered to be relevant for a specific protocol. Protocols will not be circulated to ISAC for review until the checklist has been completed by the applicant.

Please note, your protocol will be returned to you if you do not complete this checklist, or if you answer 'no' and fail to include justification for the omission of any required area.

	Included in protocol?		
Required area	**Yes**	**No**	**If no, reason for omission**
Lay Summary (max.200 words)	☒	☐	
Objective, specific aims and rationale	☒	☐	
Background	☒	☐	
Study design	☒	☐	
Study population, including estimate of expected number of relevant patients in the GPRD	☒	☐	
Sample size/ power calculation	☒	☐	
Selection of comparison group(s) or controls	☒	☐	
Exposures, outcomes and covariates	☒	☐	
Data Analysis	☒	☐	
Patient/ user group involvement †	☒	☐	
Limitations of the study design, data sources and analytic methods	☒	☐	
Plans for disseminating and communicating study results	☒	☐	

† *It is expected that many studies will benefit from the involvement of patient or user groups in their planning and refinement, and/or in the interpretation of the results and plans for further work. This is particularly, but not exclusively true of studies with interests in the impact on quality of life. Please indicate whether or not you intend to engage patients in any of the ways mentioned above.*

*ISAC strongly recommends that researchers using GPRD consider registering as a NRR data provider in order that others engaged in research within the UK can be made aware of current works. The **National Research Register (NRR)** is a register of ongoing and recently completed research projects funded by, or of interest to, the United Kingdom's National Health Service. Information on the NRR is available on www.nrr.nhs.uk .*

Please Note: Registration with the NRR is entirely voluntary and will not replace information on ISAC approved protocols that are published in summary minutes or in the ISAC annual report.

ISAC v1.0: 31/03/2008

B2. GRPD protocol

PROTOCOL FOR ADDITIONAL USE OF GPRD DATA

Seasonality of and Environmental Triggers of Asthma Episodes

Steven A. Julious

Senior Lecturer in Medical Statistics

Medical Statistics Group

University of Sheffield.

1. LAY SUMMARY

Previously authors received GPRD data (ISAC Protocol No. 06_020) to enable us to assess the seasonality of asthma in school age asthmatics associated with the return back to school from the summer vacation. authors also had age sex matched Non-asthmatics and authors believed that if the peak was associated with children picking up new viruses through mixing with a school full of children after having little contact over the summer the peak would be mirrored in the Non-asthmatics. Authors have seen a peak in the Non-asthmatics but the effect on the asthmatic children is in excess of this.

We have received a University of Sheffield PhD studentship to build on this research which authors hope to do by both further analyses the original data and also by linking these original data to environmental triggers such as air pollution and pollen.

2. OBJECTIVES, SPECIFIC AIMS AND RATIONALE

2.1. Research Objectives

The current protocol is an extension to ISAC Protocol No. 06_020. No new data is being requested.

The purpose of ISAC Protocol No. 06_020 was to assess seasonality in consultations for school age children diagnosed with asthma particularly around the return back to school. One reason given for the increase in consultations and hospitalisations around the return back to school is due to the exposure of children to a new viral pool. If this was the case then peaks should also be seen in school age children who are not asthmatics. Hence, authors included age and sex matched Non-asthmatics both to assess whether there was a peak in contacts in this population and also if there was an excess in contacts by asthmatics over this population. In a to be completed analysis of these data the results suggest that there is both a peak in the Non-asthmatics around the return back to school and also that there is an excess in asthmatics over this population.

We also have additional environmental data on pollen, weather and pollution in England and Scotland. Similarly to be before authors wish to assess the links between these environmental data and the contacts for both Asthmatics and non-asthmatics and to assess whether there is an excess in the asthmatics over the Non-asthmatics.

2.2. Aims

- To assess whether there is a peak associated with the return back to school after the summer vacation in school age asthmatic children in a primary care setting.
- To assess whether there is a peak associated with the return back to school after the summer vacation in school age non-asthmatic children in a primary care setting and

to assess whether the effects observed in asthmatics are in excess to those observed in the Non-asthmatics.

(These first two aims were in ISAC Protocol No. 06_020)

- To assess the link between environmental factors such as weather and pollution in school age asthmatic children in a primary care setting
- To assess whether the effects observed in asthmatics are in excess of those observed in Non-asthmatics

(These second two aims are new to the current protocol)

2.3. Rationale

The research aims will enable us to address the objectives of the study. Firstly by demonstrating that the associations being investigated are common to both asthmatics and Non-asthmatics. Secondly by demonstrating that there is an excess in asthmatics over Non-asthmatics and that asthmatics thus have greater seasonality around the return back to school and that Authors are more susceptible to environmental factors.

3. BACKGROUND

Research undertaken in a number of countries which has reported peaks in asthma episodes associated with the return to school [1-7]. These peaks have tended to be in hospital admissions although one study reported peaks both in hospital admissions and primary care contacts [5]. In a to be completed analysis authors saw similar effects from ISAC Protocol No. 06_020.

Three masters students in the Medical Statistics Group at the University of Sheffield have undertaken dissertation projects looking at environmental triggers of hospital admissions in two British cities. These projects highlighted the lag effect of the environmental triggers but that there was possible different lags in the pollen season than out of the pollen season. authors wish to further extend this work investigate the effect of environmental data on Asthmatics and non-asthmatics of data obtained under ISAC Protocol No. 06_020.

4. STUDY DESIGN

A retrospective study of daily aggregated primary care consultations of school age (5-16) asthmatics patients from 1999 to 2005 along with age and sex matched Non-asthmatics from the .same practice.

We chose the current study design as initially authors felt that the seasonality observed in asthmatics would be mirrored in Non-asthmatics though with an excess in asthmatics amongst asthmatics

5. STUDY POPULATION

From ISAC Protocol No. 06_020 authors have 76,116 school age asthmatic patients with their 1x1 age sex matched Non-asthmatics as well as an additional 808 asthmatic patients whom do not have a control. The asthmatic patients born between 1982 and 2000, with a clinical or referral record for asthma.

We have environmental data at the moment for the years 1999-2004. These data will be applicable for the English regions of Trent and Northern and Yorkshire as well as Scotland. These represent around 15% of the patients.
All patients will be used for the assessment of seasonality. The primary analysis of the environmental factors will be for the regions where authors have environmental data. Secondary analyses will be on national level data

6. CLINICAL MEASURES OF INTEREST

6.1. Demographic

- Subject ID
- Family ID number
- Age (in years)
- Gender
- Height and weight
- Practice number
- Region within UK (London, South East, South West, Eastern, West Midlands, Trent, North West, Northern & Yorkshire, Wales, Scotland, & Northern Ireland).
- Country within UK (England, Scotland, Wales, Northern Ireland)
- Asthma status (observation only, continuous treatment, resolved, intermittent)*
- Inhaler ability (good, moderate, poor, not examined)*
- Passive smoker

* - These will be determined using GPRD records.

6.2. Clinical Outcomes

- Date of contact
- Type of contact: contact in primary care practice; night visit; home visit; out of hours; discharge details
- Whom the contact is with: general practitioner; nurse
- Reason for contact (Read code)

6.3. Environmental Measures

- Ozone
- Sulphur di oxide
- Nitric oxide
- Carbon mono oxide
- Nitrogen di oxide
- Nitrogen oxides as nitrogen dioxide
- Pollen
- Rainfall
- Temperature
- Sunshine
- Wind speed

7. SAMPLE SIZE

We will use aggregated daily counts for the primary analysis across +5 years of data.

8. DATA ANALYSIS

The analysis will be undertaken by or under the direct auspices of statistics within the Medical Statistics Group at the University of Sheffield. Aggregate daily counts will be used for the primary analysis. Routine contacts (asthma reviews etc) will be excluded from the analysis and six none mutually exclusive endpoints will be used for the analysis: all contacts; accident and emergency contacts; out of hours contacts; emergency consultations; emergency contacts and acute visits.

For the seasonality analysis of contacts by asthmatic patients autoregressive methods will also be applied. Covariates that will be considered include: day of the week, season (fitted as a sinusoid) and control contacts. An assessment of seasonal excess of asthmatics over Non-asthmatics will be made through inspection of residuals over the time.

A similar analysis will be made for each of the environmental factors. The model will be the same except for additional terms to account for the lagged possible environmental predictors.

There will be no allowance taken for multiple comparisons.

Descriptive statistics as appropriate will be undertaken for all endpoints and broken down by demographic factors.

All analyses will be undertaken in SPSS.

9. PATIENT OR USER GROUP INVOLVEMENT

The research team have links to local and national user groups. Patient groups will be involved in both interpretation of the results and in plans for appropriate dissemination of findings.

10. LIMITATIONS OF STUDY DESIGN, DATA SOURCES AND ANALYTICAL METHODS

The environmental data authors have is for the West Coast of Scotland and South Yorkshire. Even within these areas there could be variations at a local level day to day. However, authors feel that over the duration of the study these data will still be appropriate to discern trends.

11. PLANS FOR DISSEMINATING AND COMMUNICATING STUDY RESULTS

The results of this study will be published in appropriate peer reviewed research journals. Reports and presentations will also be made in the university and at conferences aimed at clinical audiences and policy makers. General practices, the GPRD and other organisation will be able to request a summary of the results or any published work.

12. RESEARCHERS

Dr Steven A. Julious, Senior Lecturer in Medical Statistics, Medical Statistics Group, University of Sheffield, Regent Court, 30 Regent Street, Sheffield, S1 4DA

Dr Jennifer V. Freeman, Senior Lecturer in Medical Statistics, Medical Statistics Group, University of Sheffield, Regent Court, 30 Regent Street, Sheffield, S11 7EY

Dr Sue Mason, Reader in Emergency Medicine, MCRU, University of Sheffield, Regent Court, 30 Regent Street, Sheffield, S11 7EY

Jennifer Lai, PhD Student, University of Sheffield, Regent Court, 30 Regent Street, Sheffield, S11 7EY

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B3. GPRD Ethics Approval ISAC MHRA

NHS

Trent Multi-centre Research Ethics Committee

Derwent Shared Services
Laurie House
Colyear Street
Derby
DE1 1LJ

Chairman: **Dr Robert Bing**
Administrator: **Jill Marshall**

12 April 2006

Telephone: 01332 868905
Fax: 01332 868930
Email: Jill.Marshall@derwentsharedservices.nhs.uk

Dr John Parkinson
Head of GPRD
GPRD Group, Medicines & Healthcare products Regulatory Agency
Market Towers
1 Nine Elms Lane
London
SW8 5NQ

Dear Dr Parkinson

Full title of study:	**The General Practice Research Database: provision of anonymised data for use in observational public health research**
REC reference number:	**05/MRE04/87**

I am pleased to enclose the final favourable opinion letter for this study.

On behalf of the members of Trent MREC may I take this opportunity to express our appreciation for the way the committee's concerns have been addressed, and in particular the clarity of your response and documentation of the changes.

We wish you every success with the study.

Yours sincerely

pp Jill Marshall

Dr Robert Bing
Chairman, Trent MREC

05/MRE04/87

The Central Office for Research Ethics Committees is responsible for the operational management of Multi-centre Research Ethics Committees

WPH 0772

NHS

Trent Multi-centre Research Ethics Committee

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12 April 2006

Dr John Parkinson
Head of GPRD
GPRD Group, Medicines & Healthcare products Regulatory Agency
Market Towers
1 Nine Elms Lane
London
SW8 5NQ

Dear Dr Parkinson

Full title of study: **The General Practice Research Database: provision of anonymised data for use in observational public health research**
REC reference number: **05/MRE04/87**

Thank you for your letter of 05 April 2006, responding to the Committee's request for further information on the above research and submitting revised documentation.

The further information has been considered on behalf of the Committee by the Chairman.

Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised.

Ethical review of research sites

The Committee has designated this study as exempt from site-specific assessment (SSA. There is no requirement for any Local Research Ethics Committees to be informed or for site-specific assessment to be carried out at each site.

Conditions of approval

The favourable opinion is given provided that you comply with the conditions set out in the attached document. You are advised to study the conditions carefully.

Approved documents

The final list of documents reviewed and approved by the Committee is as follows:

Document	*Version*	*Date*
Application		27 October 2005
Investigator CV		27 October 2005
Protocol	3	04 April 2006
Covering Letter		27 October 2005

Response to Request for Further Information		05 April 2006
Opt-out poster for GP Practices (part of Annex 2 of protocol V 3)		
Patient leaflet (part of Annex 2 of protocol V 3)	2	10 January 2006
Guidelines for Practice Managers (part of Annex 2 of protocol V 3)		
Membership of Independent Safety Committee for MHRA database (Annex 3 of protocol V 3)		04 April 2006

Research governance approval

You should arrange for the R&D department at all relevant NHS care organisations to be notified that the research will be taking place, and provide a copy of the REC application, the protocol and this letter.

All researchers and research collaborators who will be participating in the research must obtain final research governance approval before commencing any research procedures. Where a substantive contract is not held with the care organisation, it may be necessary for an honorary contract to be issued before approval for the research can be given.

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees (July 2001) and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

05/MRE04/87	**Please quote this number on all correspondence**

With the Committee's best wishes for the success of this project

Yours sincerely

AP

Dr Robert Bing
Chairman, Trent MREC

Enclosures: *Standard approval conditions [SL-AC2]*

05/MRE04/87

Central Office for Research Ethics Committees
(COREC)

RESEARCH IN HUMAN SUBJECTS OTHER THAN CLINICAL TRIALS OF INVESTIGATIONAL MEDICINAL PRODUCTS

Standard conditions of approval by Research Ethics Committees

1. Further communications with the Research Ethics Committee

1.1 Further communications during the research with the Research Ethics Committee that gave the favourable ethical opinion (hereafter referred to in this document as "the Committee") are the personal responsibility of the Chief Investigator.

2. Commencement of the research

2.1 It is assumed that the research will commence within 12 months of the date of the favourable ethical opinion.

2.2 In the case of research requiring site-specific assessment (SSA) the research may not commence at any site until the Committee has notified the Chief Investigator that the favourable ethical opinion is extended to the site.

2.3 The research may not commence at any NHS site until the local Principal Investigator (PI) or research collaborator has obtained research governance approval from the relevant NHS care organisation.

2.4 Should the research not commence within 12 months, the Chief Investigator should give a written explanation for the delay. It is open to the Committee to allow a further period of 12 months within which the research must commence.

2.5 Should the research not commence within 24 months, the favourable opinion will be suspended and the application would need to be re-submitted for ethical review.

3. Duration of ethical approval

3.1 The favourable opinion for the research generally applies for the duration of the research. If it is proposed to extend the duration of the study as specified in the application form, the Committee should be notified.

4. Progress reports

4.1 Research Ethics Committees are required to keep a favourable opinion under review in the light of progress reports and any developments in the study. The Chief

Investigator should submit a progress report to the Committee 12 months after the date on which the favourable opinion was given. Annual progress reports should be submitted thereafter.

4.2 Progress reports should be in the format prescribed by COREC and published on the website (see http://www.corec.org.uk/applicants/apply/progress.htm).

4.3 The Chief Investigator may be requested to attend a meeting of the Committee or Sub-Committee to discuss the progress of the research.

5. Amendments

5.1 If it is proposed to make a substantial amendment to the research, the Chief Investigator should submit a notice of amendment to the Committee.

5.2 A substantial amendment is any amendment to the terms of the application for ethical review, or to the protocol or other supporting documentation approved by the Committee, that is likely to affect to a significant degree:

(a) the safety or physical or mental integrity of the trial participants

(b) the scientific value of the trial

(c) the conduct or management of the trial.

5.3 Notices of amendment should be in the format prescribed by COREC and published on the website, and should be personally signed by the Chief Investigator.

5.4 A substantial amendment should not be implemented until a favourable ethical opinion has been given by the Committee, unless the changes to the research are urgent safety measures (see section 7). The Committee is required to give an opinion within 35 days of the date of receiving a valid notice of amendment.

5.5 Amendments that are not substantial amendments ("minor amendments") may be made at any time and do not need to be notified to the Committee.

6. Changes to sites *(studies requiring site-specific assessment only)*

6.1 Where it is proposed to include a new site in the research, there is no requirement to submit a notice of amendment form to the Committee. Part C of the application form together with the local Principal Investigator's CV should be submitted to the relevant LREC for site-specific assessment (SSA).

6.2 Similarly, where it is proposed to make important changes in the management of a site (in particular, the appointment of a new PI), a notice of amendment form is not required. A revised Part C for the site (together with the CV for the new PI if applicable) should be submitted to the relevant LREC for SSA.

6.3 The relevant LREC will notify the Committee whether there is any objection to the new site or Principal Investigator. The Committee will notify the Chief Investigator of its opinion within 35 days of receipt of the valid application for SSA.

6.4 For studies designated by the Committee as exempt from SSA, there is no requirement to notify the Committee of the inclusion of new sites.

7. Urgent safety measures

7.1 The sponsor or the Chief Investigator, or the local Principal Investigator at a trial site, may take appropriate urgent safety measures in order to protect research participants against any immediate hazard to their health or safety.

7.2 The Committee must be notified within three days that such measures have been taken, the reasons why and the plan for further action.

8. Serious Adverse Events

8.1 A Serious Adverse Event (SAE) is an untoward occurrence that:

(a) results in death
(b) is life-threatening
(c) requires hospitalisation or prolongation of existing hospitalisation
(d) results in persistent or significant disability or incapacity
(e) consists of a congenital anomaly or birth defect
(f) is otherwise considered medically significant by the investigator.

8.2 A SAE occurring to a research participant should be reported to the Committee where in the opinion of the Chief Investigator the event was related to administration of any of the research procedures, and was an unexpected occurrence.

8.3 Reports of SAEs should be provided to the Committee within 15 days of the Chief Investigator becoming aware of the event, in the format prescribed by COREC and published on the website.

8.4 The Chief Investigator may be requested to attend a meeting of the Committee or Sub-Committee to discuss any concerns about the health or safety of research subjects.

8.5 Reports should not be sent to other RECs in the case of multi-site studies.

9. Conclusion or early termination of the research

9.1 The Chief Investigator should notify the Committee in writing that the research has ended within 90 days of its conclusion. The conclusion of the research is defined as the final date or event specified in the protocol, not the completion of data analysis or publication of the results.

9.2 If the research is terminated early, the Chief Investigator should notify the Committee within 15 days of the date of termination. An explanation of the reasons for early termination should be given.

9.3 Reports of conclusion or early termination should be submitted in the form prescribed by COREC and published on the website.

10. Final report

10.1 A summary of the final report on the research should be provided to the Committee within 12 months of the conclusion of the study. This should include information on whether the study achieved its objectives, the main findings, and arrangements for publication or dissemination of the research including any feedback to participants.

11. Review of ethical opinion

11.1 The Committee may review its opinion at any time in the light of any relevant information it receives.

11.2 The Chief Investigator may at any time request that the Committee reviews its opinion, or seek advice from the Committee on any ethical issue relating to the research.

12. Breach of approval conditions

12.1 Failure to comply with these conditions may lead to suspension or termination of the favourable ethical opinion by the Committee.

B4. ScHARR Ethics Approval GPRD

The University Of Sheffield.

Cheryl Oliver
Ethics Committee Administrator

Regent Court
30 Regent Street
Sheffield S1 4DA

Telephone: +44 (0) 114 2220871
Fax: +44 (0) 114 272 4095 (non confidential)
Email: c.a.oliver@sheffield.ac.uk

Our ref: /CAO

12 January 2010

Jennifer (Che Han) Lai
ScHARR

Dear Jennifer

The seasonality and environmental triggers of childhood asthma resulting in medical contact

I am pleased to inform you your supervisor has reviewed your project and classed it as 'low risk' so you can proceed with your research. The research must be conducted within the requirements of the hosting/employing organisation or the organisation where the research is being undertaken.

I have received a hard copy of your secondary analysis of anonymised data form together with your Supervisor's decision in line with the new streamlined University Ethics procedure, which I will keep on file.

Yours sincerely

Cheryl Oliver
Ethics Committee Administrator

Cc: Steven Julious

B5. Read Codes for Diagnosis of Asthma

Table B. 1: Read Codes for diagnosis of asthma

GPRD Code			READ or OXMIS	READ_OXMIS Code	Definition
202172	599	2	OXMIS	493 CL	ASTHMA MEDICATION REGULARLY
204183	427	0	READ	663N100	Asthma disturbs sleep weekly
204184	1986	0	READ	663f.00	Asthma never restricts exercise
210535	228	14	OXMIS	L4930LO	LATE ONSET ASTHMA
211152	128	0	OXMIS	493 CK	ASTHMA MEDICATION PRN
213217	4268	8	READ	663N.00	Asthma disturbing sleep
213218	335	0	READ	663N000	Asthma causing night waking
213219	2682	2	READ	663P.00	Asthma limiting activities
213220	4132	0	READ	663W.00	Asthma prophylactic medication used
213221	2059	1	READ	663f.00	Asthma sometimes restricts exercise
216144	3068	108	READ	H331.11	Late onset asthma
216145	9166	168	READ	H33z.00	Asthma unspecified
216156	16	0	READ	H47y000	Detergent asthma
220242	1342	5	OXMIS	493 AE	ASTHMA SEASONAL
222256	5759	0	READ	663h.00	Asthma - currently dormant
222257	4247	3	READ	663j.00	Asthma - currently active
225248	116	2	READ	H330100	Extrinsic asthma with status asthmaticus
225249	35	0	READ	H331000	Intrinsic asthma without status asthmaticus
225250	24	0	READ	H33zz12	Allergic asthma NEC
234378	1304	3	READ	H330.13	Hay fever with asthma
234378	1304	3	READ	H330.13	Hay fever with asthma
234379	947	120	READ	H33z000	Status asthmaticus NOS
234380	1061	4	READ	H33zz11	Exercise induced asthma
238257	362	3	OXMIS	493 GS	ASTHMA POLLEN INITIATED
240350	1339	0	READ	663e.00	Asthma restricts exercise
240351	225	0	READ	6.63E+100	Asthma severely restricts exercise
243390	16822	367	READ	H33..11	Bronchial asthma
243391	39	0	READ	H331100	Intrinsic asthma with status asthmaticus
243392	92	3	READ	H331111	Intrinsic asthma with asthma attack
243393	33800	1380	READ	H33z100	Asthma attack
243394	2	0	READ	H35y700	Wood asthma
249550	775	0	READ	663N200	Asthma disturbs sleep frequently
249551	9988	1	READ	663O.00	Asthma not disturbing sleep
252517	1078	3	READ	H330.14	Pollen asthma
252518	343	2	READ	H33z200	Late-onset asthma
256651	311	3	OXMIS	493 CJ	ASTHMA MEDICATION INTERMITTENTLY
256652	318	16	OXMIS	493 JC	CHRONIC ASTHMA
258757	8641	0	READ	663Q.00	Asthma not limiting activities
261748	3045	6	READ	H330.00	Extrinsic (atopic) asthma

GPRD Code			READ or OXMIS	READ_OXMIS Code	Definition
261749	7438	79	READ	H330.12	Childhood asthma
261750	56	1	READ	H331z00	Intrinsic asthma NOS
261751	8457	563	READ	H33z011	Severe asthma attack
265869	223	3	OXMIS	493 BG	ASTHMA FREQUENCY REGULARLY
267062	13469	50	READ	173A.00	Exercise induced asthma
268000	1955	5	READ	663V000	Occasional asthma
271042	1405526	8265	READ	H33..00	Asthma
271043	1837	1	READ	H330011	Hay fever with asthma
271043	1837	1	READ	H330011	Hay fever with asthma
271044	116	1	READ	H330z00	Extrinsic asthma NOS
271045	179	2	READ	H332.00	Mixed asthma
271046	17481	14	READ	H33zz00	Asthma NOS
275019	36	1	OXMIS	493 HT	INTRINSIC ASTHMA
277041	685	0	READ	663O000	Asthma never disturbs sleep
277043	50129	1	READ	663V.00	Asthma severity
277044	4106	5	READ	663V100	Mild asthma
277045	3307	1	READ	663V200	Moderate asthma
280087	1130	19	READ	H312000	Chronic asthmatic bronchitis
280092	754	13	READ	H330111	Extrinsic asthma with asthma attack
284119	49	0	OXMIS	493 BI	ASTHMA FREQUENCY ON EXERCISE ONLY
286207	264	2	READ	663d.00	Emergency asthma admission since last appointment
287656	6328	679	READ	8H2P.00	Emergency admission, asthma
289196	4198	56	READ	H330.11	Allergic asthma
289197	77071	1144	READ	H333.00	Acute exacerbation of asthma
289198	415	10	READ	H33z111	Asthma attack NOS
295370	45457	2	READ	663U.00	Asthma management plan given
295371	687	21	READ	663V300	Severe asthma
298479	160	1	READ	H330000	Extrinsic asthma without status asthmaticus
298480	831	4	READ	H331.00	Intrinsic asthma
303974	899277	25357	OXMIS	493	ASTHMA
303975	25036	2634	OXMIS	493 AA	ASTHMA ACUTE
303976	14023	3589	OXMIS	493 AB	ASTHMA ATTACK
303977	495	6	OXMIS	493 AD	ASTHMA OCCASIONAL
303978	177	7	OXMIS	493 BH	ASTHMA FREQUENCY CONSTANTLY
303979	14670	467	OXMIS	493 BR	BRONCHIAL ASTHMA
303981	407	9	OXMIS	493 CH	CHILDHOOD ASTHMA
303982	1164	289	OXMIS	493 D	STATUS ASTHMATICUS
303983	2136	25	OXMIS	493 EB	ASTHMA EXERCISE INDUCED
303984	1265	74	OXMIS	493 F	ASTHMATIC ALLERGY
303985	1028	6	OXMIS	493 GR	ASTHMA ALLERGIC GRASS
303986	102	3	OXMIS	493 HR	ASTHMA HIGH RISK
303987	7011	723	OXMIS	493 KA	EXACERBATION OF ASTHMA

GPRD Code			READ or OXMIS	READ_OXMIS Code	Definition
303988	21261	1006	OXMIS	493 KB	ASTHMA EXACERBATION
303989	523	6	OXMIS	493 NA	NOCTURNAL ASTHMA
306531	653	132	OXMIS	493 AH	ASTHMA HOSPITALISED
306532	649	7	OXMIS	493 AI	ASTHMA SEVERITY MILD
306533	555	9	OXMIS	493 AJ	ASTHMA SEVERITY MODERATE
306534	385	35	OXMIS	493 AK	ASTHMA SEVERITY SEVERE
306536	666	21	OXMIS	493 BD	ASTHMA AND BRONCHITIS
306537	150	0	OXMIS	493 BF	ASTHMA FREQUENCY RARELY
306538	1133	1	OXMIS	493 CM	ASTHMA MEDICATION PROPHYLACTICLY
306539	446	3	OXMIS	493 EA	ASTHMA EXERCISE INCLUDED
306540	821	9	OXMIS	493 EP	ASTHMA EPISODIC
306888	160	27	OXMIS	691 TM	ECZEMA WITH ASTHMA
308638	30	0	READ	h33z100	Asthma attack
309475	5319	0	READ	663n.00	Asthma treatment compliance satisfactory
309585	1162	0	READ	663p.00	Asthma treatment compliance unsatisfactory
309607	1882	0	READ	663v.00	Asthma causes daytime symptoms most days
309610	192	1	READ	663y.00	Number of asthma exacerbations in past year
310118	4424	1	READ	663q.00	Asthma daytime symptoms
331603	71	0	READ	663m.00	Asthma accident and emergency attendance since last visit
331626	443	0	READ	663r.00	Asthma causes night symptoms 1 to 2 times per month
331714	165	0	READ	66YC.00	Absent from work or school due to asthma
331790	3560	0	READ	663s.00	Asthma never causes daytime symptoms
331791	979	0	READ	663t.00	Asthma causes daytime symptoms 1 to 2 times per month
331792	1176	0	READ	663u.00	Asthma causes daytime symptoms 1 to 2 times per week
336015	82	0	READ	663x.00	Asthma limits walking on the flat
336059	246	0	READ	663w.00	Asthma limits walking up hills or stairs
339880	1017	5	READ	1O2.00	Asthma confirmed
340378	1054	0	READ	66YP.00	Asthma night-time symptoms
340949	2598	3	READ	178..00	Asthma trigger
341590	12	1	READ	1780	Aspirin induced asthma
344837	51	5	READ	8HTT.00	Referral to asthma clinic
345151	36	1	READ	H334.00	Brittle asthma

B6. ScHARR Ethics Approval Sheffield Children's Hospital

The University Of Sheffield.

Cheryl Oliver
Ethics Committee Administrator

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Email: c.a.oliver@sheffield.ac.uk

Our ref: /CAO

8 March 2010

Jennifer (Che Han) Lai
ScHARR

Dear Jennifer

Mapping Childhood Asthma in Sheffield

I am pleased to inform you your supervisor has reviewed your project and classed it as 'low risk' so you can proceed with your research. The research must be conducted within the requirements of the hosting/employing organisation or the organisation where the research is being undertaken.

I have received a hard copy of your secondary analysis of anonymised data form together with your Supervisor's decision in line with the new streamlined University Ethics procedure, which I will keep on file.

Yours sincerely

Cheryl Oliver
Ethics Committee Administrator

Cc: Steven Julious

B7. Matching Process for Sheffield Children Hospital data

1. Method

Original data was obtained in excel format. The dataset was converted into SPSS format and matched by two different criteria:

- Matching asthmatics to Non-asthmatics by date, age and gender: this will inform you that given any day, a case is more likely to come from somewhere different to Non-asthmatics.
- Matching asthmatics to Non-asthmatics by age and gender MSOA: this will inform you that given in any given MSOA, a case is more likely to come on a different day to Non-asthmatics.

For the Admissions data:

The date within each dataset was separated into three variables: year, month and day. Children from the age of 4.5 to 16.5 years who came in as a non-elective admission and lived in Sheffield were selected. Age was rounded to an integer and gender was re-coded into a number.

Age categories were formed in the instance that not all asthmatics matched to Non-asthmatics based on the first criteria (year, month, day, gender, age).

- Ageband2 = age band of two years e.g 5 and 6 = one age band. 15, 16 and 17 = one age band.
- Ageband3 = age band of three years e.g 5, 6 and 7 = one age band. 14, 15, 16 and 17 = one age band.
- Ageband4 = age band of 4 years e.g 5, 6, 7 and 8= one age band. 12, 13, 14, 15, 16 and 17 = one age band.
- Agebandx = two age categories; 5, 6, 7, 8, 9, 10, and 11 is one age category and the remaining ages up to 17 equalled the other age category.

Asthmatics were matched to non-asthmatics and separated from the unmatched asthmatics. Non-asthmatics were matched with asthmatics and unmatched Non-asthmatics taken out of the dataset so that non-asthmatics that have already been match were not used for a match in the next step. By matching non-asthmatics to asthmatics, this also acted a cross check of the results obtained by matching asthmatics to non-asthmatics. The numbers for "After matching" and "After matched Asthmatics and non-asthmatics were taken out" should be the same.

When matching asthmatics to Non-asthmatics by date, gender and age (to see that on any given day, a case is more like to arrive at hospital from a residence difference to Non-asthmatics) the variable MSOA was labelled differently in asthmatics and non-asthmatics.

Table B. 2: Admission data, steps taken to match by date, gender and age for counts per MSOA.

	Action		Asthmatics N	Non-asthmatics N
1	The Asthmatics and non-asthmatics were separated into two datasets.		1579	36987
2	Sort Asthmatics and non-asthmatics datasets by, year, month, day, ageyears, gender (and random number for Non-asthmatics) 427 matched	After Matched	38139	38139
		After matched Asthmatics and non-asthmatics were taken out	37712	37712
		Unmatched remaining	1152	36560
3	Sort Asthmatics and non-asthmatics datasets by, year, month, day, age_band2, gender (and random number for Non-asthmatics) 323 matched	After Matched	37389	37389
		After matched Asthmatics and non-asthmatics were taken out	37066	37066
		Unmatched remaining	829	36237
4	Sort Asthmatics and non-asthmatics datasets by, year, month, day, age_band3, gender (and random number for Non-asthmatics) 251 matched	After Matched	36815	36815
		After matched Asthmatics and non-asthmatics were taken out	36564	36564
		Unmatched remaining	578	35986
5	Sort Asthmatics and non-asthmatics datasets by, year, month, day, age_band4, gender (and random number for Non-asthmatics) 181 matched	After Matched	36383	36383
		After matched Asthmatics and non-asthmatics were taken out	36202	36202
		Unmatched remaining	397	35805
6	Sort Asthmatics and non-asthmatics datasets by, year, month, day, age_bandx, gender (and random number for Non-asthmatics) 163 matched	After Matched	35805	35805
		After matched Asthmatics and non-asthmatics were taken out	35876	35876
		Unmatched remaining	234	35642
7	Sort Asthmatics and non-asthmatics datasets by, year, month, day, gender (and random number for Non-asthmatics) 165 matched	After Matched	35711	35711
		After matched Asthmatics and non-asthmatics were taken out	35546	35546
		Unmatched remaining	69	35477
8	Sort Asthmatics and non-asthmatics datasets by, year, month, day, ageyears, (and random number for Non-asthmatics) 17 matched	After Matched	35529	35529
		After matched Asthmatics and non-asthmatics were taken out	35512	35512
		Unmatched remaining	52	35460
9	Sort Asthmatics and non-asthmatics datasets by, year, month, day, age_band2, (and random number for Non-asthmatics) 28 matched	After Matched	35484	35484
		After matched Asthmatics and non-asthmatics were taken out	35456	35456
		Unmatched remaining	24	35432
10	Sort Asthmatics and non-asthmatics datasets by, year, month, day, age_bandx, (and random number for Non-asthmatics) 12 matched	After Matched	35444	35444
		After matched Asthmatics and non-asthmatics were taken out	35432	35432
		Unmatched remaining	12	35420
11	Sort Asthmatics and non-asthmatics datasets by, year, month, day (and random number for Non-asthmatics) 4 matched	After Matched		
		After matched Asthmatics and non-asthmatics were taken out		
		Unmatched remaining	8	35416

The same technique was used for A&E contacts.

Table B. 3: A&E Contacts data, steps taken to match by date, gender and age for counts per MSOA.

	Action		Asthmatics N	Non-asthmatics N
1	The Asthmatics and non-asthmatics were separated into two datasets.		3016	227168
2	Sort Asthmatics and non-asthmatics datasets by, year, month, day, ageyears, gender (and random number for Non-asthmatics) 2730 matched	After Matched	227454	227454
		After matched Asthmatics and non-asthmatics were taken out	224724	224724
		Unmatched remaining	286	224438
3	Sort Asthmatics and non-asthmatics datasets by, year, month, day, age_band2, gender (and random number for Non-asthmatics) 234 matched	After Matched	224490	224490
		After matched Asthmatics and non-asthmatics were taken out	224256	224256
		Unmatched remaining	52	224204
4	Sort Asthmatics and non-asthmatics datasets by, year, month, day, age_band3, gender (and random number for Non-asthmatics) 50 matched	After Matched	224206	224206
		After matched Asthmatics and non-asthmatics were taken out	224156	224156
		Unmatched remaining	2	224154
5	Sort Asthmatics and non-asthmatics datasets by, year, month, day, age_band4, gender (and random number for Non-asthmatics) 2 matched	After Matched	224154	224154
		After matched Asthmatics and non-asthmatics were taken out	224152	224152
		Unmatched remaining	0	224152

When matching asthmatics to Non-asthmatics by MSOA, gender and age (to see that on from any given MSOA, a case is more like to arrive at hospital on different days in comparison to Non-asthmatics) the variable AdmissionDate was labelled differently in asthmatics and Non-asthmatics.

Table B. 4: Admission data, steps taken to match by MSOA, gender and age for daily counts.

	Action		Asthmatics N	Non-asthmatics N
1	The Asthmatics and non-asthmatics were separated into two datasets.		1579	36987
2	Sort Asthmatics and non-asthmatics datasets by MSOA, year, ageyears, gender (and random number for Non-asthmatics) 1179 matched	After Matched	37390	37390
		After matched Asthmatics and non-asthmatics were taken out	33214	33214
		Unmatched remaining	403	35811
3	Sort Asthmatics and non-asthmatics datasets by MSOA, year, age_band2, gender (and random number for Non-asthmatics) 231 matched	After Matched	35983	35983
		After matched Asthmatics and non-asthmatics were taken out	35752	35752
		Unmatched remaining	172	35580
4	Sort Asthmatics and non-asthmatics datasets by MSOA, year, age_band3, gender (and random number for Non-asthmatics) 98 matched	After Matched	35654	35654
		After matched Asthmatics and non-asthmatics were taken out	35556	35556
		Unmatched remaining	74	35482
5	Sort Asthmatics and non-asthmatics datasets by MSOA, year, age_band4, gender (and random number for Non-asthmatics) 37 matched	After Matched	35519	35519
		After matched Asthmatics and non-asthmatics were taken out	35482	35482
		Unmatched remaining	37	35445
6	Sort Asthmatics and non-asthmatics datasets by MSOA year, age_bandX, gender (and random number for Non-asthmatics) 16 matched	After Matched	35466	35466
		After matched Asthmatics and non-asthmatics were taken out	35450	35450
		Unmatched remaining	21	35429
7	Sort Asthmatics and non-asthmatics datasets by MSOA, year, gender (and random number for Non-asthmatics) 16 matched	After Matched	35434	35434
		After matched Asthmatics and non-asthmatics were taken out	35418	35418
		Unmatched remaining	5	35413
8	Sort Asthmatics and non-asthmatics datasets by MSOA, year, ageyears (and random number for Non-asthmatics) 1 matched	After Matched	35417	35417
		After matched Asthmatics and non-asthmatics were taken out	35416	35416
		Unmatched remaining	4	35412
9	Sort Asthmatics and non-asthmatics datasets by MSOA year, age_band3 (and random number for Non-asthmatics) 3 matched	After Matched	35413	35413
		After matched Asthmatics and non-asthmatics were taken out	35410	35410
		Unmatched remaining	1	35409
9	Sort Asthmatics and non-asthmatics datasets by MSOA year, age_band4 (and random number for Non-asthmatics) 1 matched		35412	35412
			35411	35411
			0	35408

Table B. 5: A&E Contacts data, steps taken to match by MSOA, gender and age for daily counts.

	Action		Asthmatics N	Non-asthmatics N
1	The Asthmatics and non-asthmatics were separated into two datasets.		3016	227168
2	Sort Asthmatics and non-asthmatics datasets by MSOA, year, ageyears, gender (and random number for Non-asthmatics) 2999 matched	After Matched	227185	227185
		After matched Asthmatics and non-asthmatics were taken out	224186	224186
		Unmatched remaining	17	224169
3	Sort Asthmatics and non-asthmatics datasets by MSOA, year, age_band2, gender (and random number for Non-asthmatics) 6 matched	After Matched	224170	224170
		After matched Asthmatics and non-asthmatics were taken out	224154	224154
		Unmatched remaining	1	224153
4	Sort Asthmatics and non-asthmatics datasets by MSOA, year, age_band3, gender (and random number for Non-asthmatics) 1 matched	After Matched	224153	224153
		After matched Asthmatics and non-asthmatics were taken out	224152	224152
		Unmatched remaining	0	224152

Matched Admissions and A&E Contacts were aggregated by date or MSOA. These data include duplicate asthmatics whereby a case presented at A&E and was admitted to hospital. There are 635 duplicate asthmatics whereby admissions were admitted from either A&E. For 118 A&E asthma related medical contacts, cases were admitted and diagnosed with another condition (See Table B.6). In All Counts, all duplicates were considered as 1 contact.

Table B. 6: Matched admissions (to A&E Contact) conditions.

Condition	Frequency	Percent
"Acute upper respiratory infection, unspecified"	12	1.9
"Asthma, unspecified"	517	81.4
"Cystic fibrosis, unspecified"	1	.2
"Lobar pneumonia, unspecified"	6	.9
"Pneumonia, unspecified"	4	.6
"Viral infection, unspecified"	24	3.8
Acute bronchiolitis due to respiratory syncytial virus	1	.2
Bronchiectasis	1	.2
Fracture of upper end of ulna	1	.2
Influenza with oth resp manifest influenza virus identified	1	.2
Other and unspecified abnormalities of breathing	1	.2
Pneumonia due to Mycoplasma pneumoniae	2	.3
Predominantly allergic asthma	3	.5
Status asthmaticus	22	3.5
Stridor	1	.2
Unspecified acute lower respiratory infection	4	.6
Wheezing	34	5.4
Total	635	100.0

Duplicates were taken out of the A&E dataset only. Thus no events made by same person that appear in both Admissions and A&E contacts (A&E Contacts dataset).

Table B.7: A&E Contacts data, steps taken to match by date, gender and age for counts per MSOA.

	Action		Asthmatics N	Non-asthmatics N
1	The Asthmatics and non-asthmatics were separated into two datasets.		2378	204870
2	Sort Asthmatics and non-asthmatics datasets by, year, month, day, ageyears, gender (and random number for Non-asthmatics) 2118 matched	After Matched	205145	205145
		After matched Asthmatics and non-asthmatics were taken out	203017	203017
		Unmatched remaining	260	202752
3	Sort Asthmatics and non-asthmatics datasets by, year, month, day, age_band2, gender (and random number for Non-asthmatics) 202 matched	After Matched	202803	202803
		After matched Asthmatics and non-asthmatics were taken out	202593	202593
		Unmatched remaining	58	202520
4	Sort Asthmatics and non-asthmatics datasets by, year, month, day, age_band3, gender (and random number for Non-asthmatics) 52 matched	After Matched	202539	202539
		After matched Asthmatics and non-asthmatics were taken out	202485	202485
		Unmatched remaining	6	202478
5	Sort Asthmatics and non-asthmatics datasets by, year, month, day, age_band4, gender (and random number for Non-asthmatics) 9 matched	After Matched	202476	202476
		After matched Asthmatics and non-asthmatics were taken out	202467	202467
		Unmatched remaining	0	202467

Table B.8: A&E Contacts data, steps taken to match by date, gender and age for daily counts.

	Action		Asthmatics N	Non-asthmatics N
1	The Asthmatics and non-asthmatics were separated into two datasets.		2378	204870
2	Sort Asthmatics and non-asthmatics datasets by MSOA, year, ageyears, gender (and random number for Non-asthmatics) 2360 matched	After Matched	204887	204887
		After matched Asthmatics and non-asthmatics were taken out	202501	202501
		Unmatched remaining	18	202510
3	Sort Asthmatics and non-asthmatics datasets by MSOA, year, age_band2, gender (and random number for Non-asthmatics) 16 matched	After Matched	202485	224485
		After matched Asthmatics and non-asthmatics were taken out	224469	224469
		Unmatched remaining	2	224469
4	Sort Asthmatics and non-asthmatics datasets by MSOA, year, age_band3, gender (and random number for Non-asthmatics) 2 matched	After Matched	224468	224468
		After matched Asthmatics and non-asthmatics were taken out	224467	224467
		Unmatched remaining	0	224466

Separately, A&E Contacts can have events that were admitted and admissions can have events that went to A&E prior to admissions. HOWEVER, if combining to create All hospital contacts, authors cannot have events made by same person's in both datasets = either or scenario. Add Admissions to A&E Contacts where persons who had been admitted were taken out. This does not hold is same person made multiple admissions or multiple A&E contacts. Only removed Admission contacts from A&E dataset.

Appendix C

Descriptive Results

C1. Clinical Datasets Summary Statistics and Plots

C1.1. England and Wales: Summary Statistics, Histograms and Plots over time (All Datasets).

C1.1.1. Demographic information

Scotland's sample consists of 62,569 asthmatics: 98.8 percent (n=61,834) matched with Non-asthmatics, (1.2 percent, n=735) unmatched. 56.5 percent were male (n=35,321, females n=27,248).

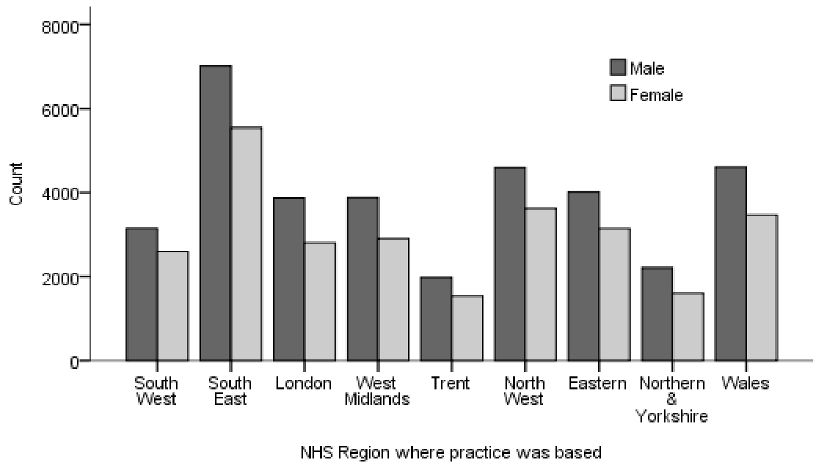
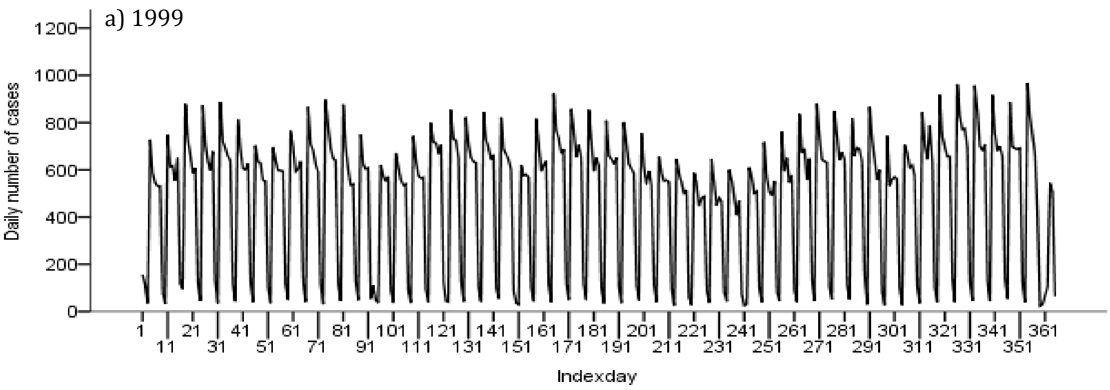
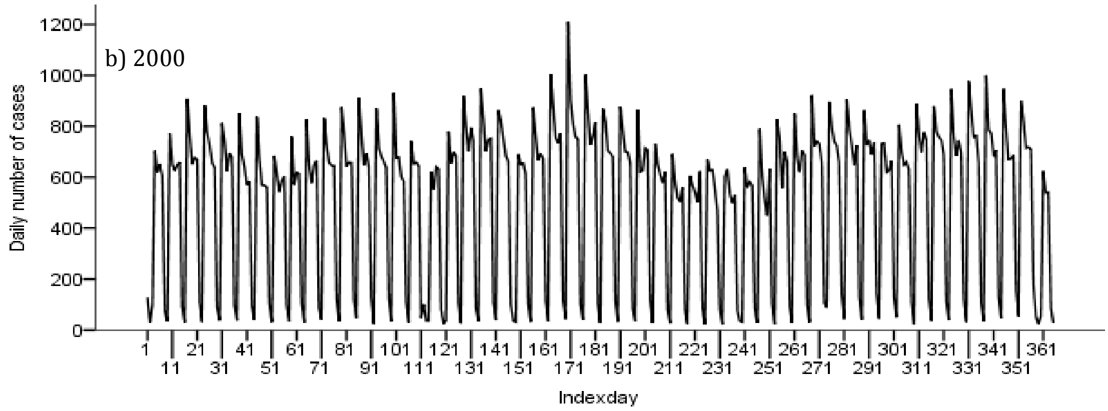
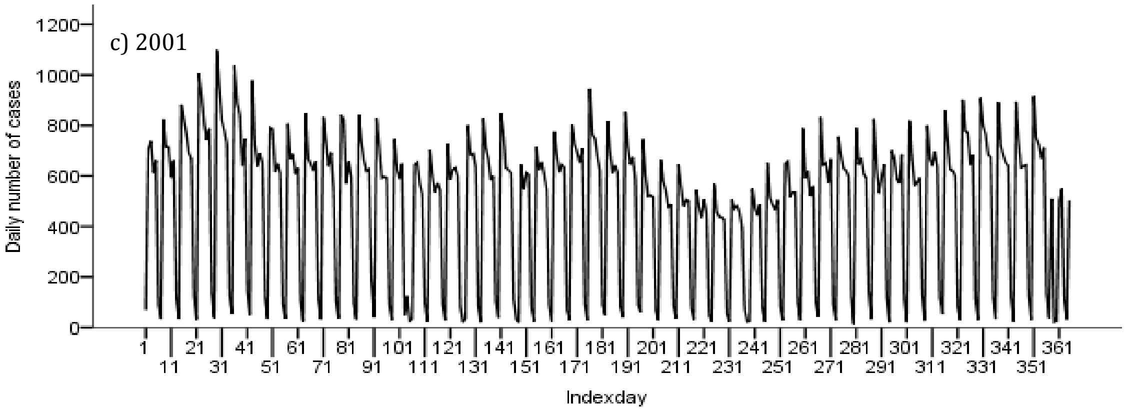


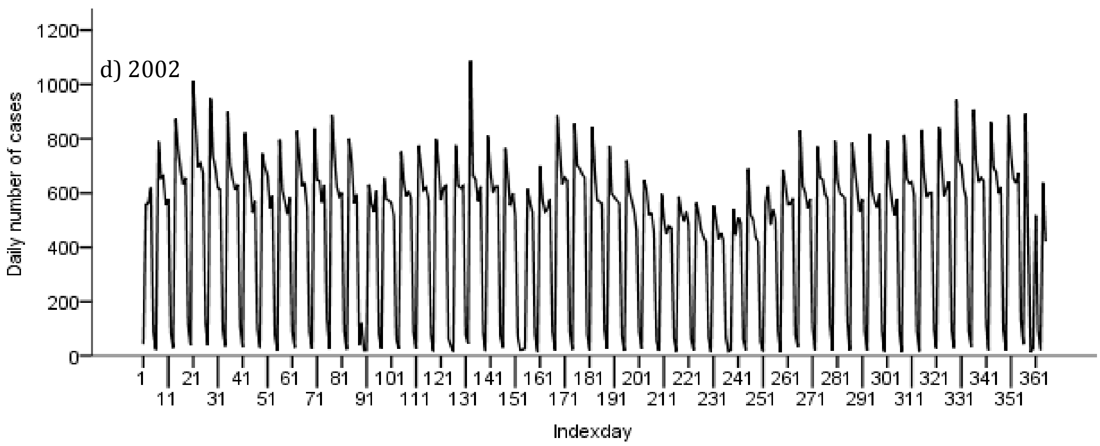
Figure C1. 1: England and Wales - regional distribution by gender.

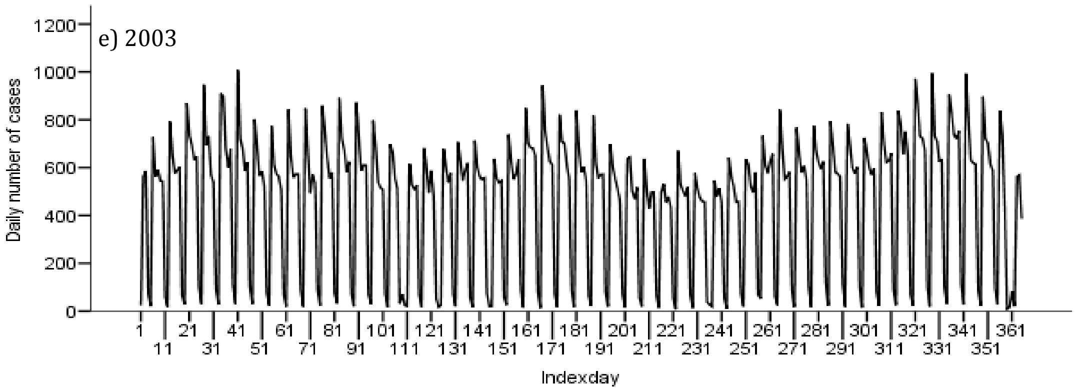
C1.1.2. Plots of daily counts by year


a) 1999
Daily number of cases
0
200
400
600
800
1000
1200
1 11 21 31 41 51 61 71 81 91 101 111 121 131 141 151 161 171 181 191 201 211 221 231 241 251 261 271 281 291 301 311 321 331 341 351 361
Indexday


b) 2000
Daily number of cases
0
200
400
600
800
1000
1200
1 11 21 31 41 51 61 71 81 91 101 111 121 131 141 151 161 171 181 191 201 211 221 231 241 251 261 271 281 291 301 311 321 331 341 351 361
Indexday


c) 2001
Daily number of cases
0
200
400
600
800
1000
1200
1 11 21 31 41 51 61 71 81 91 101 111 121 131 141 151 161 171 181 191 201 211 221 231 241 251 261 271 281 291 301 311 321 331 341 351 361
Indexday


d) 2002
Daily number of cases
0
200
400
600
800
1000
1200
1 11 21 31 41 51 61 71 81 91 101 111 121 131 141 151 161 171 181 191 201 211 221 231 241 251 261 271 281 291 301 311 321 331 341 351 361
Indexday



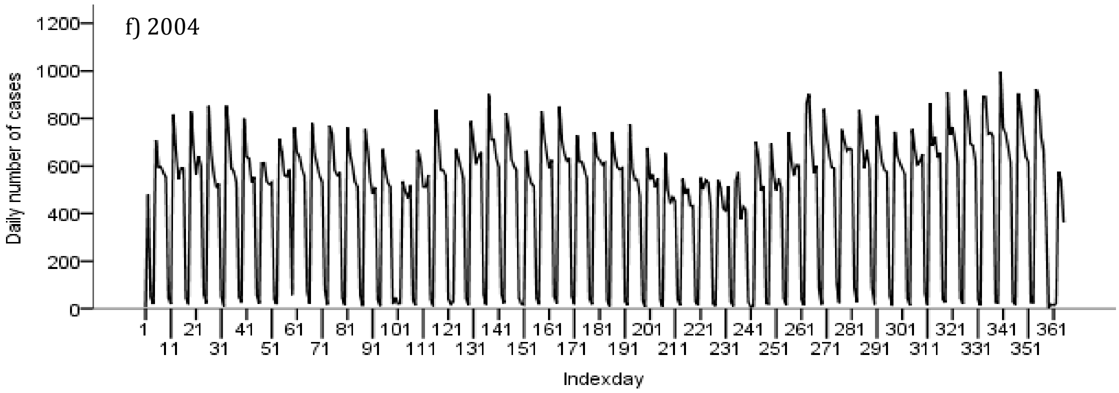
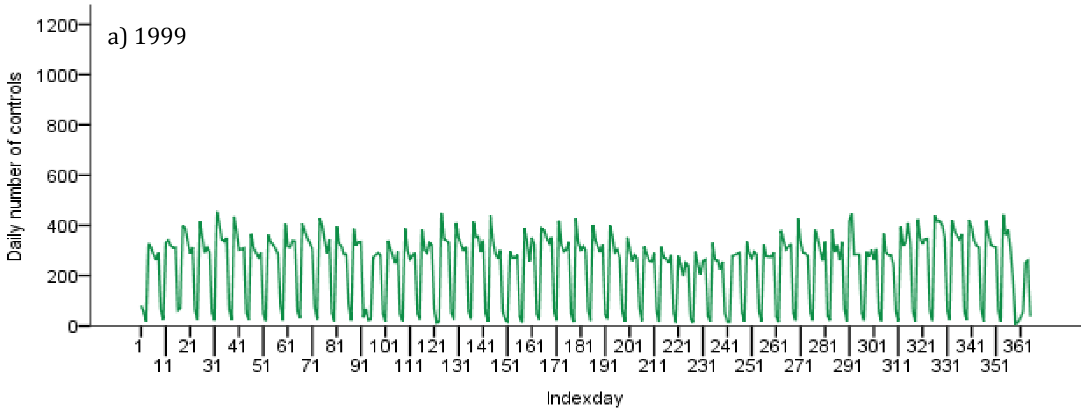
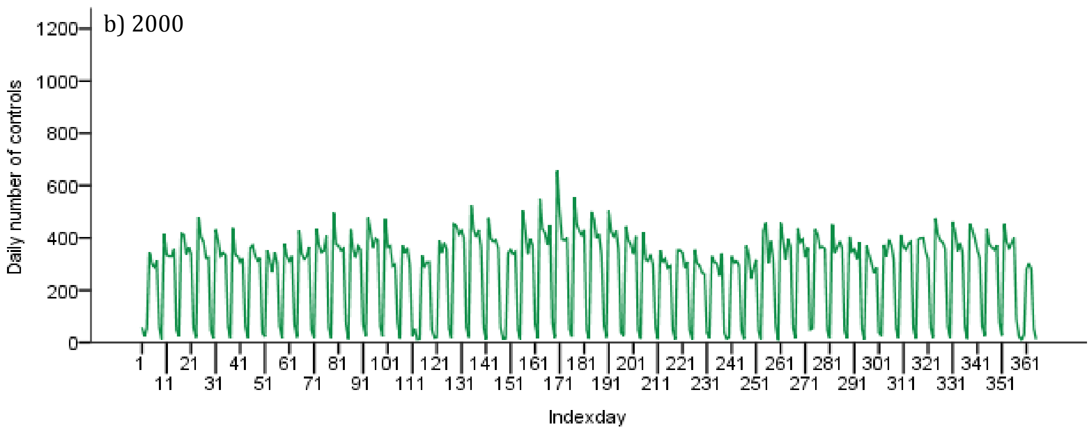


Figure C1. 2: England and Wales All Counts Asthmatics a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.





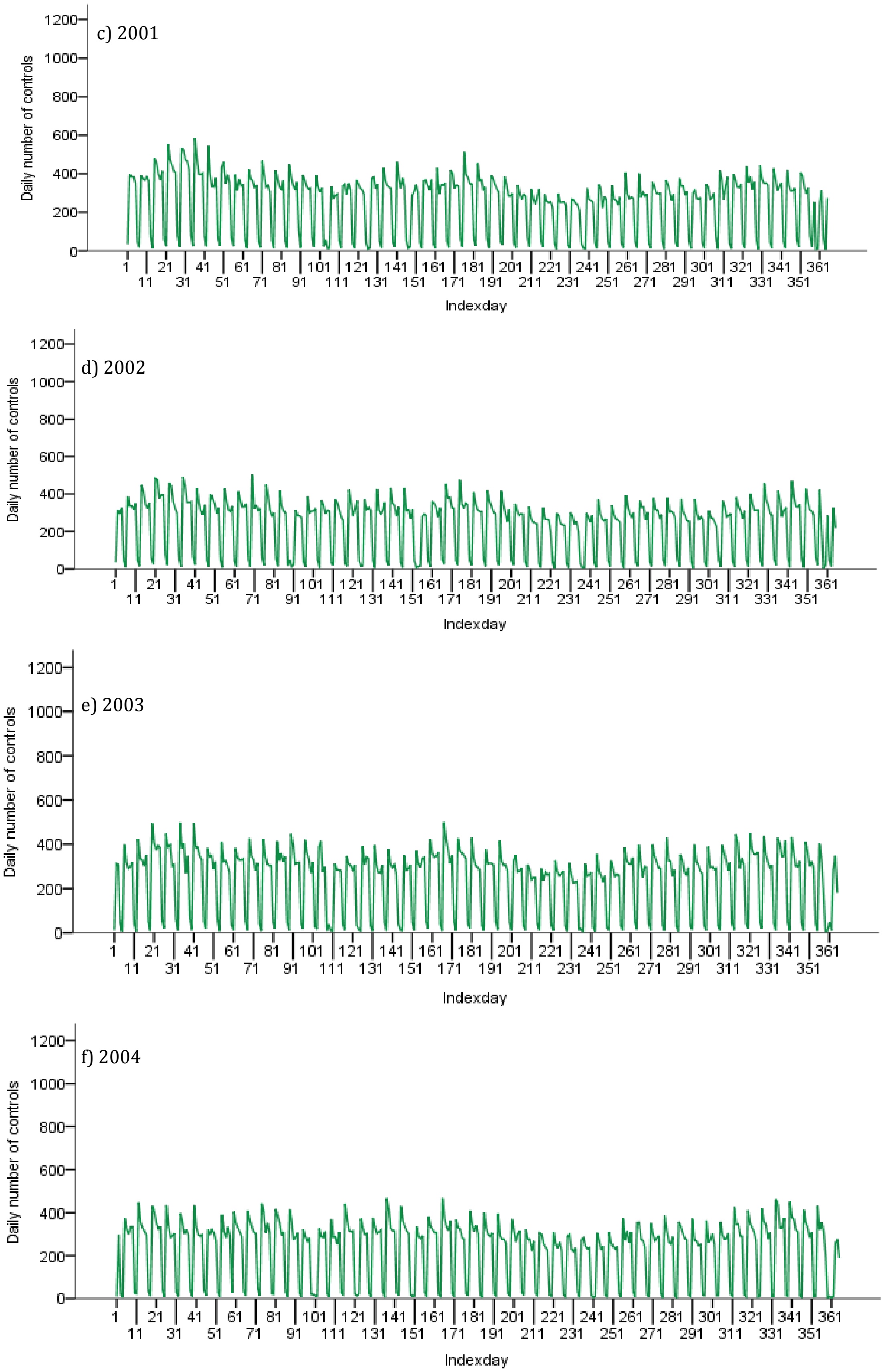
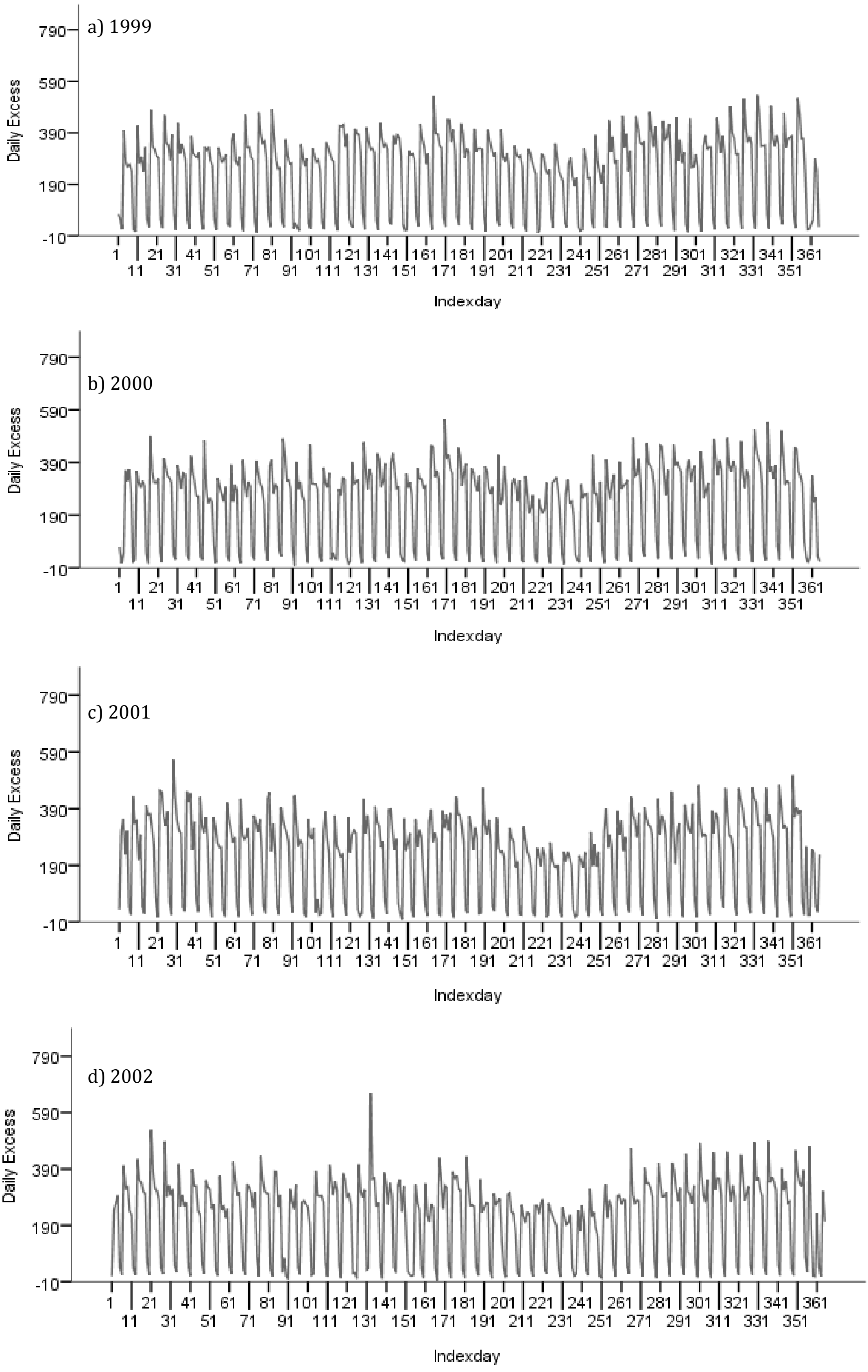


Figure C1. 3: England and Wales All Counts Non-asthmatics a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


a) 1999
b) 2000
c) 2001
d) 2002
Daily Excess
Indexday
790
590
390
190
-10
1
11
21
31
41
51
61
71
81
91
101
111
121
131
141
151
161
171
181
191
201
211
221
231
241
251
261
271
281
291
301
311
321
331
341
351
361

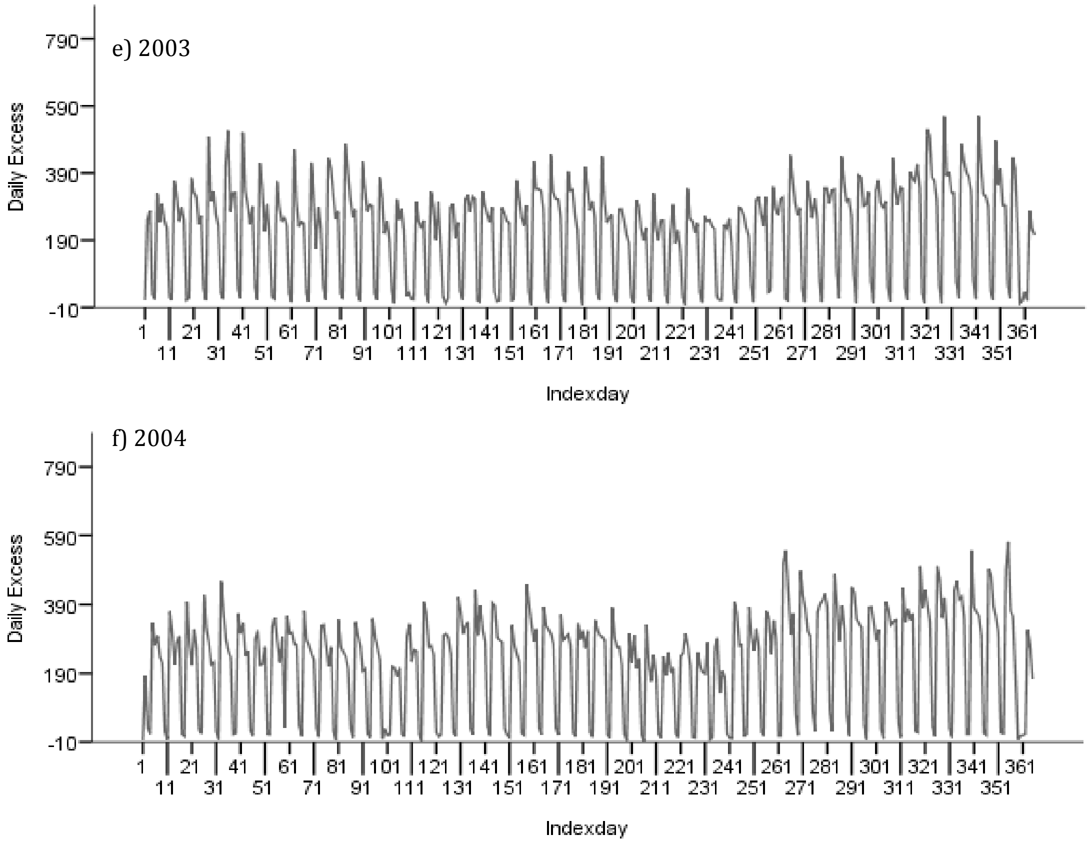
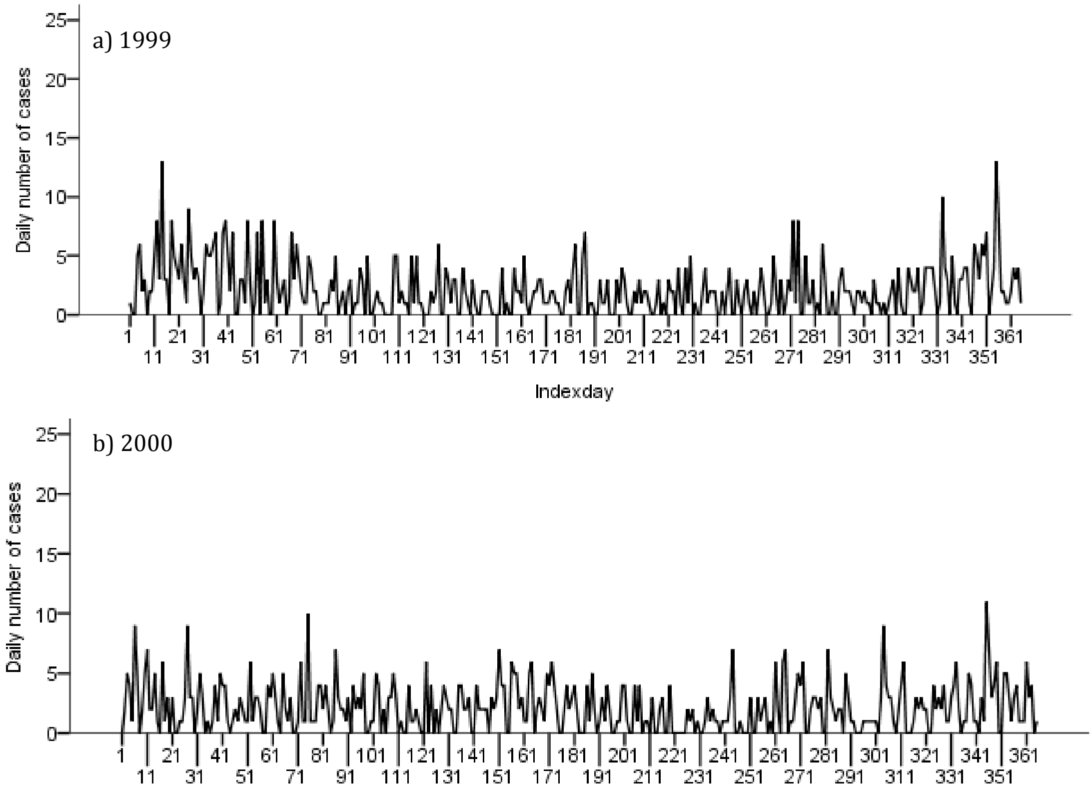


Figure C1. 4: England and Wales All Counts Excess a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.



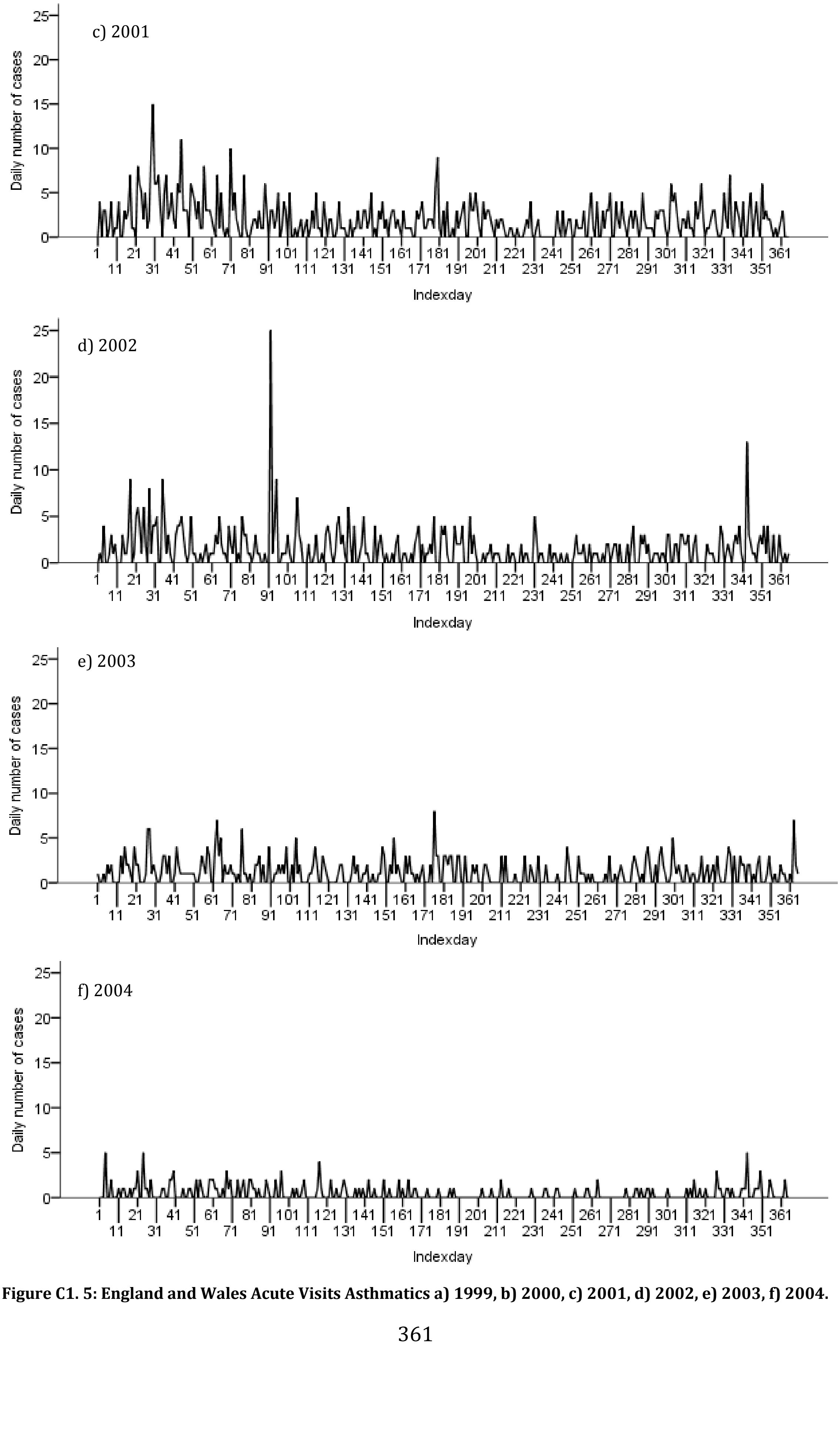
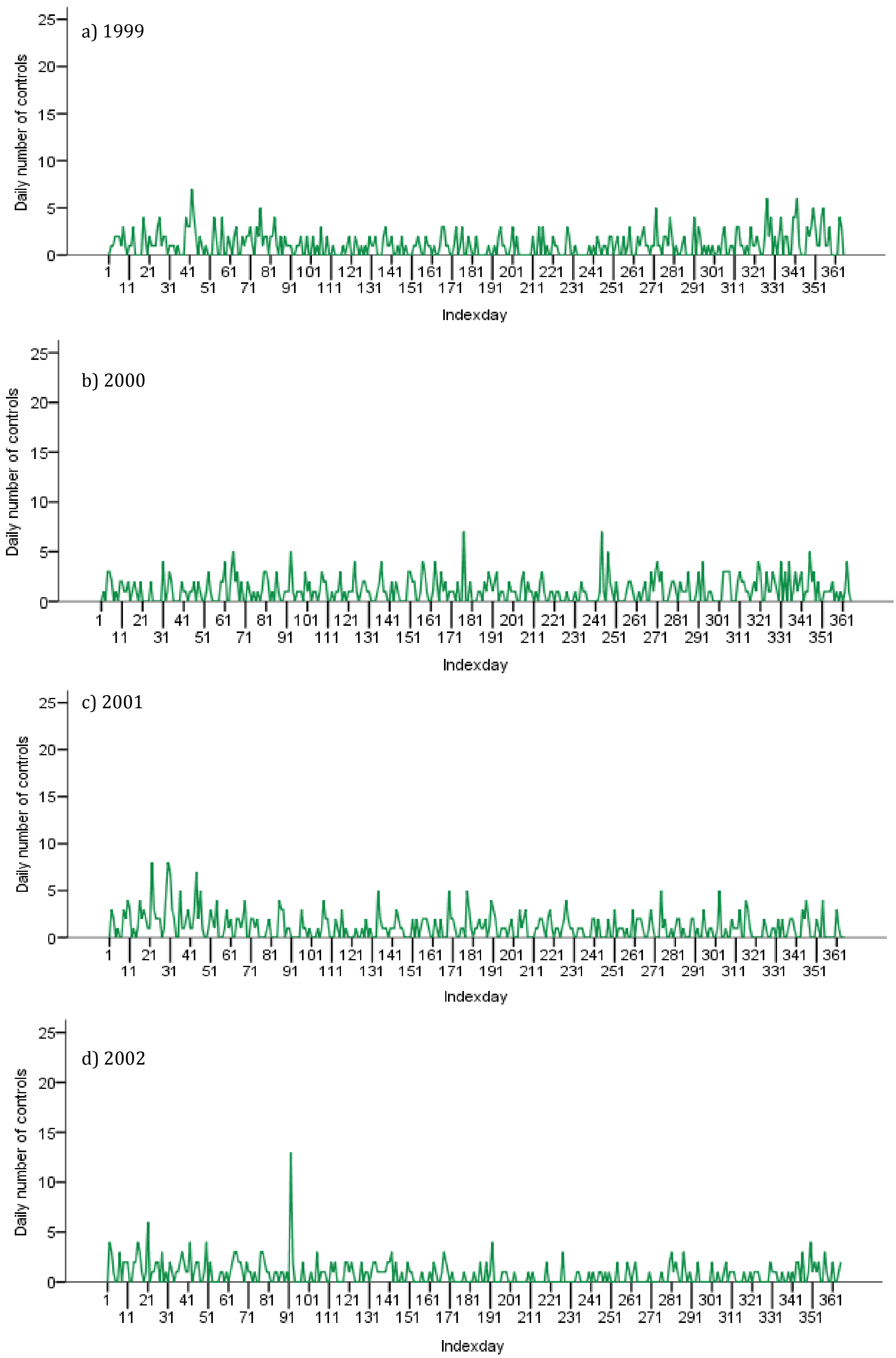
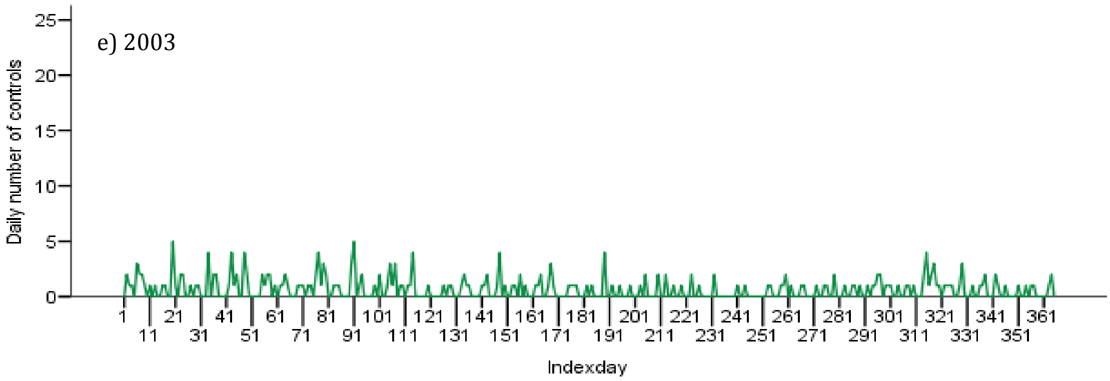


Figure C1. 5: England and Wales Acute Visits Asthmatics a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.



a) 1999
b) 2000
c) 2001
d) 2002
Daily number of controls
Indexday



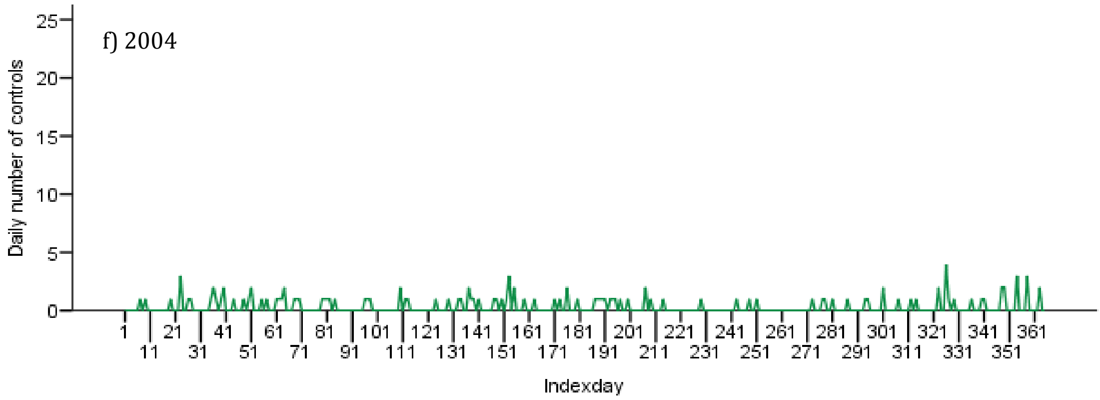
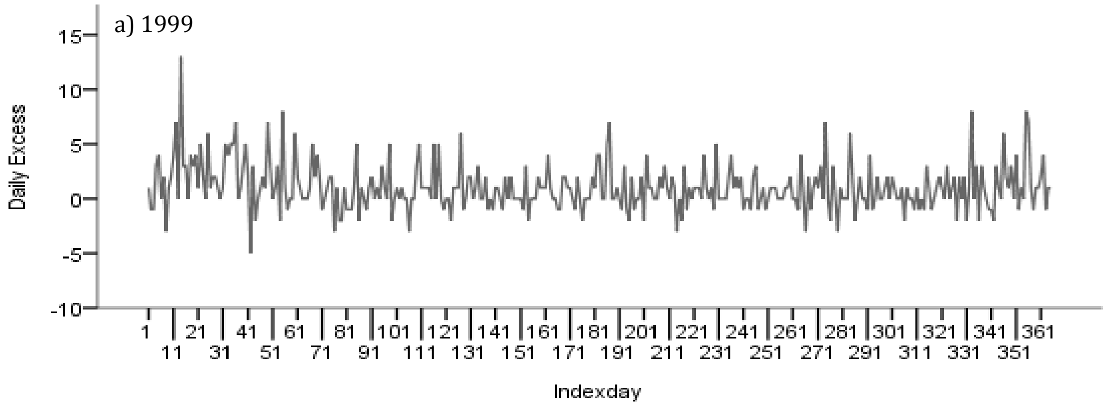
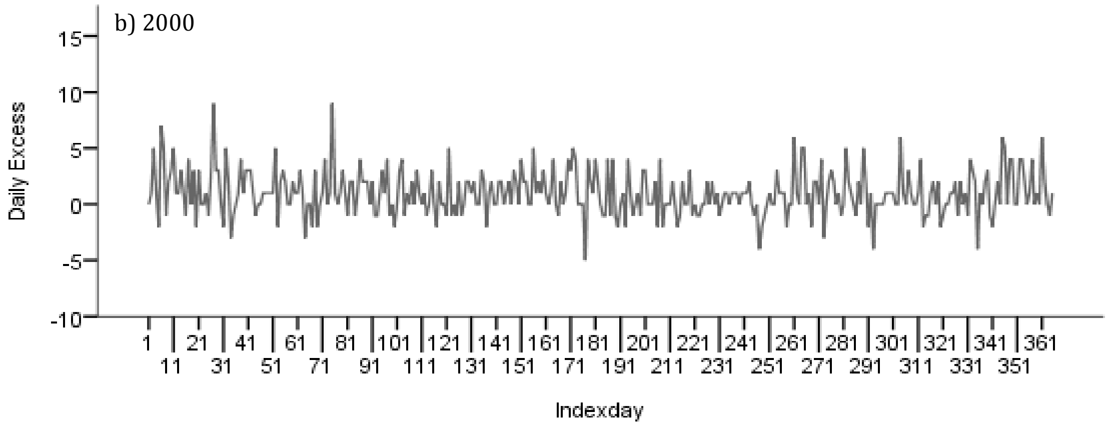


Figure C1.6: England and Wales Acute Visits Non-asthmatics a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.





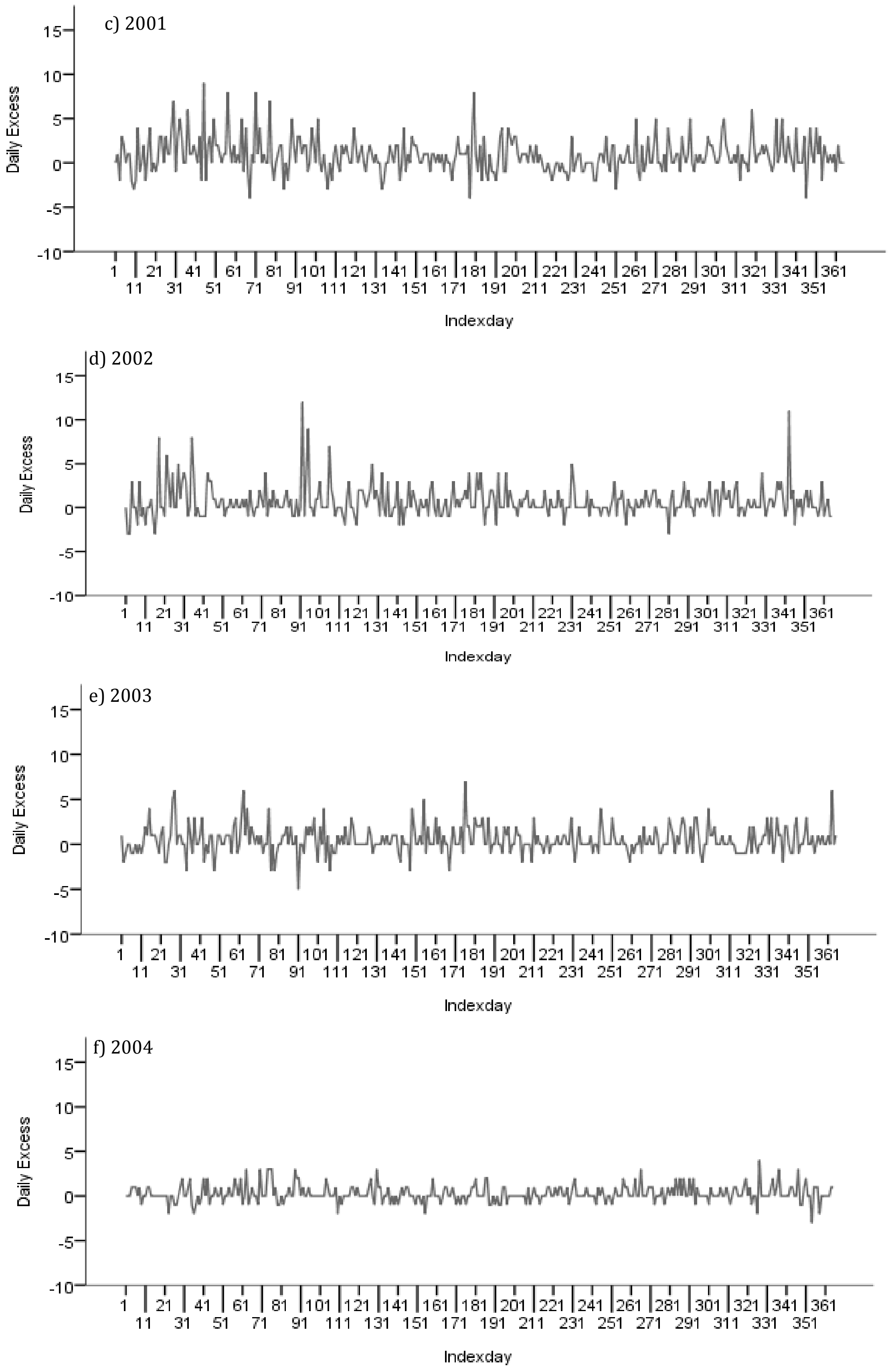
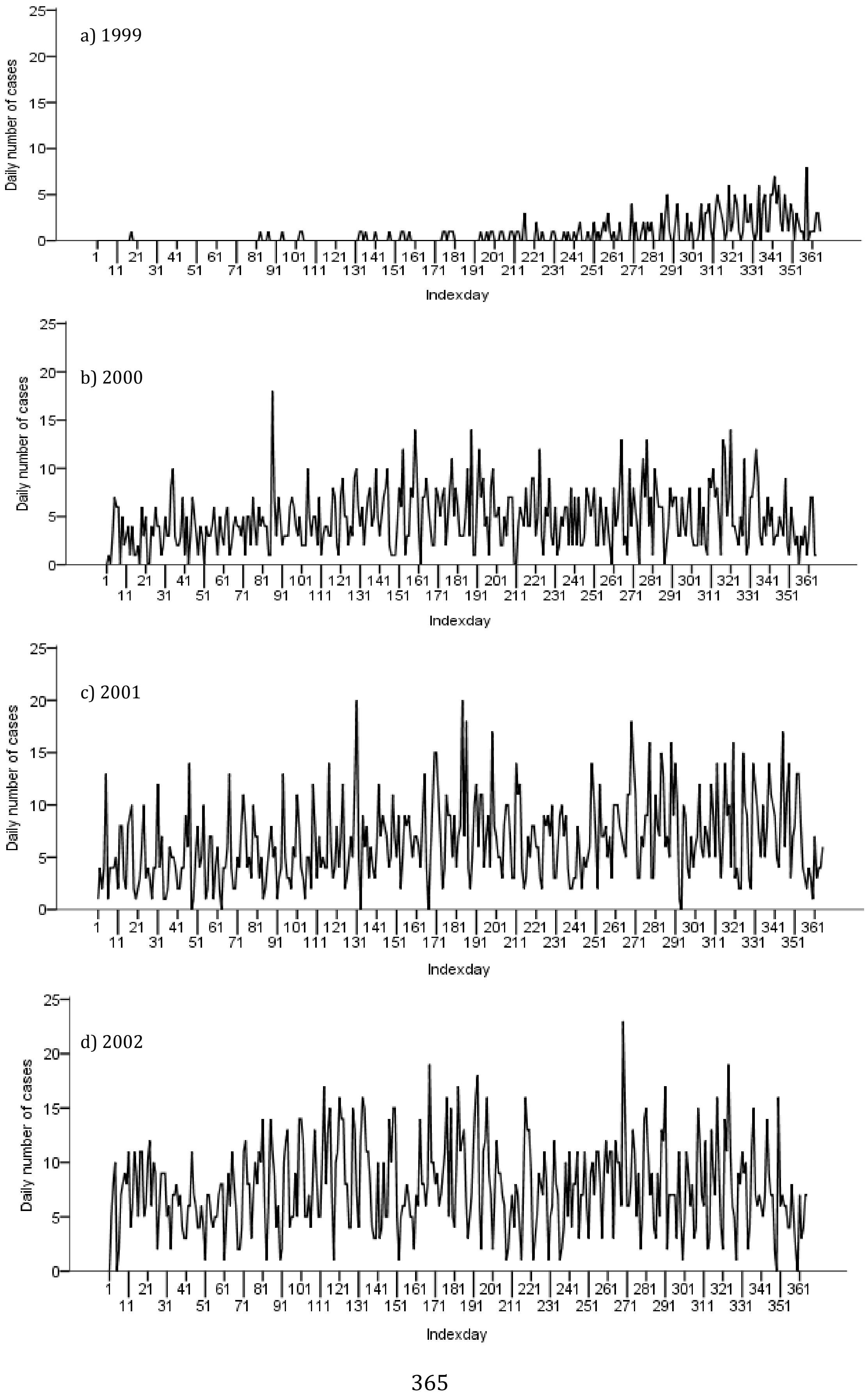
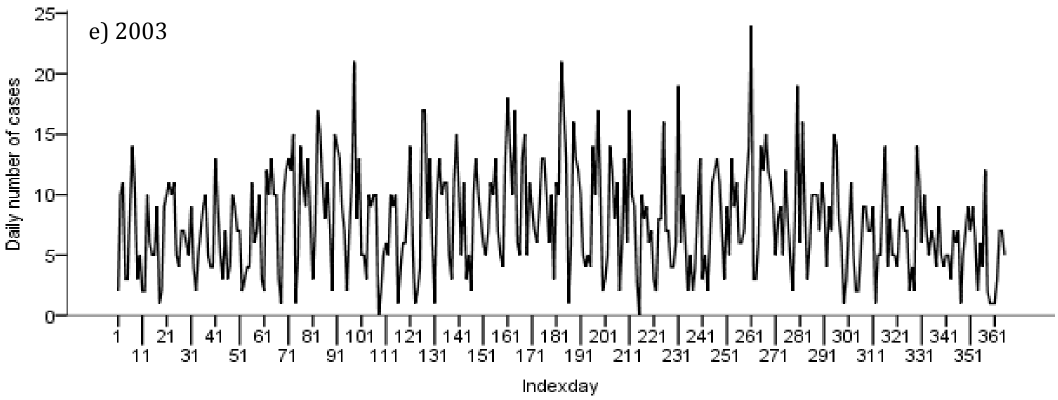


Figure C1. 7: England and Wales Acute Visits Excess a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


a) 1999
b) 2000
c) 2001
d) 2002
Daily number of cases
Indexday



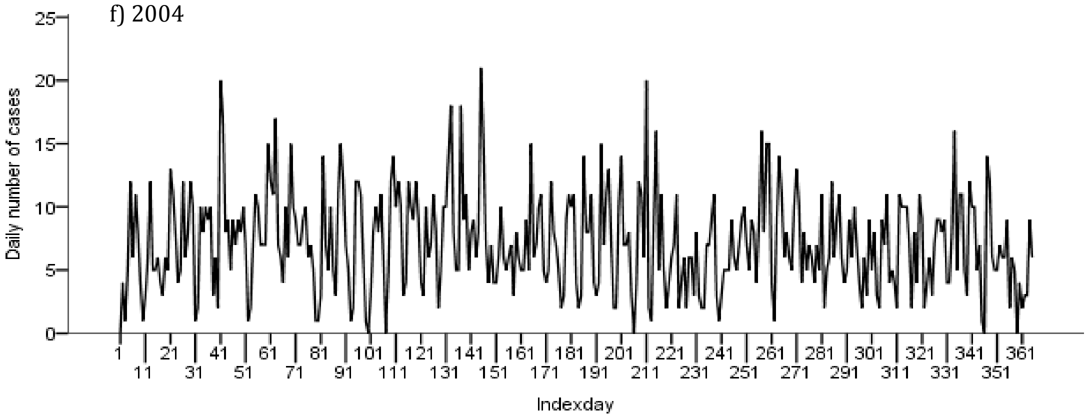
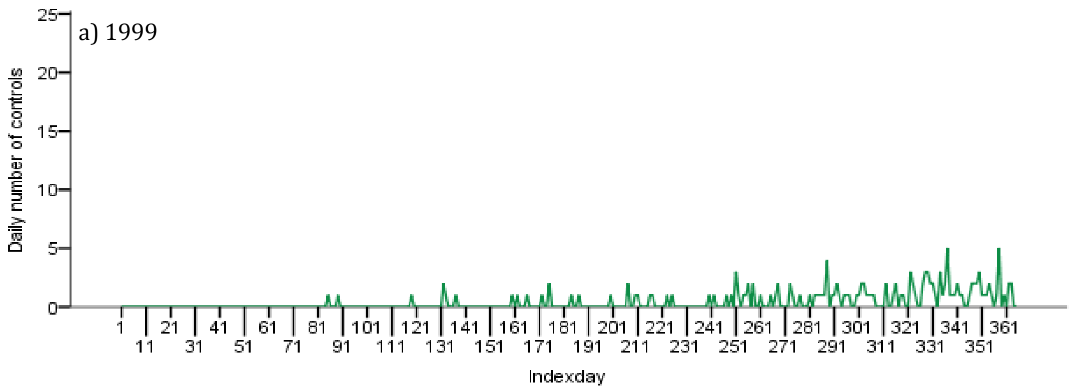
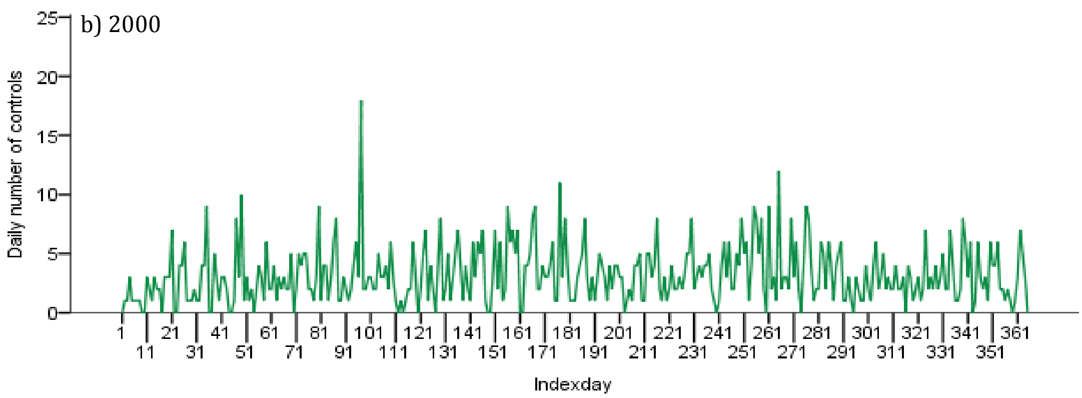


Figure C1. 8: England and Wales Casualty Counts Asthmatics a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.





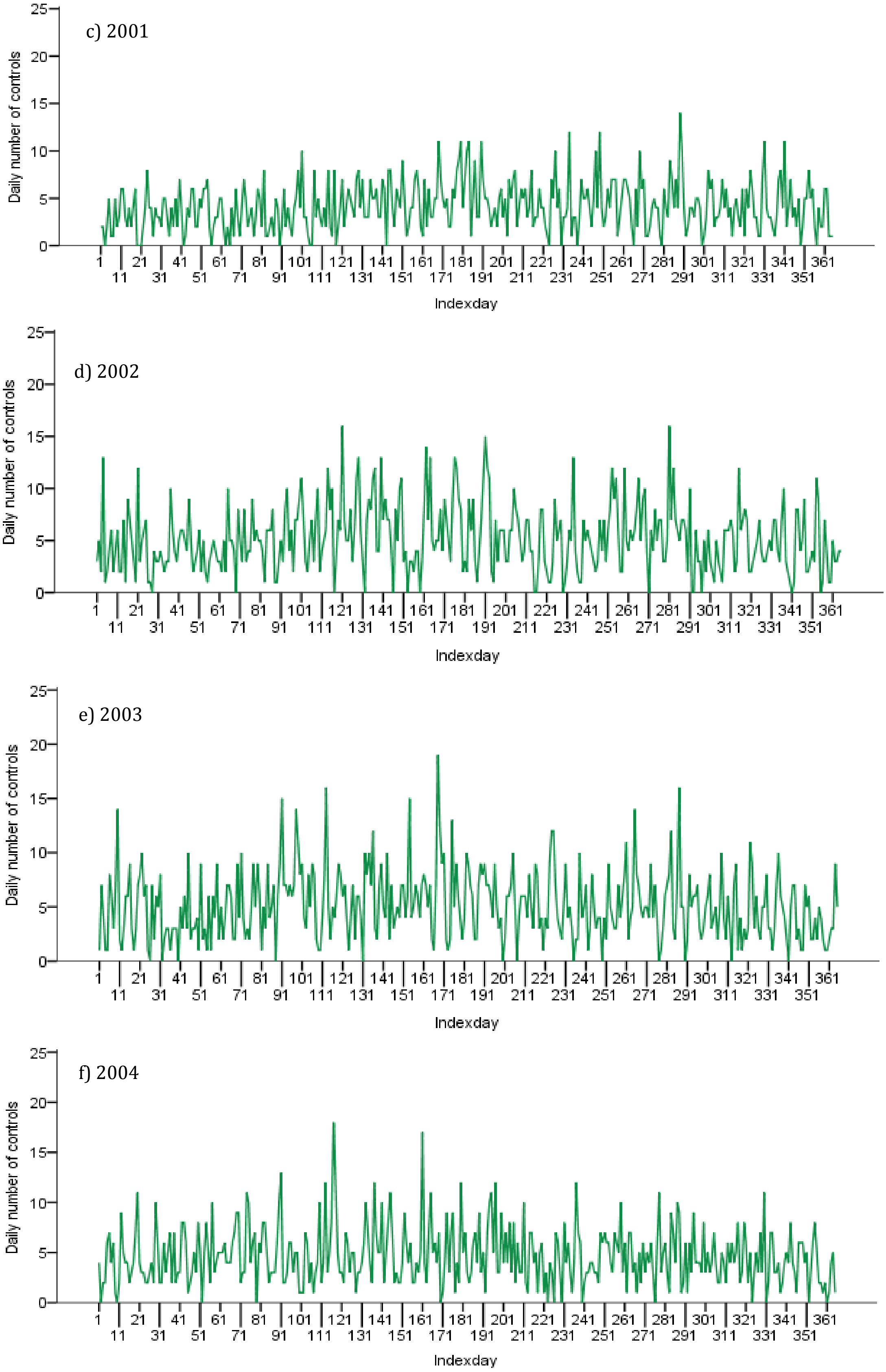
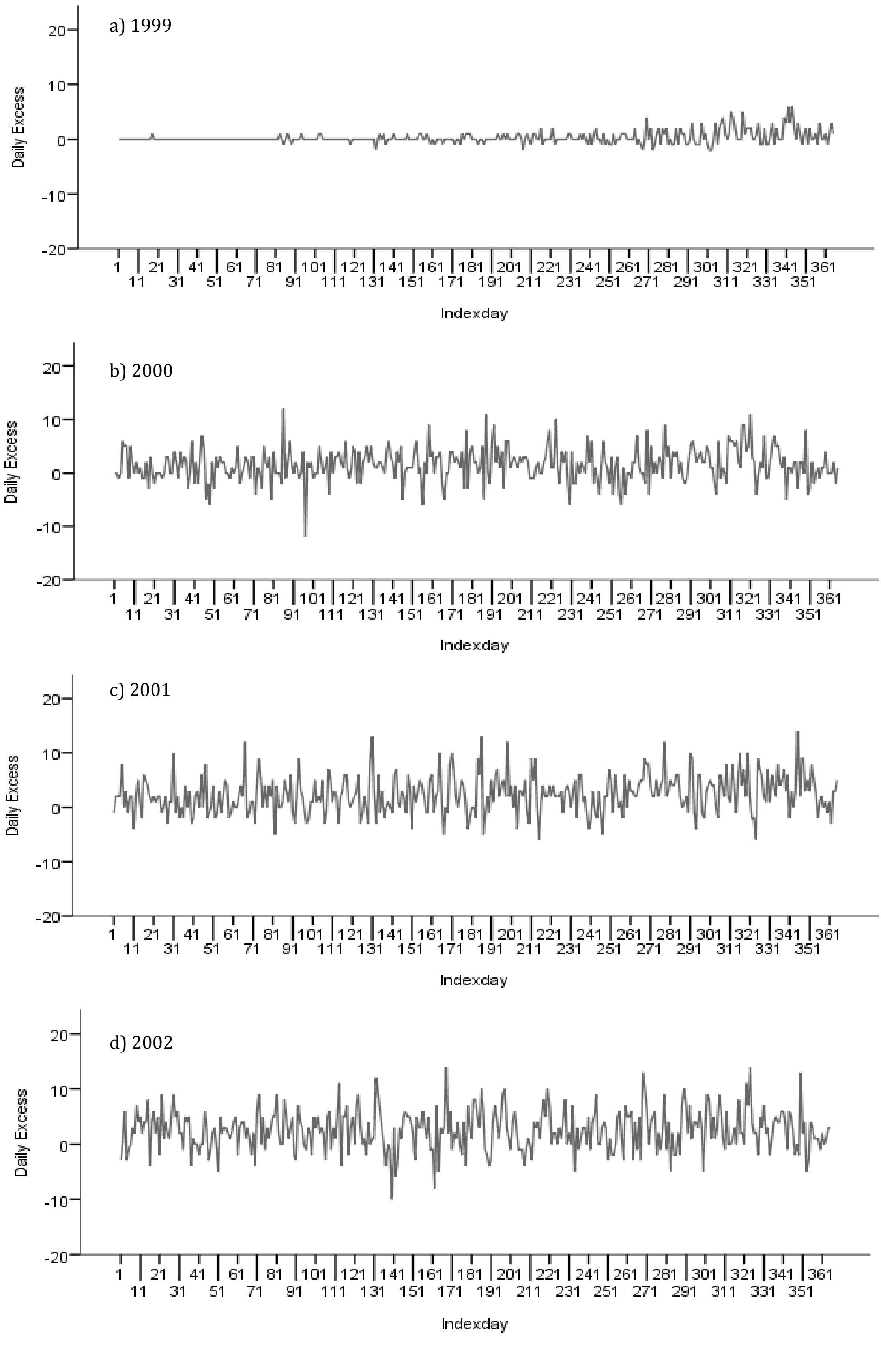
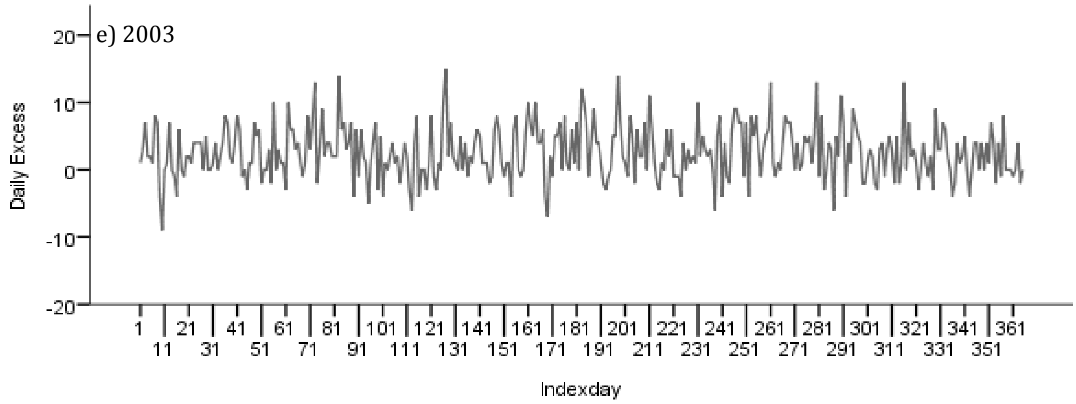


Figure C1. 9: England and Wales Casualty Counts Non-asthmatics a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


a) 1999
b) 2000
c) 2001
d) 2002
Daily Excess
20
10
0
-10
-20
1
11
21
31
41
51
61
71
81
91
101
111
121
131
141
151
161
171
181
191
201
211
221
231
241
251
261
271
281
291
301
311
321
331
341
351
361
Indexday



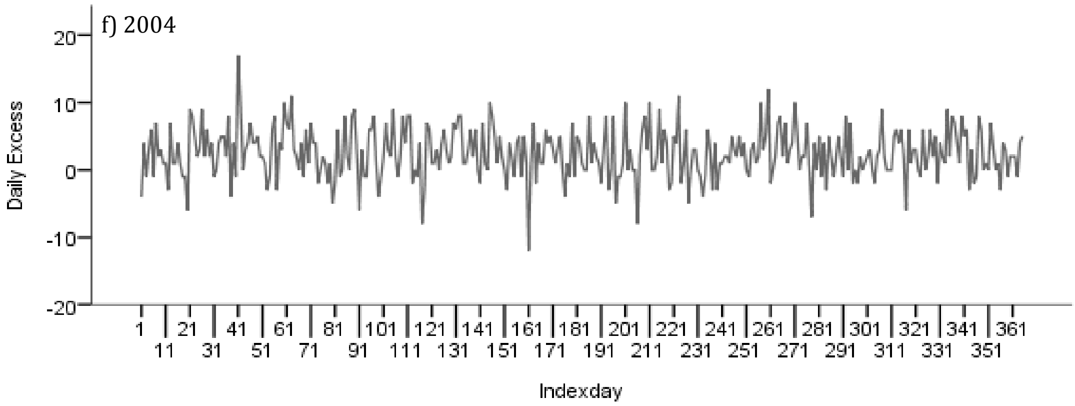
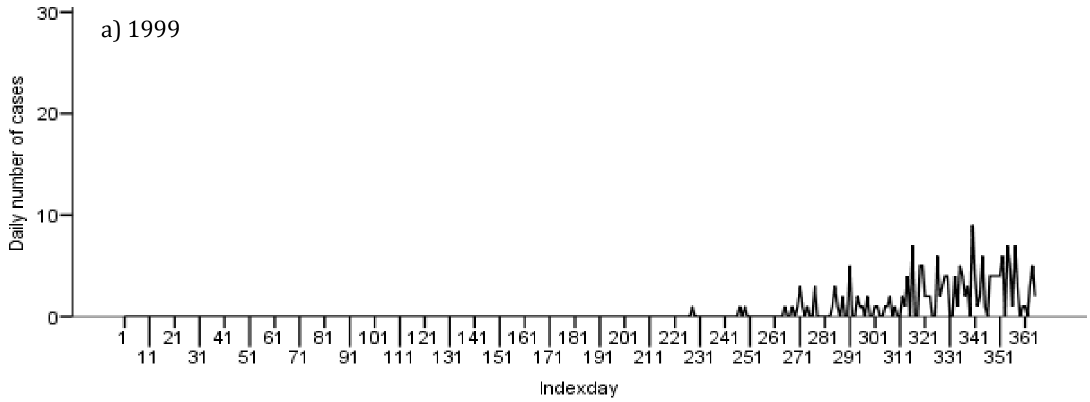
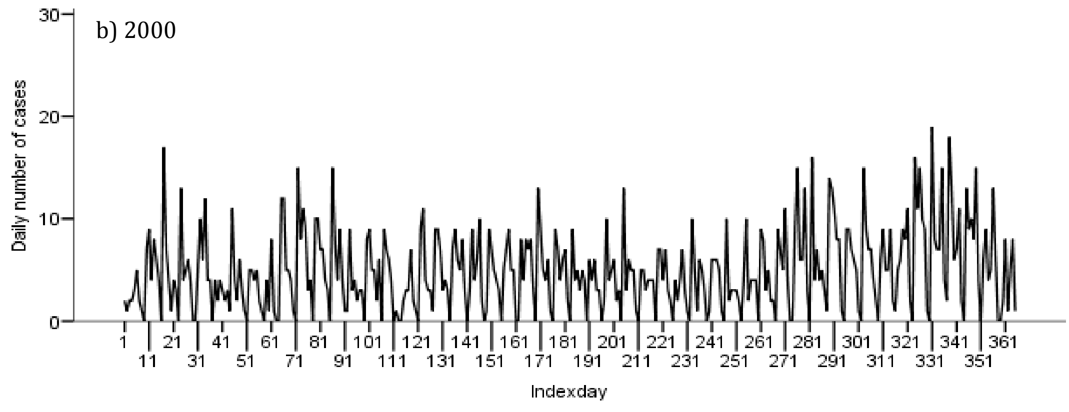


Figure C1. 10: England and Wales Casualty Counts Excess a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.





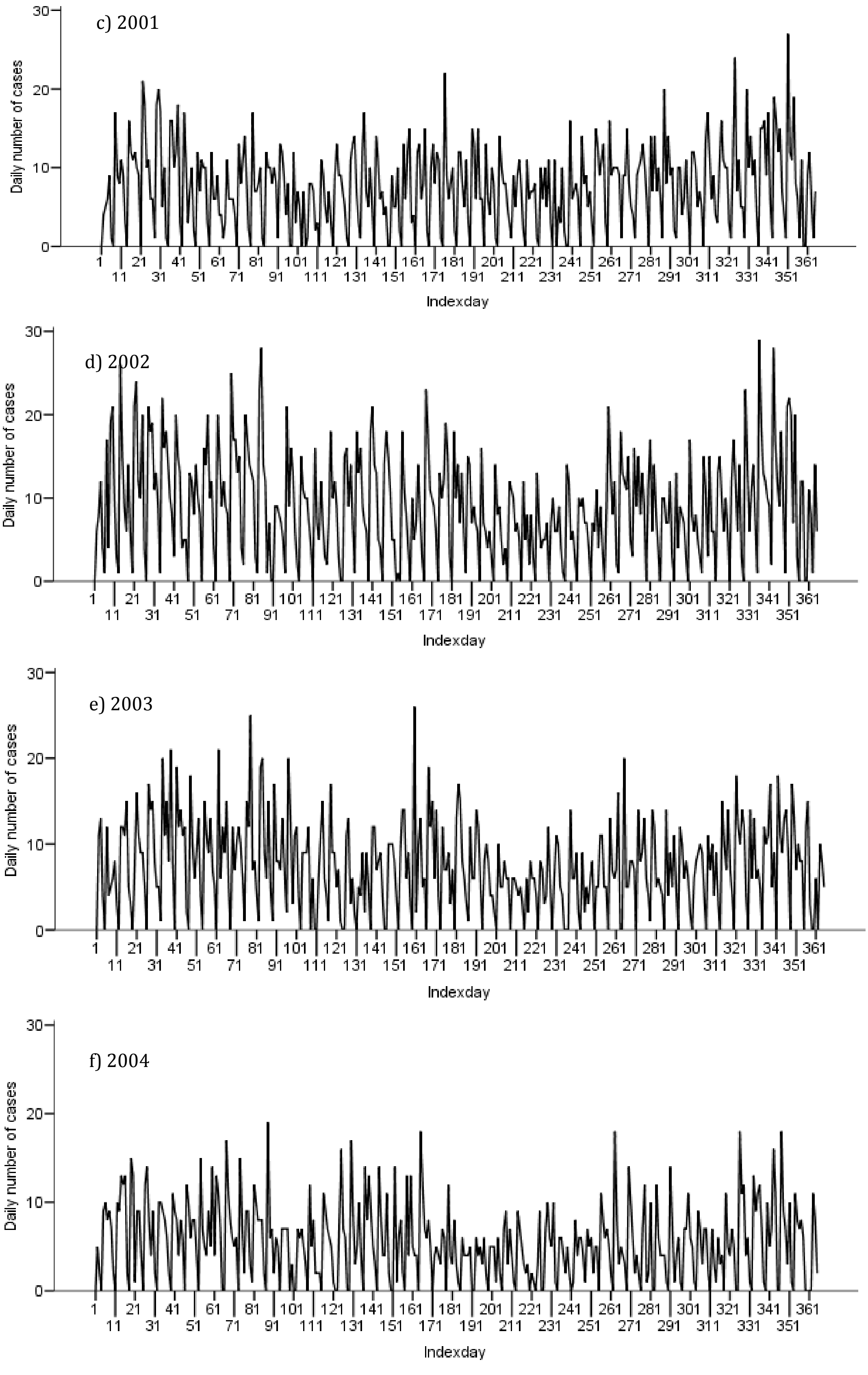
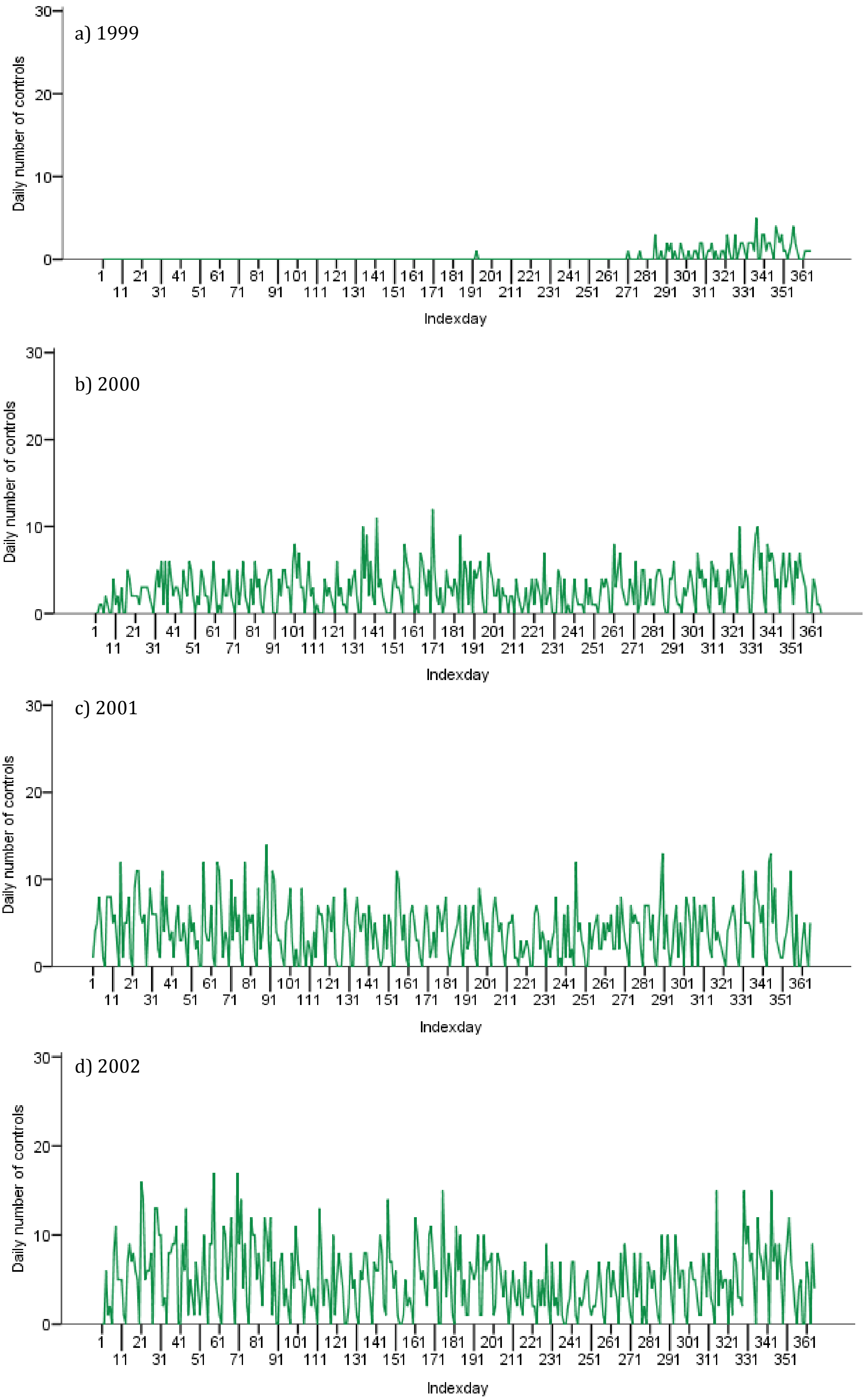
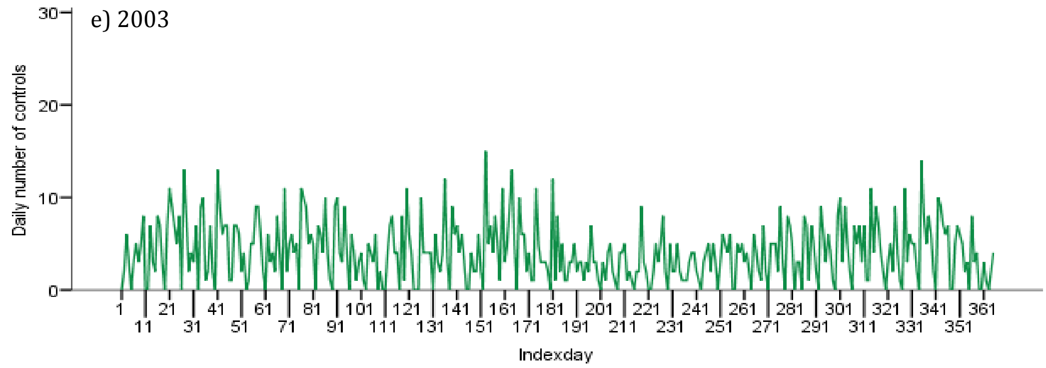


Figure C1. 11: England and Wales Emergency Consultations Asthmatics a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


a) 1999
b) 2000
c) 2001
d) 2002
Daily number of controls
Indexday
0
10
20
30



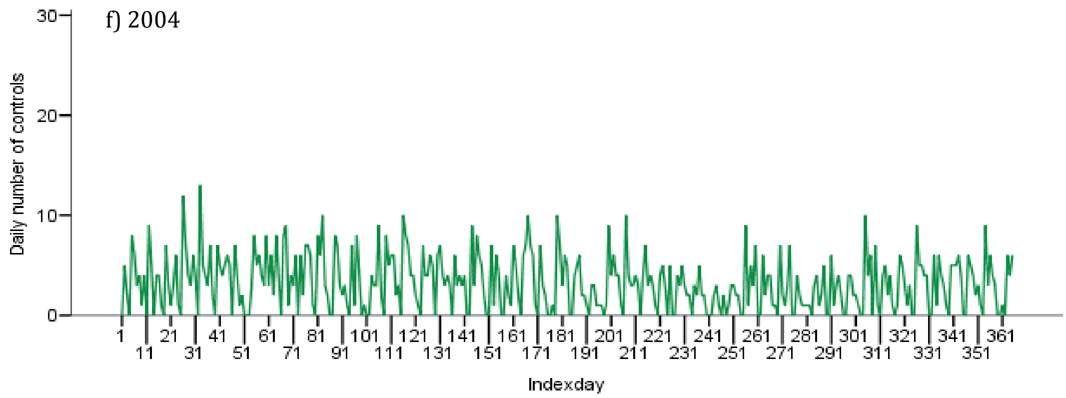
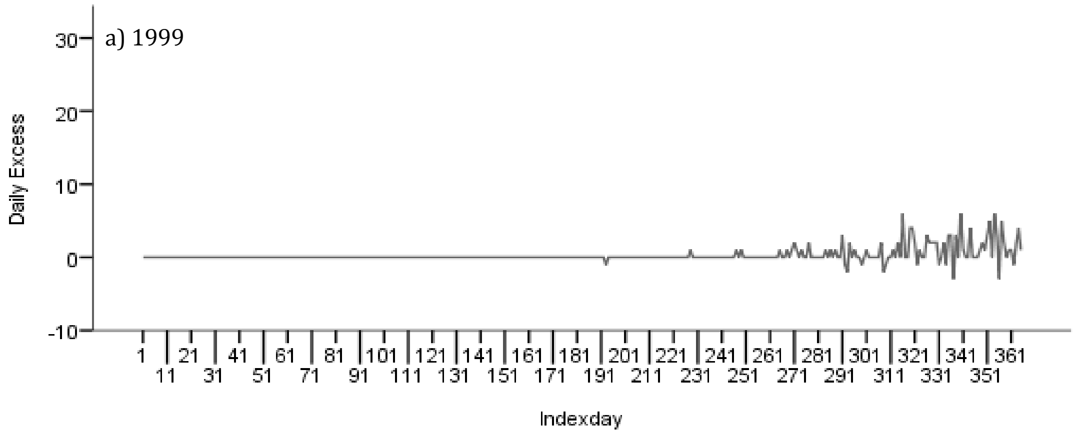
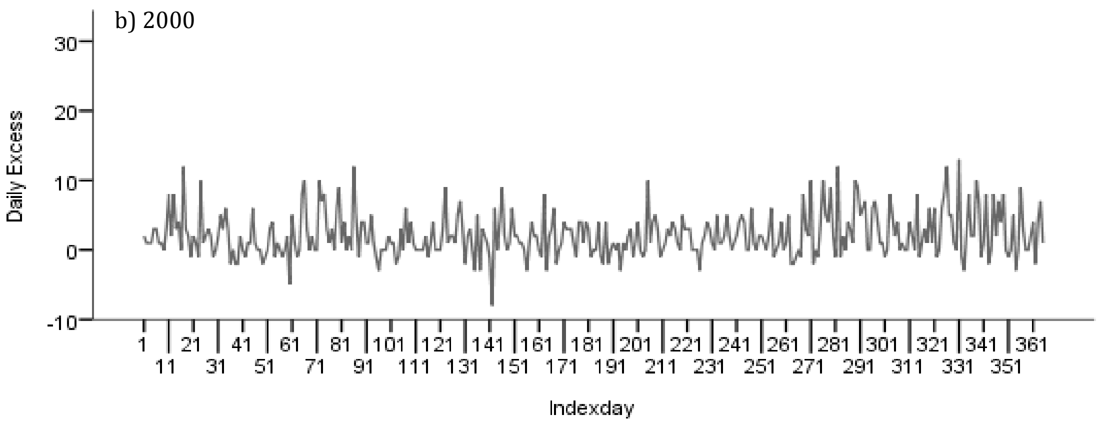


Figure C1. 12: England and Wales Emergency Consultations Non-asthmatics a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.





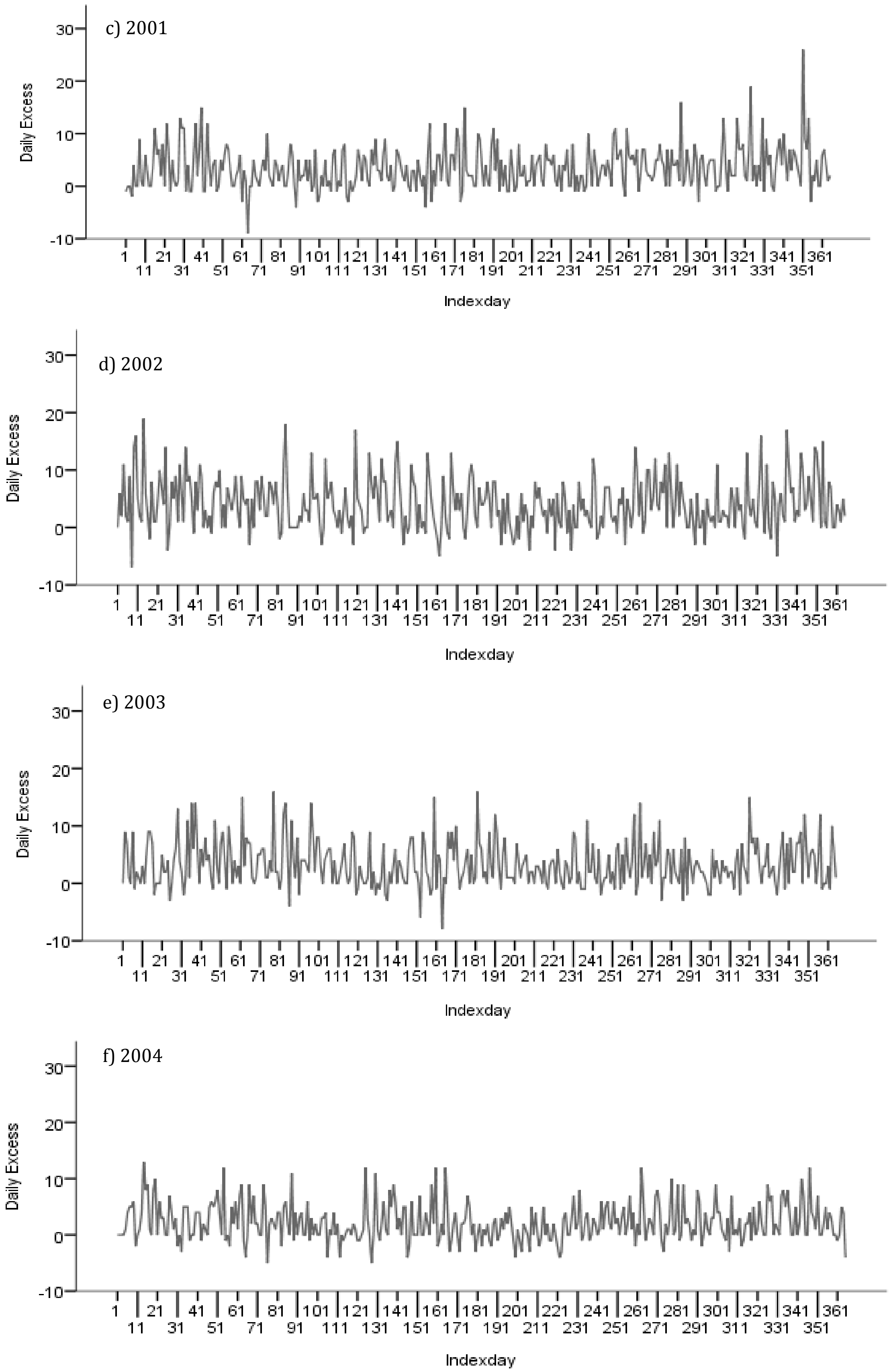
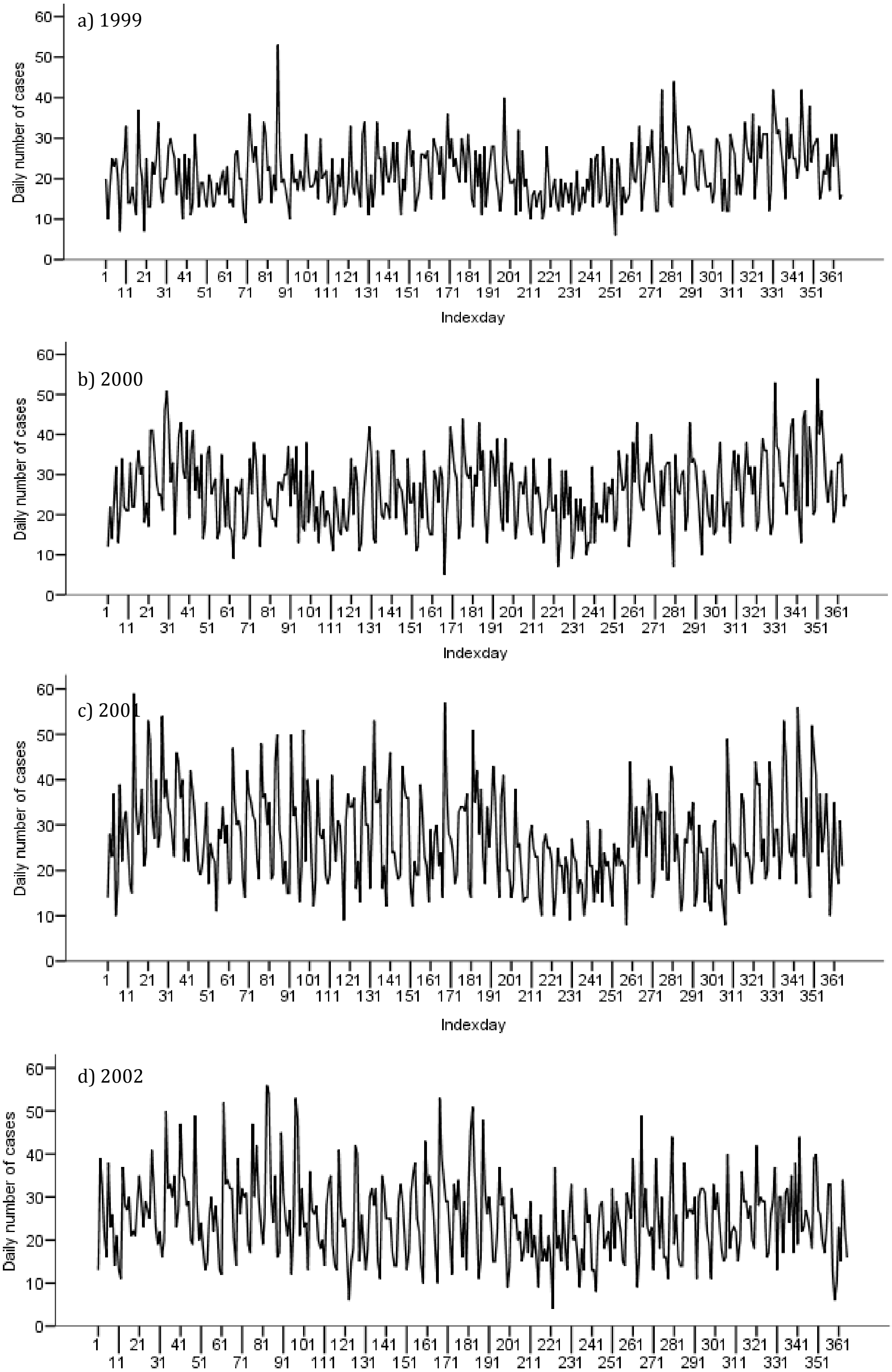
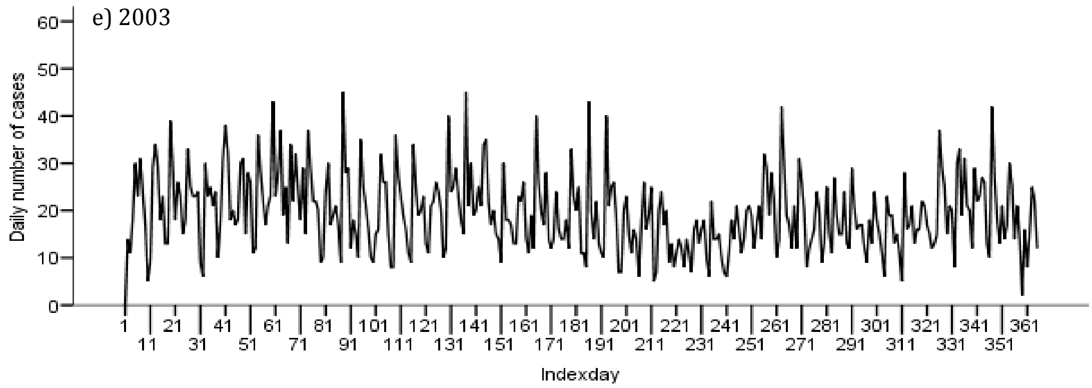


Figure C1. 13: England and Wales Emergency Consultations Excess a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


a) 1999
Daily number of cases
Indexday
b) 2000
Daily number of cases
Indexday
c) 2001
Daily number of cases
Indexday
d) 2002
Daily number of cases
Indexday



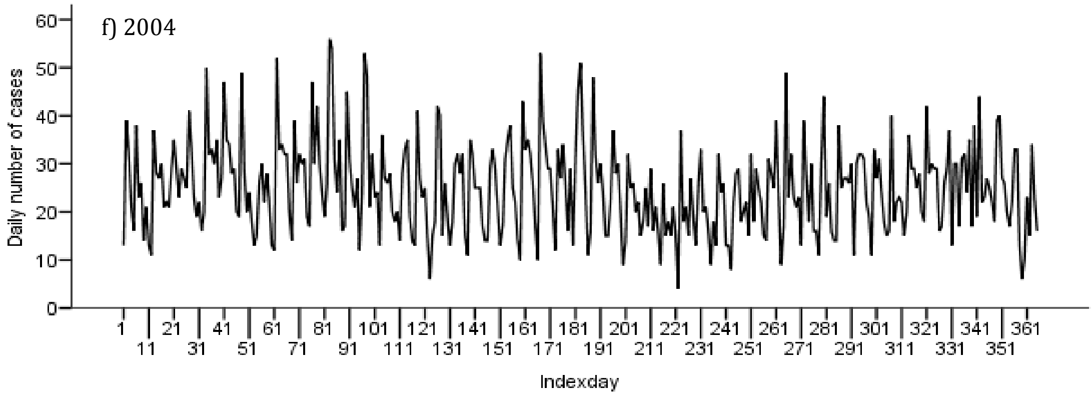
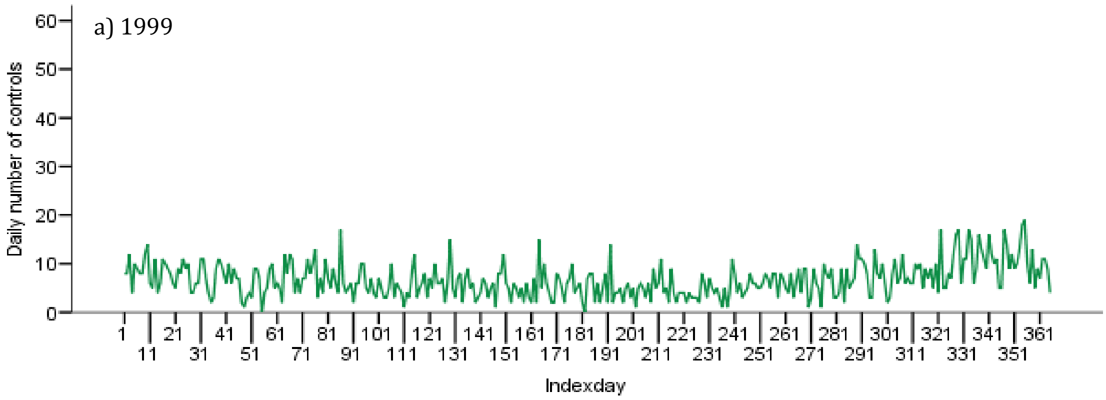
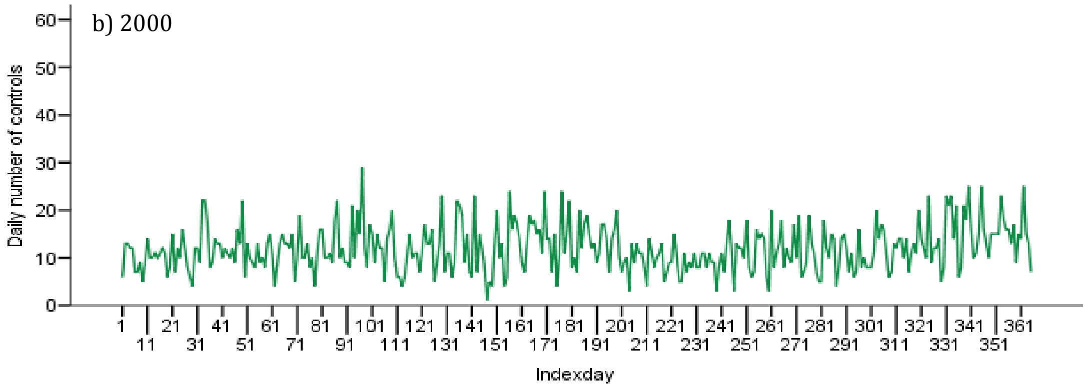
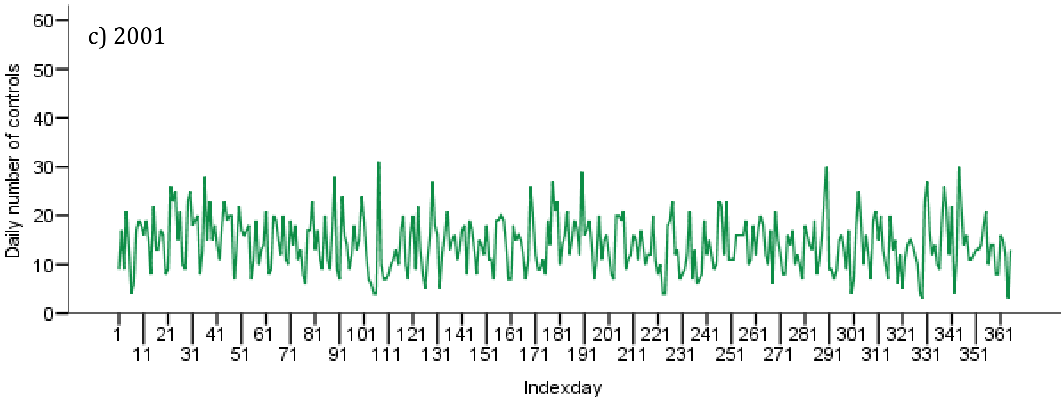
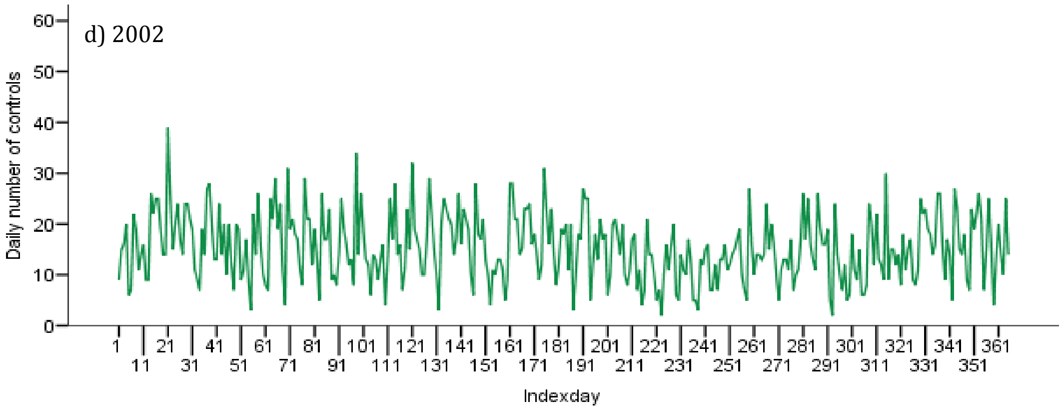


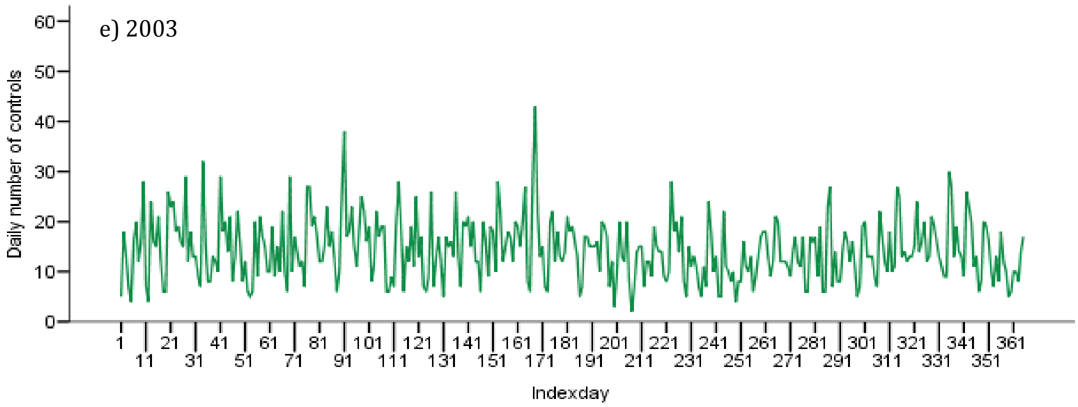
Figure C1. 14: England and Wales Emergency Counts Asthmatics a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.











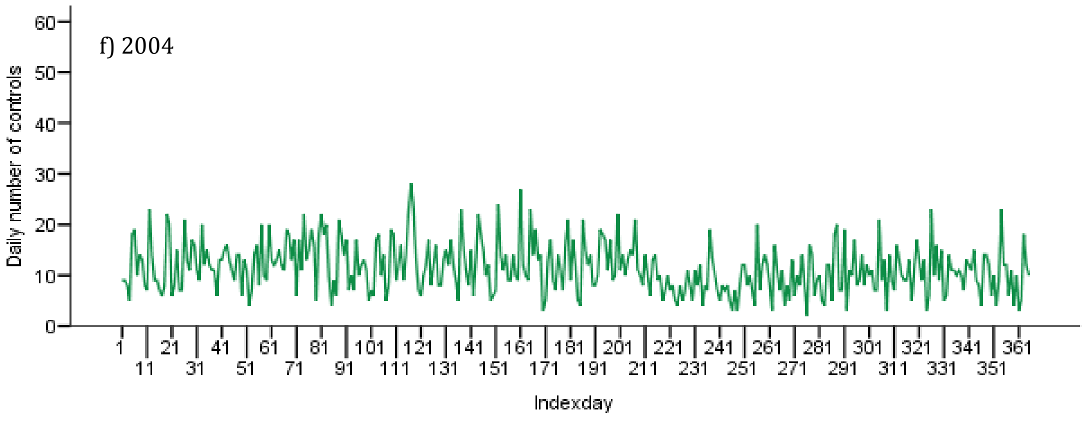
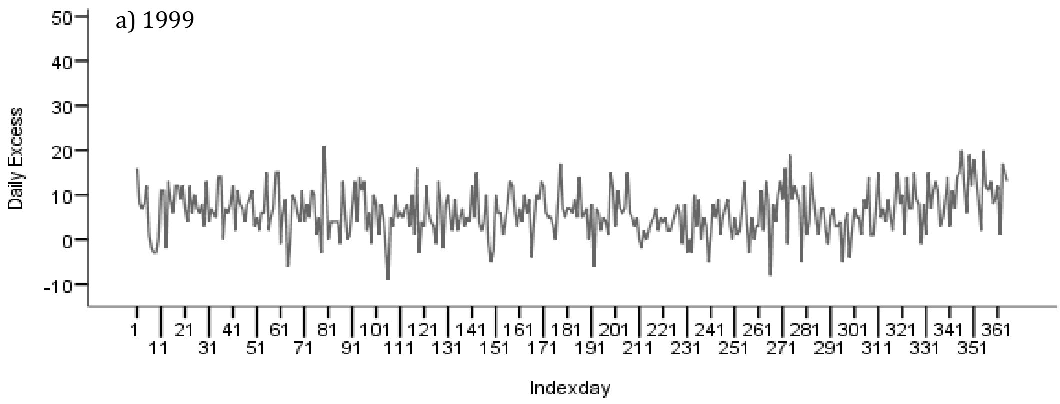
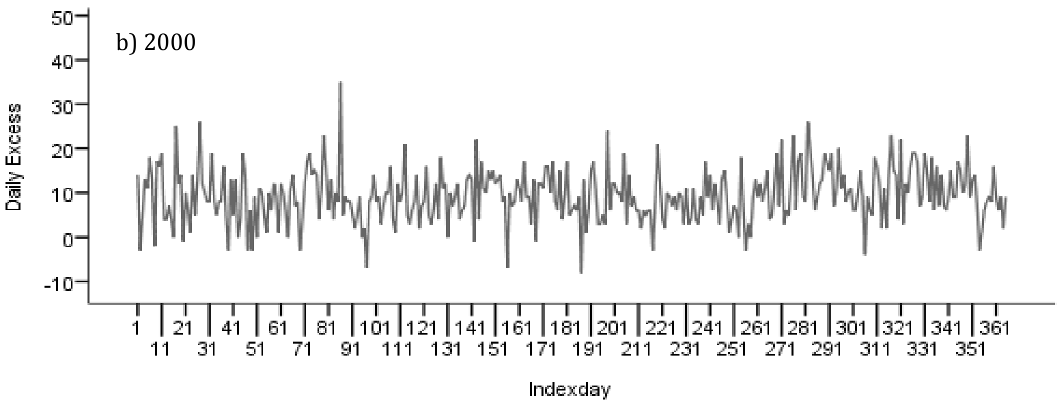
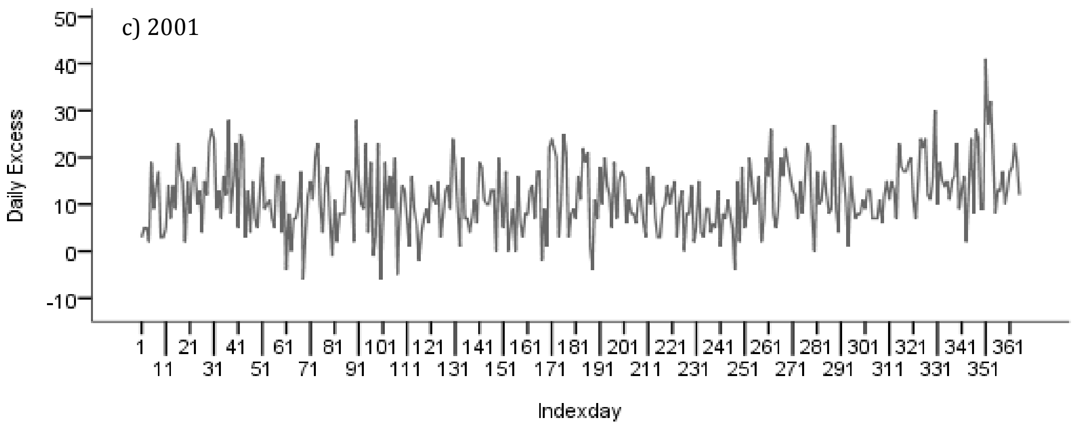
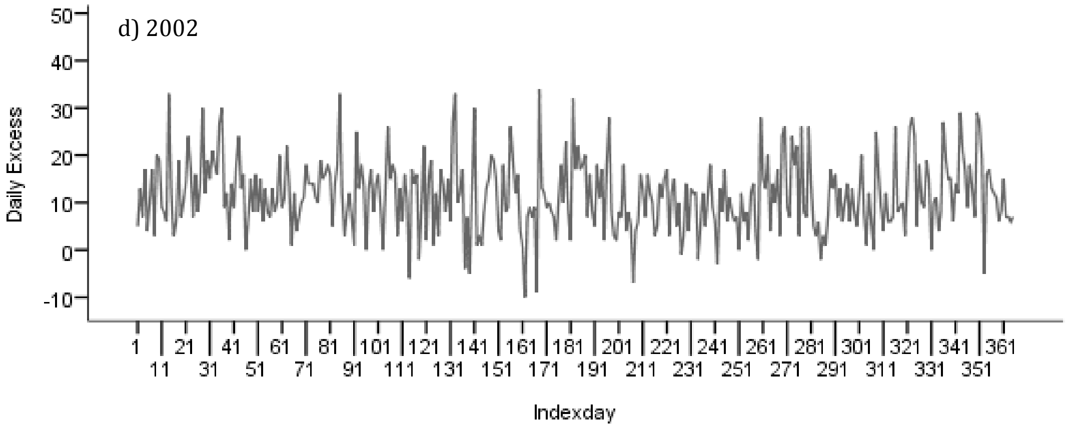


Figure C1. 15: England and Wales Emergency Counts Non-asthmatics a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


a) 1999
Daily Excess
Indexday


b) 2000
Daily Excess
Indexday


c) 2001
Daily Excess
Indexday


d) 2002
Daily Excess
Indexday

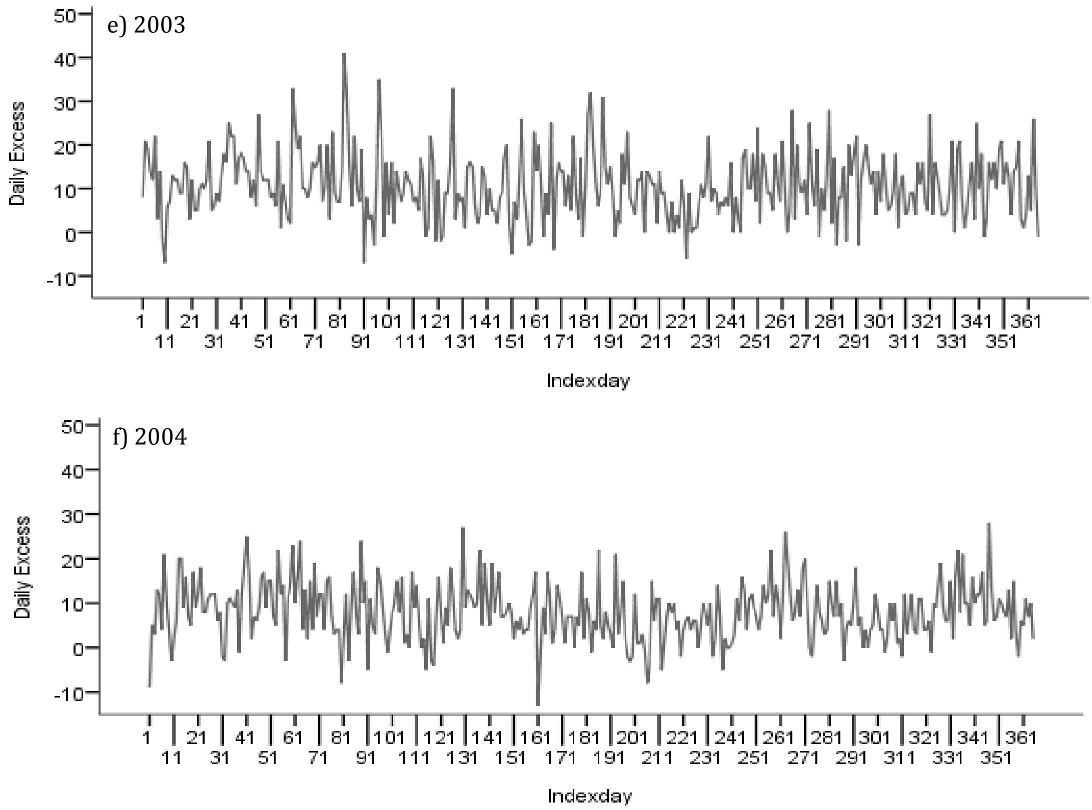
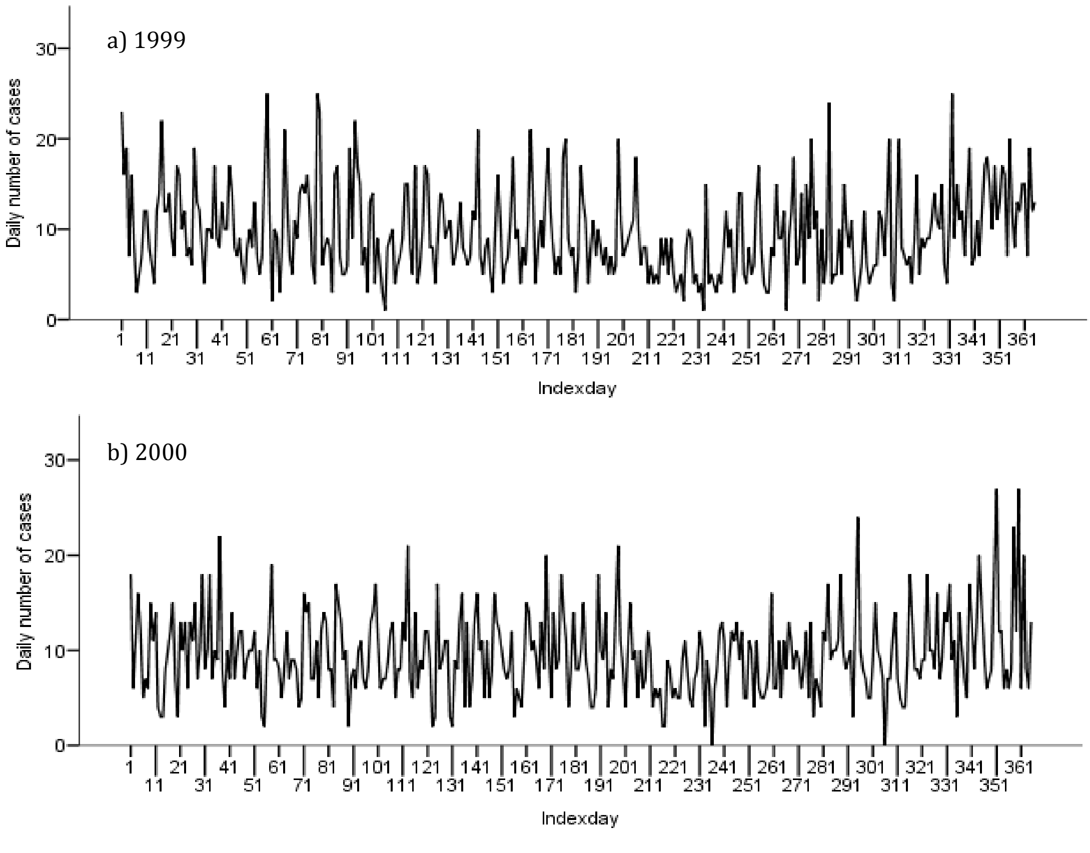


Figure C1. 16: England and Wales Emergency Counts Excess a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.



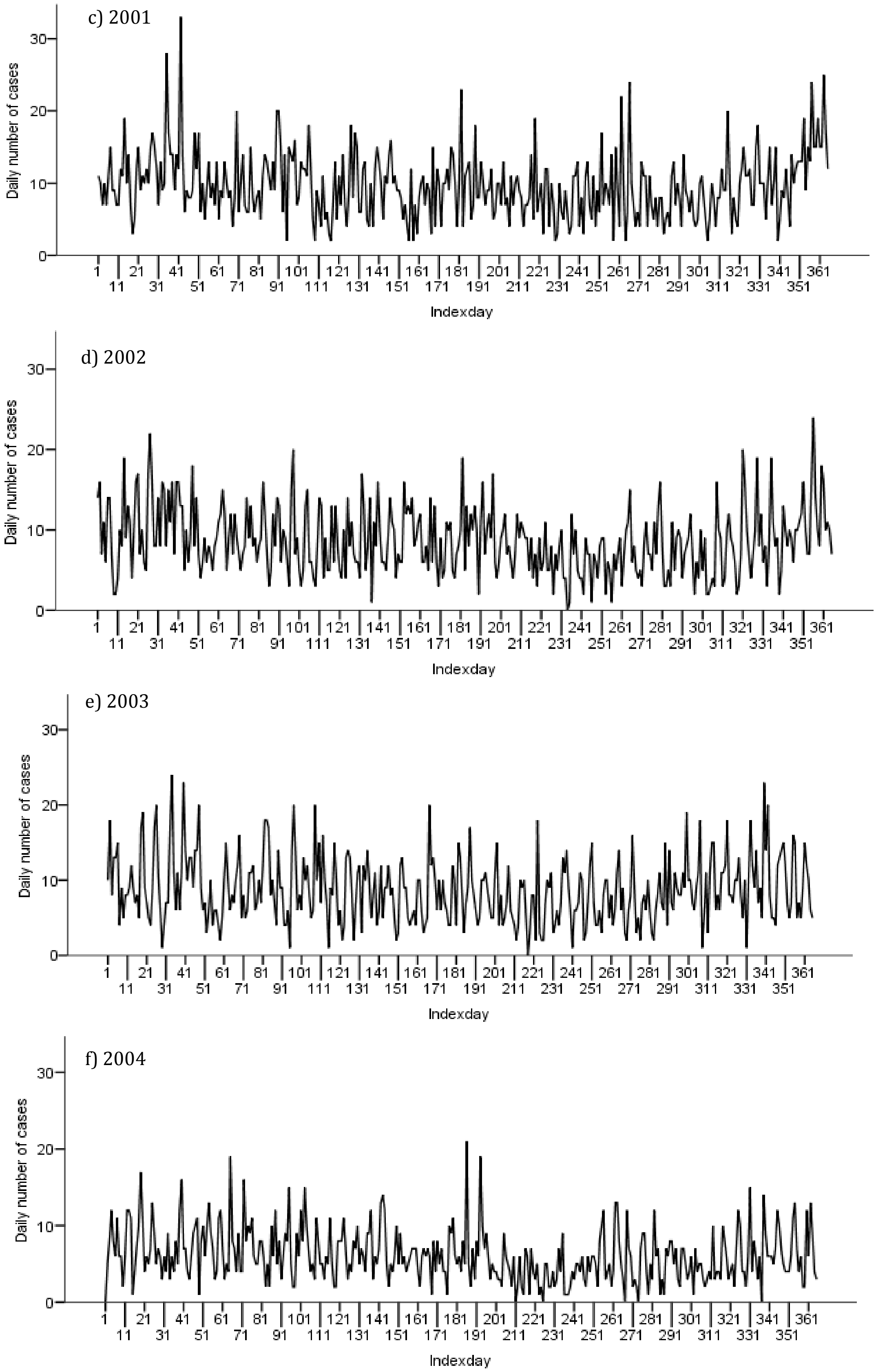
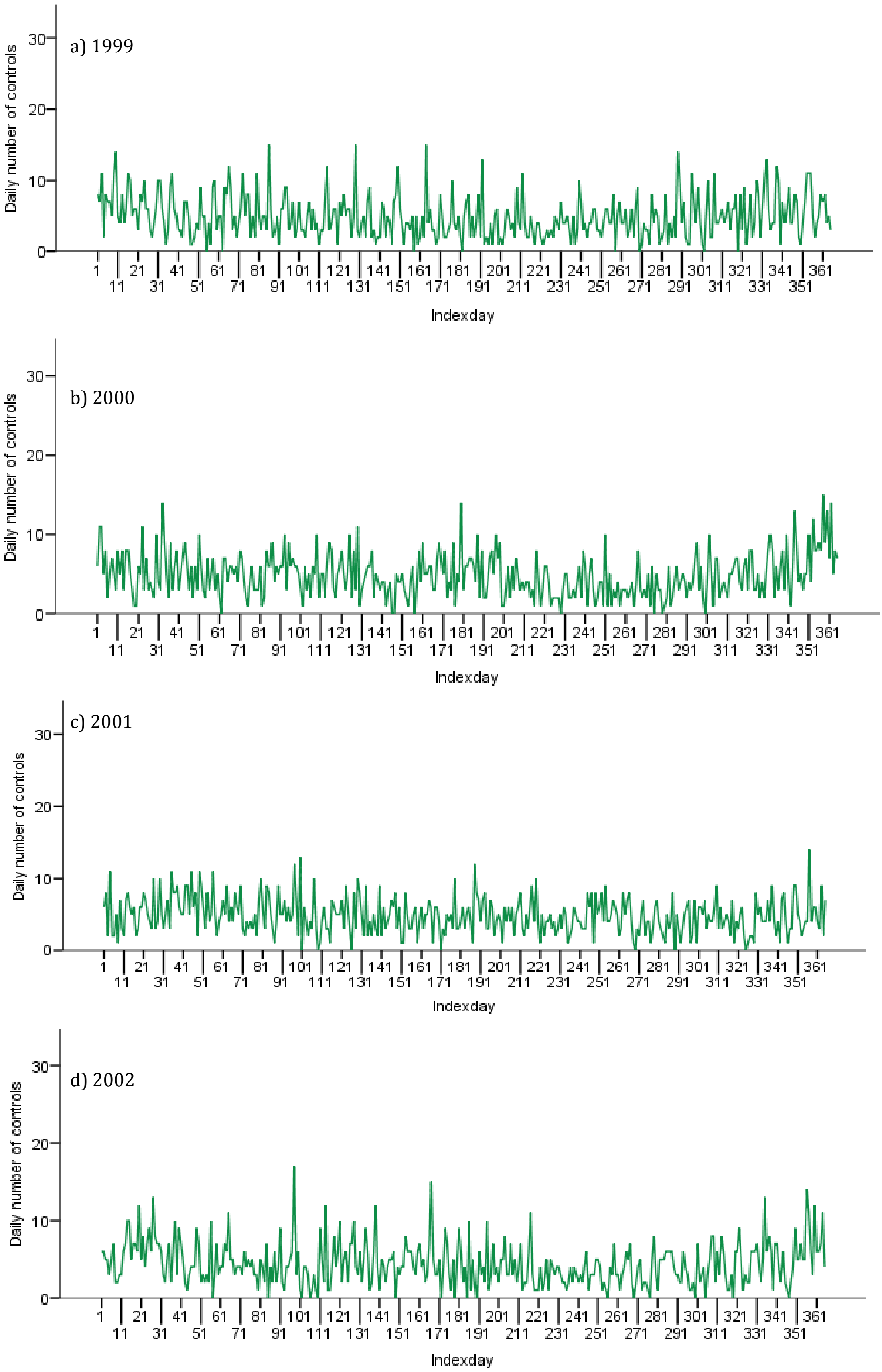
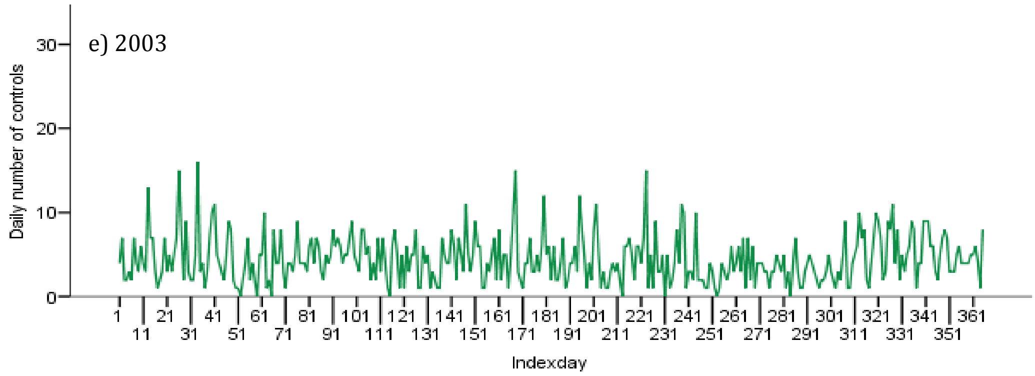


Figure C1. 17: England and Wales Out of Hours Counts Asthmatics a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


a) 1999
b) 2000
c) 2001
d) 2002
Daily number of controls
Indexday
0
10
20
30



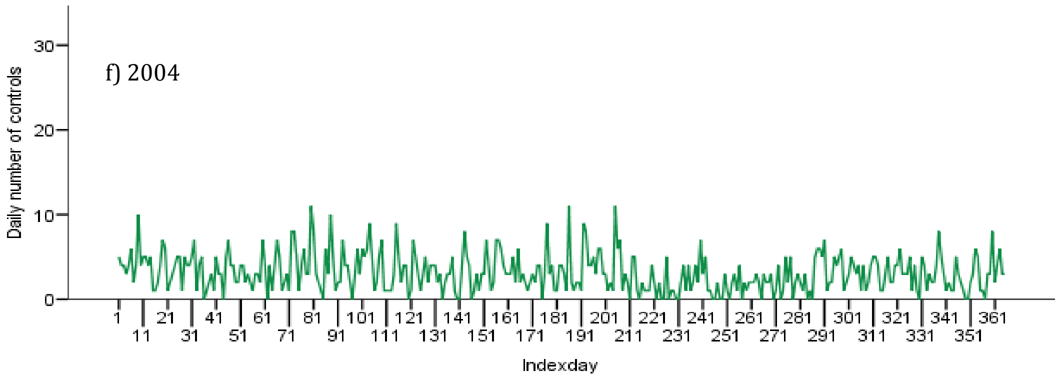
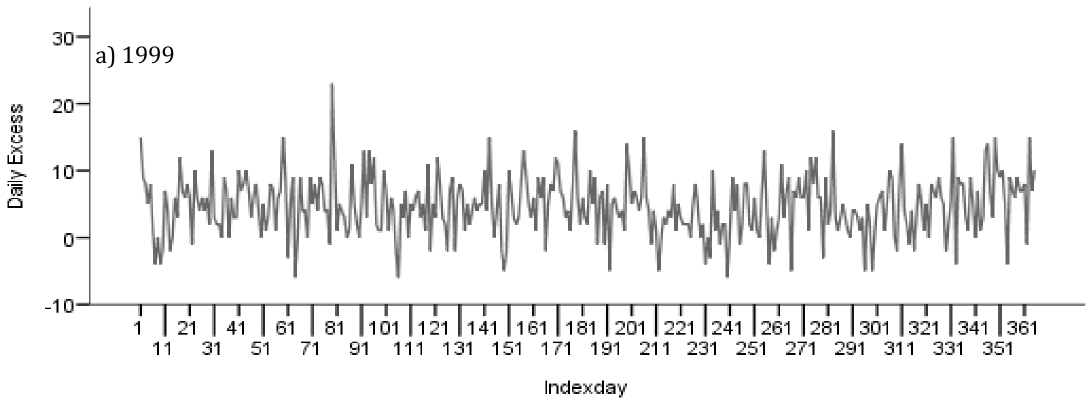
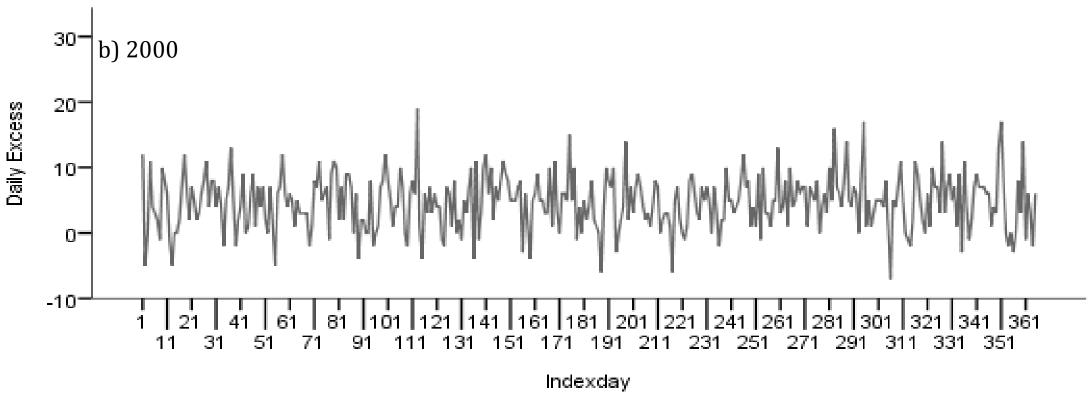


Figure C1. 18: England and Wales Out of Hours Counts Non-asthmatics a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.





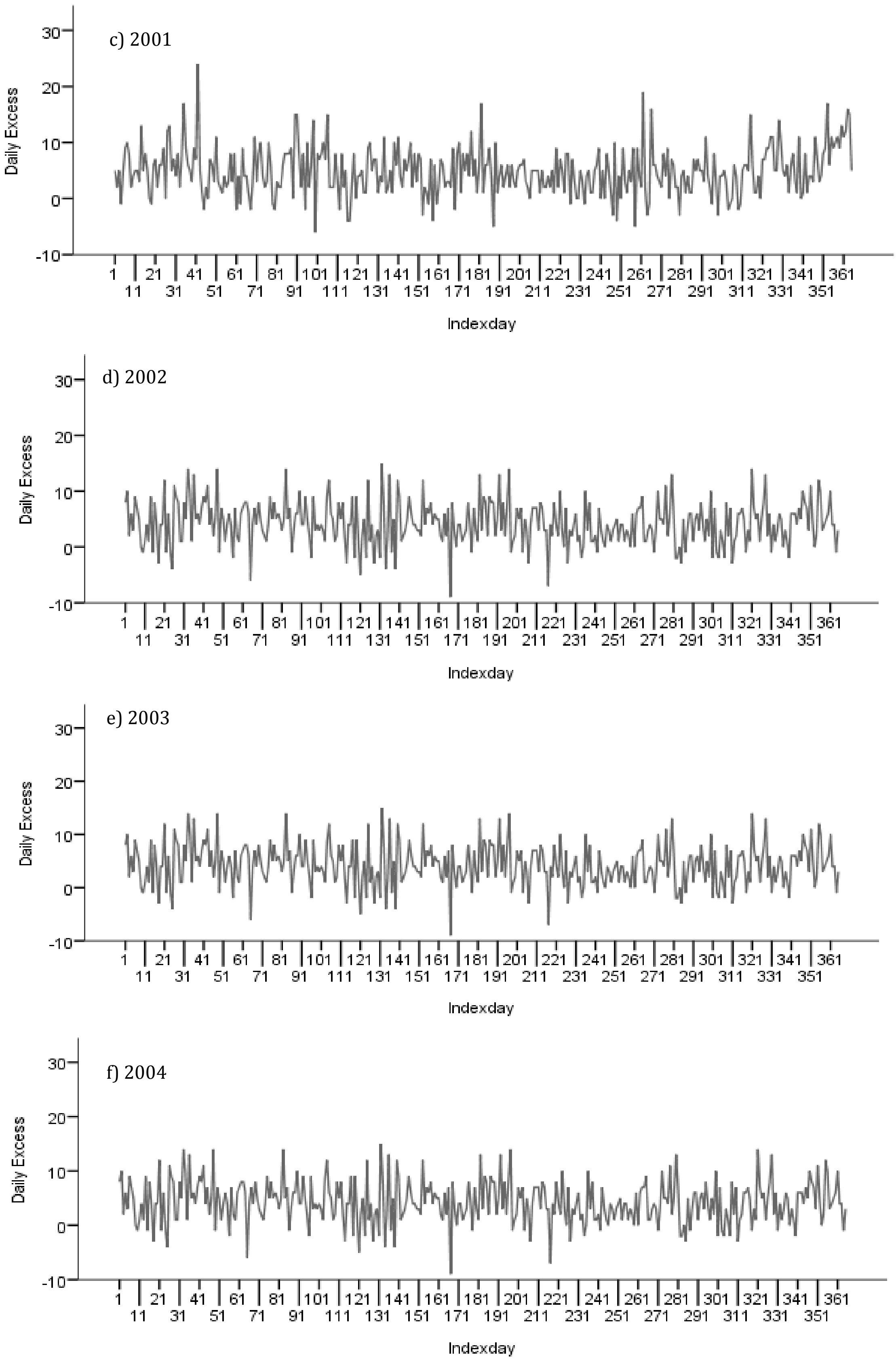


Figure C1. 19: England and Wales Out of Hours Excess a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.

C1.1.3. England and Wales Summary descriptives for Acute Visits, Casualty Counts, Emergency Consultations, Emergency and Out of Hours Counts

Table C. 1: England and Wales All Medical Contacts - descriptive statistics (n=2190).

Asthmatics, Non-asthmatics or Excess	Statistics	All Counts	Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours Counts
Asthmatics	**Mean**	470.92	1.60	5.78	5.85	21.96	8.73
	Median	581.5	1	5	5	21	8
	SD	294.01	1.96	4.35	5.43	9.69	4.53
	Minimum	3	0	0	0	0	0
	Maximum	1211	25	24	29	59	33
Non-asthmatics	**Mean**	241.24	.87	3.80	3.25	12.36	4.44
	Median	298	0	3	3	12	4
	SD	150.03	1.20	3.14	3.21	6.12	2.81
	Minimum	2	0	0	0	0	0
	Maximum	656	13	19	17	43	17
Excess	**Mean**	229.68	.73	1.98	2.60	9.60	4.29
	Median	274	0	1	1	9	4
	SD	148.57	1.81	3.45	3.77	7.06	4.14
	Minimum	-8	-5	-12	-9	-13	-9
	Maximum	660	13	17	26	41	24

Table C. 2: England and Wales All Counts - descriptive statistics of the daily number of contacts made on weekdays or weekends.

	Weekday			Weekend		
Statistics	**Asthmatics**	**Non-asthmatics**	**Excess**	**Asthmatics**	**Non-asthmatics**	**Excess**
Number of days	1565			625		
Mean	635.57	325.42	310.15	58.63	30.45	28.18
Median	637	326	310	44	23	22
SD	159.27	80.67	89.49	37.56	19.42	21.42
Minimum	6	4	-4	3	2	-8
Maximum	1211	656	660	186	105	102

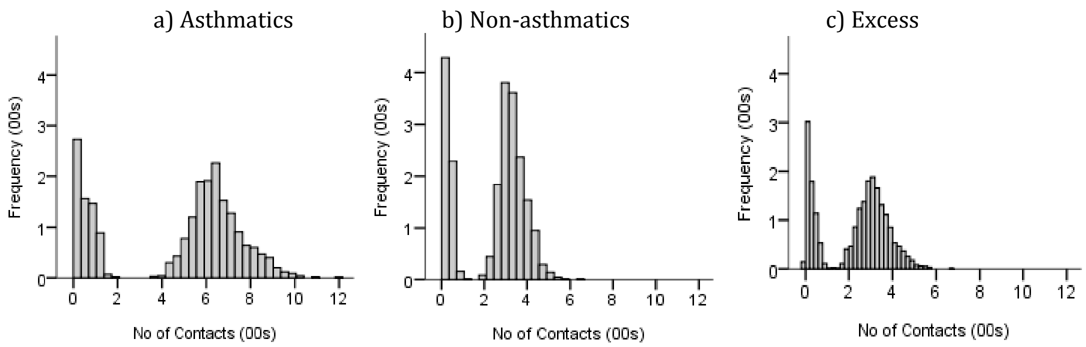


Figure C1. 20: England and Wales All Counts - distribution of the daily number of contacts a) Asthmatics, b) Non-asthmatics and c) Excess (n=2,190 days).

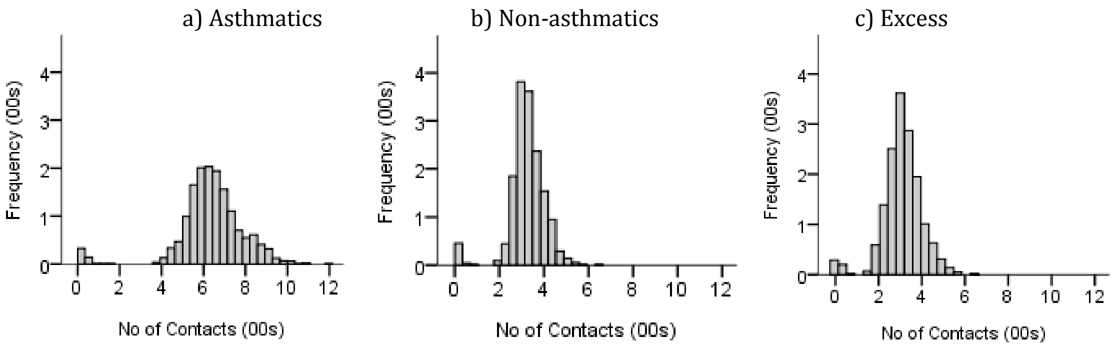


Figure C1. 21: England and Wales All Counts – distribution of the daily number of contacts weekday only a) Asthmatics, b) Non-asthmatics, and c) Excess.

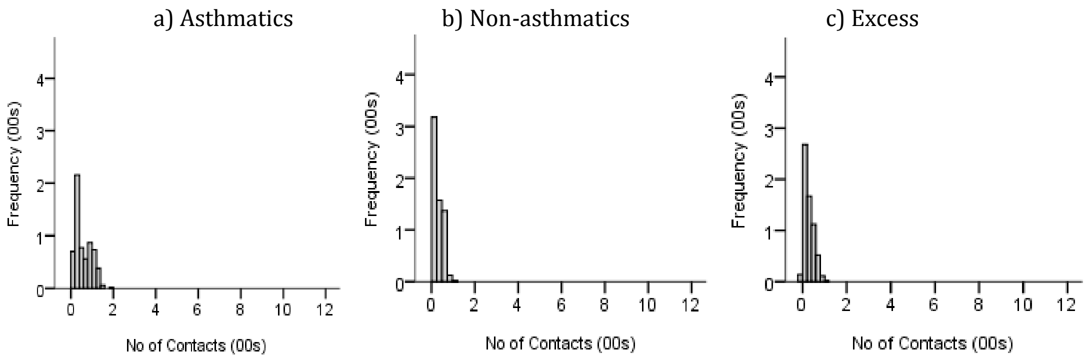
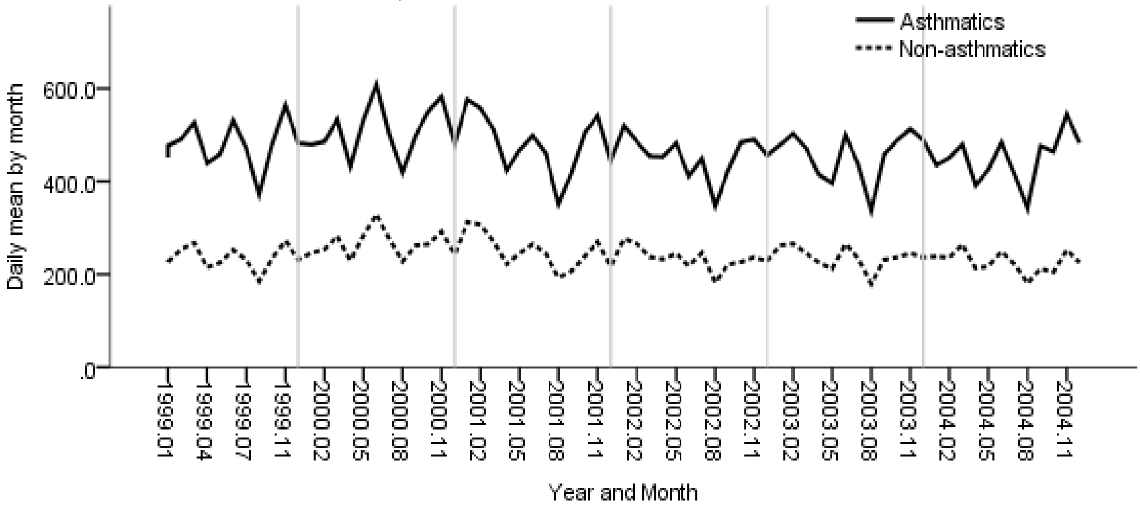


Figure C1. 22: England and Wales All Counts – distribution of the daily number of contacts weekend only a) Asthmatics, b) Non-asthmatics, and c) Excess (difference between asthmatics and non-asthmatics).

a) Asthmatics and non-asthmatics



b) Excess

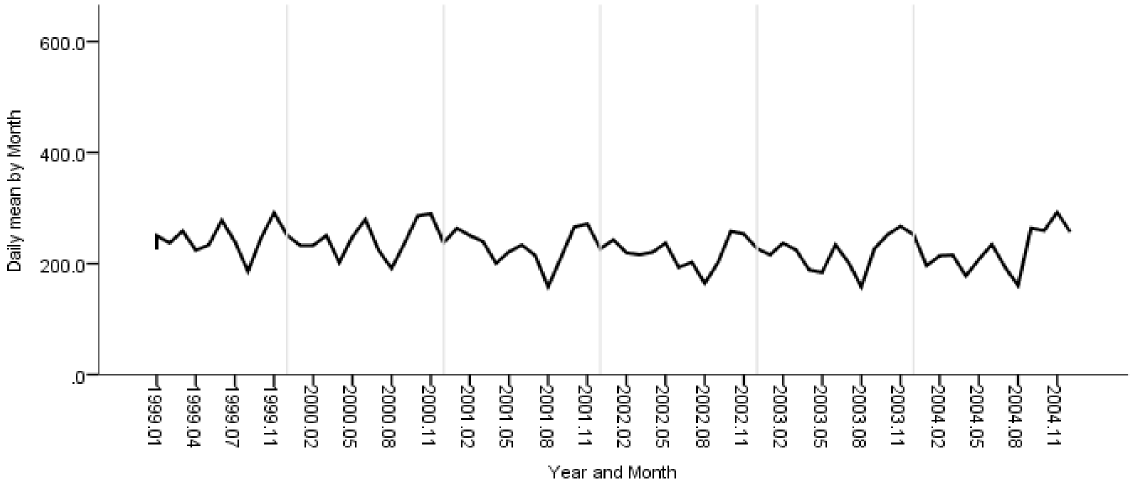


Figure C1. 23: England and Wales All Counts - plot of the daily mean number of contacts aggregated by month 1999-2004 a) Asthmatics and non-asthmatics and b) Excess.

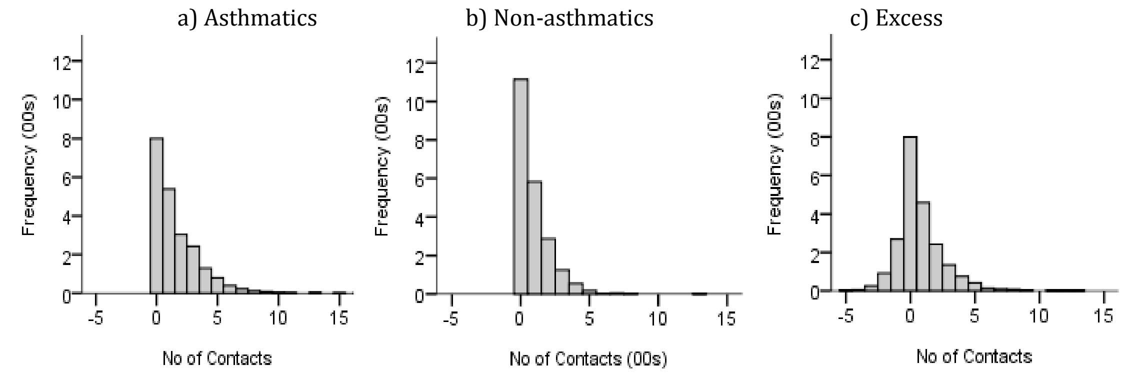


Figure C1. 24: Acute Visits England and Wales – distribution of the daily number of contact a) Asthmatics, b) Non-asthmatics and c) Excess.

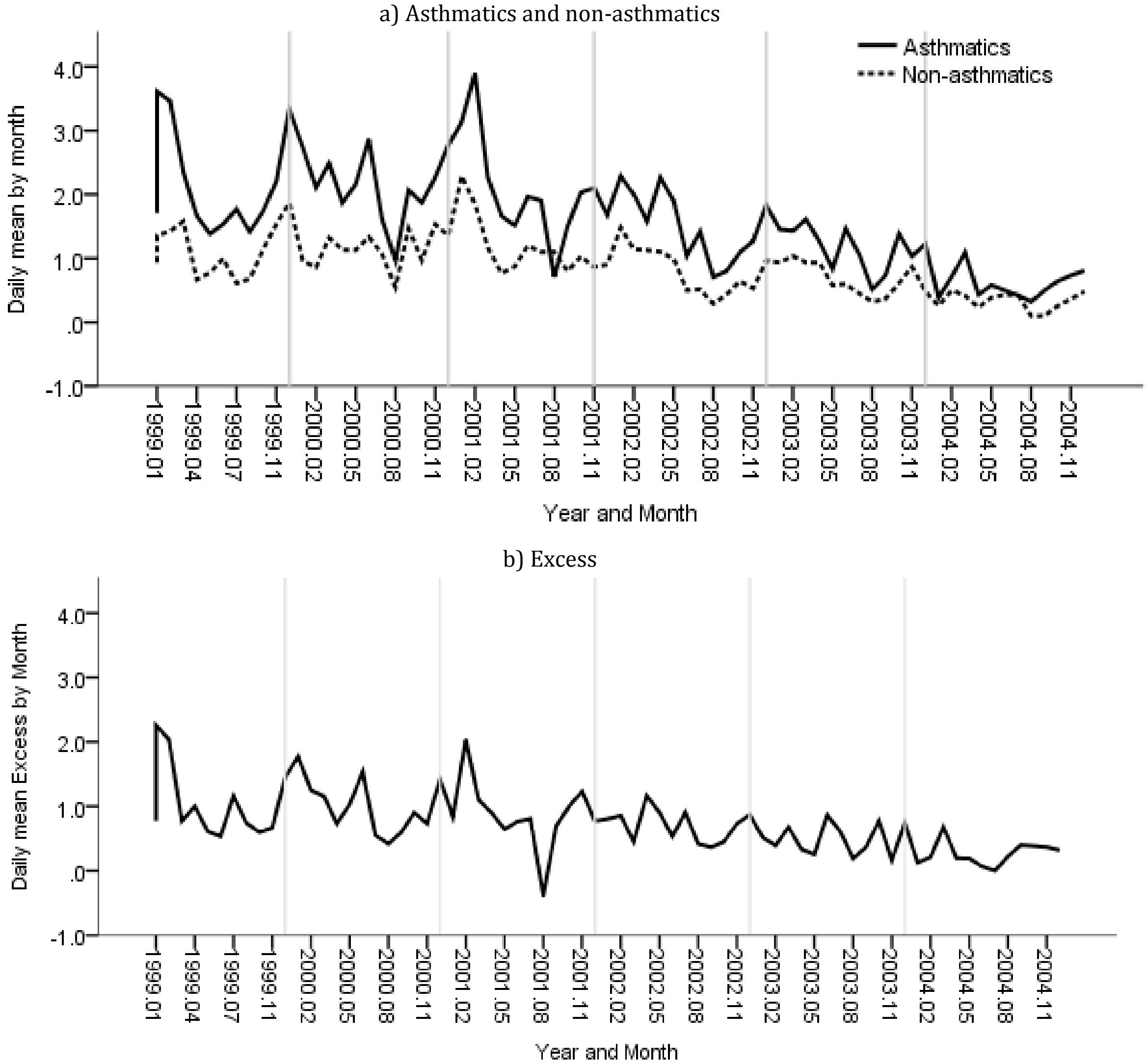


Figure C1. 25: Acute Visits England and Wales - plot of the daily mean number of contacts aggregated by month 1999-2004 a) Asthmatics and non-asthmatics and b) Excess.

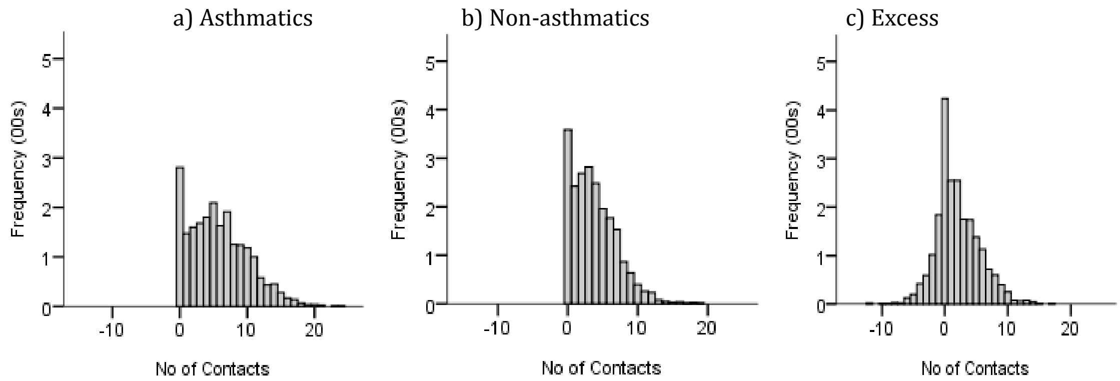


Figure C1. 26: Casualty Counts England and Wales – distribution of the daily number of contact a) Asthmatics, b) Non-asthmatics and c) Excess.

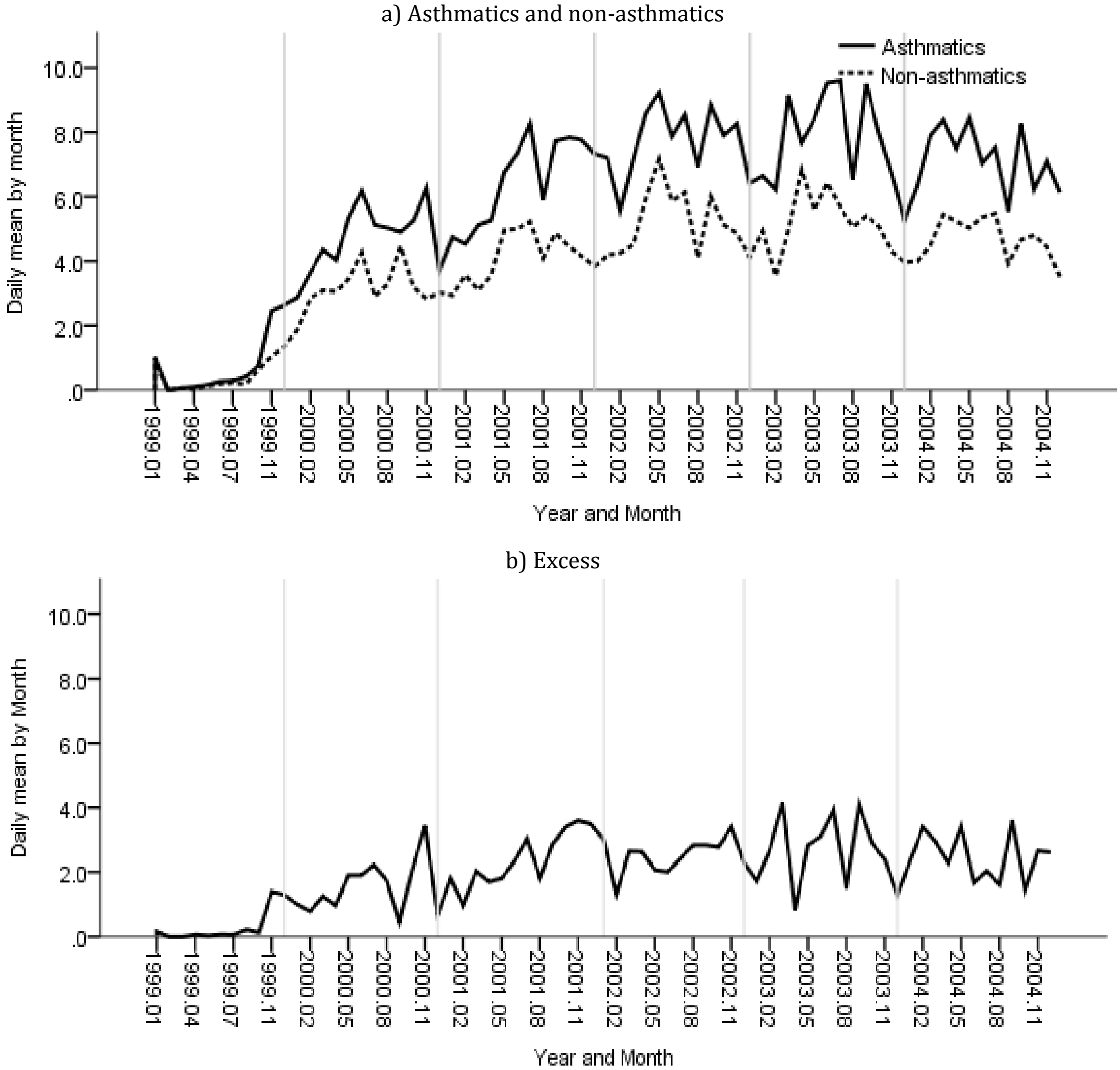


Figure C1. 27: England and Wales Casualty Counts- plot of the daily mean number of contacts aggregated by month 1999-2004 a) Asthmatics and non-asthmatics and b) Excess.

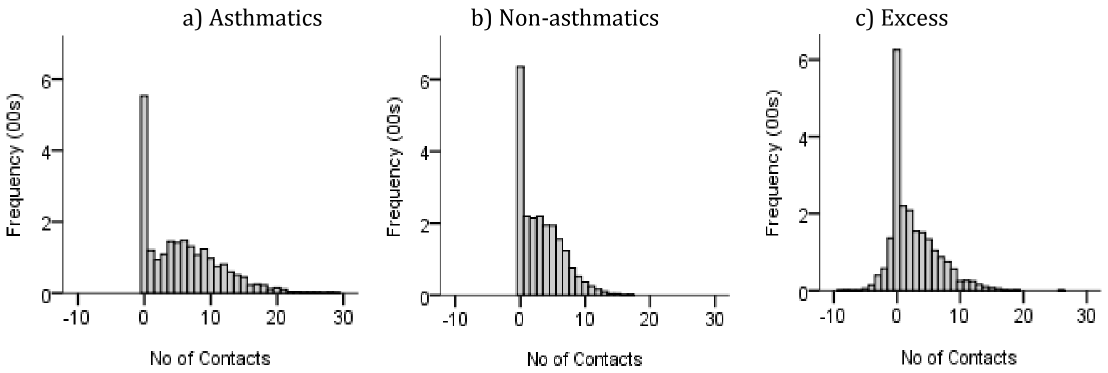


Figure C1. 28: Emergency Consultations England and Wales – distribution of the daily number of contact a) Asthmatics, b) Non-asthmatics and c) Excess.

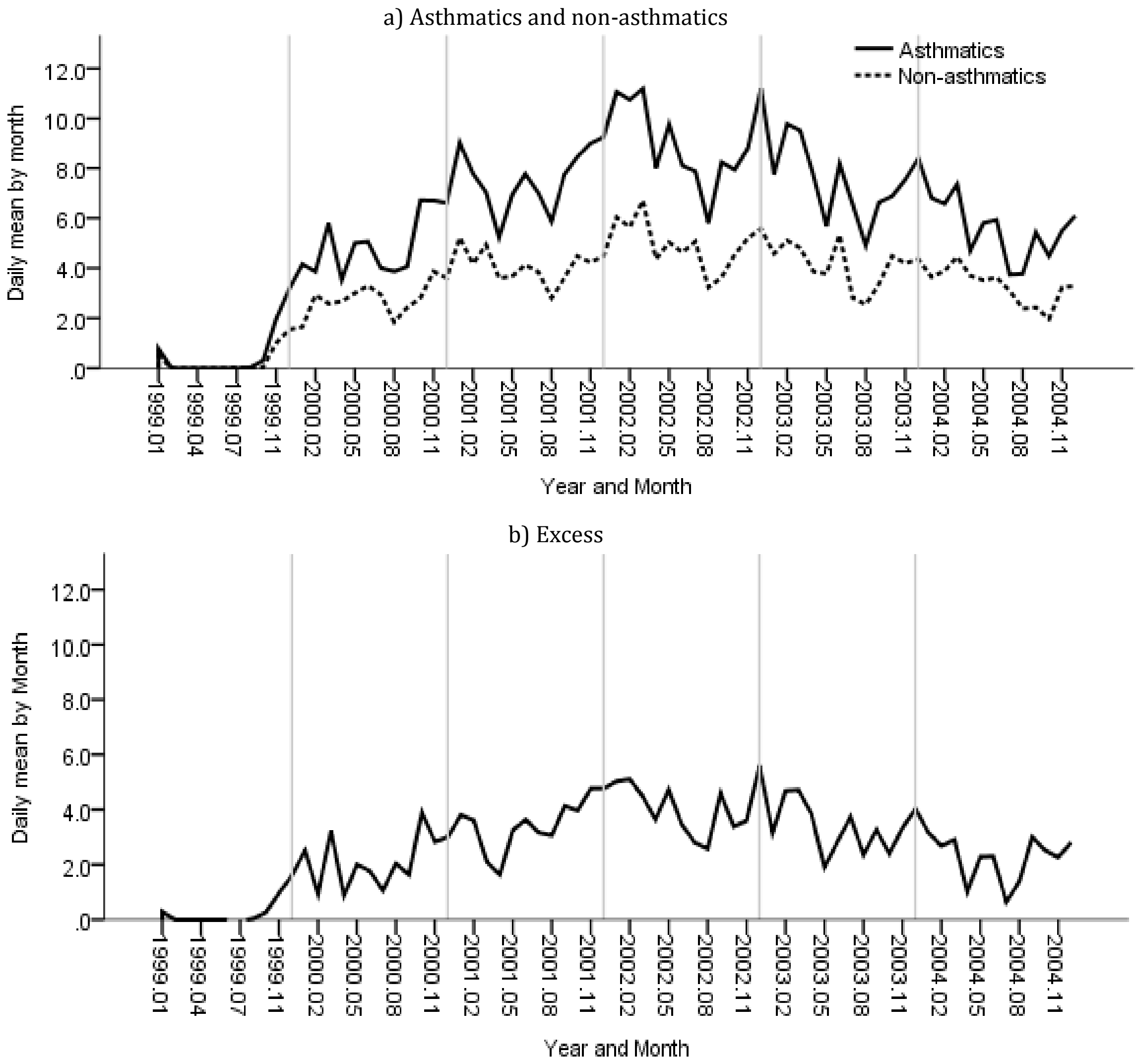


Figure C1. 29: England and Wales Emergency Consultations - plot of the daily mean number of contacts aggregated by month 1999-2004 a) Asthmatics and non-asthmatics and b) Excess.

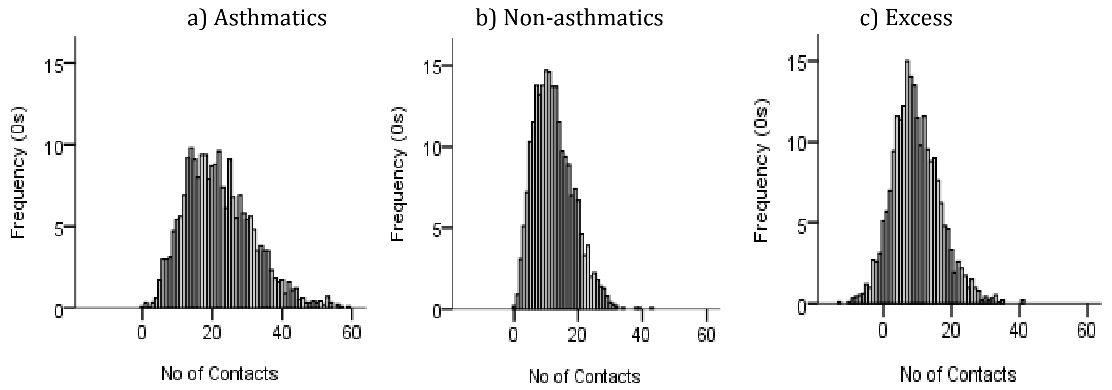


Figure C1. 30: England and Wales Emergency Counts – distribution of the daily number of contact a) Asthmatics, b) Non-asthmatics and c) Excess.

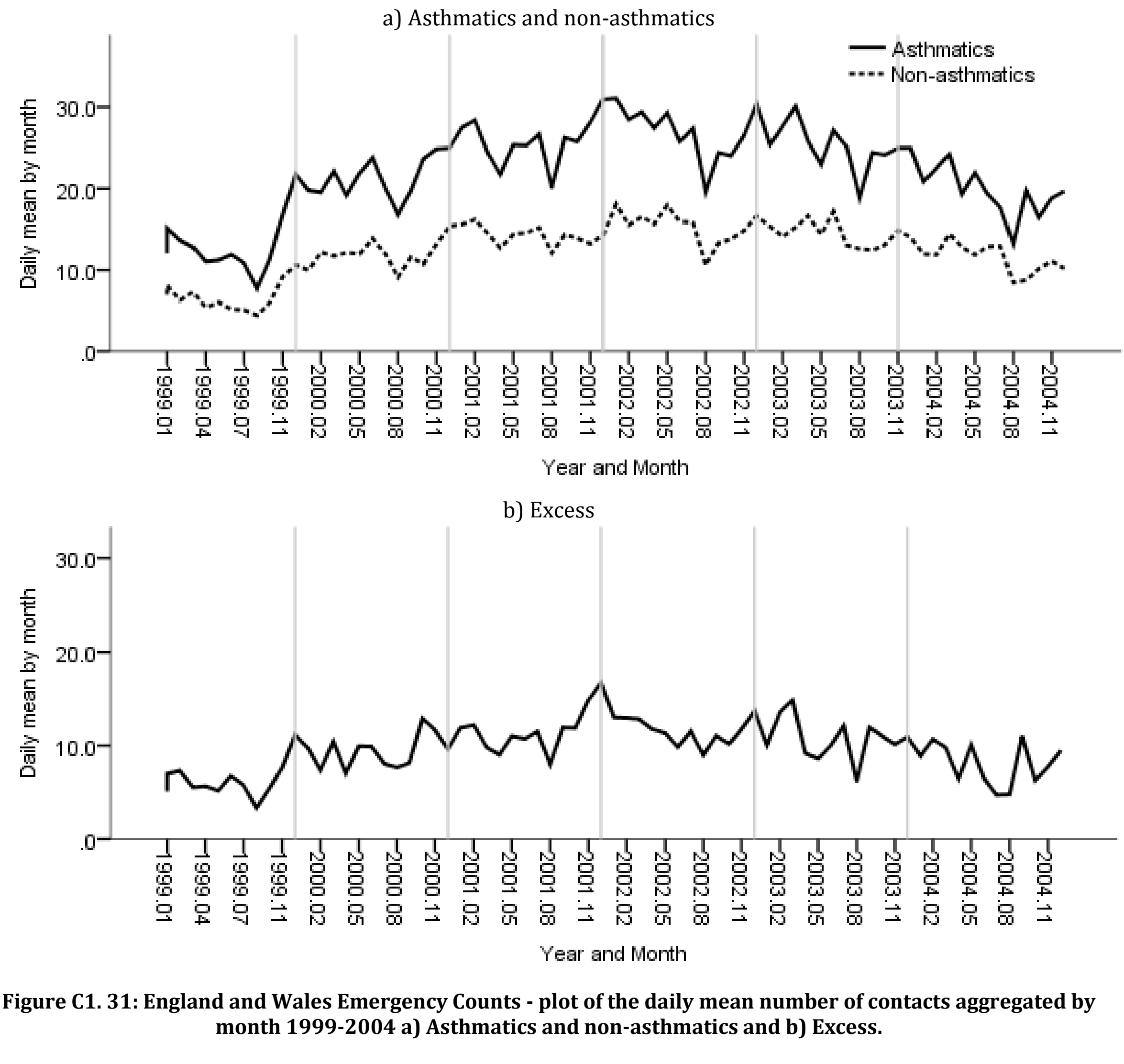


Figure C1. 31: England and Wales Emergency Counts - plot of the daily mean number of contacts aggregated by month 1999-2004 a) Asthmatics and non-asthmatics and b) Excess.

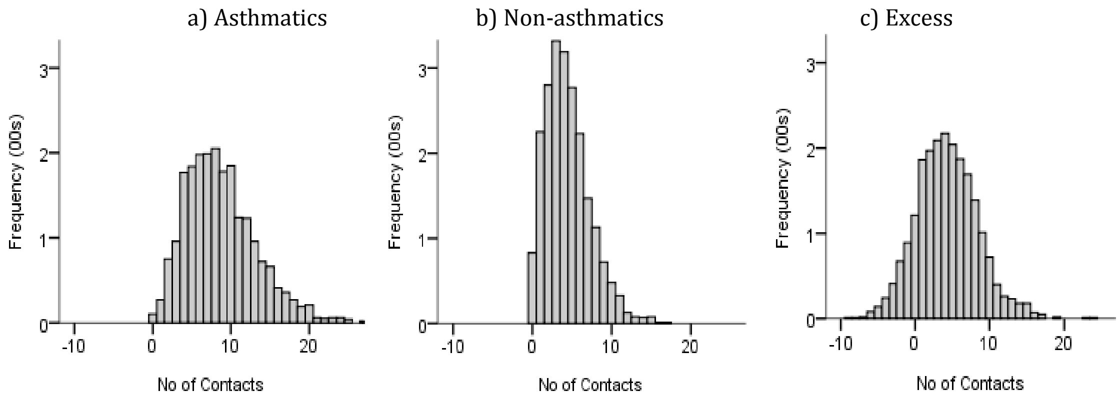


Figure C1. 32: England and Wales Out of Hours Counts– distribution of the daily number of contact a) Asthmatics, b) Non-asthmatics and c) Excess.

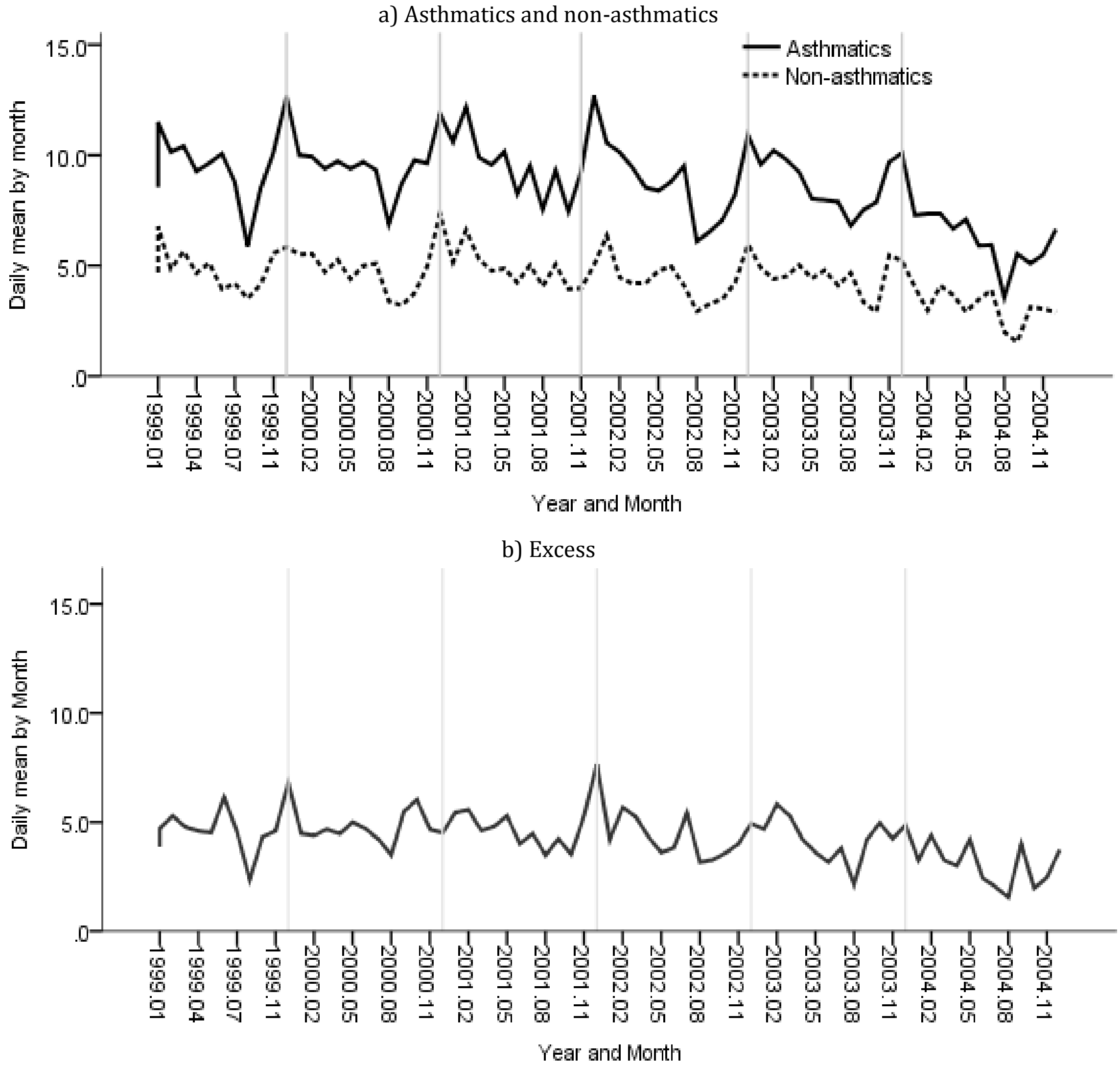


Figure C1. 33: England and Wales Out of Hours Counts - plot of the daily mean number of contacts aggregated by month 1999-2004 a) Asthmatics and non-asthmatics and b) Excess.

Table C. 3: England and Wales - sum of the total number of daily counts.

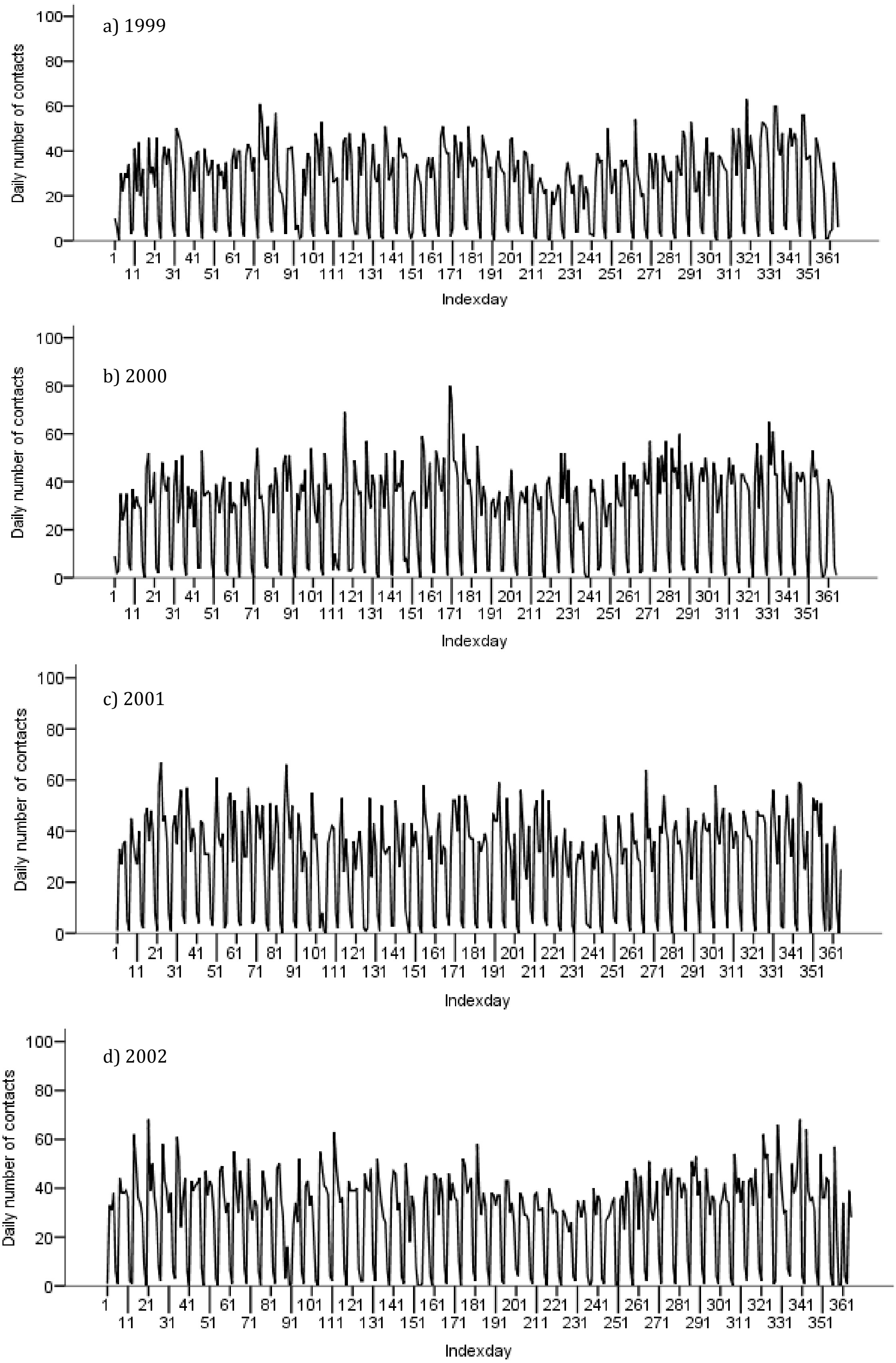
Medical Contacts	Asthmatics	Non-asthmatics
All Counts	1031310	528319
Acute Visits	3510	1913
Casualty Counts	12654	8320
Emergency Consultations	12802	7114
Emergency Counts	48086	27062
Out of Hours Counts	19120	9715

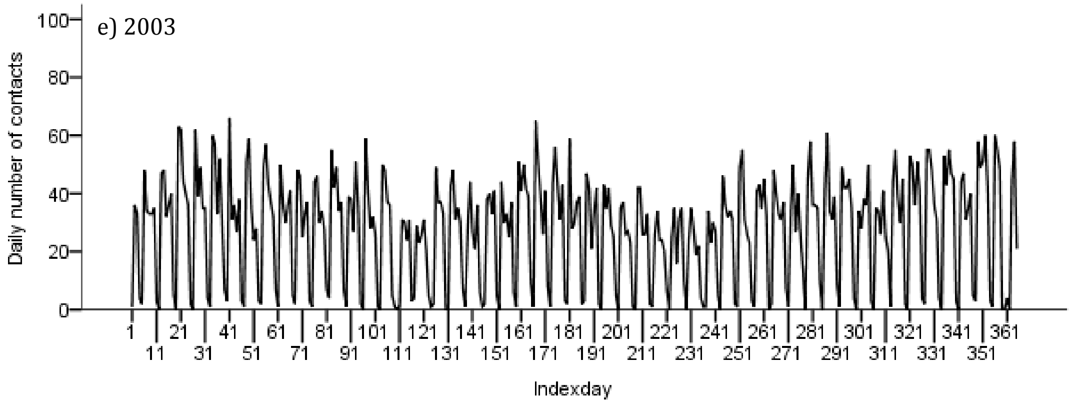
C1.2. Trent Region: Summary Statistics, Histograms and Plots over time (All Datasets).

C1.2.1. Demographic Information

The sample from the Trent Region contributed the smallest number of contacts to the England and Wales sample (only 5.6 percent). The Trent sample consisted of 3,523 asthmatics; 99.6 percent (n=3,508) were matched with non-asthmatics. There was slightly lower representation of males than females in the Trent sample compared to England and Wales (56.3 percent, n=1,983, females n=1,540).

C1.2.2. Plots over time by year


a) 1999
b) 2000
c) 2001
d) 2002
Daily number of contacts
Indexday
0
20
40
60
80
100
1 21 41 61 81 101 121 141 161 181 201 221 241 261 281 301 321 341 361
11 31 51 71 91 111 131 151 171 191 211 231 251 271 291 311 331 351



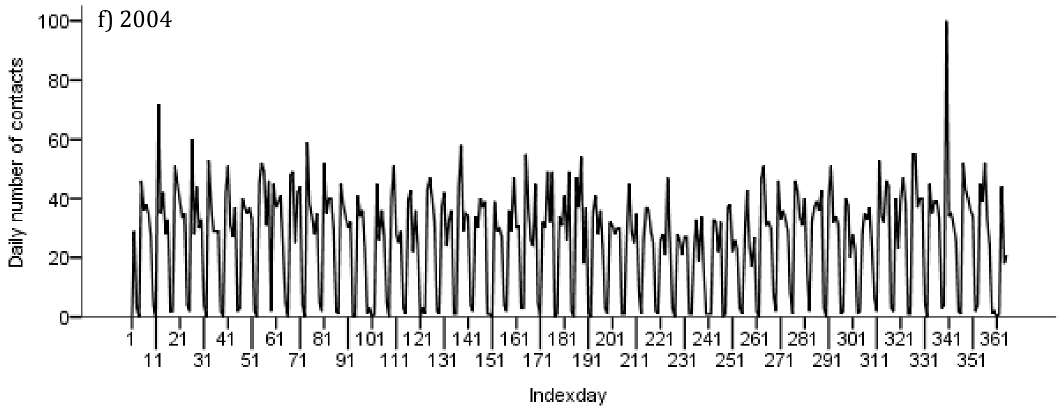
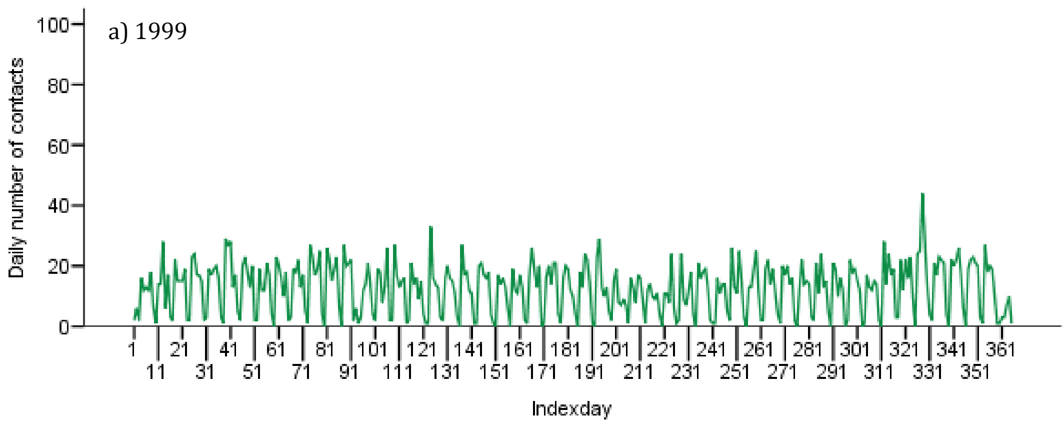
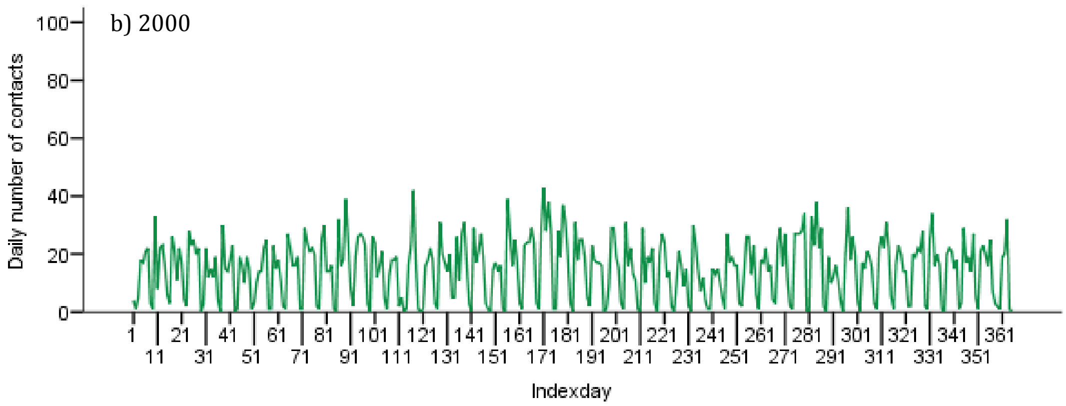


Figure C1. 34: Trent Region All Counts Asthmatics a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.





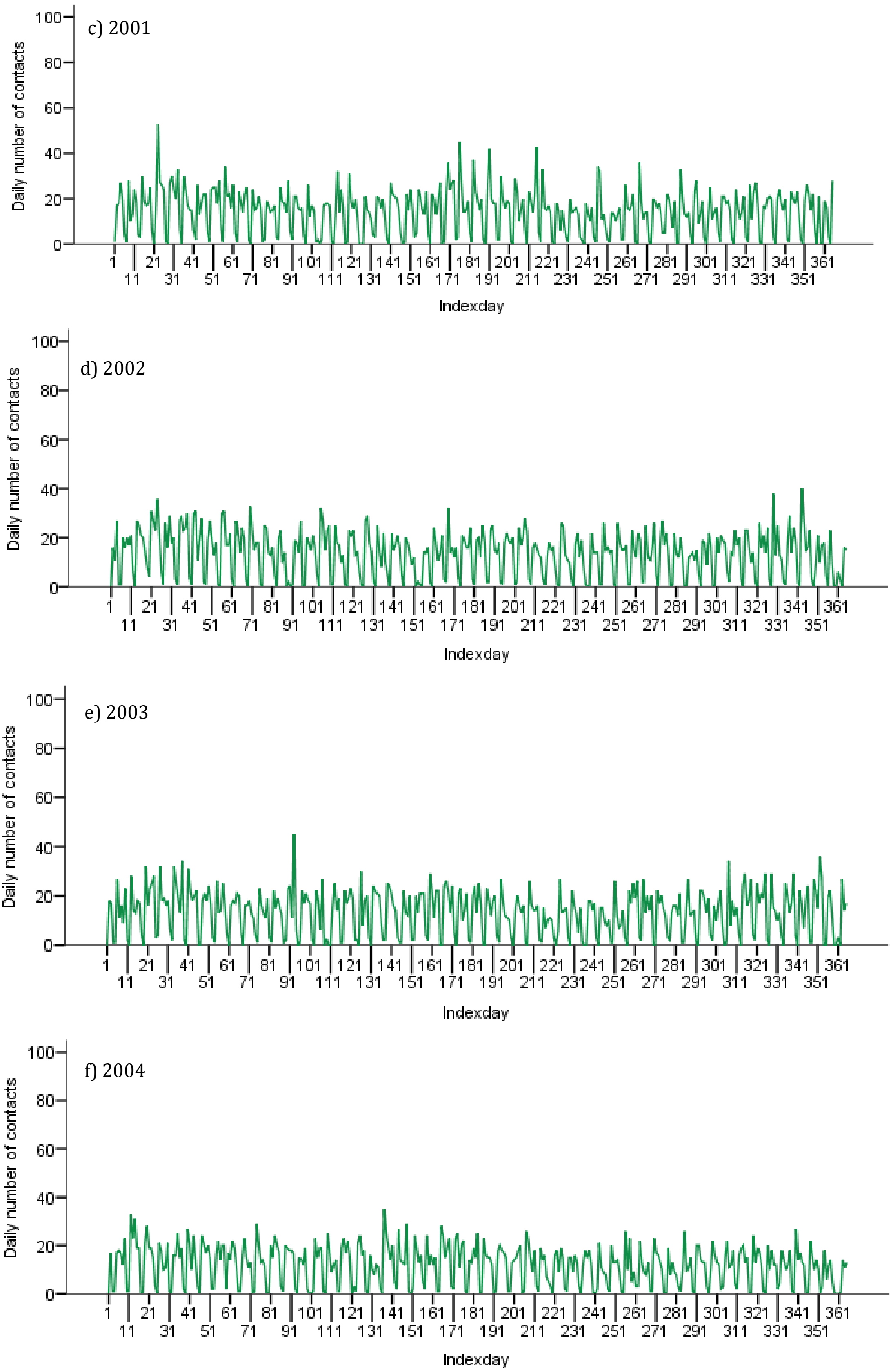
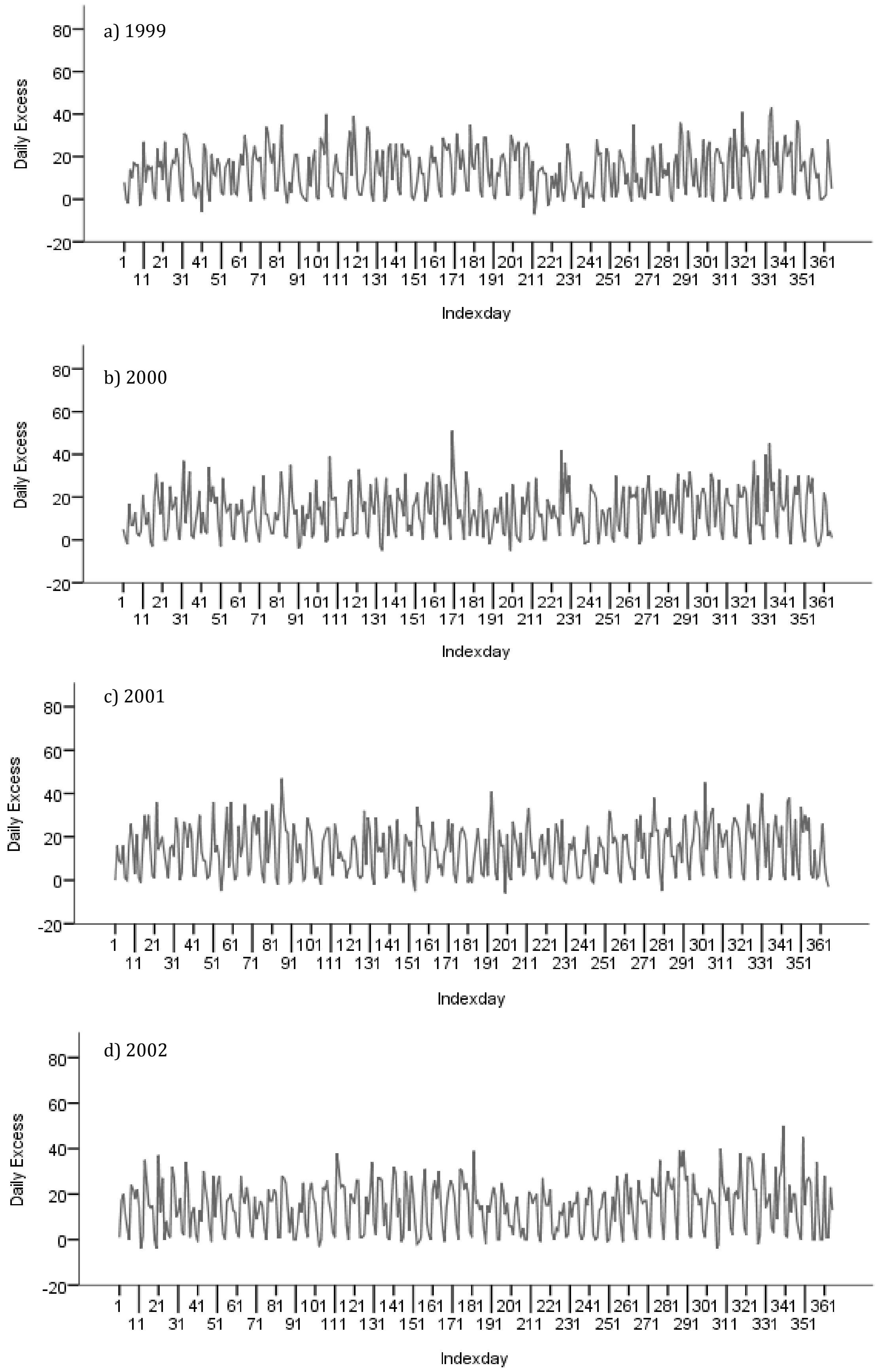


Figure C1.35: Trent Region All Counts Non-asthmatics a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


a) 1999
b) 2000
c) 2001
d) 2002
Daily Excess
Indexday
80
60
40
20
0
-20
1 21 41 61 81 101 121 141 161 181 201 221 241 261 281 301 321 341 361
11 31 51 71 91 111 131 151 171 191 211 231 251 271 291 311 331 351

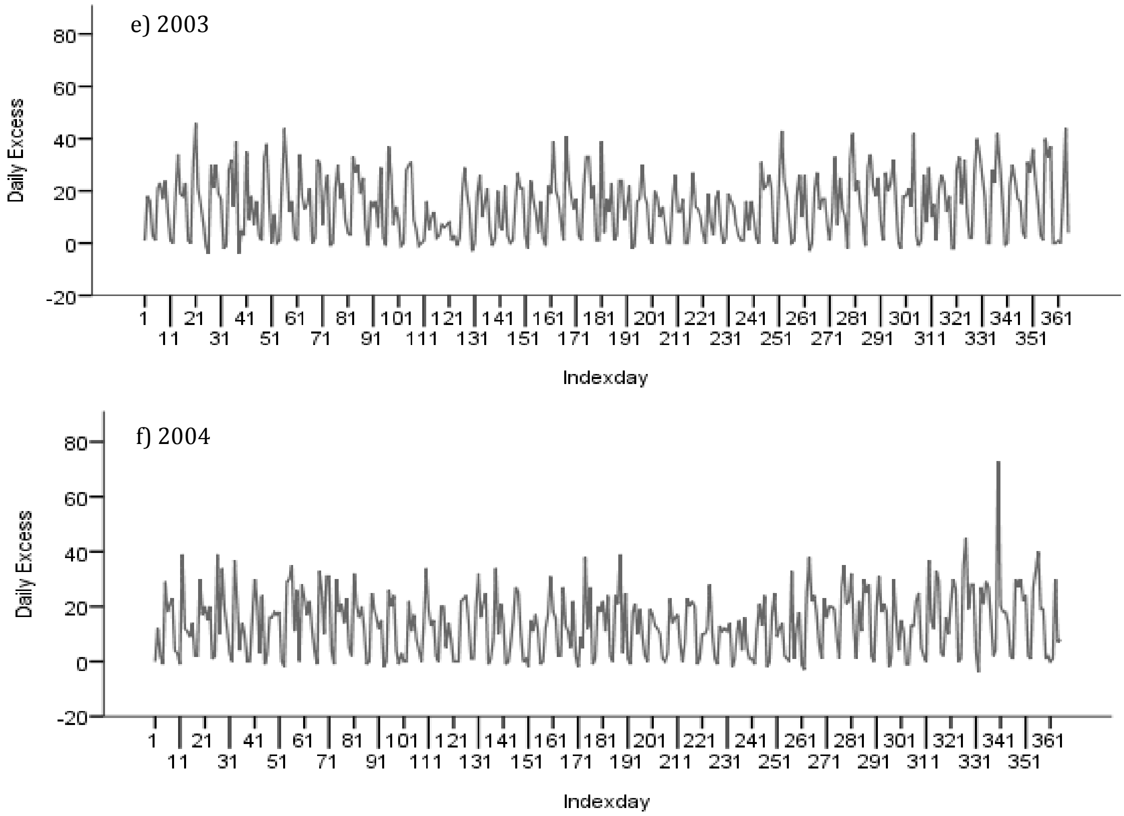
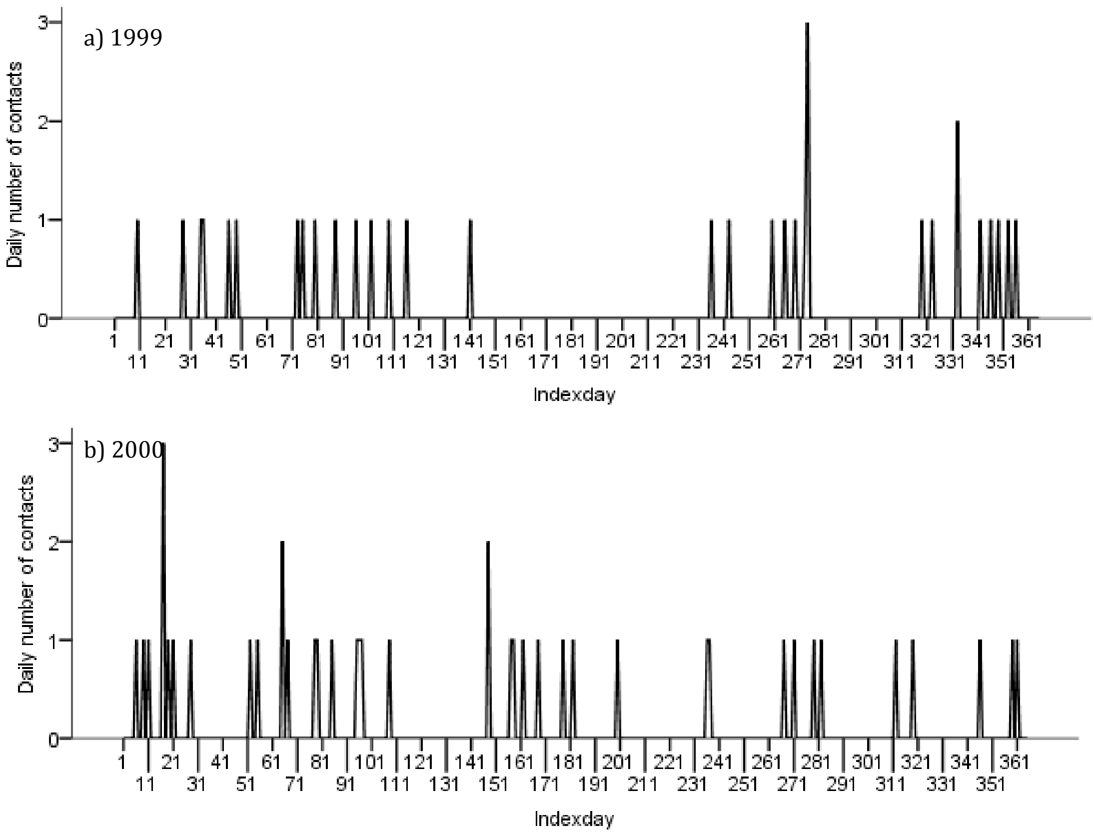


Figure C1. 36: Trent Region All Counts Excess a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.



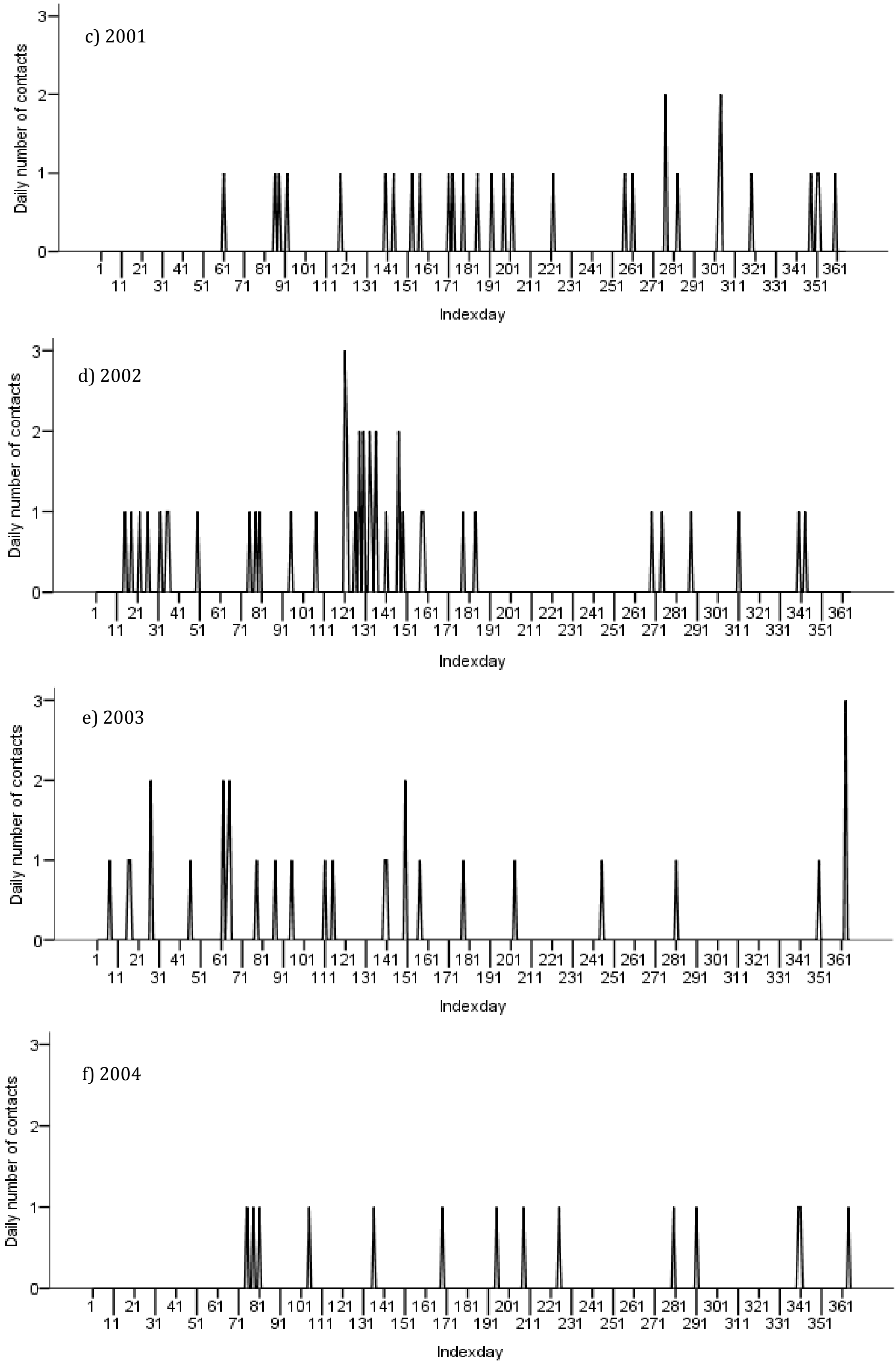
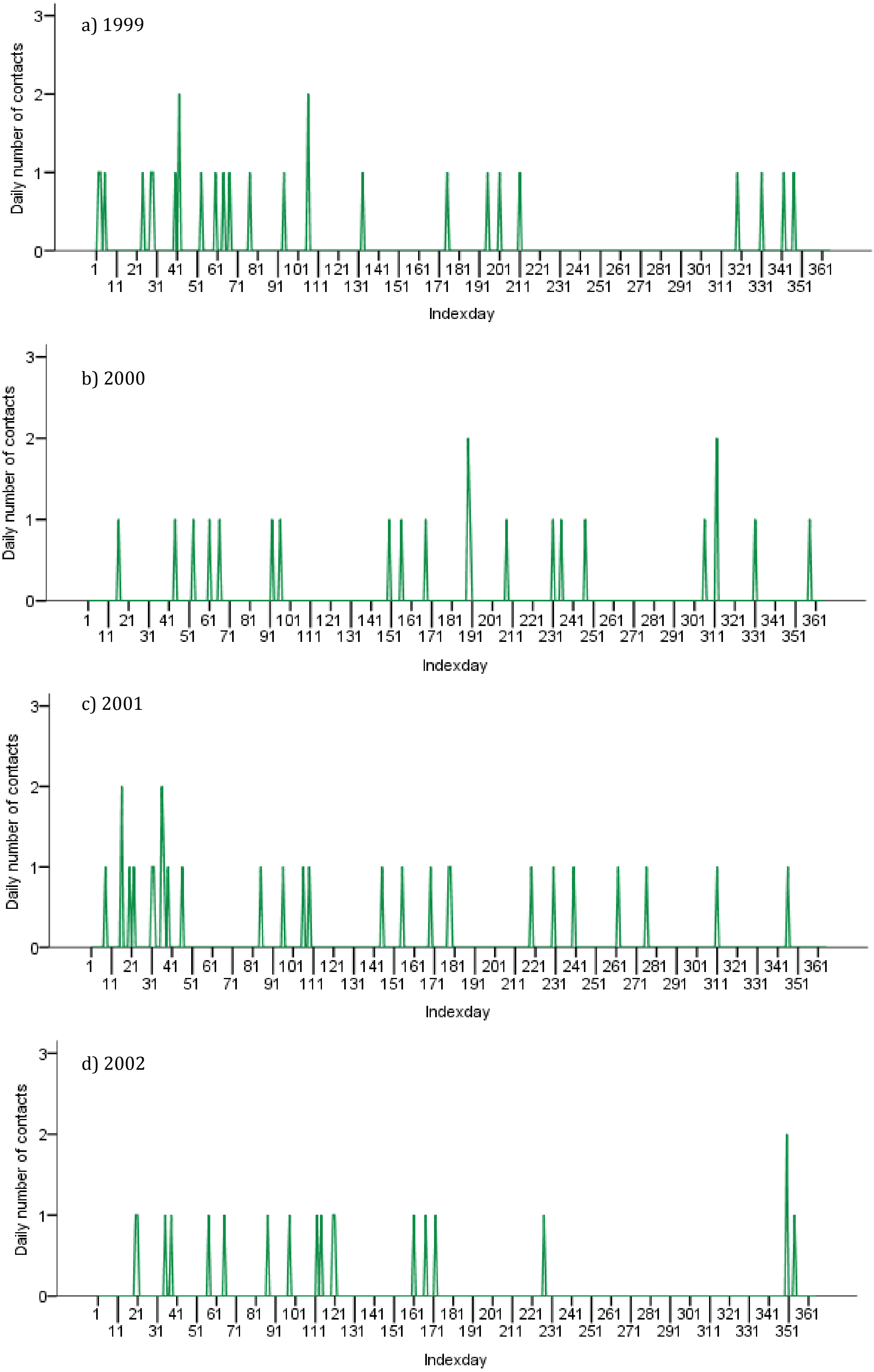


Figure C1. 37: Trent Region Acute Visits Asthmatics a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


a) 1999
b) 2000
c) 2001
d) 2002
Daily number of contacts
Indexday

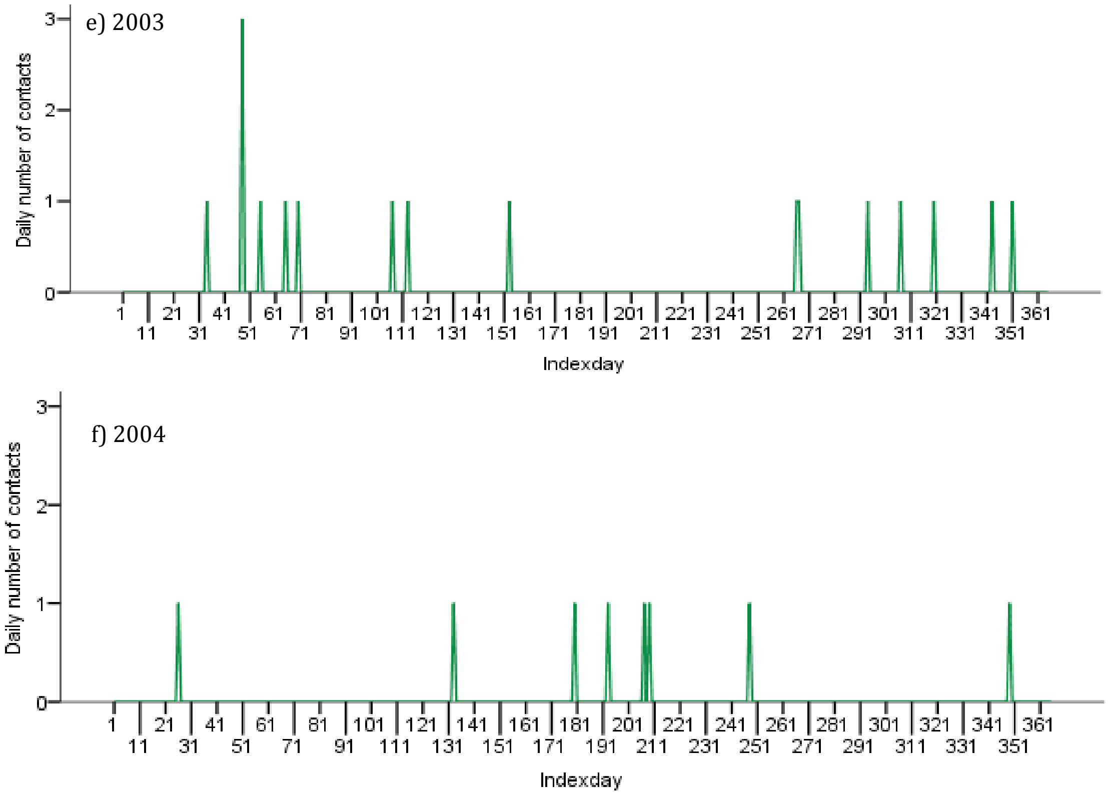
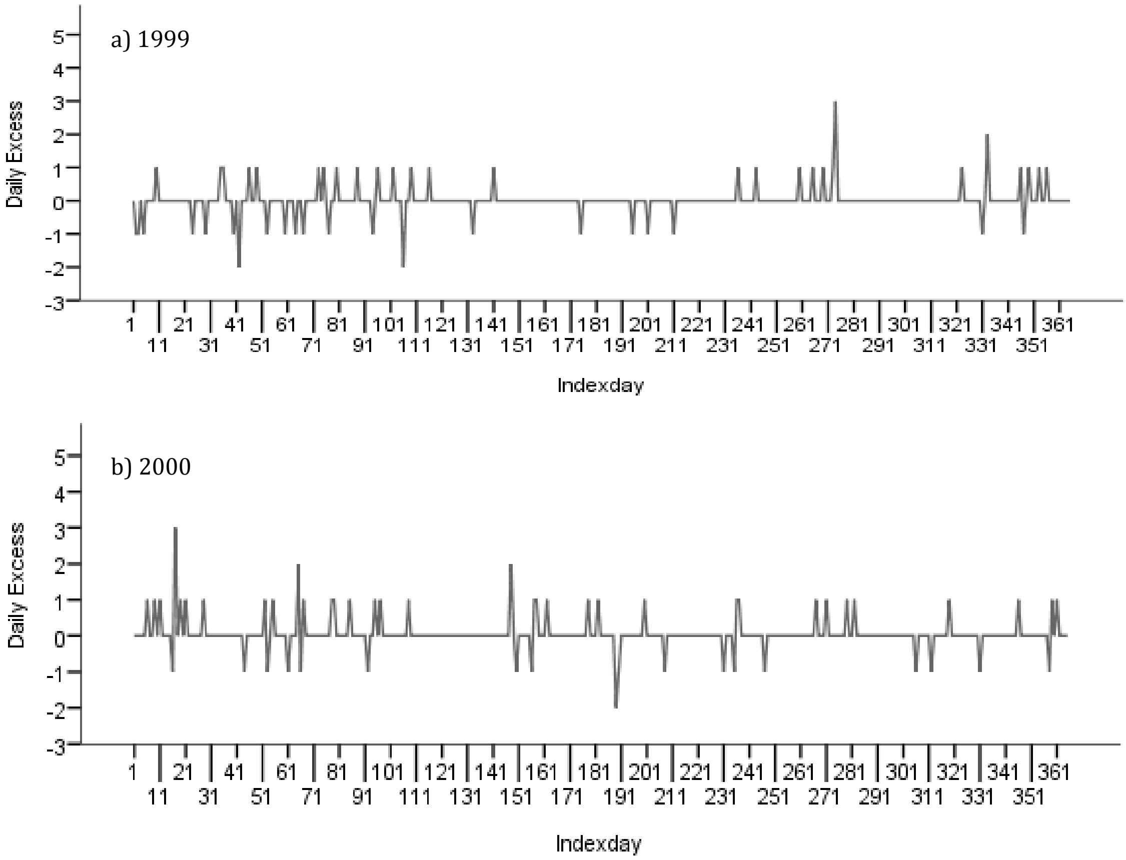


Figure C1. 38: Trent Region Acute Visits Non-asthmatics a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.



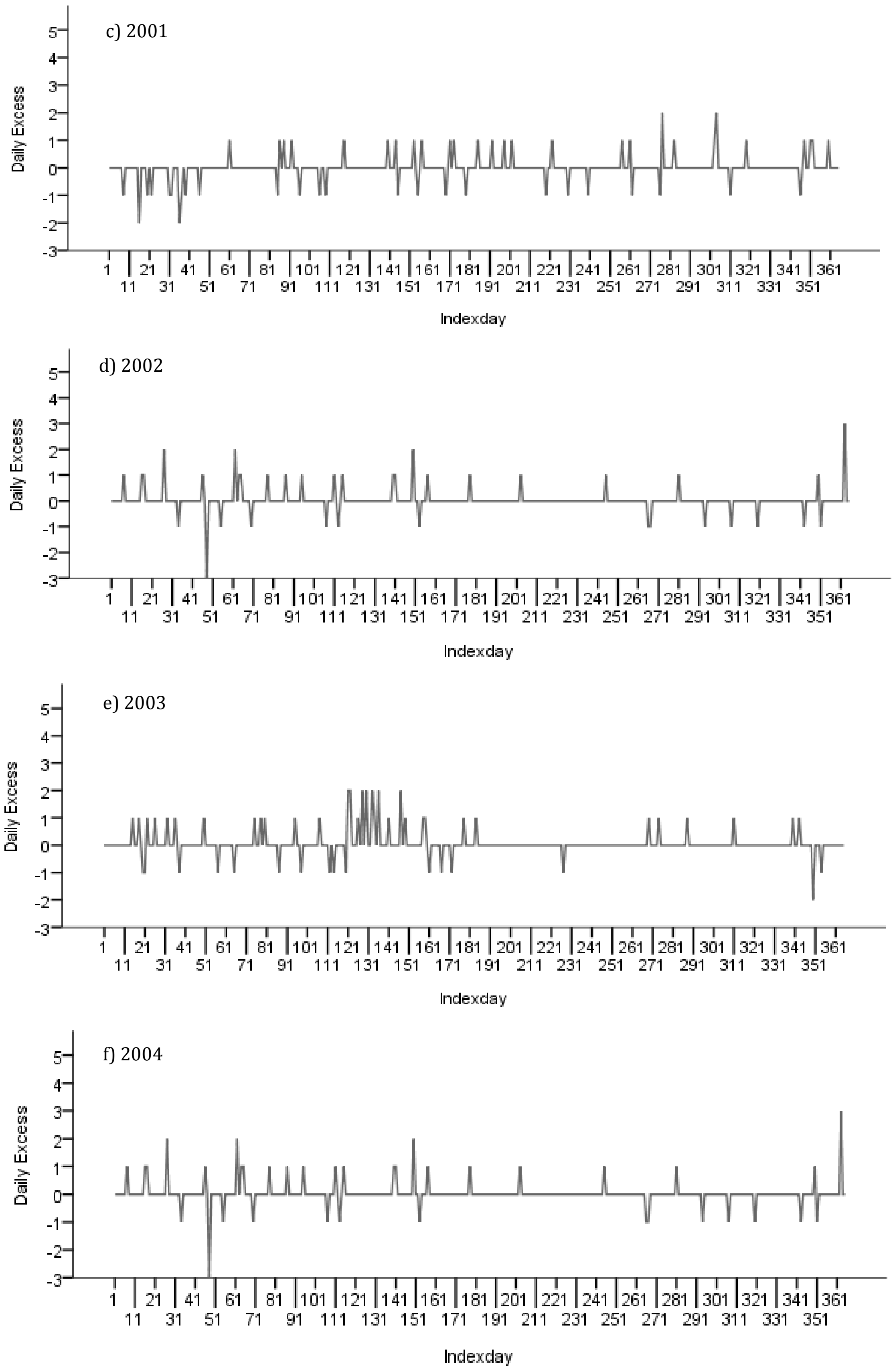
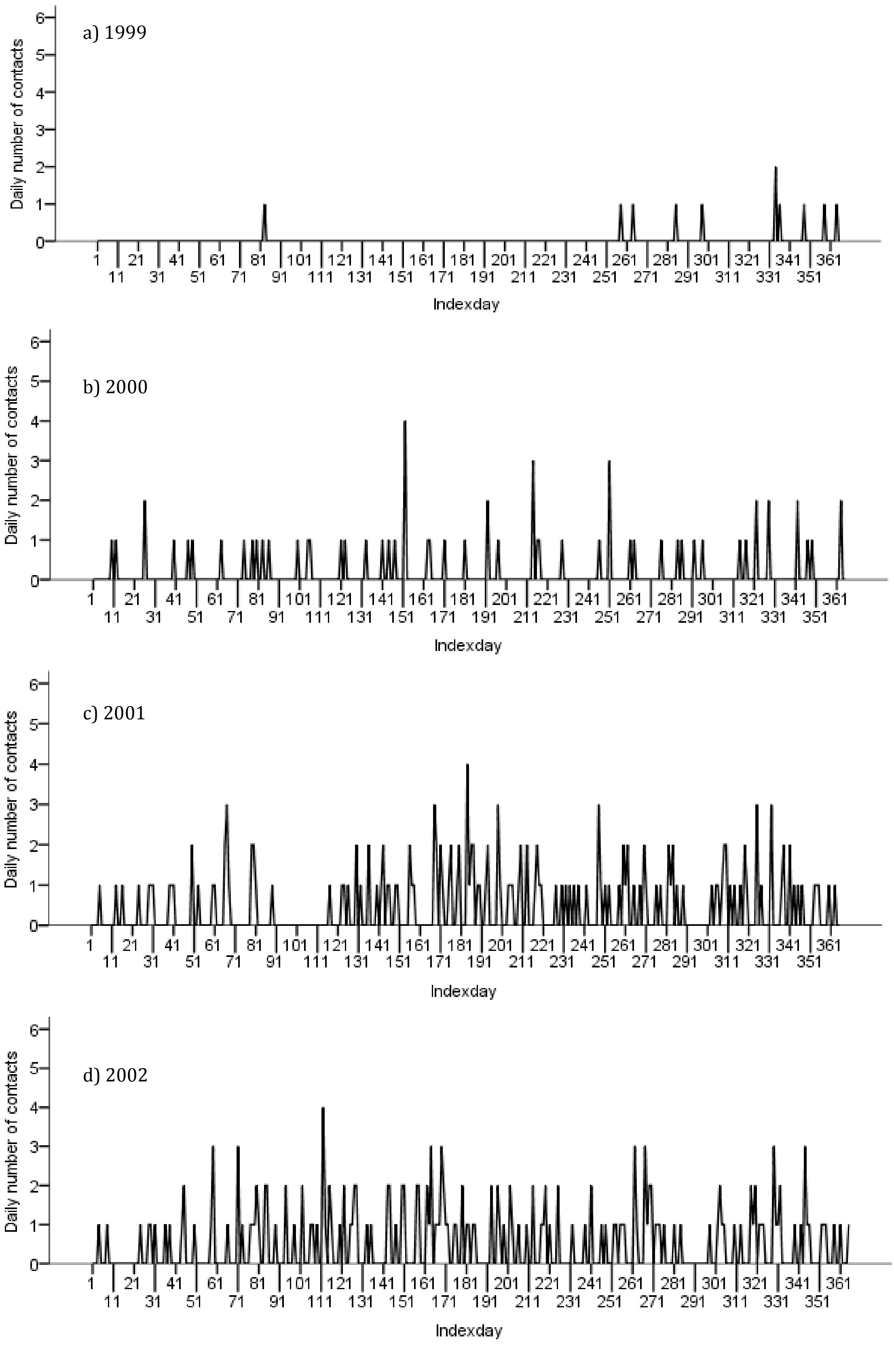
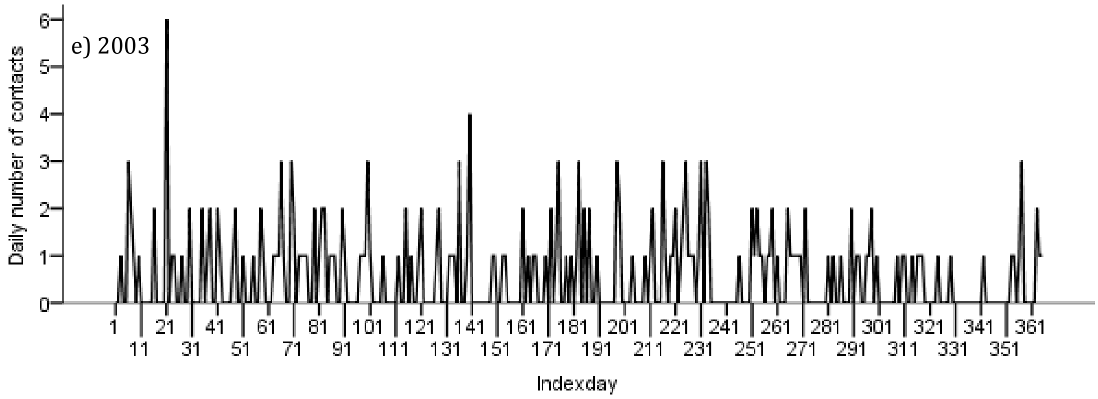


Figure C1. 39: Trent Region Acute Visits Excess a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


a) 1999
Daily number of contacts
Indexday
b) 2000
Daily number of contacts
Indexday
c) 2001
Daily number of contacts
Indexday
d) 2002
Daily number of contacts
Indexday



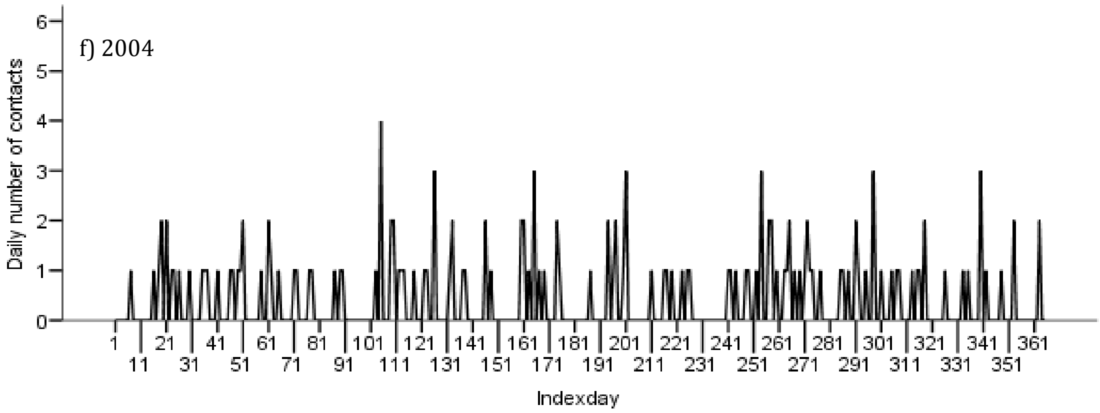
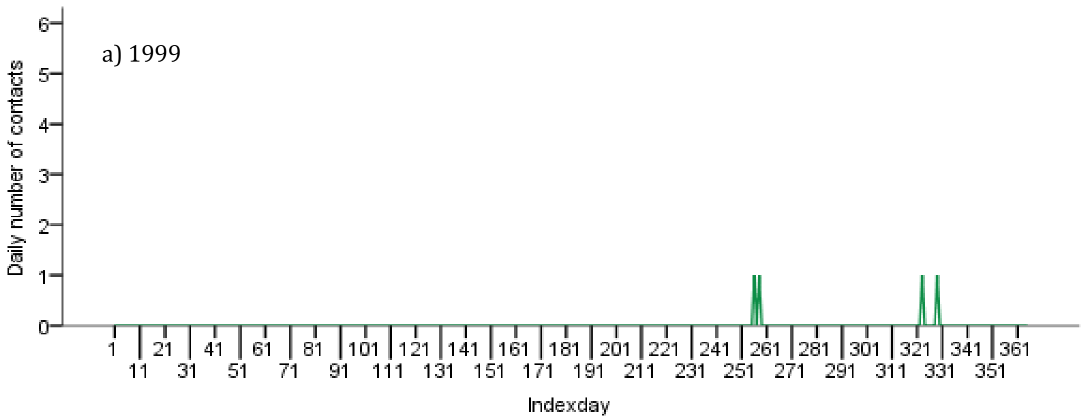
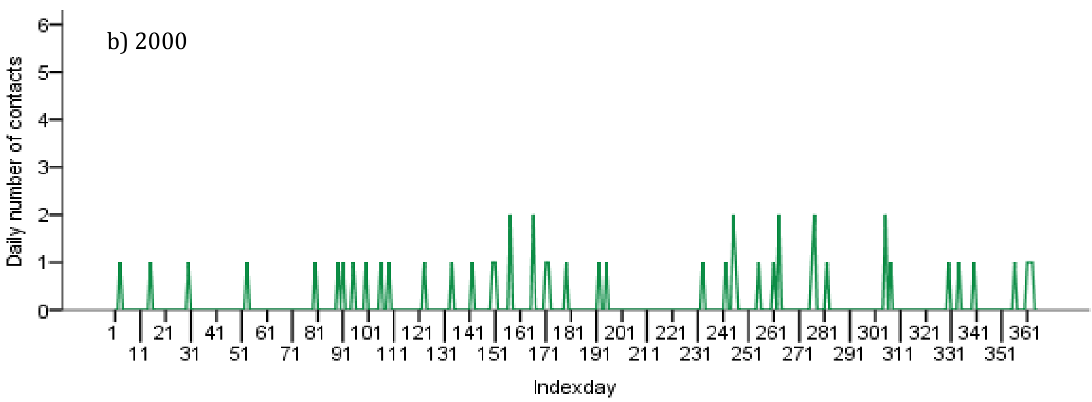


Figure C1. 40: Trent Region Casualty Counts Asthmatics a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.





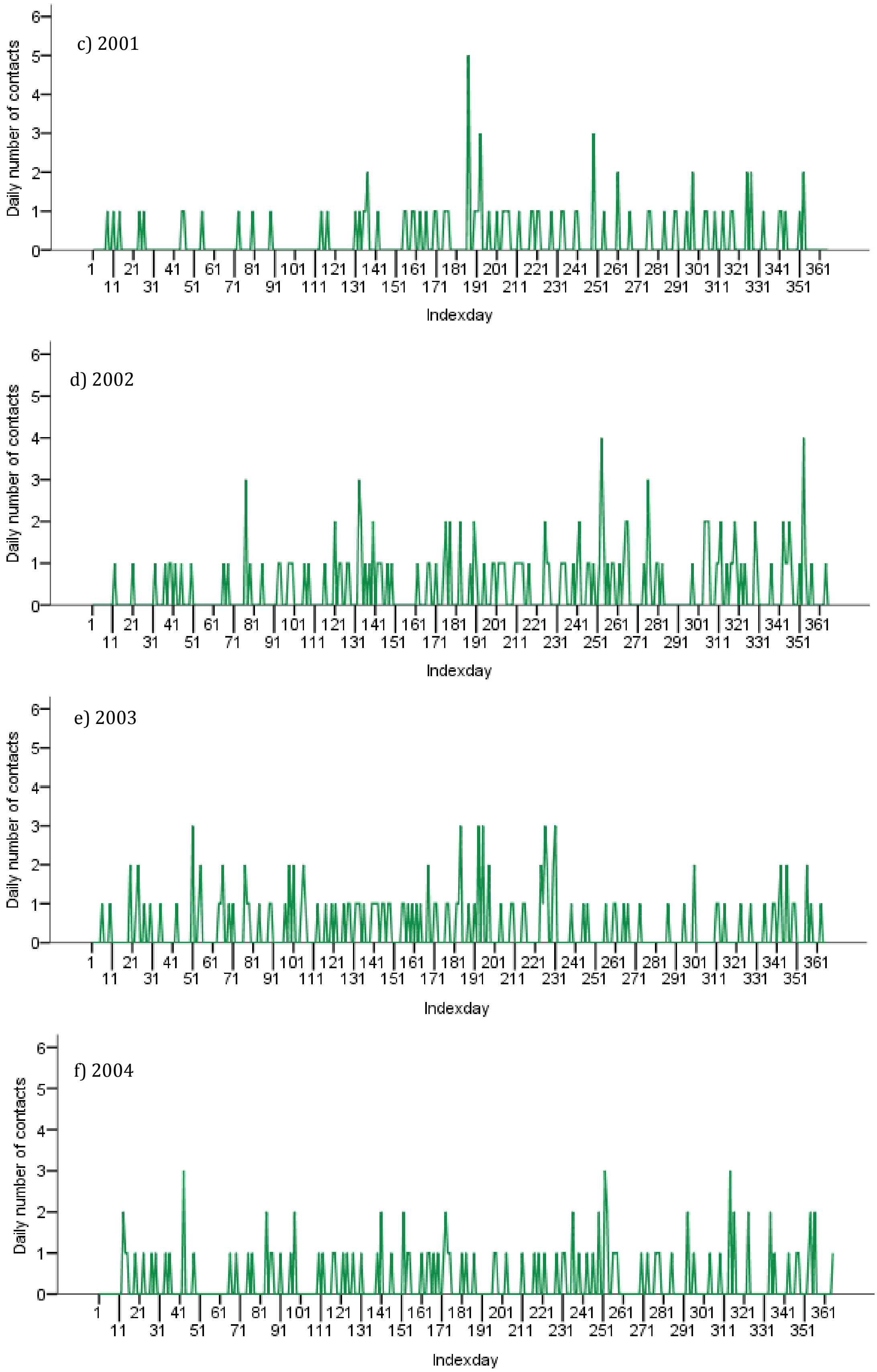
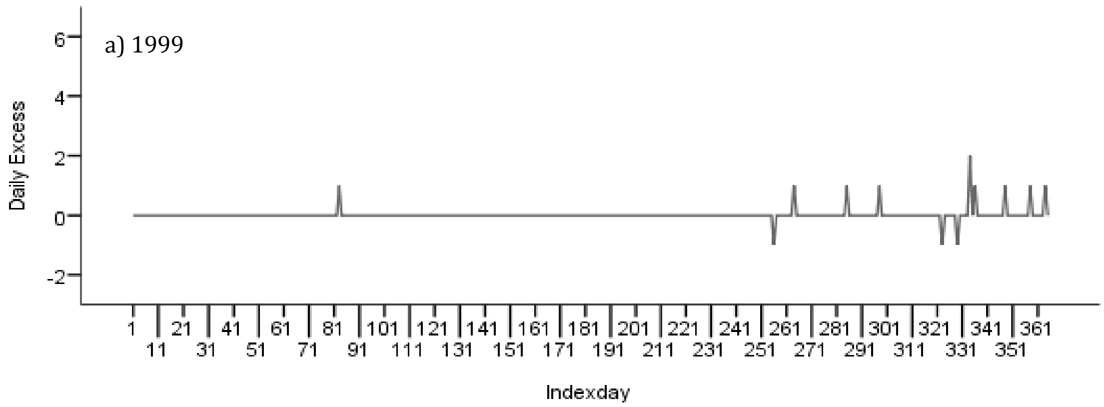
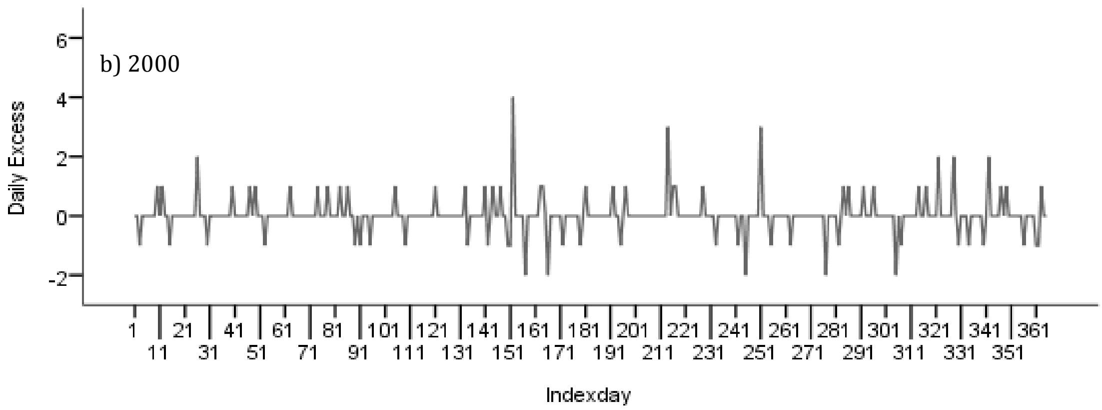
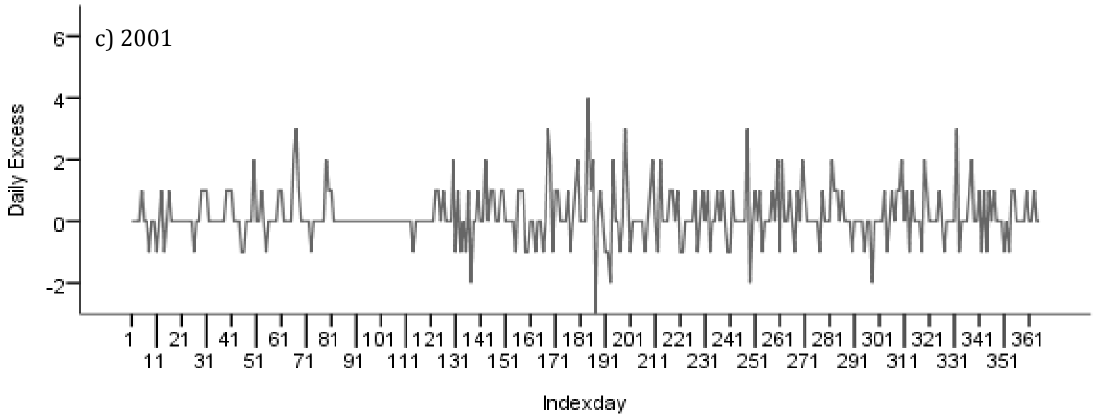
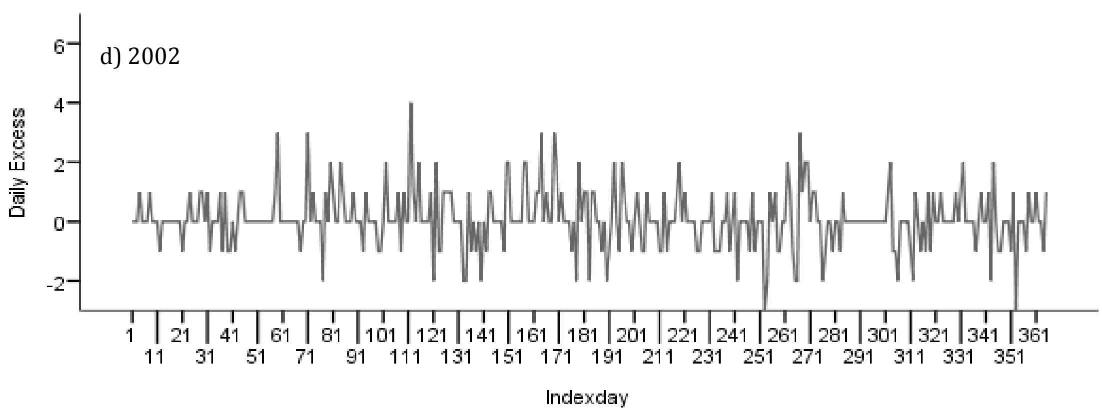


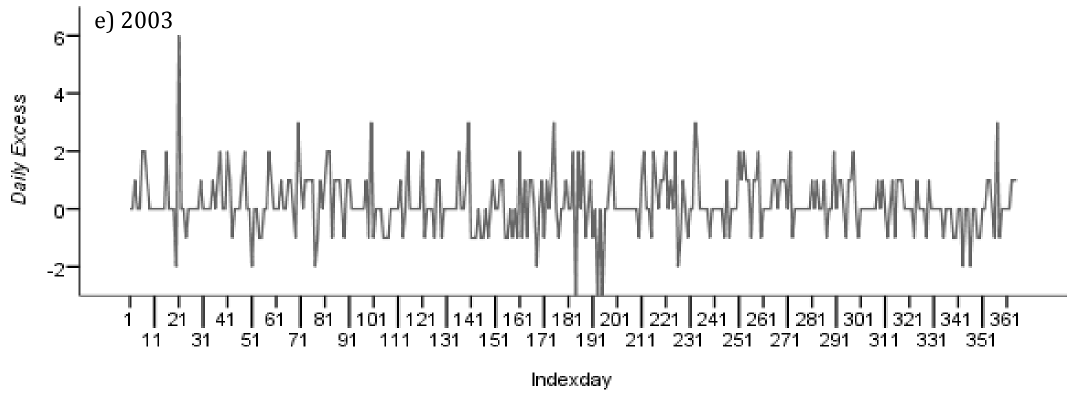
Figure C1. 41: Trent Region Casualty Counts Non-asthmatics a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


a) 1999
Daily Excess
Indexday


b) 2000
Daily Excess
Indexday


c) 2001
Daily Excess
Indexday


d) 2002
Daily Excess
Indexday



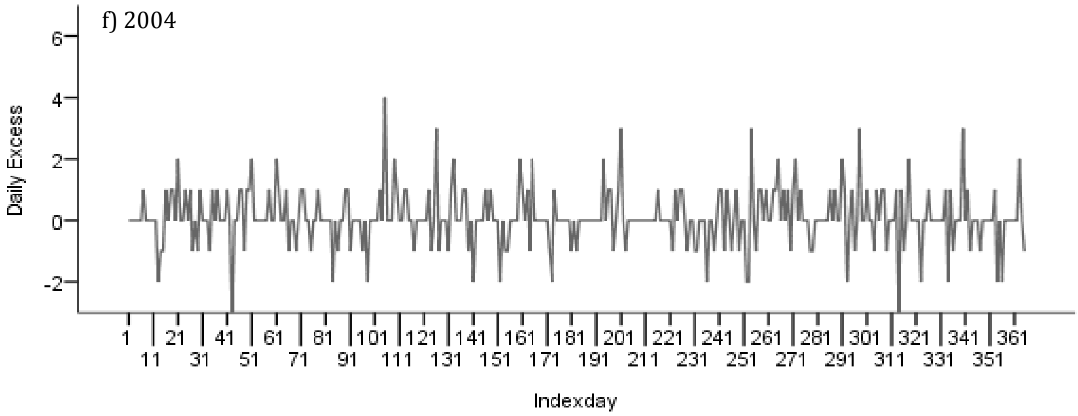
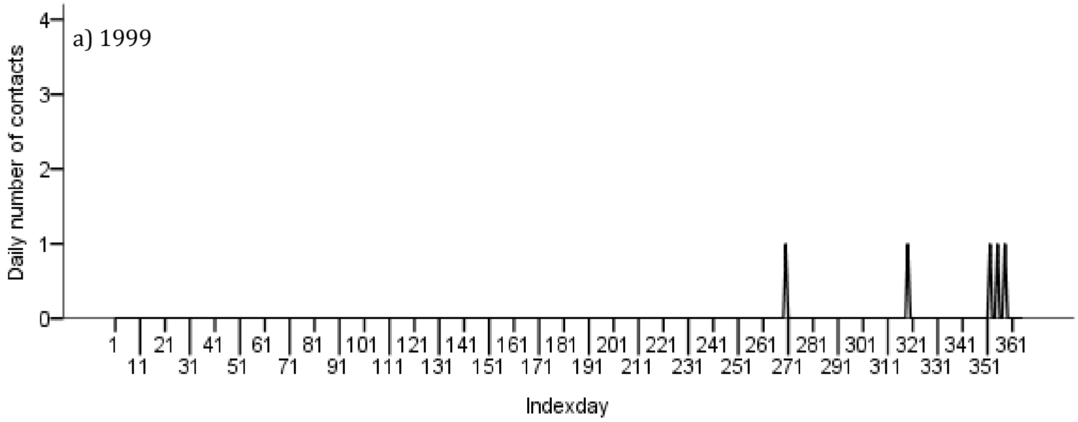
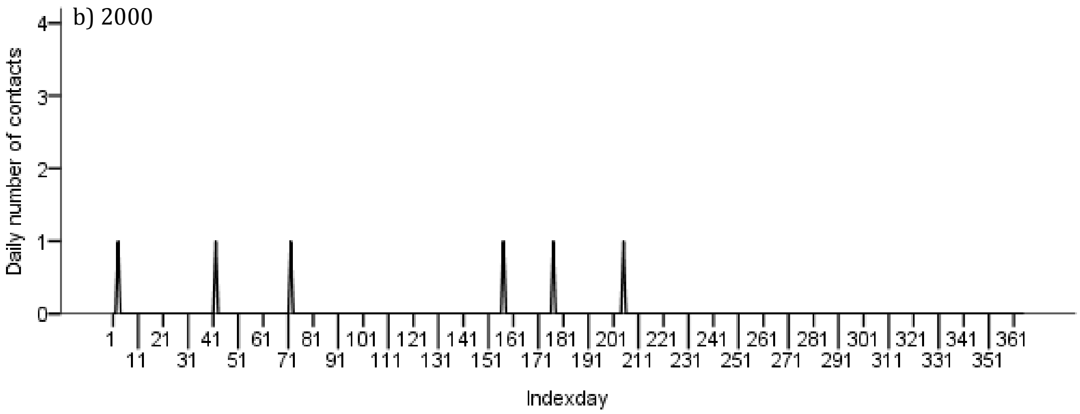


Figure C1. 42: Trent Region Casualty Counts Excess a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.





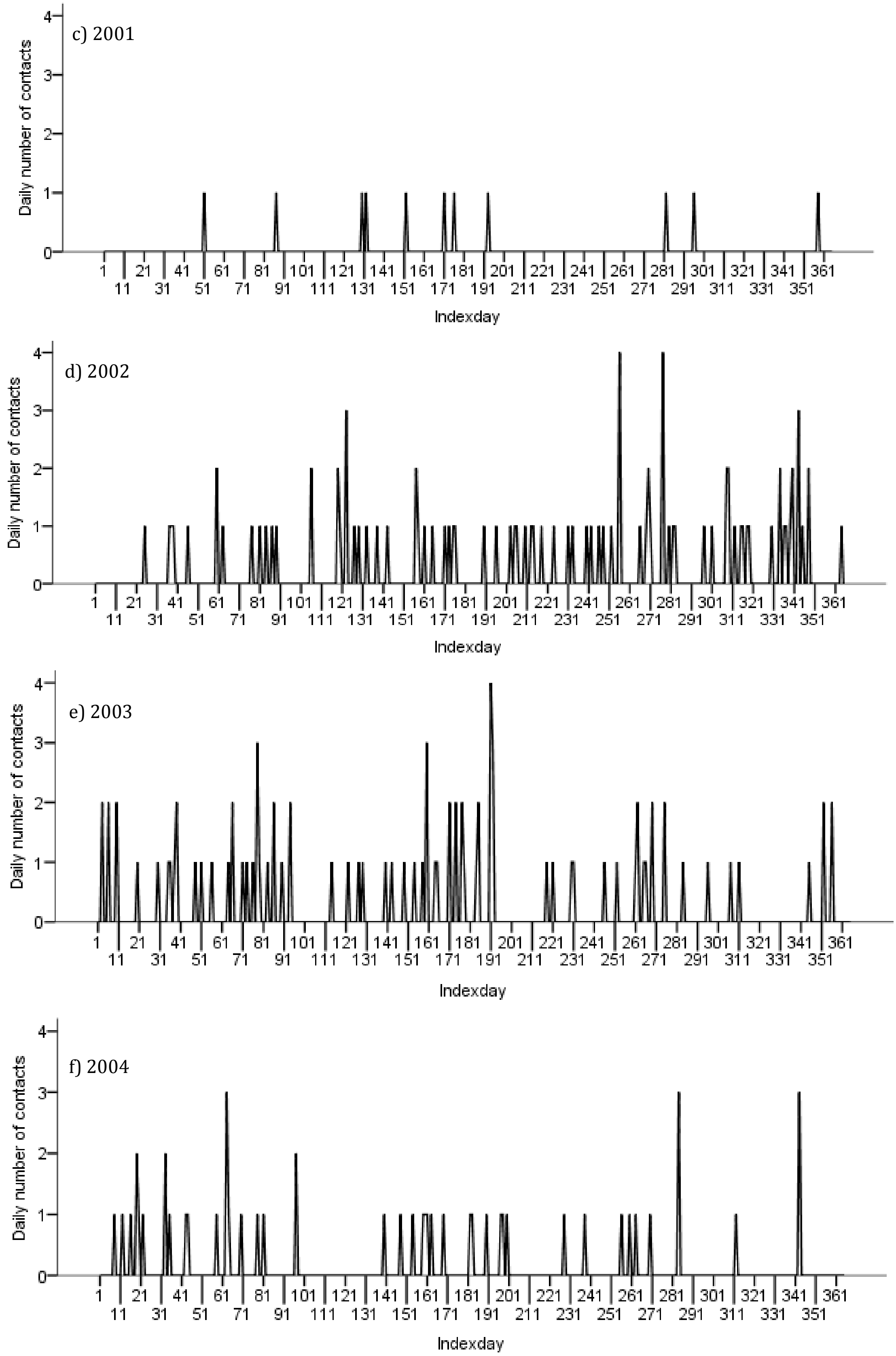
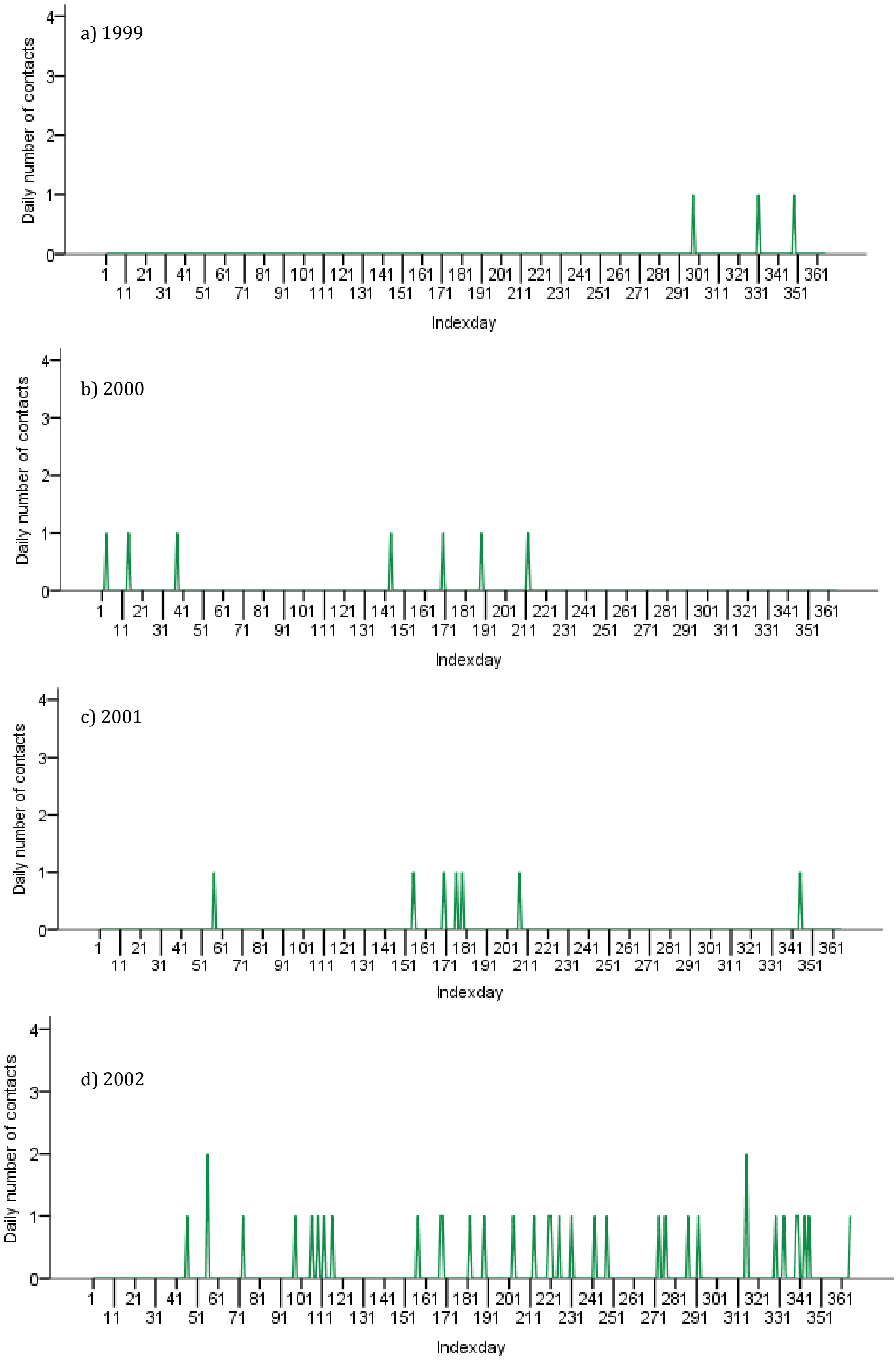


Figure C1. 43: Trent Region Emergency Consultations Asthmatics a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


a) 1999
b) 2000
c) 2001
d) 2002
Daily number of contacts
Indexday
0
1
2
3
4
1
11
21
31
41
51
61
71
81
91
101
111
121
131
141
151
161
171
181
191
201
211
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231
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251
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271
281
291
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311
321
331
341
351
361

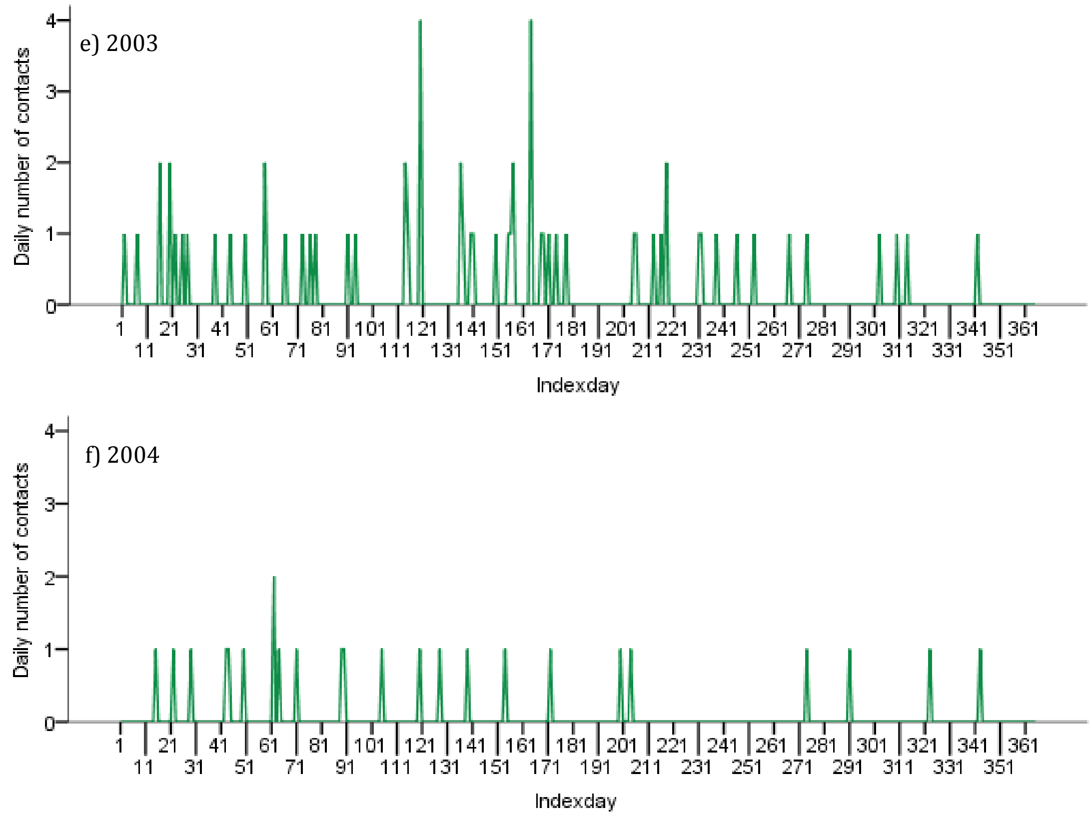
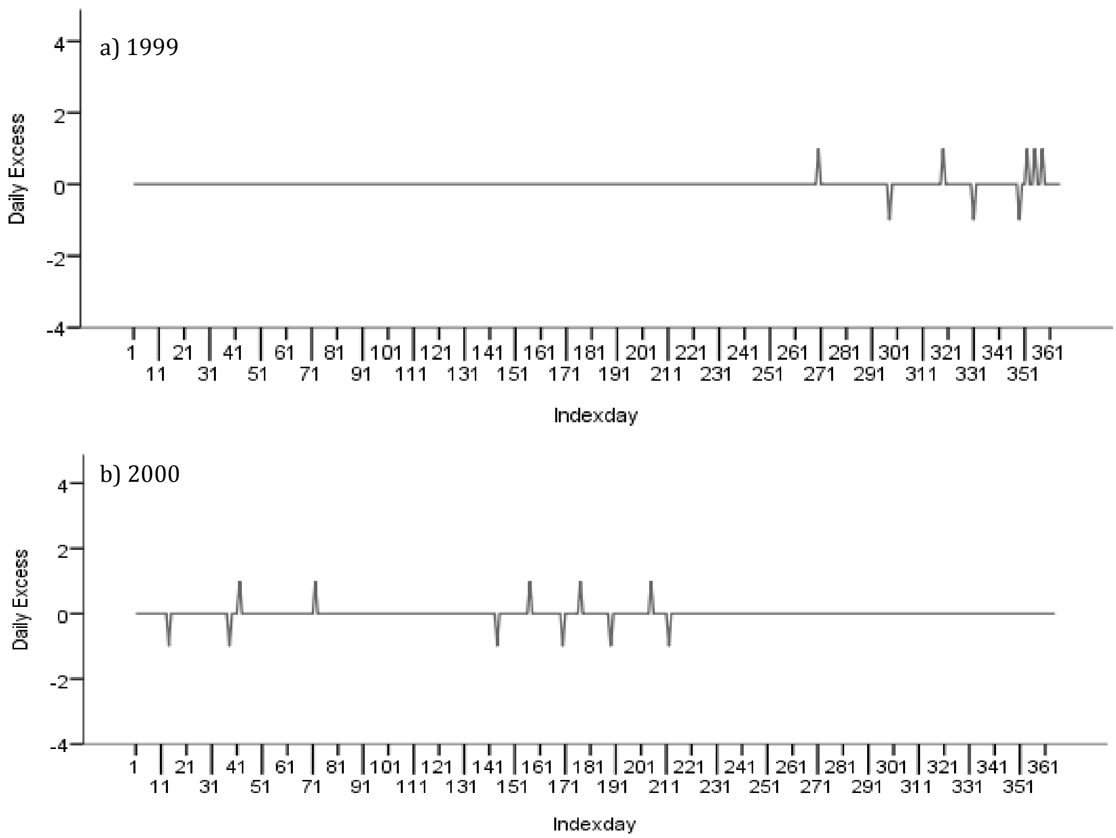


Figure C1. 44: Trent Region Emergency Consultations Non-asthmatics a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.



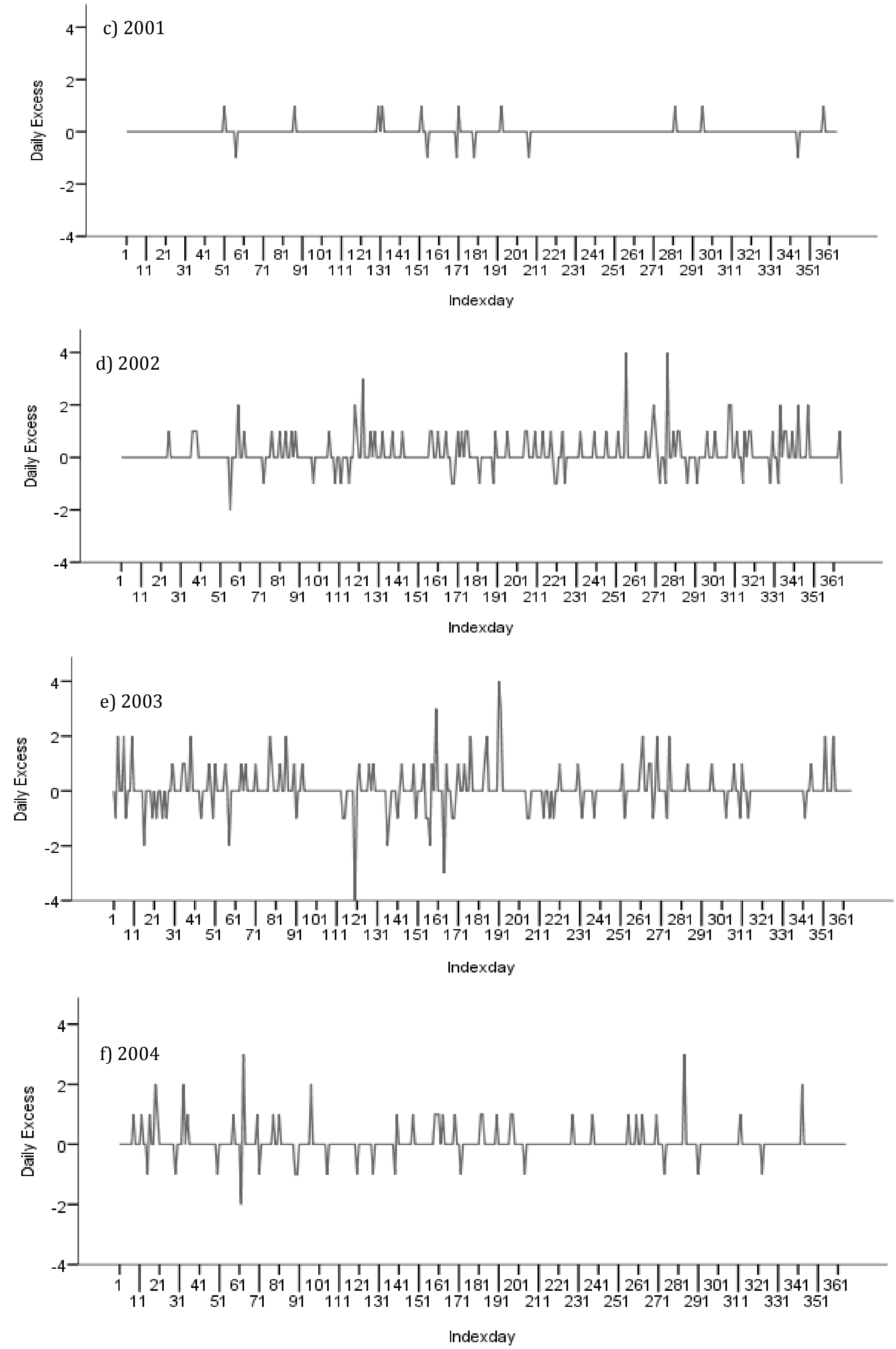
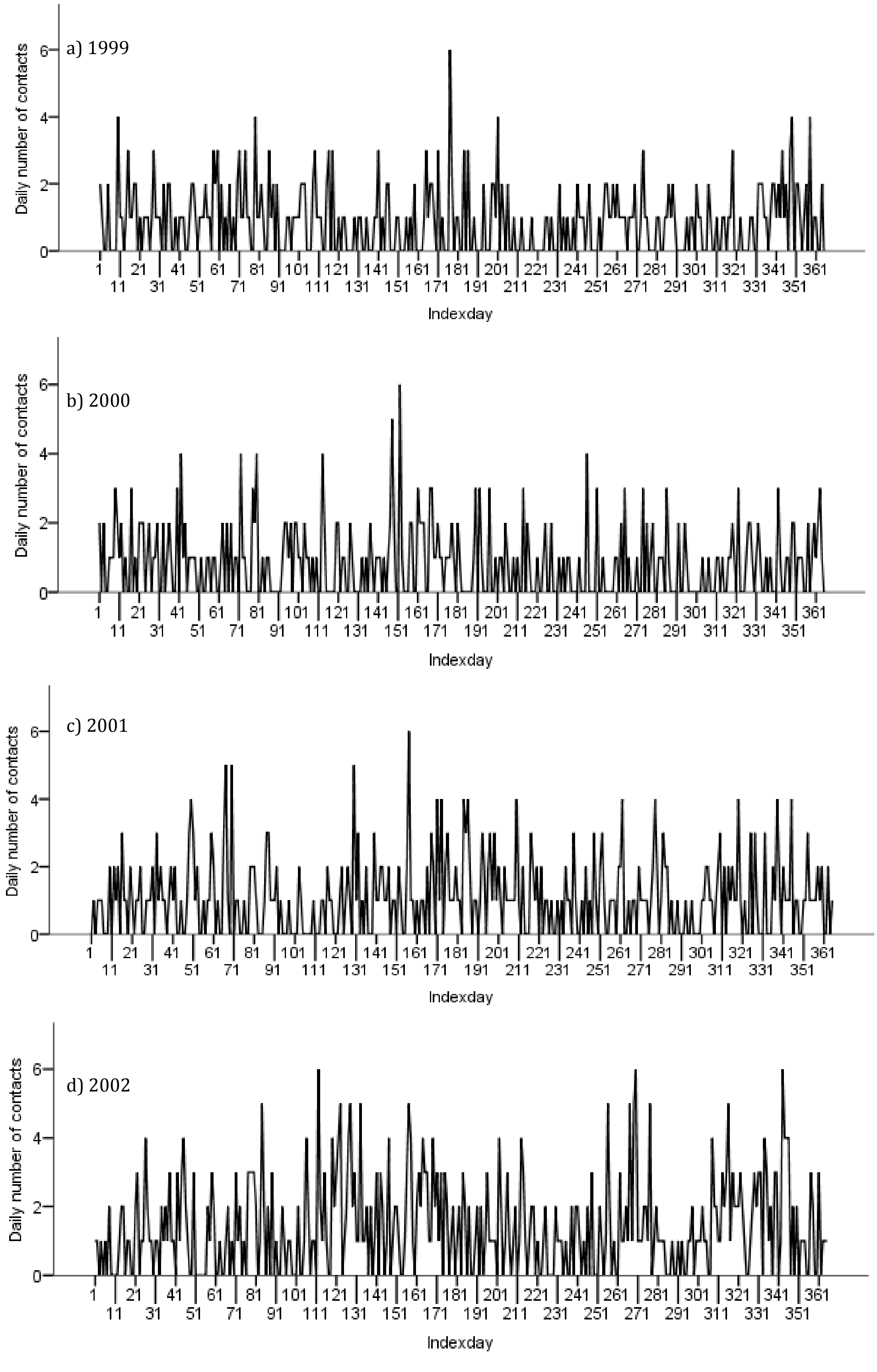


Figure C1. 45: Trent Region Emergency Consultations Excess a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


a) 1999
b) 2000
c) 2001
d) 2002
Daily number of contacts
Indexday

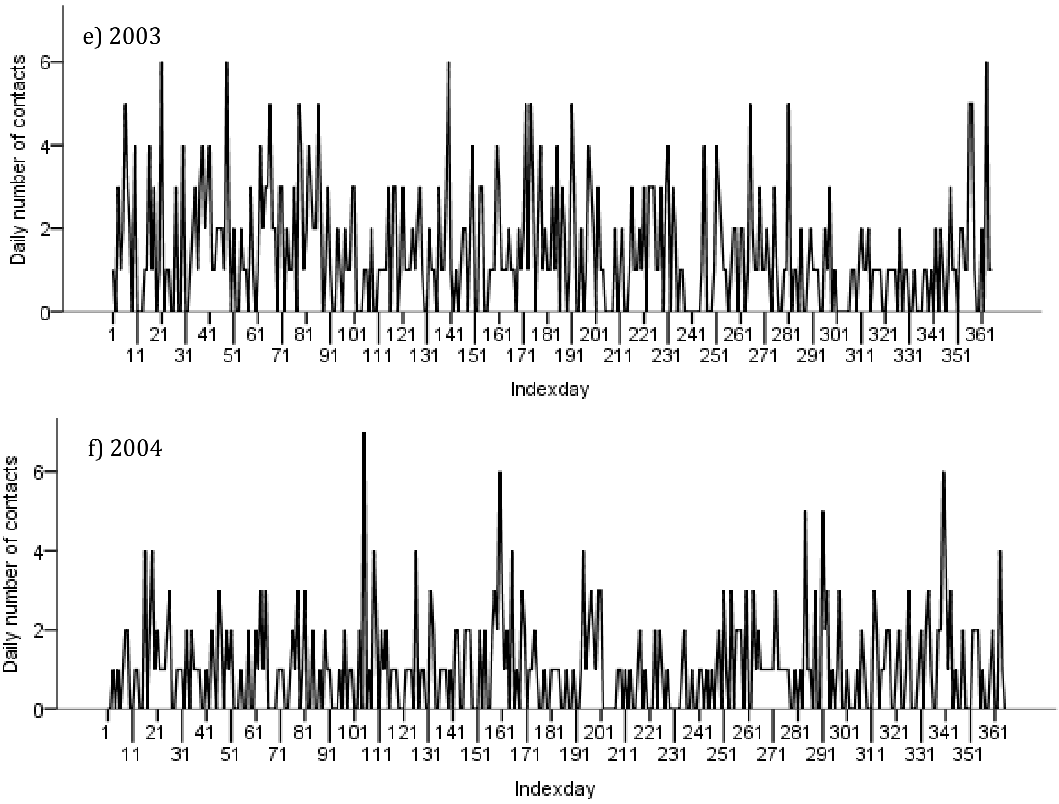
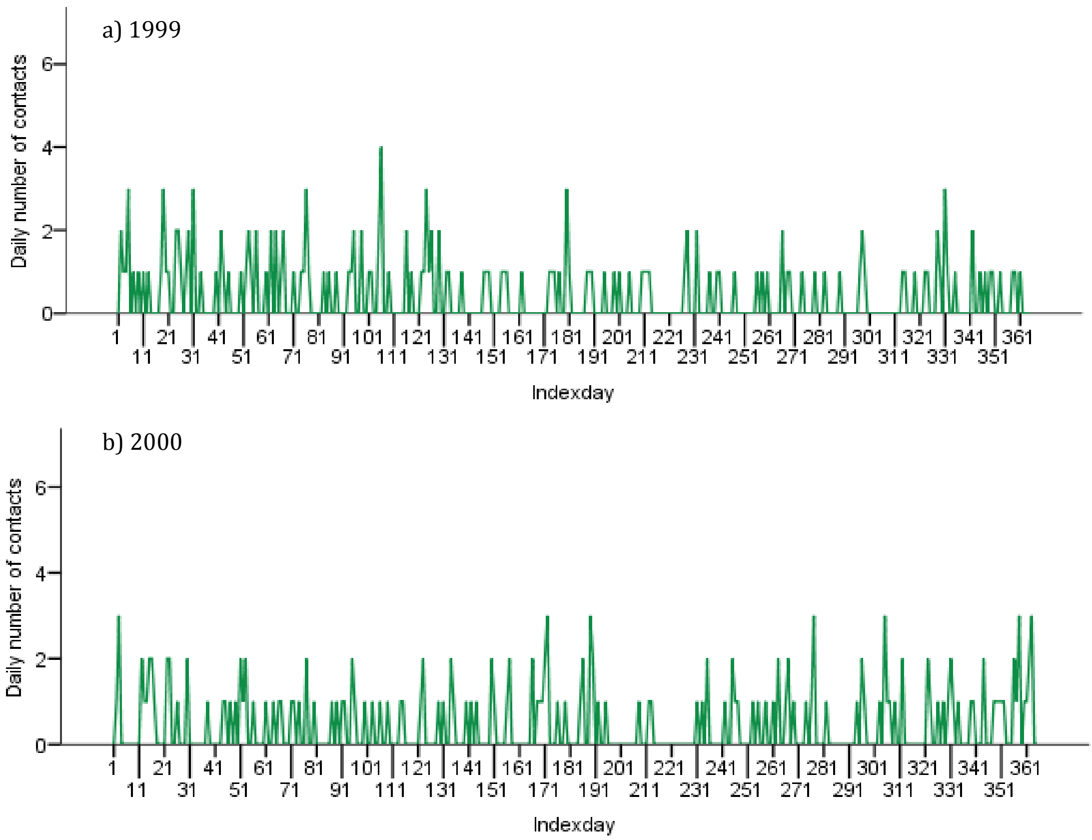


Figure C1. 46: Trent Region Emergency Counts Asthmatics a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.



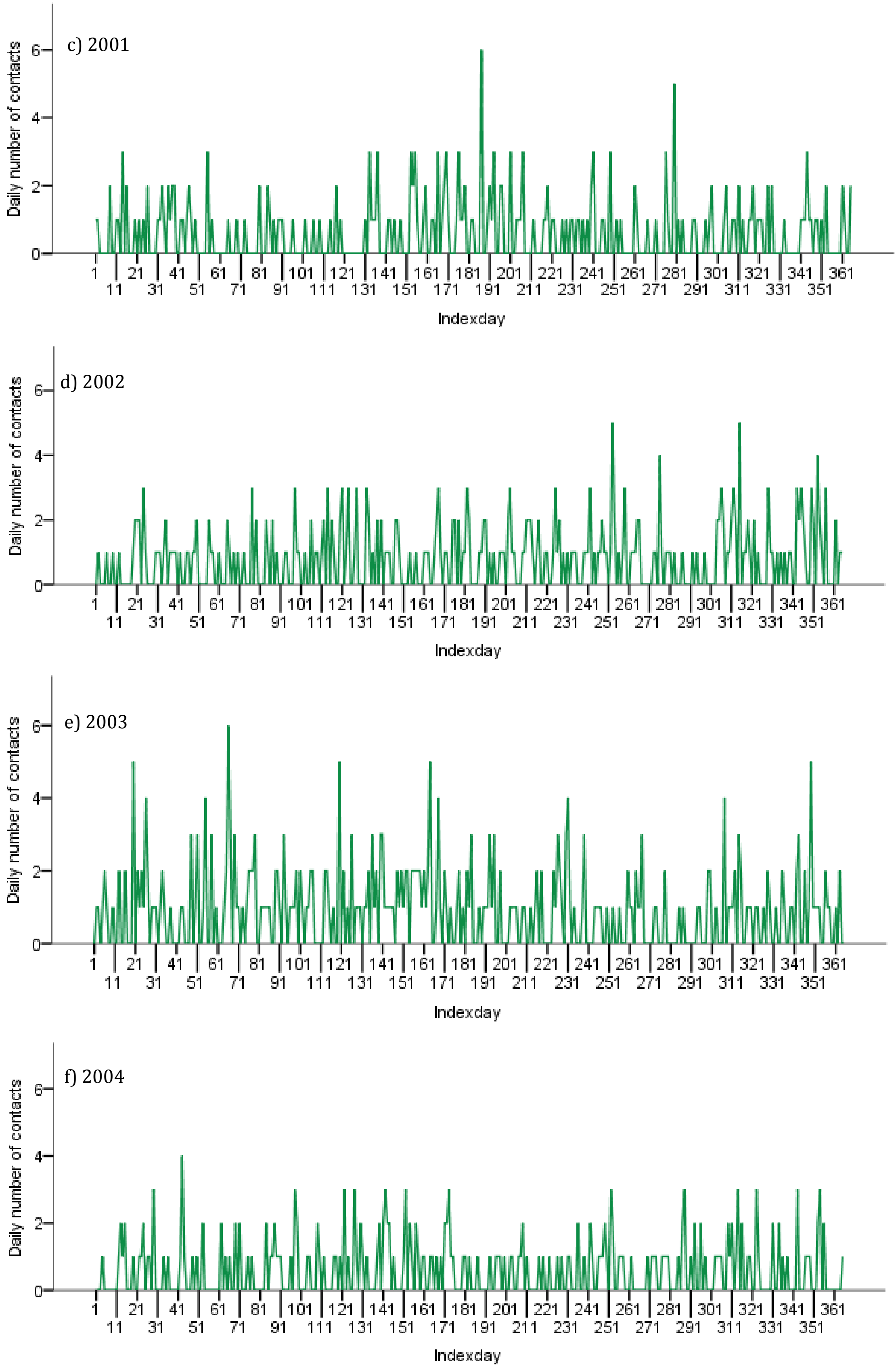
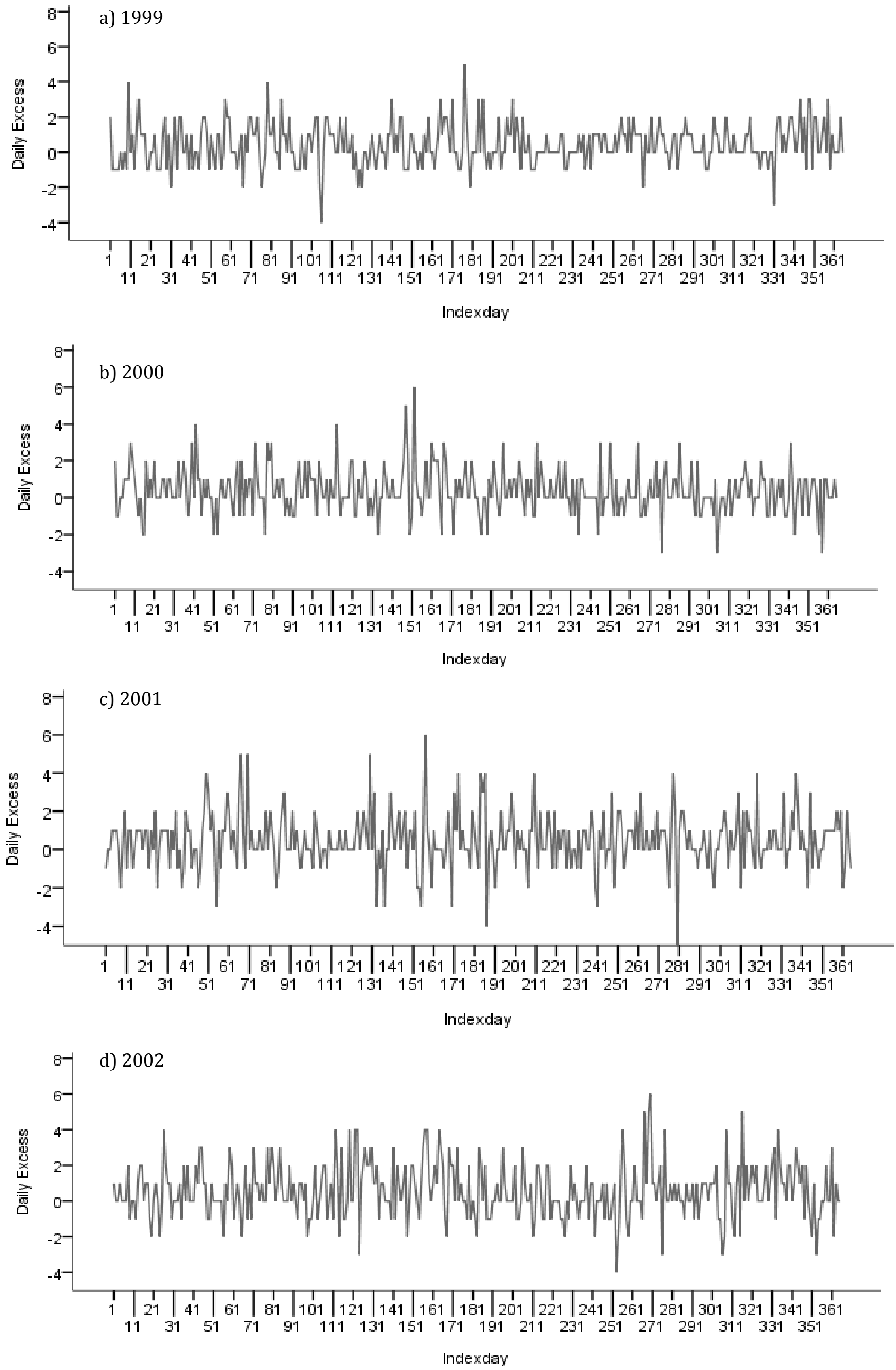


Figure C1. 47: Trent Region Emergency Counts Non-asthmatics a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


a) 1999
b) 2000
c) 2001
d) 2002
Daily Excess
Indexday

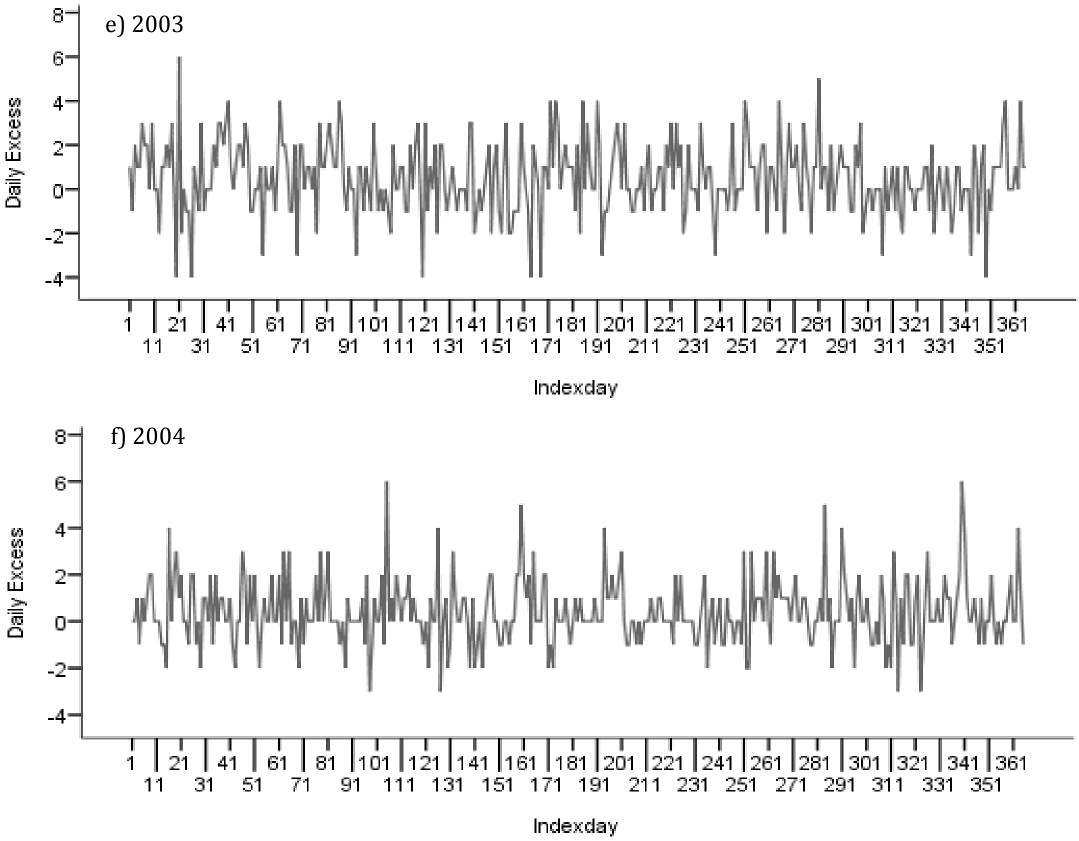
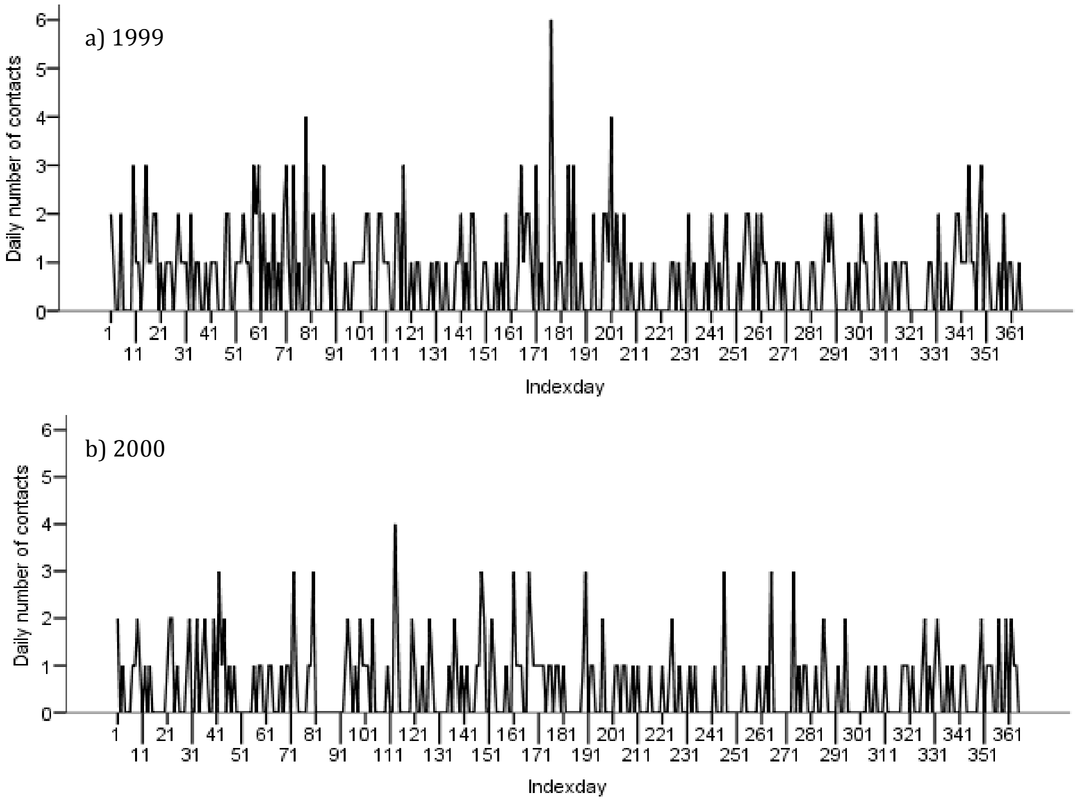


Figure C1. 48: Trent Region Emergency Counts Excess a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.



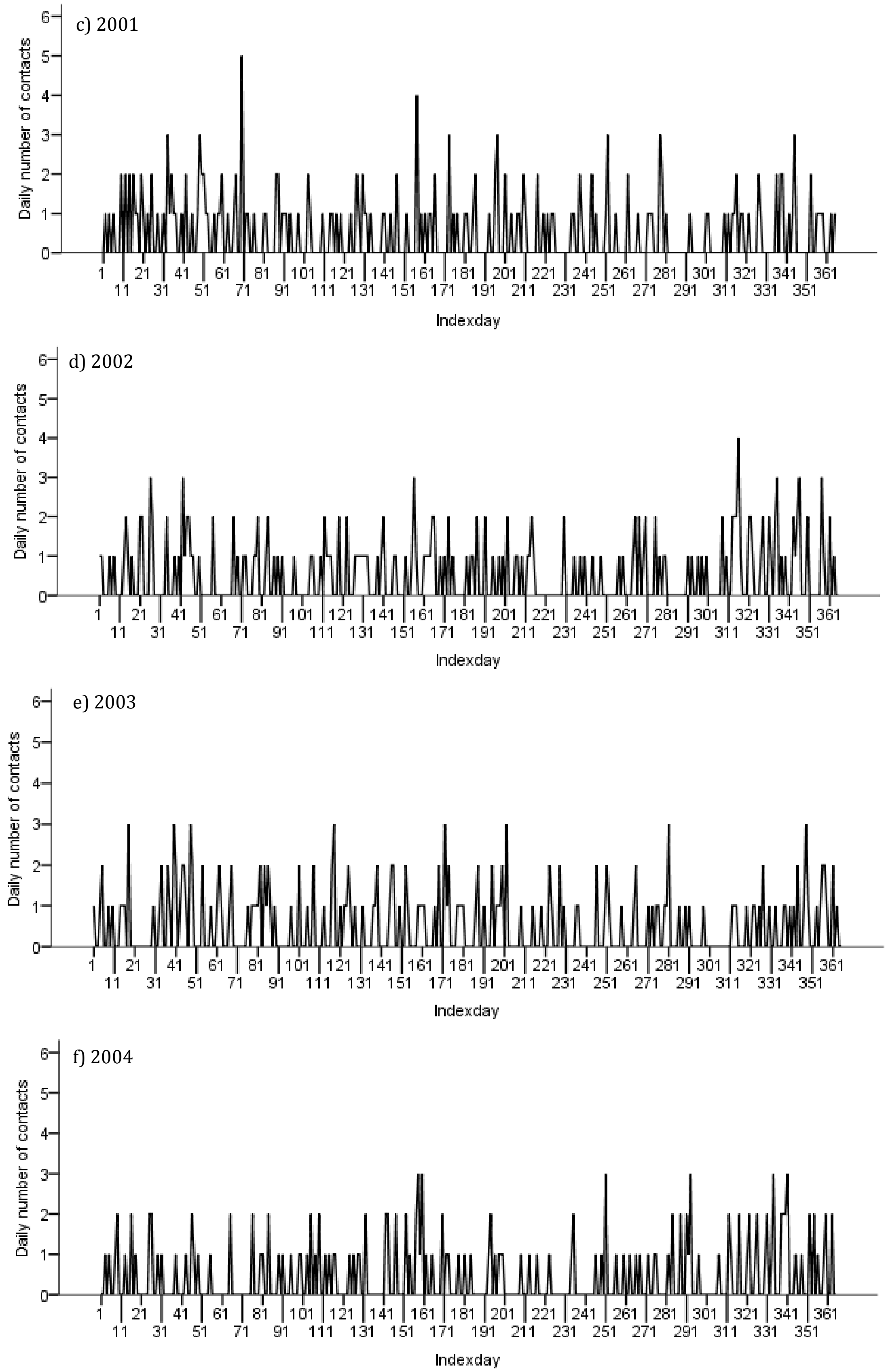
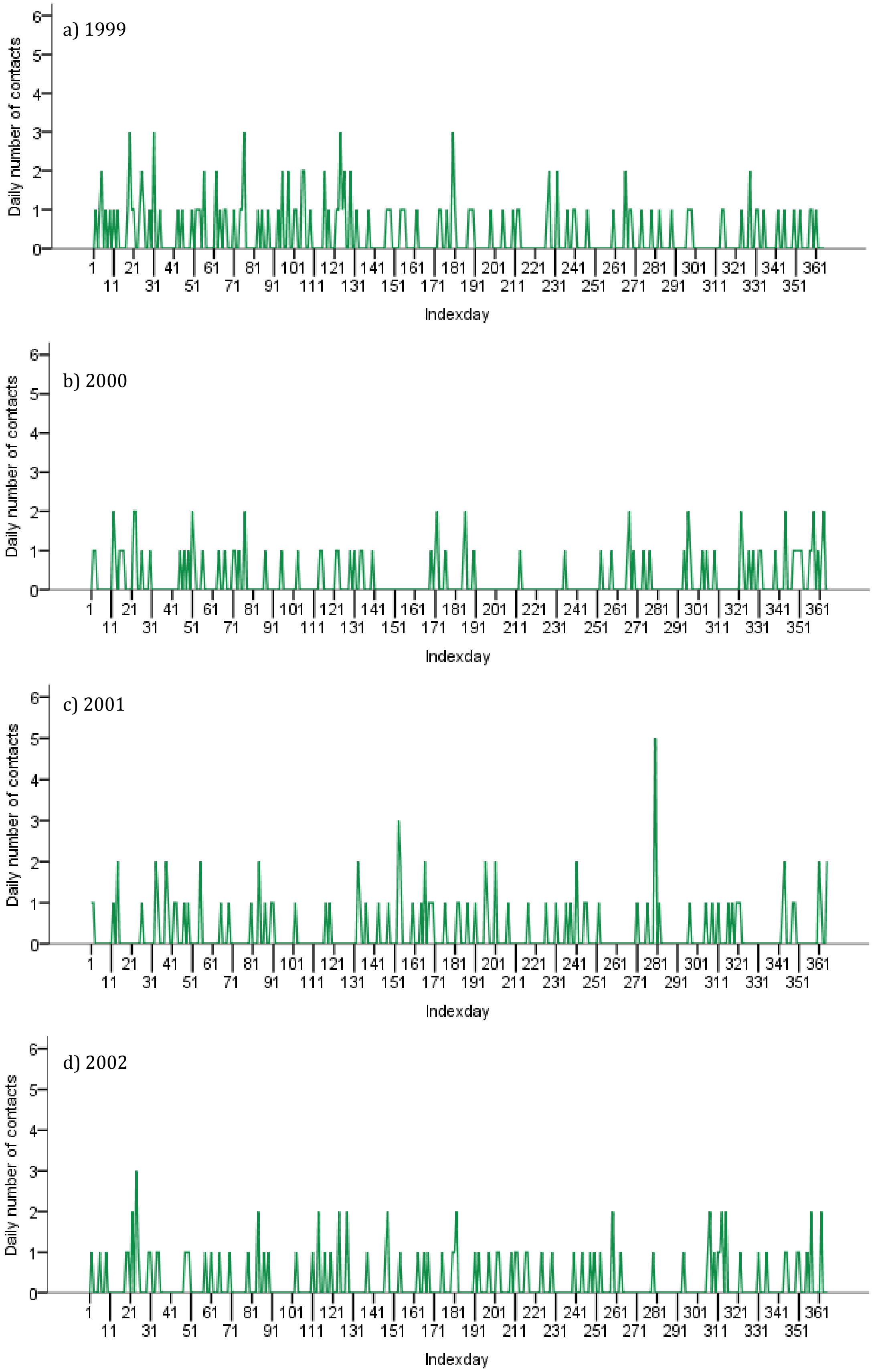


Figure C1. 49: Trent Region Out of Hours Counts Asthmatics a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


a) 1999
b) 2000
c) 2001
d) 2002
Daily number of contacts
Indexday
0
1
2
3
4
5
6
1 21 41 61 81 101 121 141 161 181 201 221 241 261 281 301 321 341 361
11 31 51 71 91 111 131 151 171 191 211 231 251 271 291 311 331 351

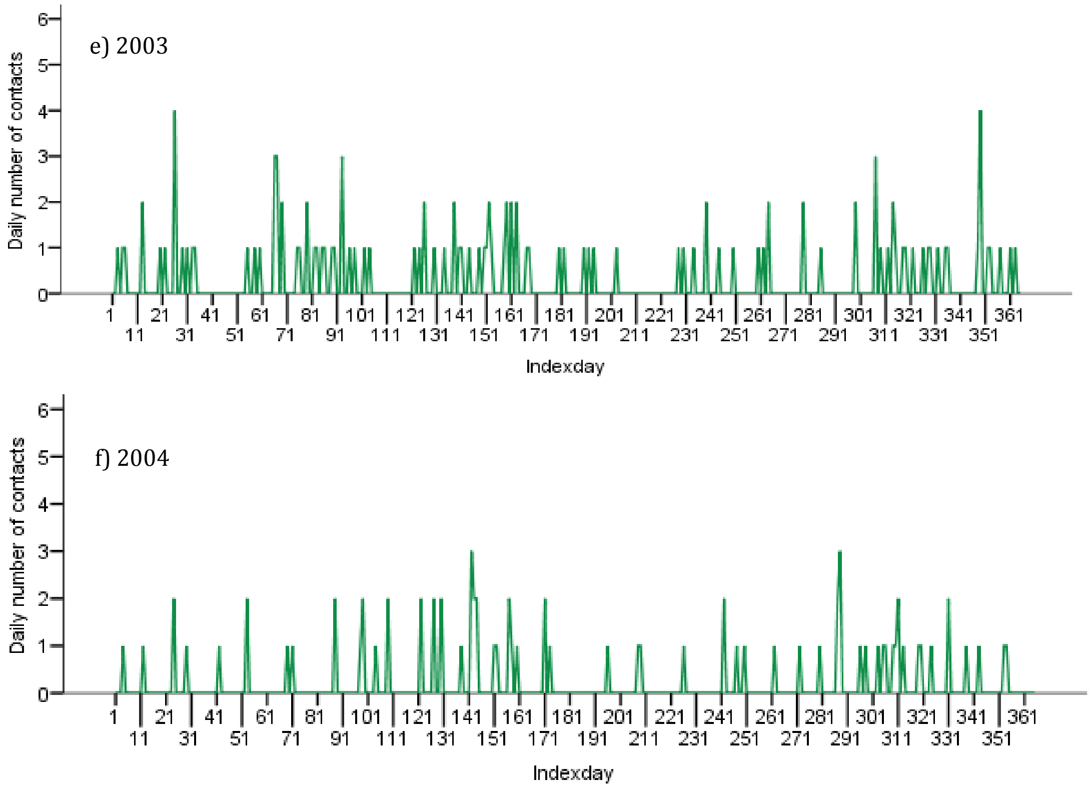
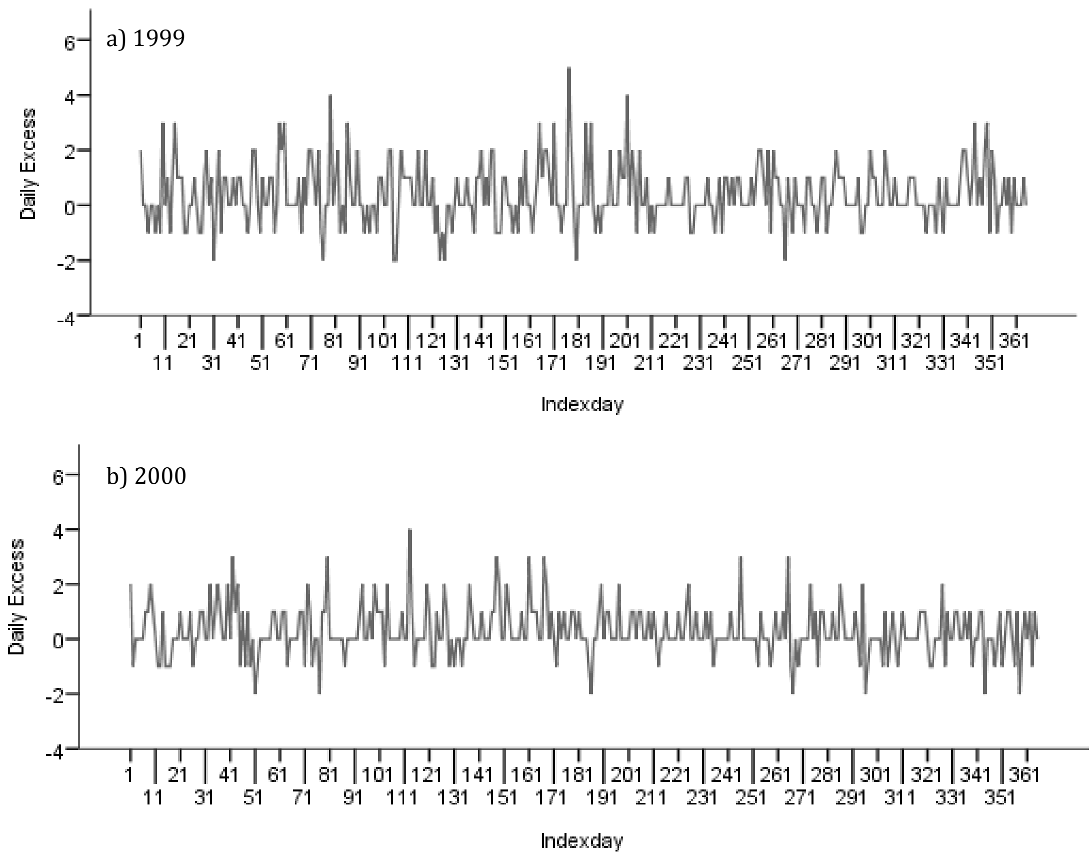


Figure C1. 50: Trent Region Out of Hours Counts Non-asthmatics a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.



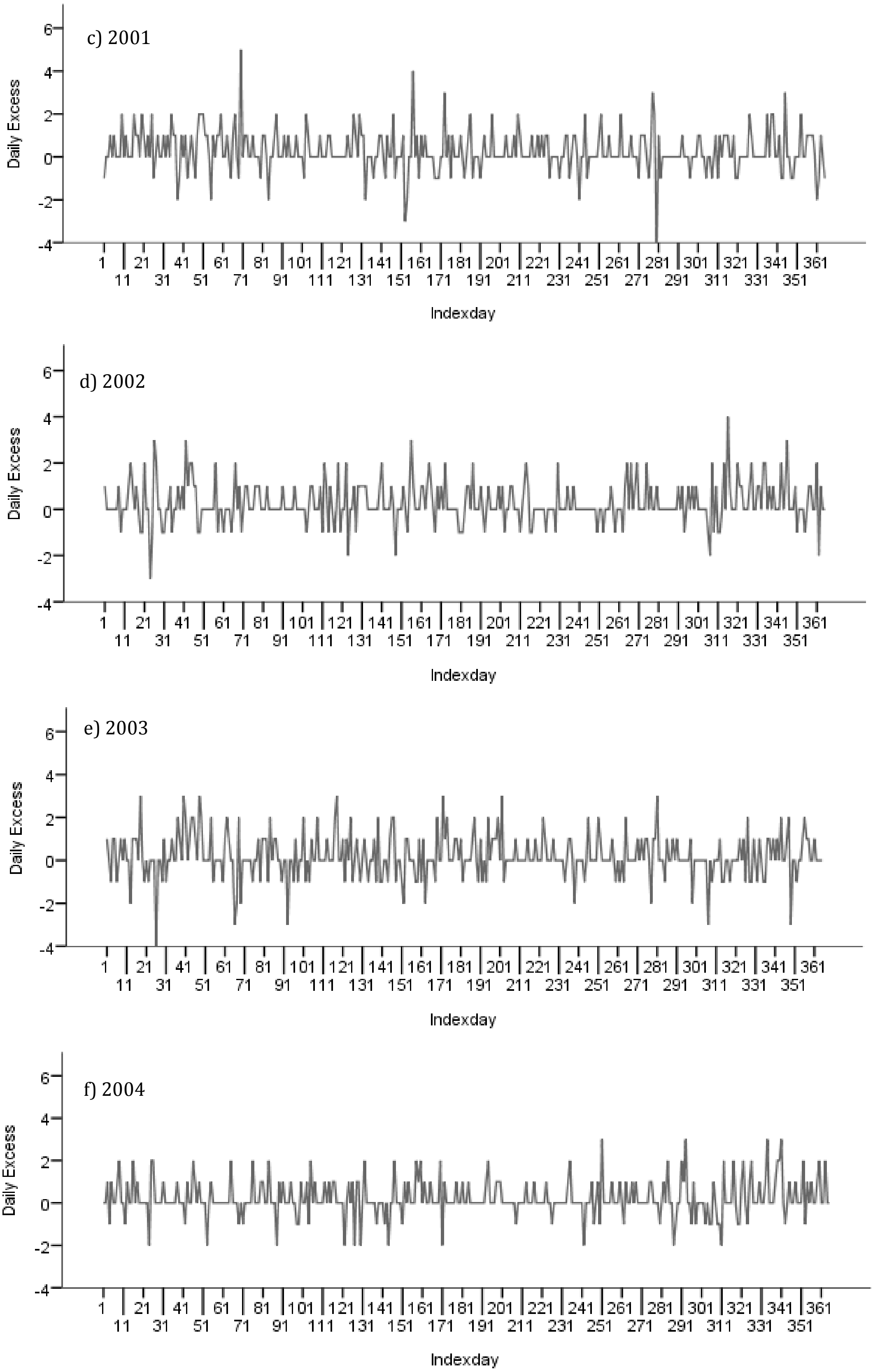


Figure C1. 51: Trent Region Out of Hours Excess a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.

C1.2.3. Trent Region Summary Statistics, histograms and monthly means for Acute Visits, Casualty Counts, Emergency Consultations, Emergency Counts and Out of Hours counts

Table C. 4: Trent Region All Medical Contacts - descriptive statistics (n=2190)

Asthmatics, Non-asthmatics or Excess	Statistics	All Counts	Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours Counts
Asthmatics	**Mean**	27.35	.09	.35	.12	1.10	.55
	Median	32	0	0	0	1	0
	SD	18.06	0.32	0.69	0.41	1.21	0.80
	Minimum	0	0	0	0	0	0
	Maximum	100	3	6	4	7	6
Non-asthmatics	**Mean**	13.39	.05	.24	.06	.64	.27
	Median	15	0	0	0	0	0
	SD	9.39	0.25	0.55	0.28	0.90	0.58
	Minimum	0	0	0	0	0	0
	Maximum	53	3	5	4	6	5
Excess	**Mean**	13.95	.03	.11	.05	.46	.27
	Median	14	0	0	0	0	0
	SD	11.20	0.40	0.81	0.46	1.41	0.96
	Minimum	-7	-3	-3	-4	-5	-5
	Maximum	73	3	6	4	6	5

Table C. 5: Trent Region All Counts - descriptive statistics, weekday or weekend

Statistics	Weekday			Weekend		
	Asthmatics	Non-asthmatics	Excess	Asthmatics	Non-asthmatics	Excess
Number of days	1565	1565	1565	625	625	625
Mean	36.91	18.03	18.88	3.39	1.79	1.60
Median	37	18	19	3	1	1
SD	11.48	6.84	9.32	3.12	1.78	2.83
Minimum	0	0	-6	0	0	-7
Maximum	100	53	73	20	9	15

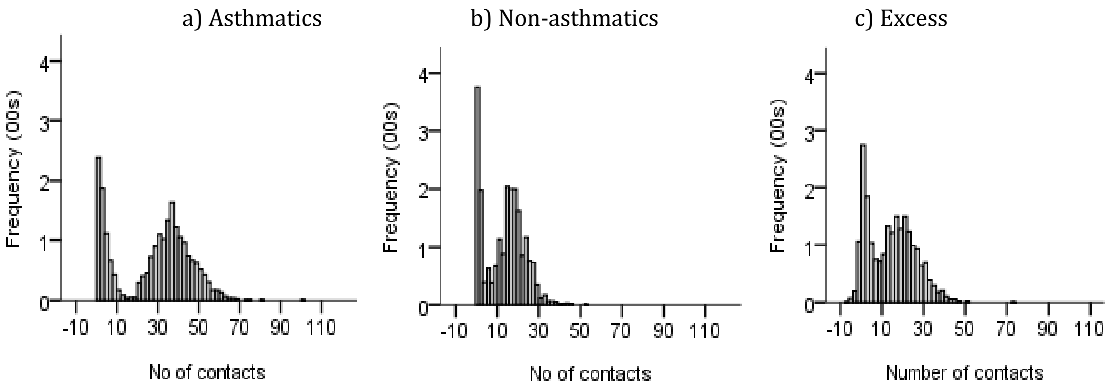


Figure C1. 52: All Counts: Trent Region – distribution of the daily number of contact a) Asthmatics, b) Non-asthmatics and c) Excess.

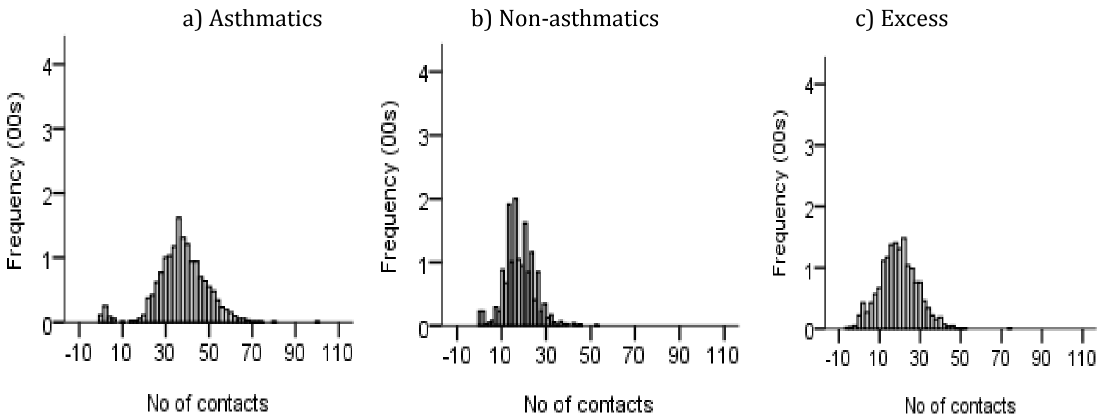


Figure C1. 53: All Counts: Trent Region – distribution of the daily number of contact Weekday a) Asthmatics, b) Non-asthmatics and c) Excess

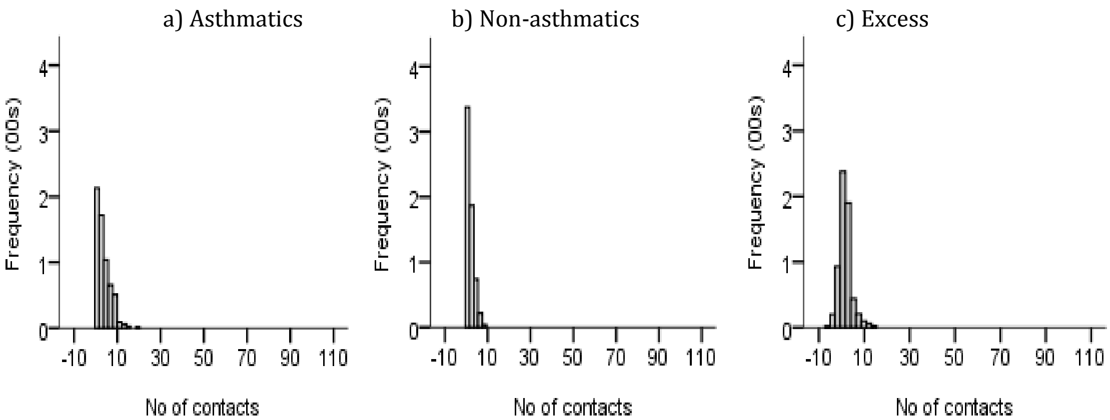


Figure C1. 54: All Counts: Trent Region – distribution of the daily number of contact Weekend a) Asthmatics, b) Non-asthmatics and c) Excess

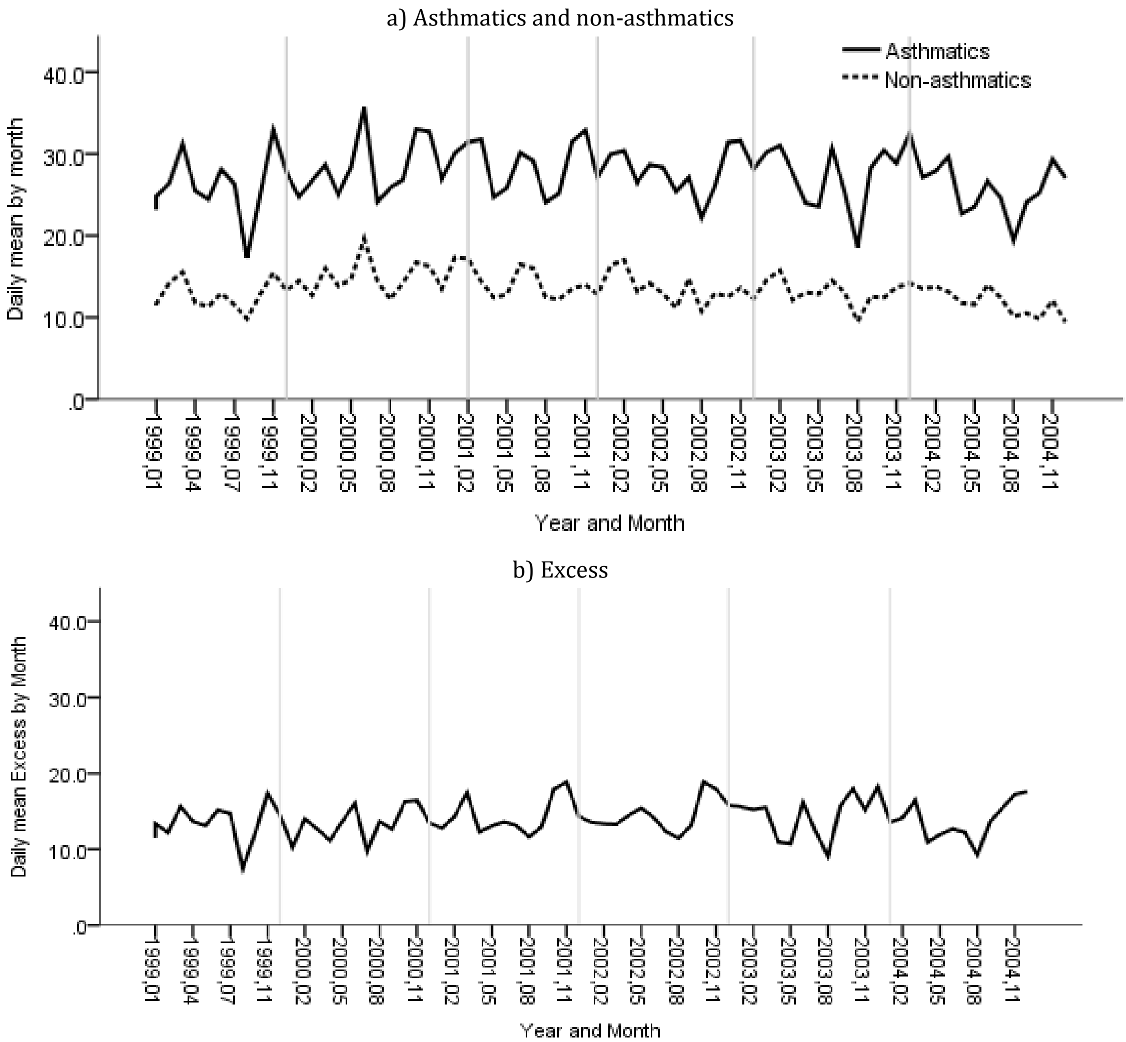


Figure C1. 55: Trent Region All Counts - plot of the daily mean number of contacts aggregated by month 1999-2004 a) Asthmatics and non-asthmatics and b) Excess.

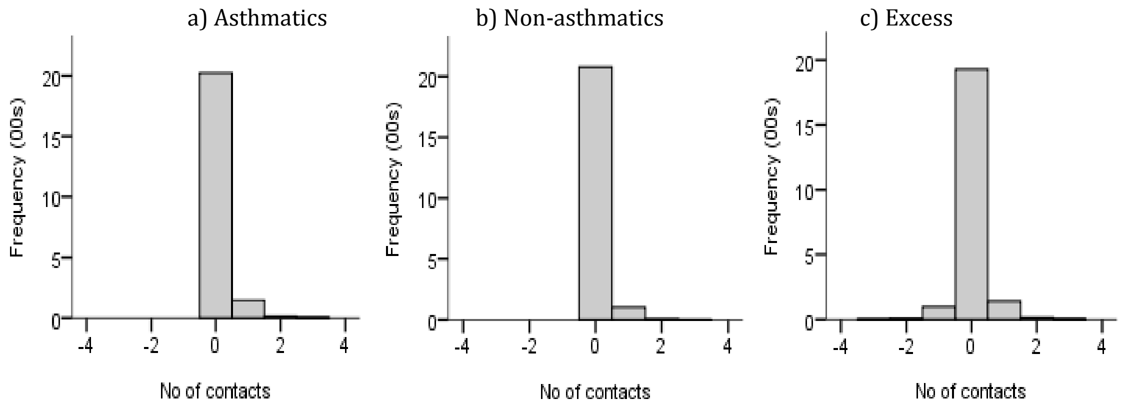


Figure C1. 56: Acute Visits: Trent Region – distribution of the daily number of contact a) Asthmatics, b) Non-asthmatics and c) Excess.

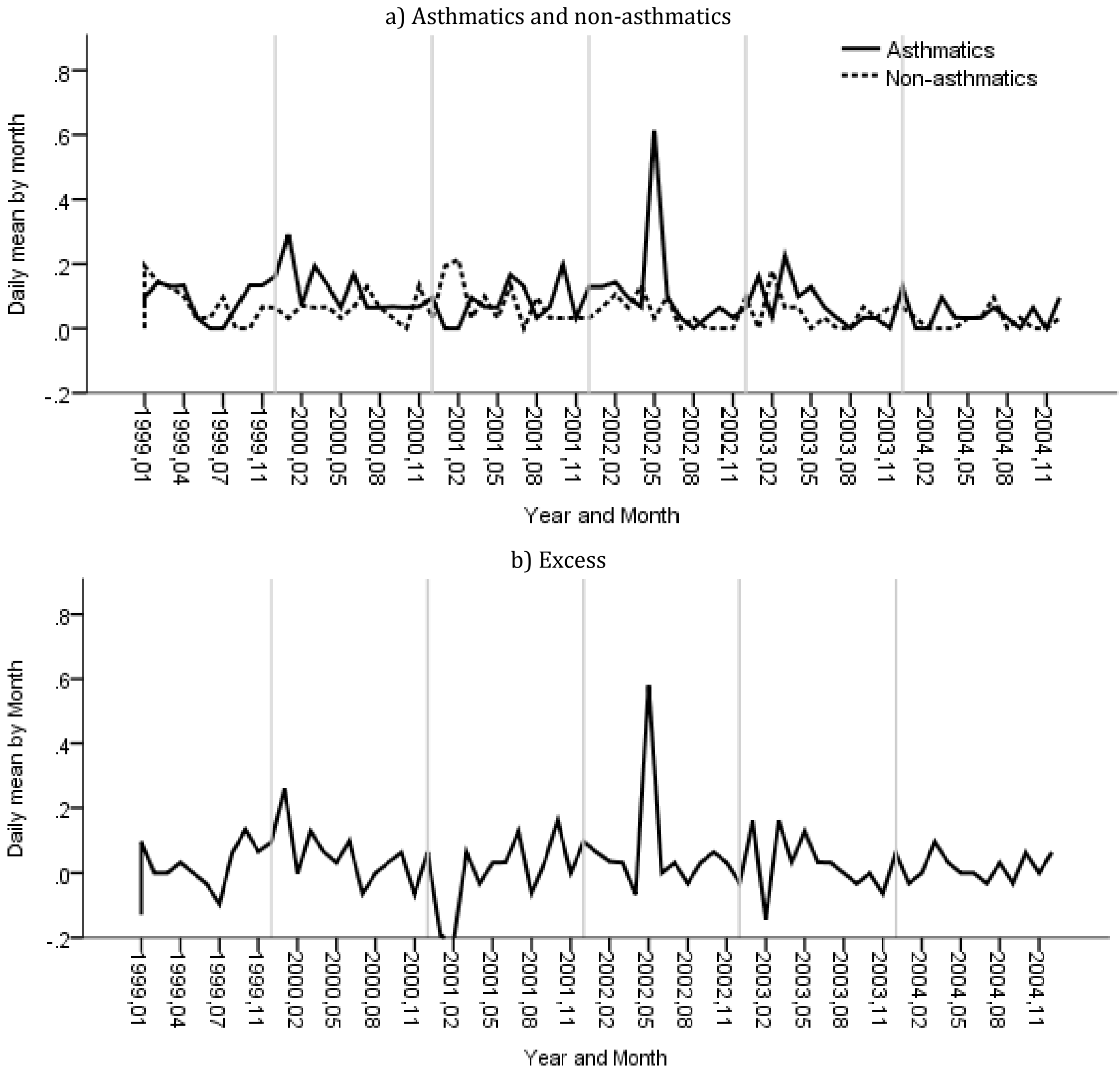


Figure C1. 57: Acute Visits: Trent Region - plot of the daily mean number of contacts aggregated by month 1999-2004 a) Asthmatics and non-asthmatics and b) Excess.

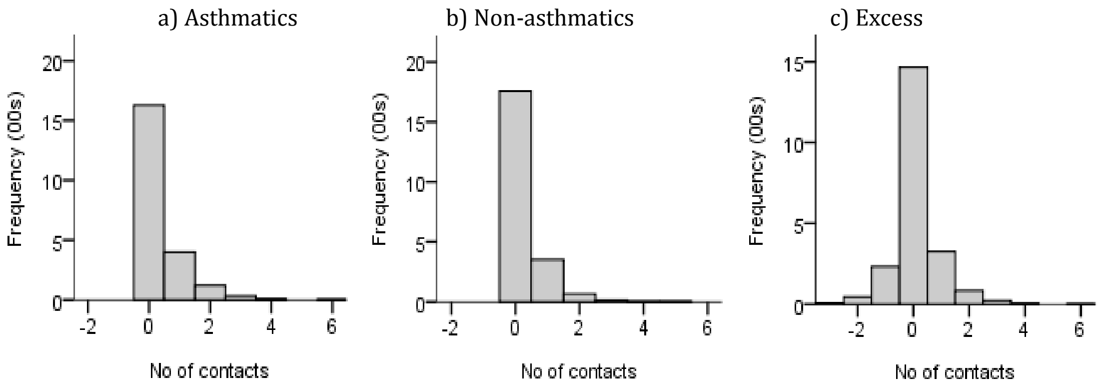


Figure C1. 58: Casualty Counts: Trent Region – distribution of the daily number of contact a) Asthmatics, b) Non-asthmatics and c) Excess.

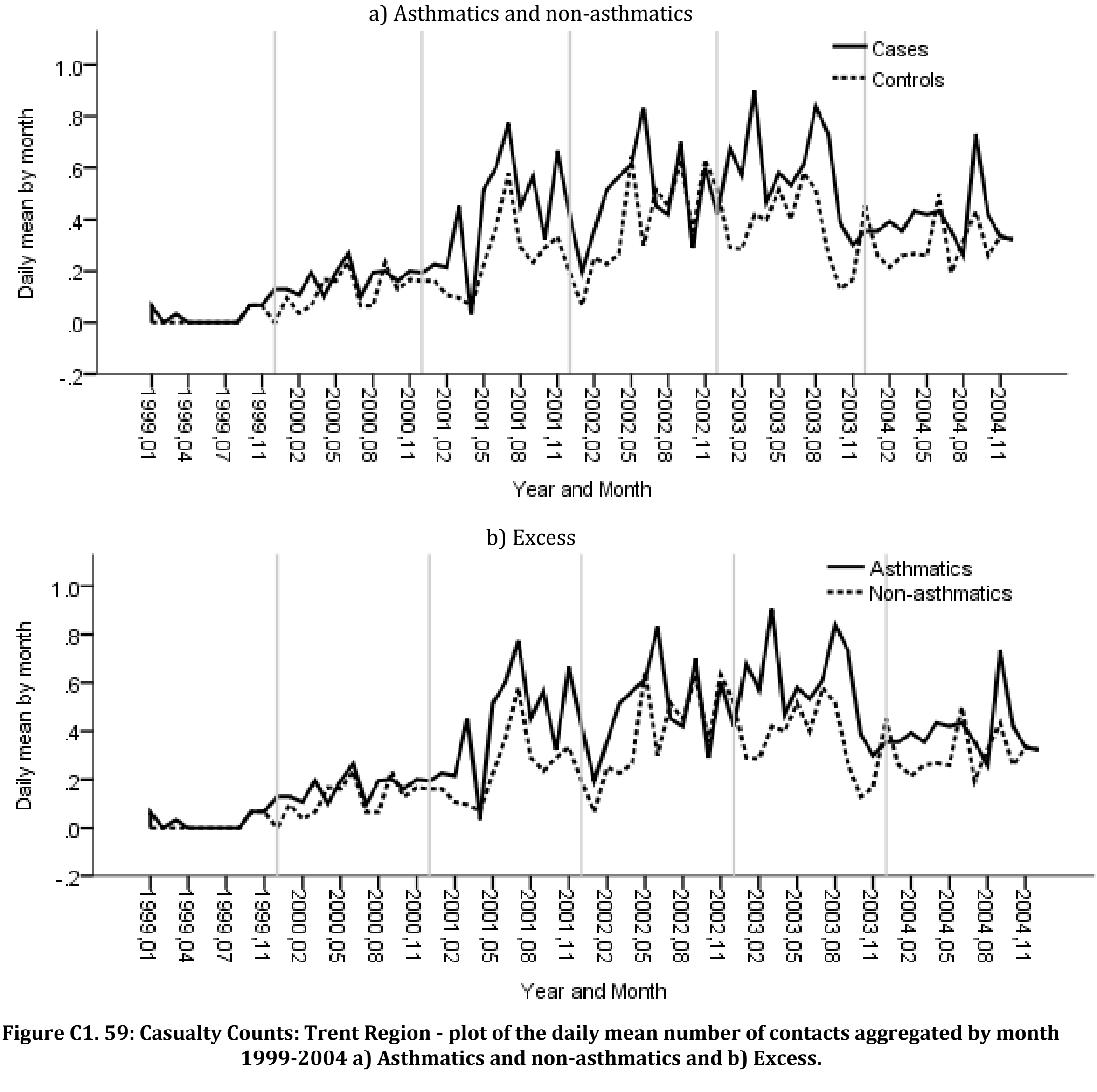


Figure C1. 59: Casualty Counts: Trent Region - plot of the daily mean number of contacts aggregated by month 1999-2004 a) Asthmatics and non-asthmatics and b) Excess.

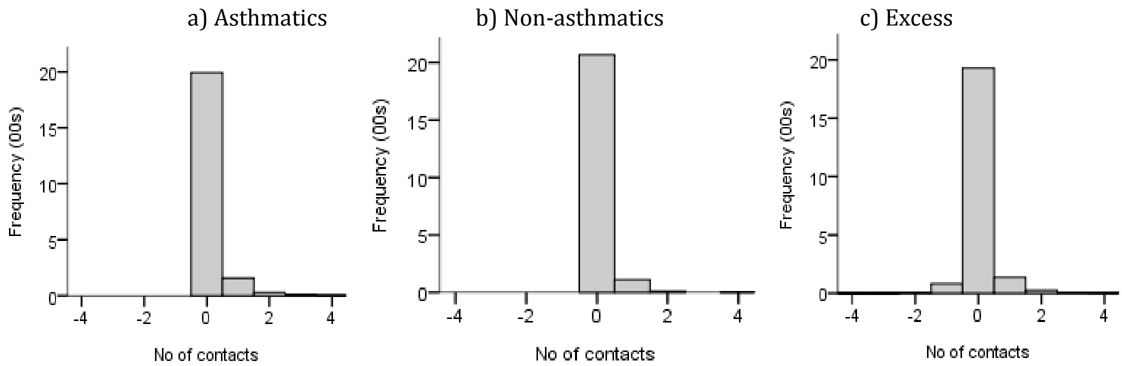


Figure C1.60: Emergency Consultations: Trent Region – distribution of the daily number of contact a) Asthmatics, b) Non-asthmatics and c) Excess.

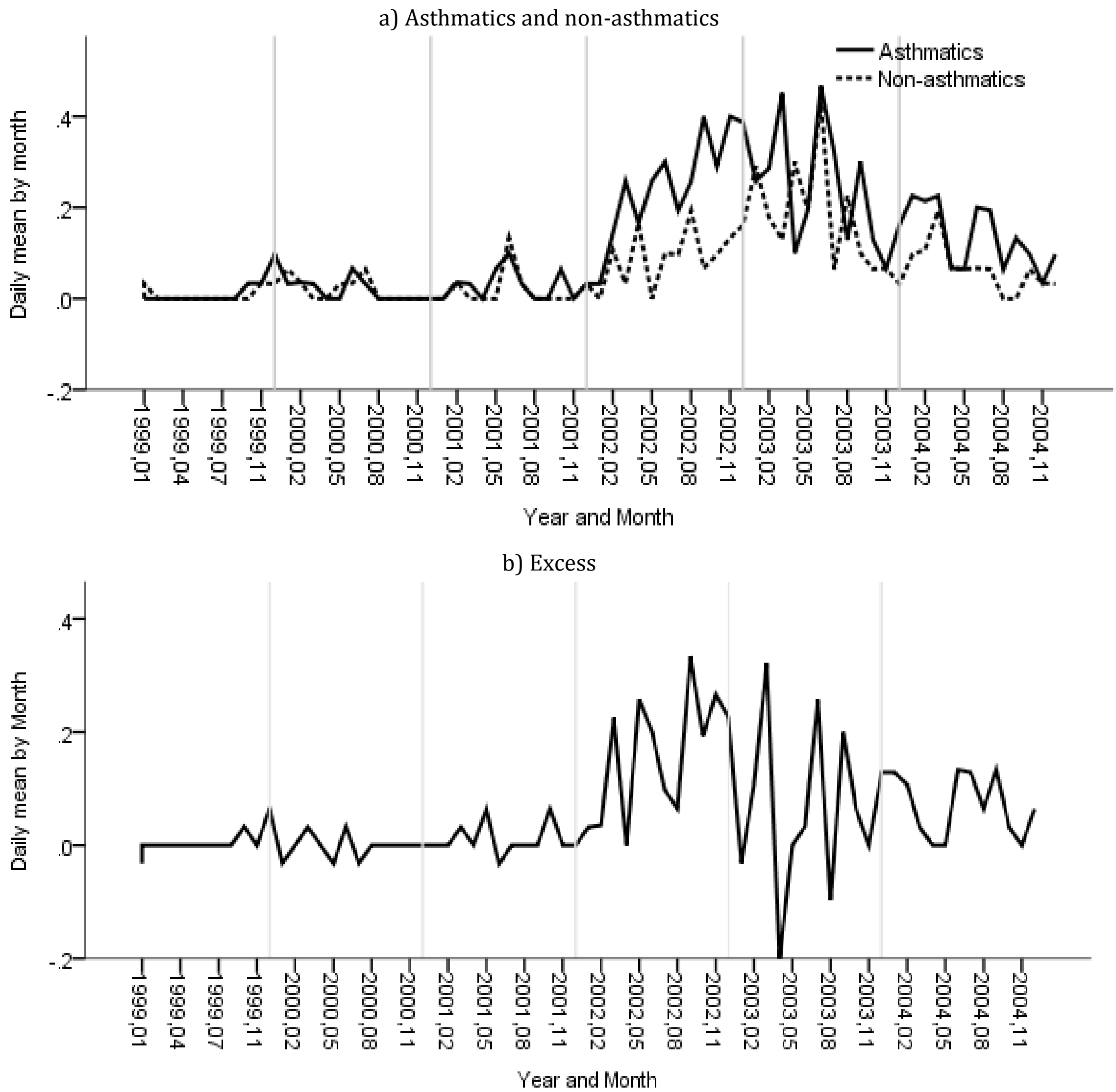


Figure C1.61: Emergency Consultations: Trent Region - plot of the daily mean number of contacts aggregated by month 1999-2004 a) Asthmatics and non-asthmatics and b) Excess.

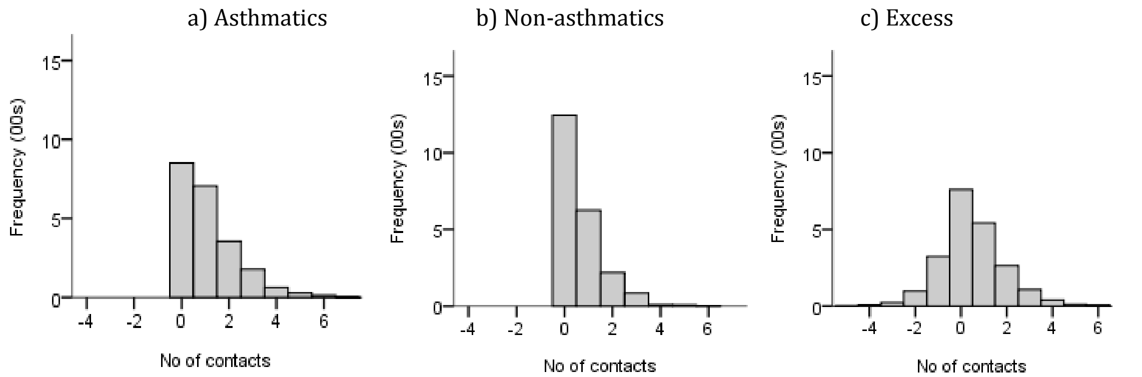


Figure C1.62: Emergency Counts: Trent Region – distribution of the daily number of contact a) Asthmatics, b) Non-asthmatics and c) Excess.

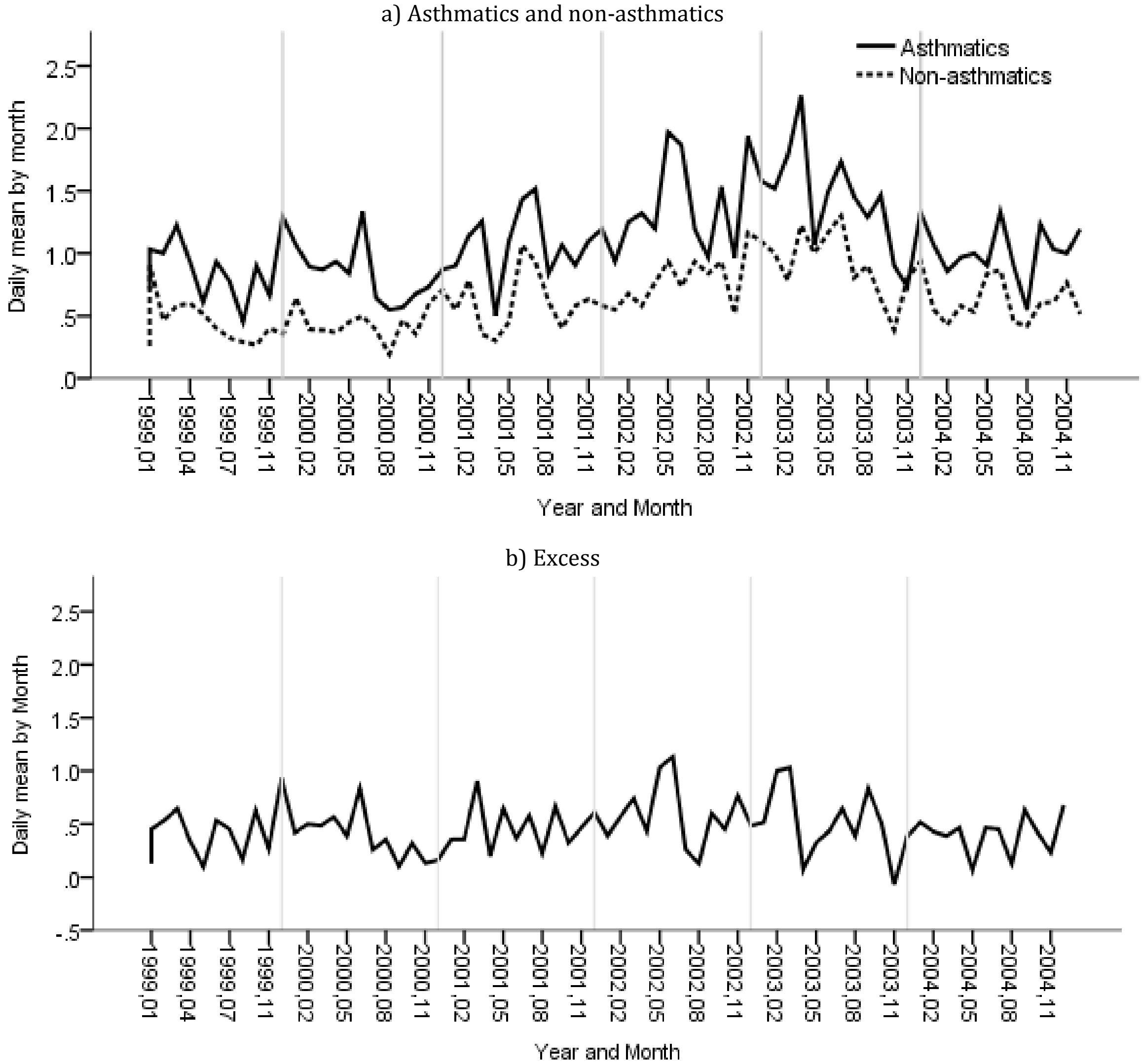


Figure C1. 63: Emergency Counts: Trent Region - plot of the daily mean number of contacts aggregated by month 1999-2004 a) Asthmatics and non-asthmatics and b) Excess.

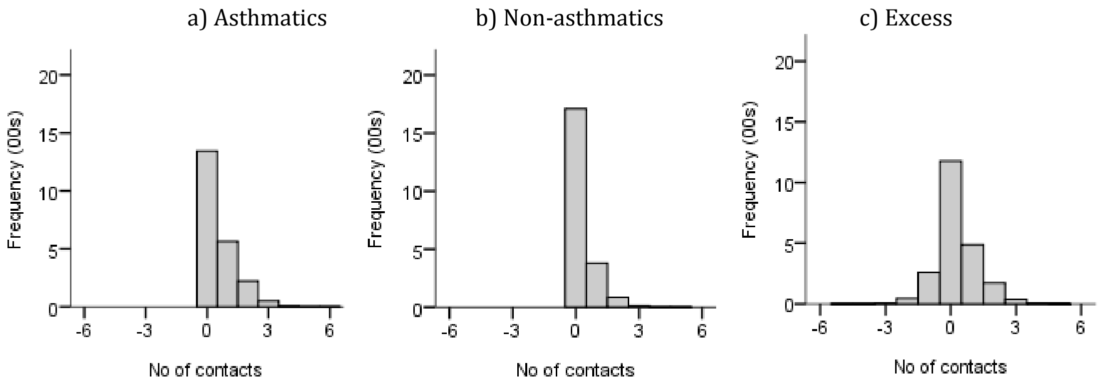


Figure C1. 64: Out of Hours Counts: Trent Region – distribution of the daily number of contact a) Asthmatics, b) Non-asthmatics and c) Excess.

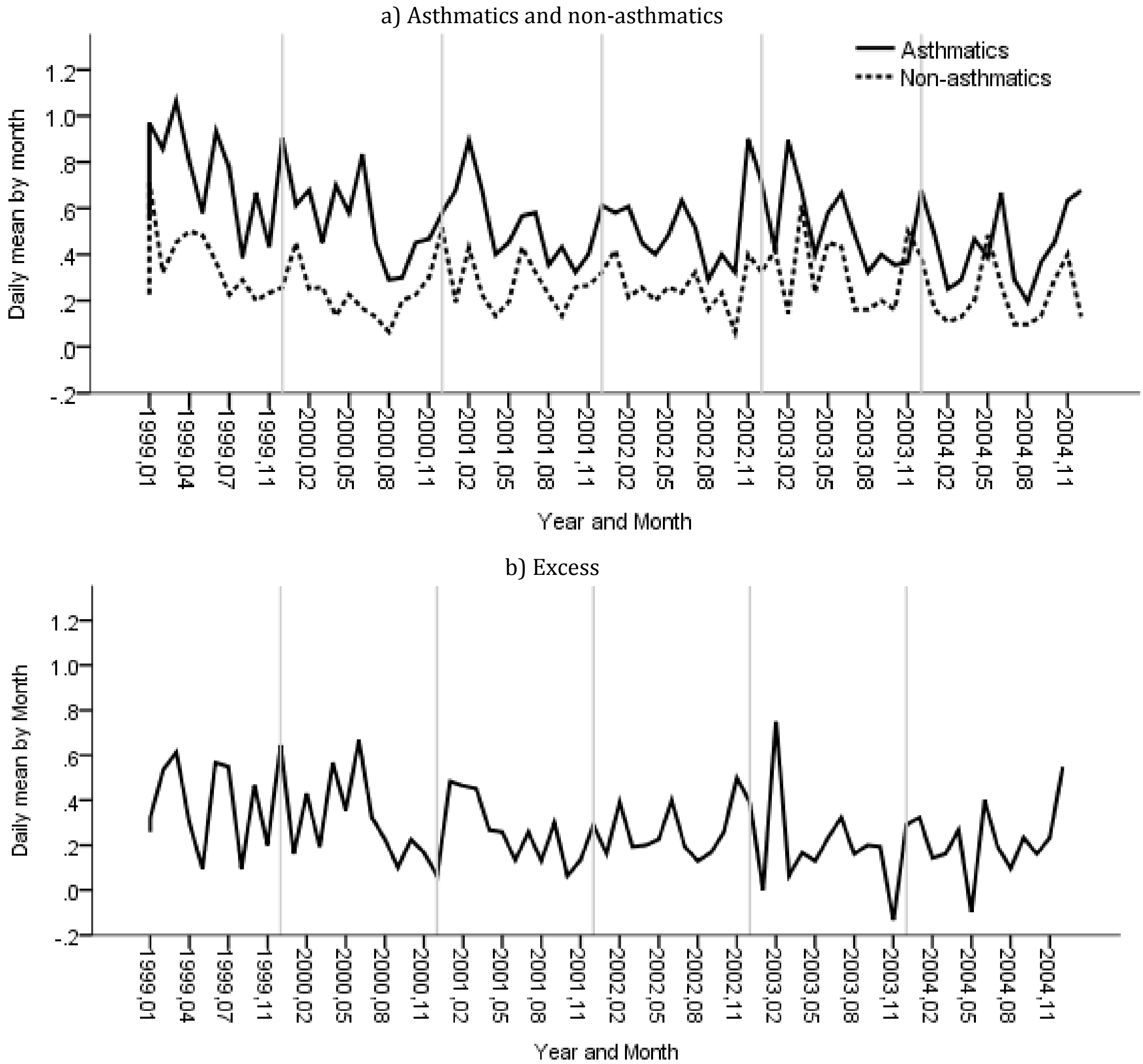


Figure C1. 65: Out of Hours Counts: Trent Region - plot of the daily mean number of contacts aggregated by month 1999-2004 a) Asthmatics and non-asthmatics and b) Excess.

Table C. 6: Trent Region -sum of the total number of daily counts

Medical Contacts	Asthmatics	Non-asthmatics
All Counts	59886	29332
Acute Visits	189	120
Casualty Counts	772	535
Emergency Consultations	252	139
Emergency Counts	2408	1396
Out of Hours Counts	1195	602

C1.3. Sheffield: Summary Statistics, Histograms and Plots over time (All Datasets).

C1.3.1. Demographic Information

For Sheffield, there were 1,770 one-to-one matched secondary care contacts from 1999 to 2004. Sixty-three percent of the sample consisted of contacts made by males (n=1,116, females n=656). In contrast to the GPRD dataset where age related information was not given as part of the dataset, SCH data included information on age for each medical contact. There were higher numbers of hospital contacts made by younger rather than older children attending hospital. The gender difference was greater at younger ages.

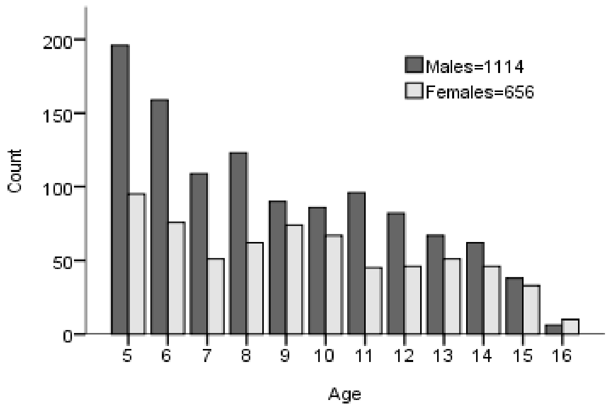
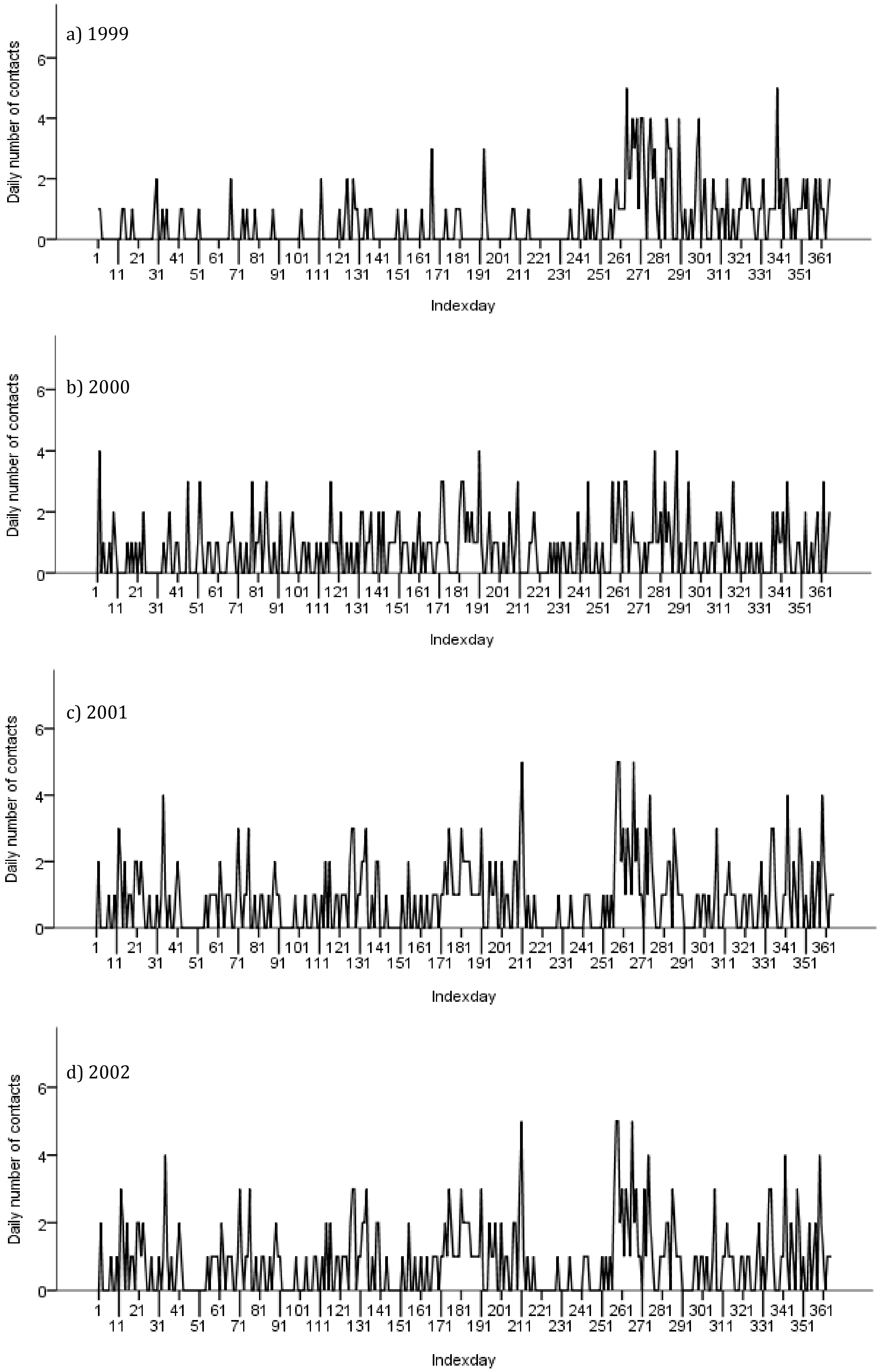


Figure C1. 66: Age and gender distribution of patients attending hospital from 1999 to 2004.

C1.3.2. Sheffield Plots over time by year.


a) 1999
b) 2000
c) 2001
d) 2002
Daily number of contacts
0
2
4
6
1 21 41 61 81 101 121 141 161 181 201 221 241 261 281 301 321 341 361
11 31 51 71 91 111 131 151 171 191 211 231 251 271 291 311 331 351
Indexday

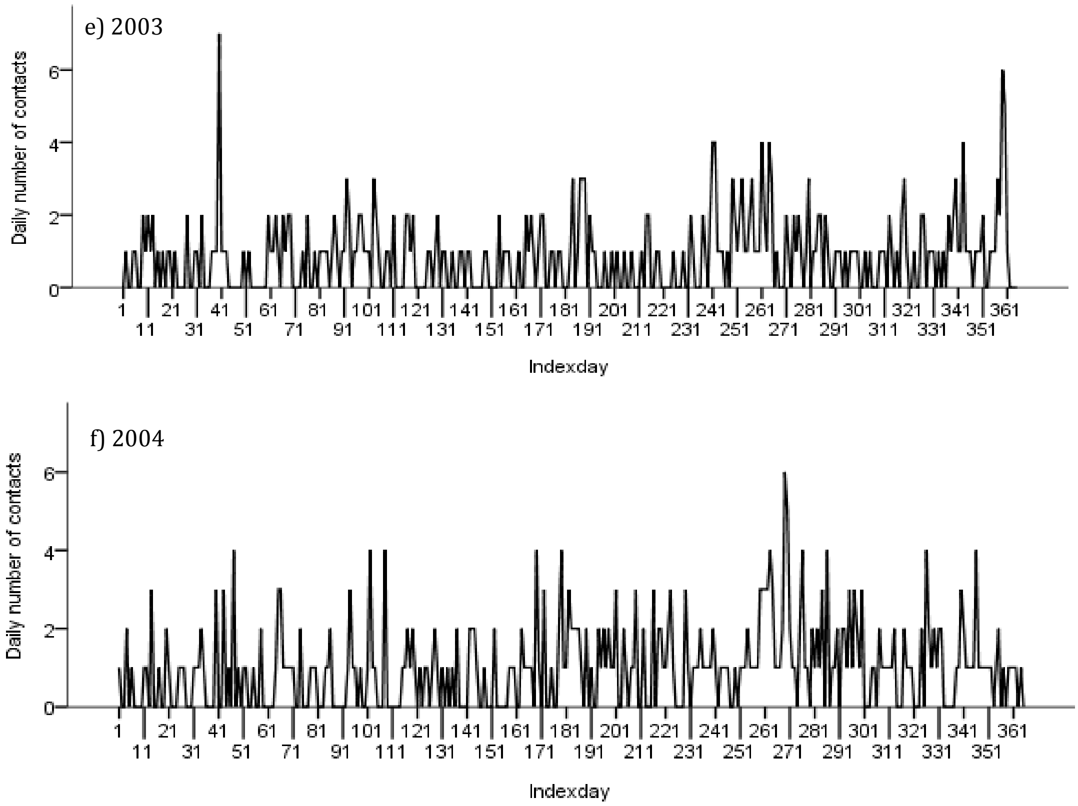
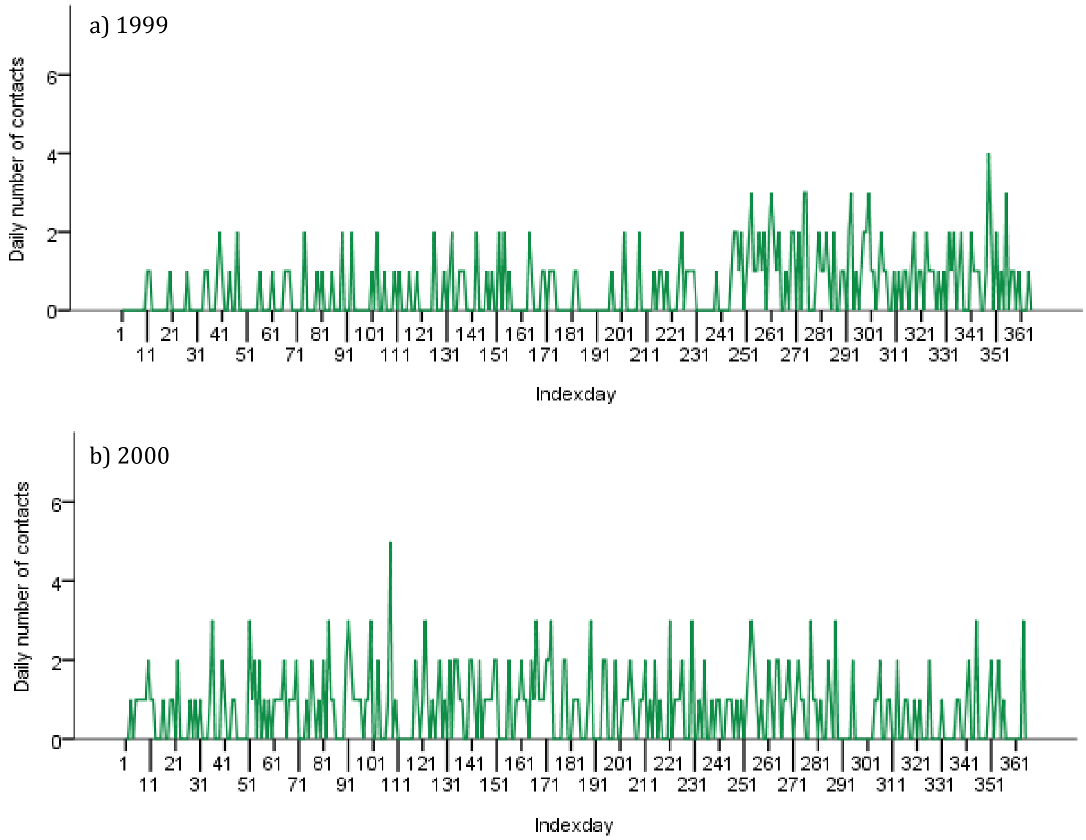


Figure C1. 67: Sheffield All Counts Asthmatics a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.



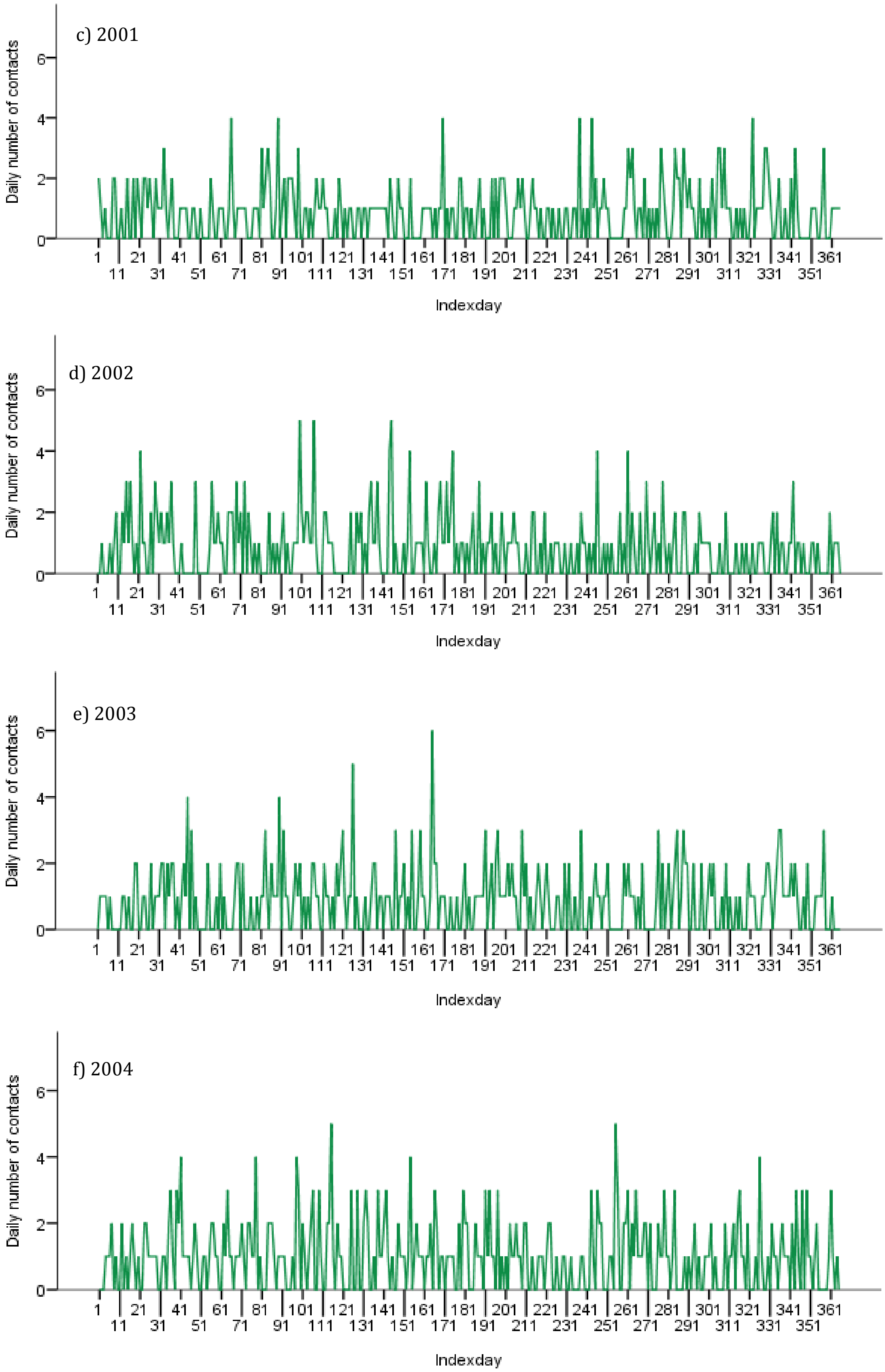
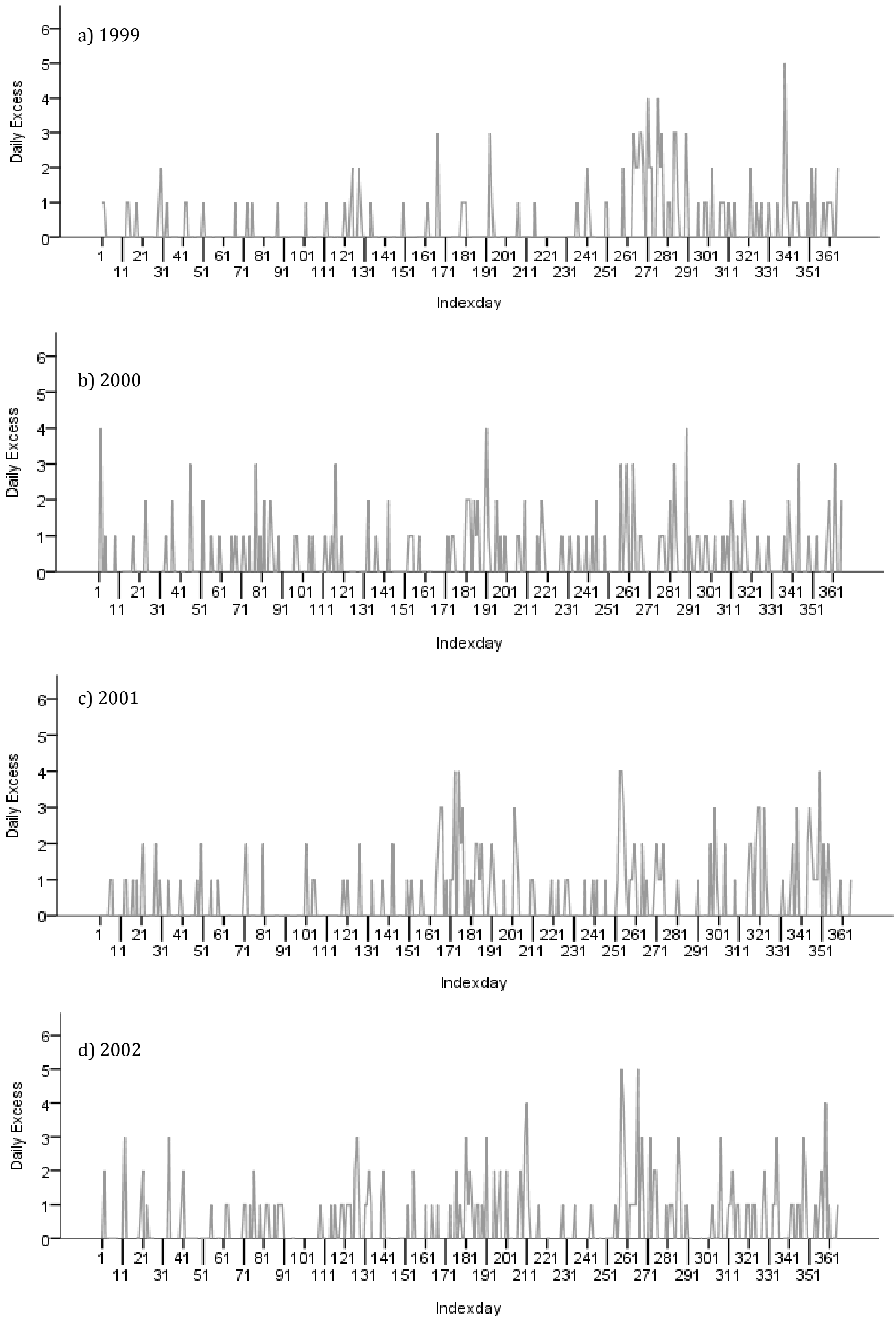


Figure C1. 68: Sheffield All Counts Non-asthmatics a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


a) 1999
b) 2000
c) 2001
d) 2002
Daily Excess
Indexday
0
1
2
3
4
5
6
1
11
21
31
41
51
61
71
81
91
101
111
121
131
141
151
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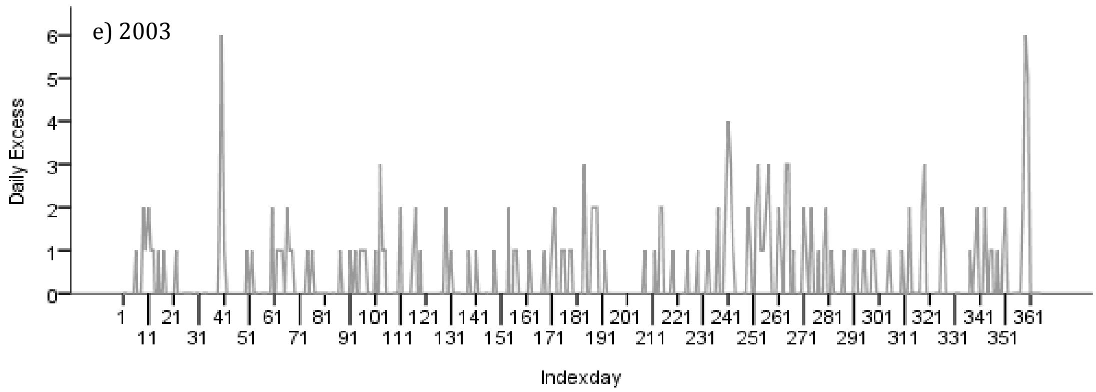


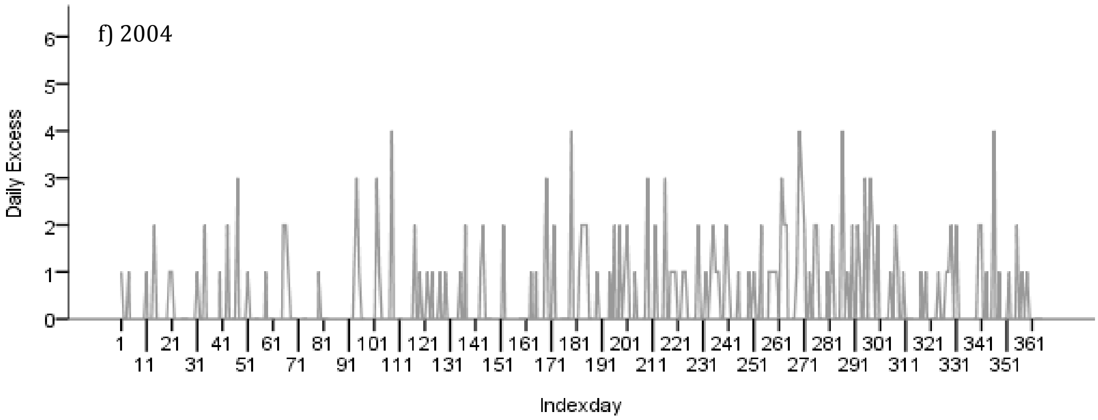
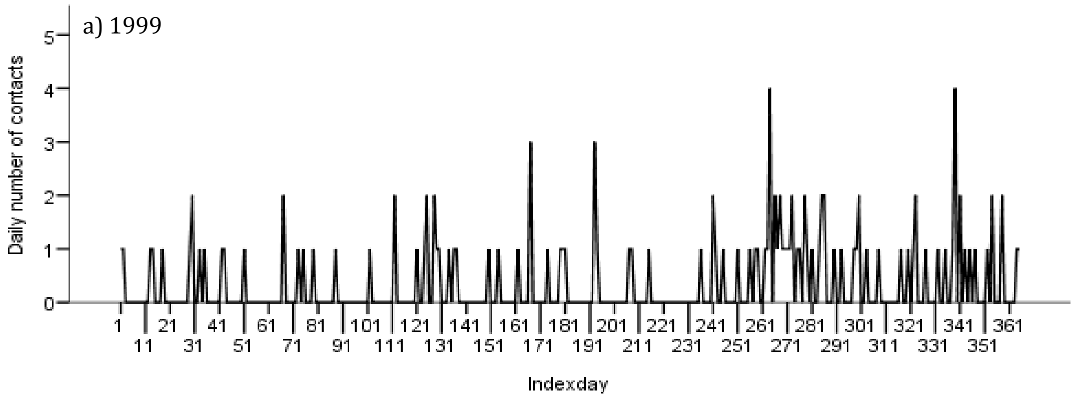
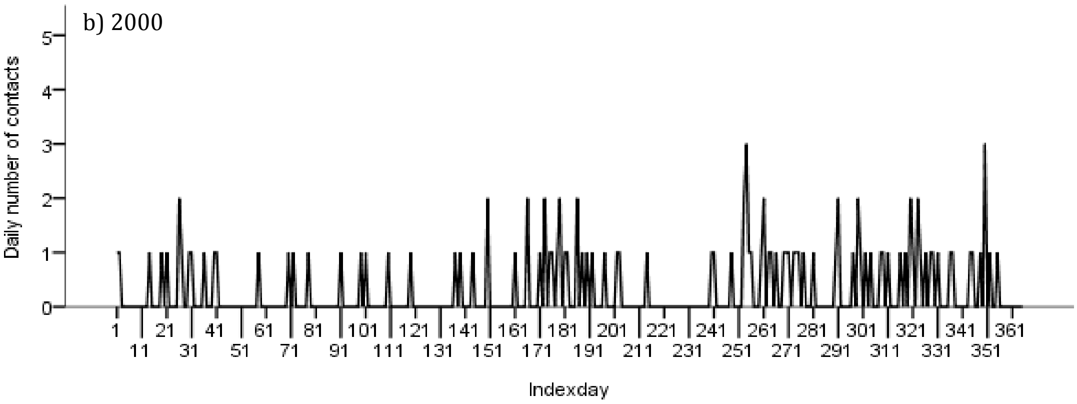


Figure C1. 69: Sheffield All Counts Excess a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.





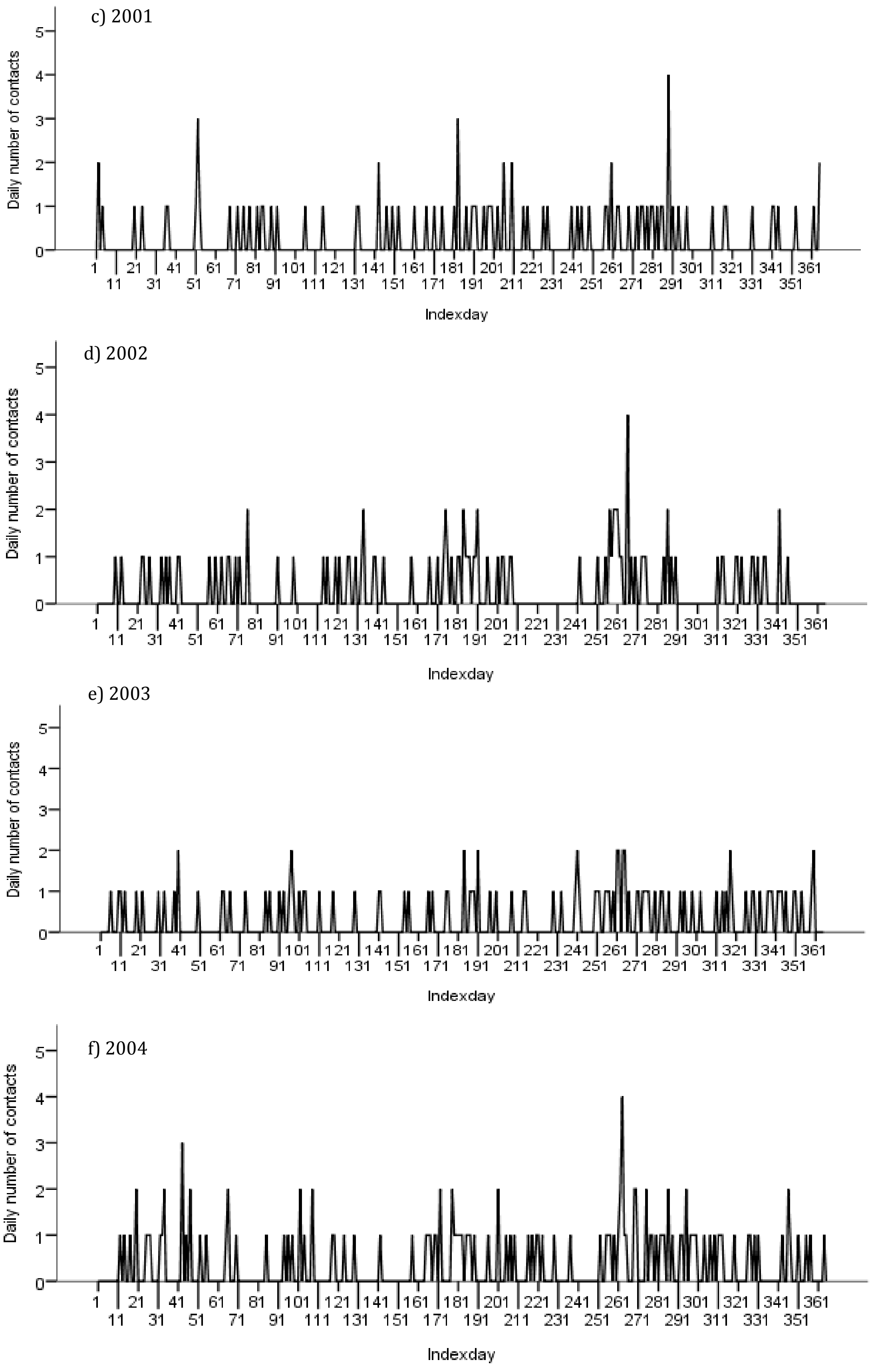
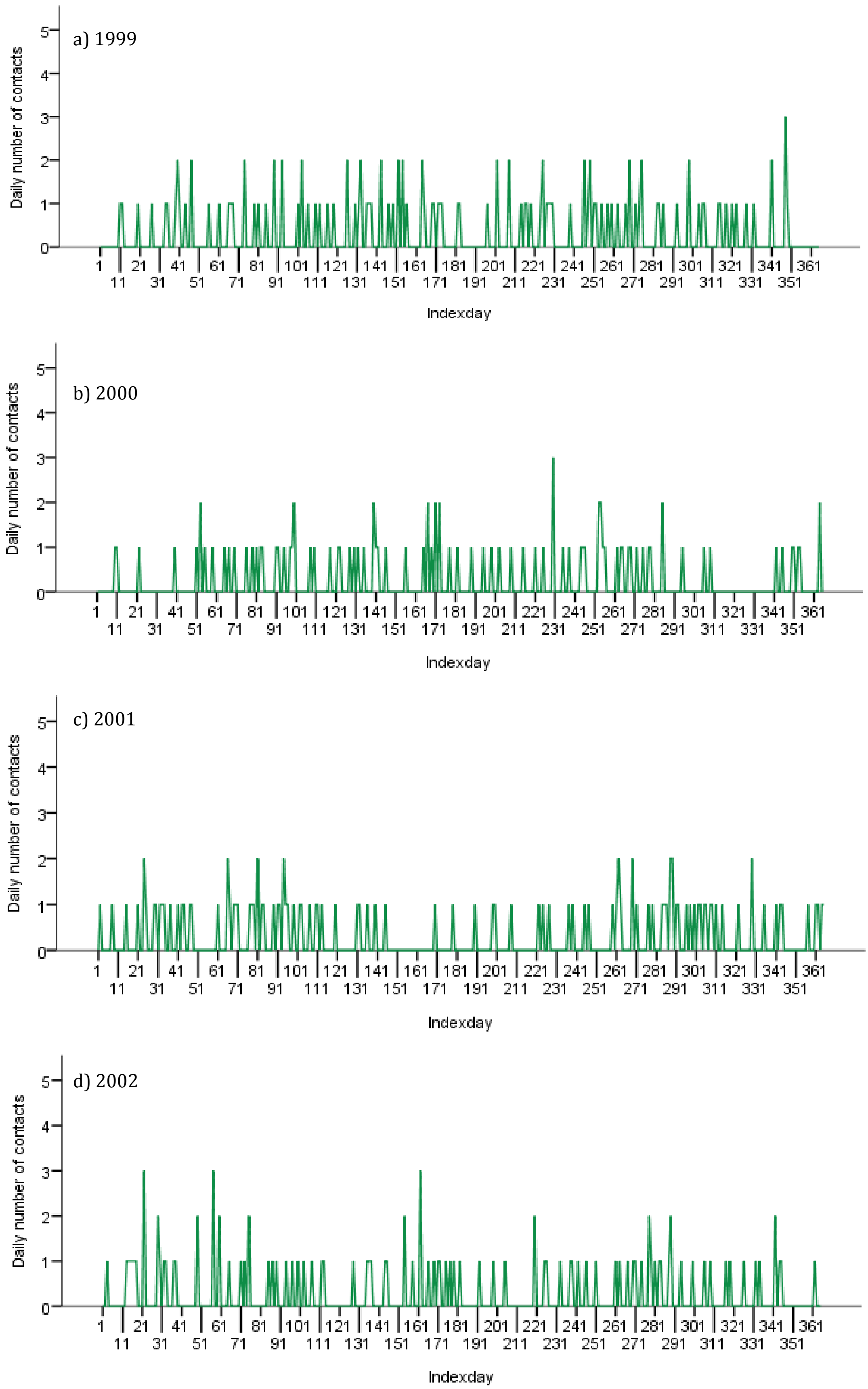
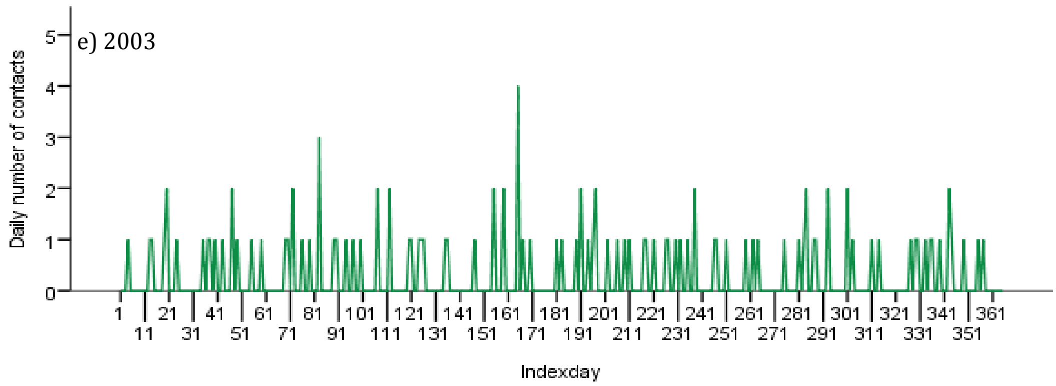


Figure C1. 70: Sheffield Admissions Asthmatics a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


a) 1999
Daily number of contacts
Indexday
b) 2000
Daily number of contacts
Indexday
c) 2001
Daily number of contacts
Indexday
d) 2002
Daily number of contacts
Indexday



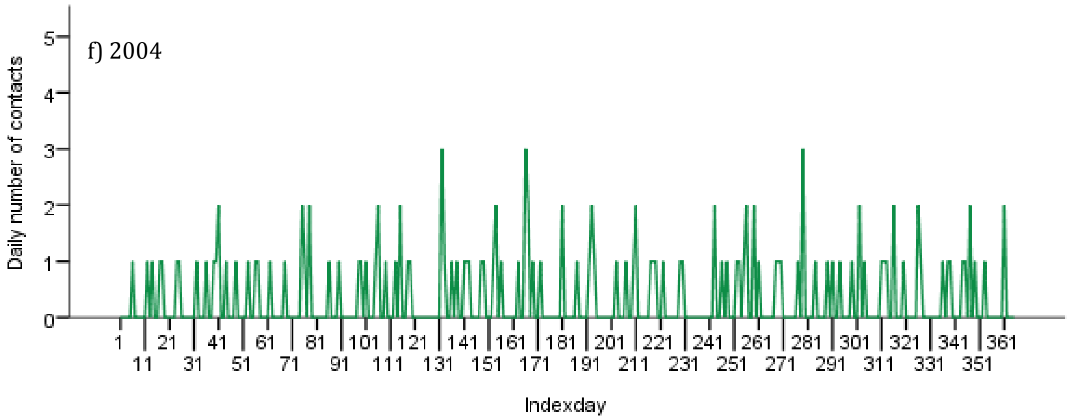
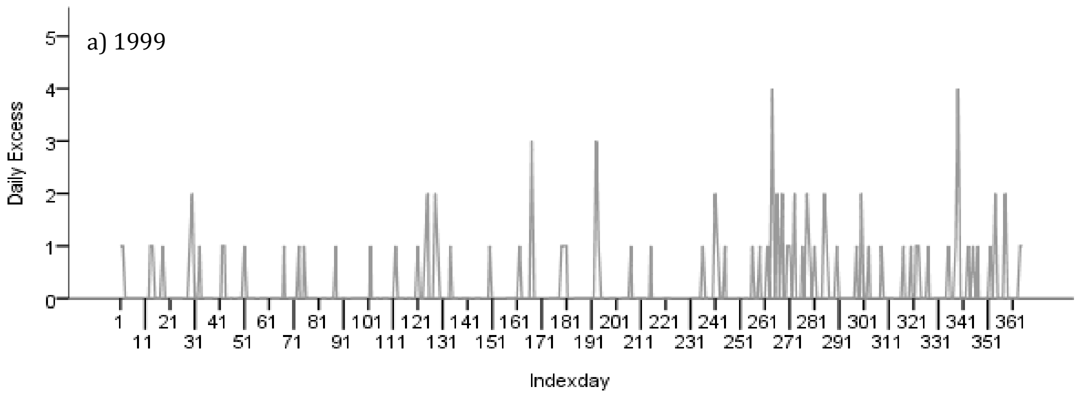
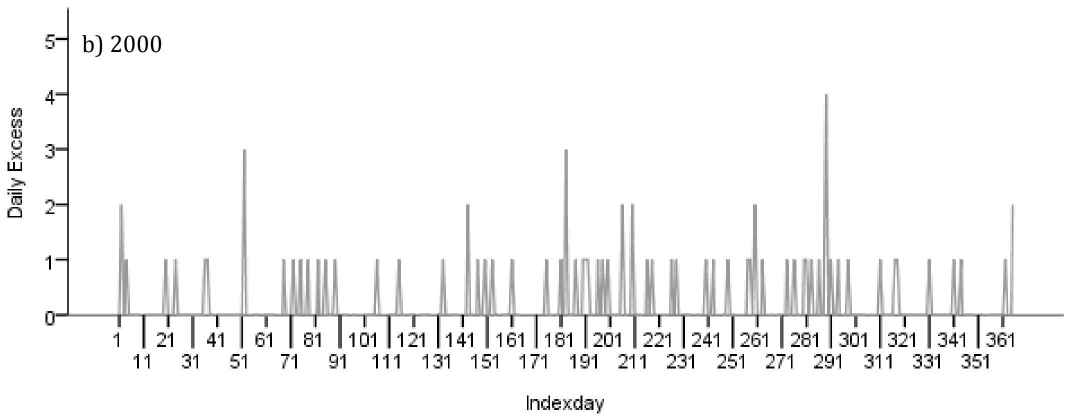


Figure C1. 71: Sheffield Admissions Non-asthmatics a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.





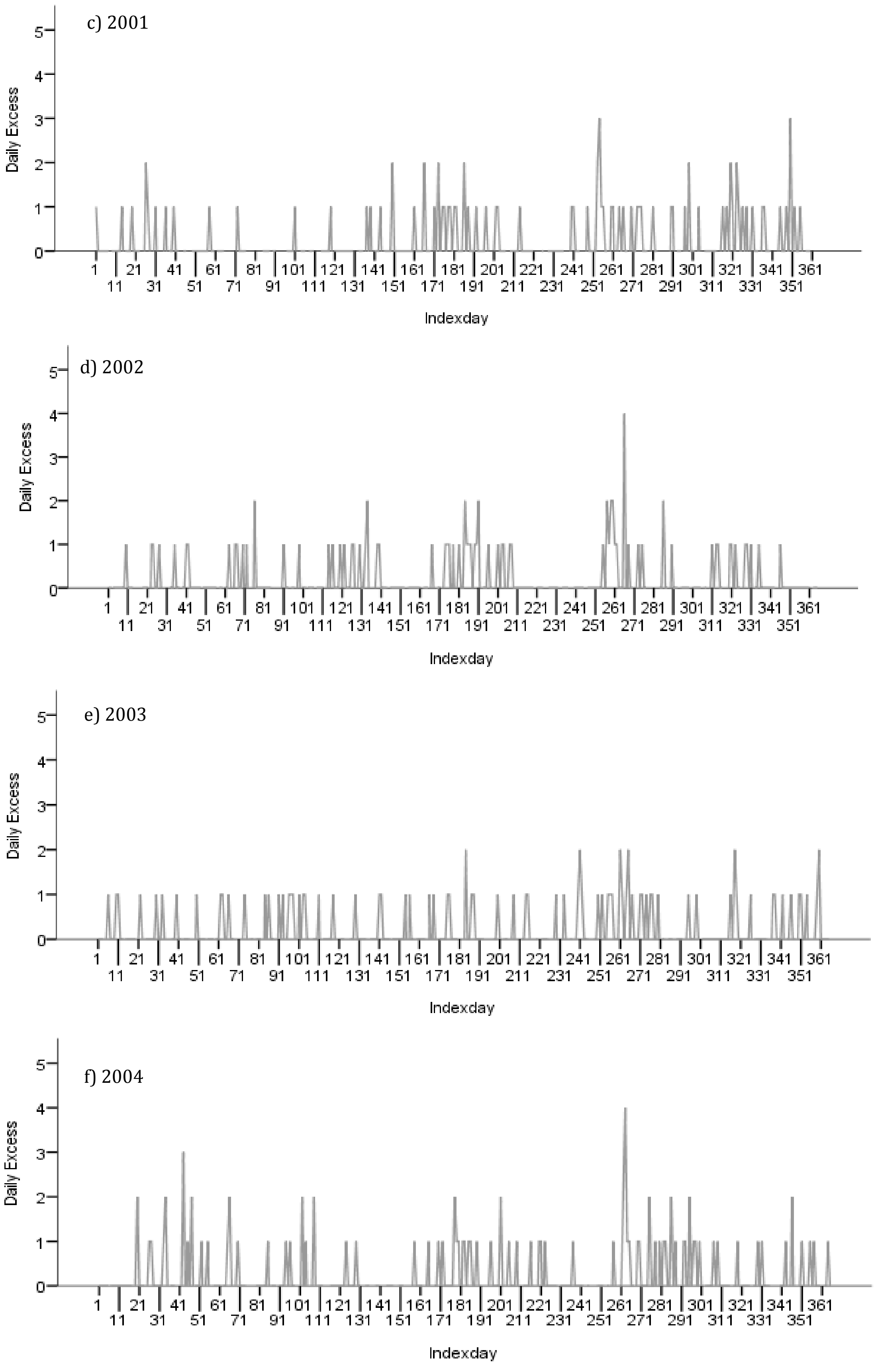
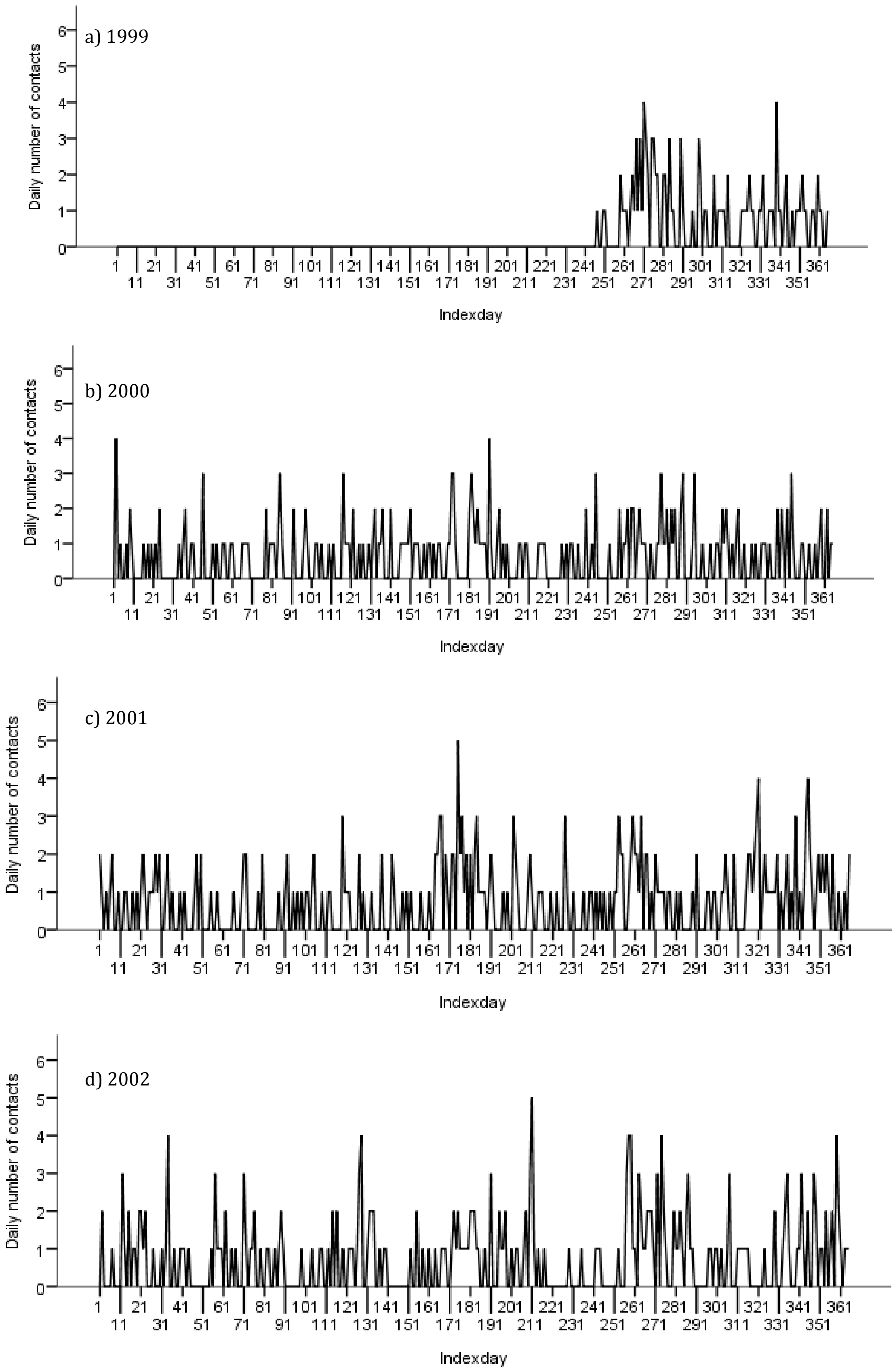
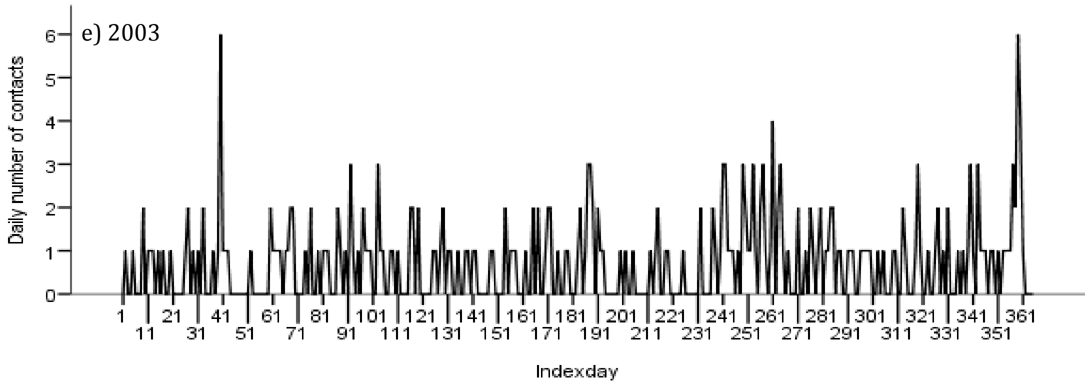


Figure C1. 72: Sheffield Admissions Excess a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


a) 1999
b) 2000
c) 2001
d) 2002
Daily number of contacts
Indexday



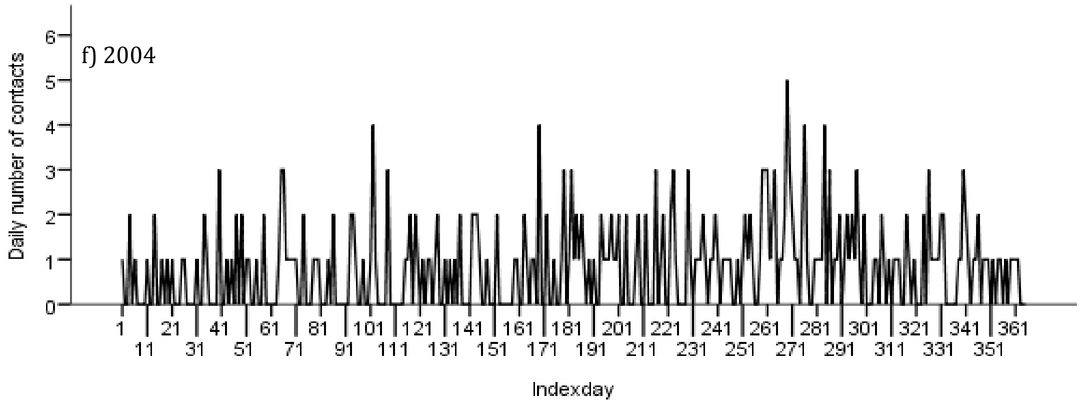
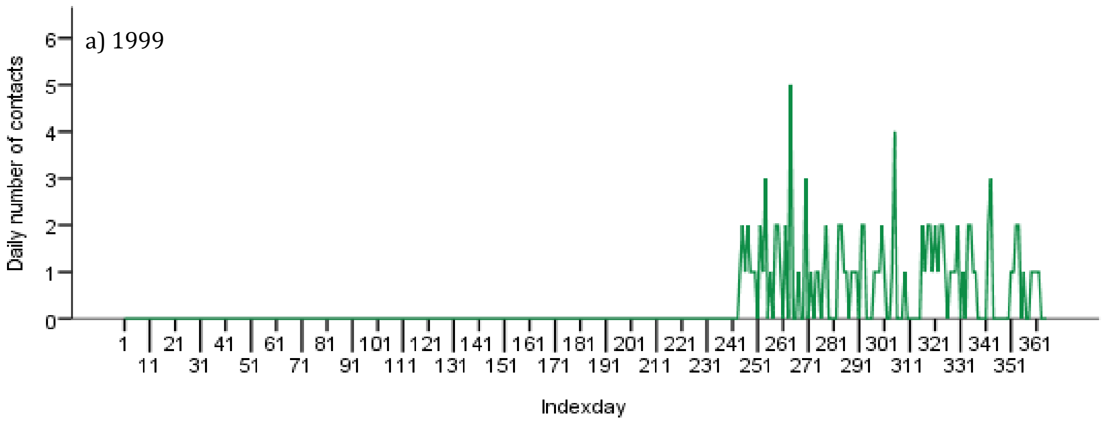
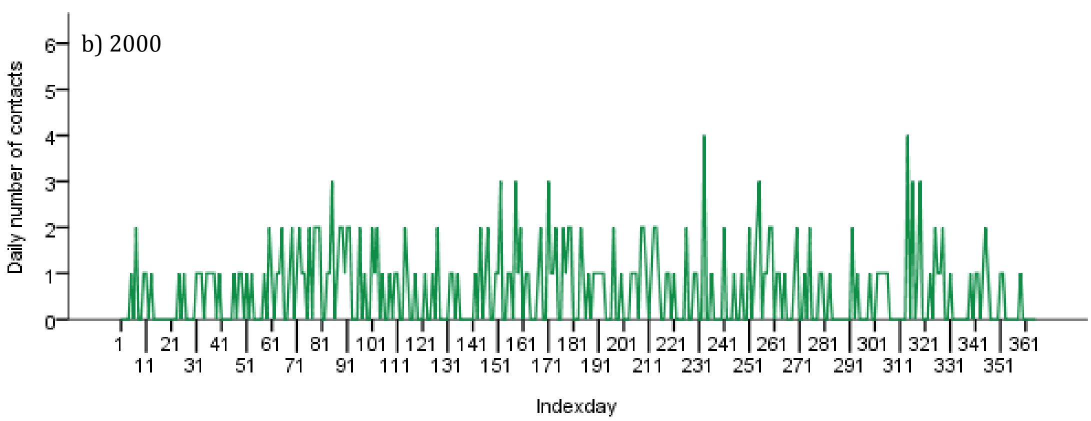


Figure C1. 73: Sheffield A&E Counts Asthmatics a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.





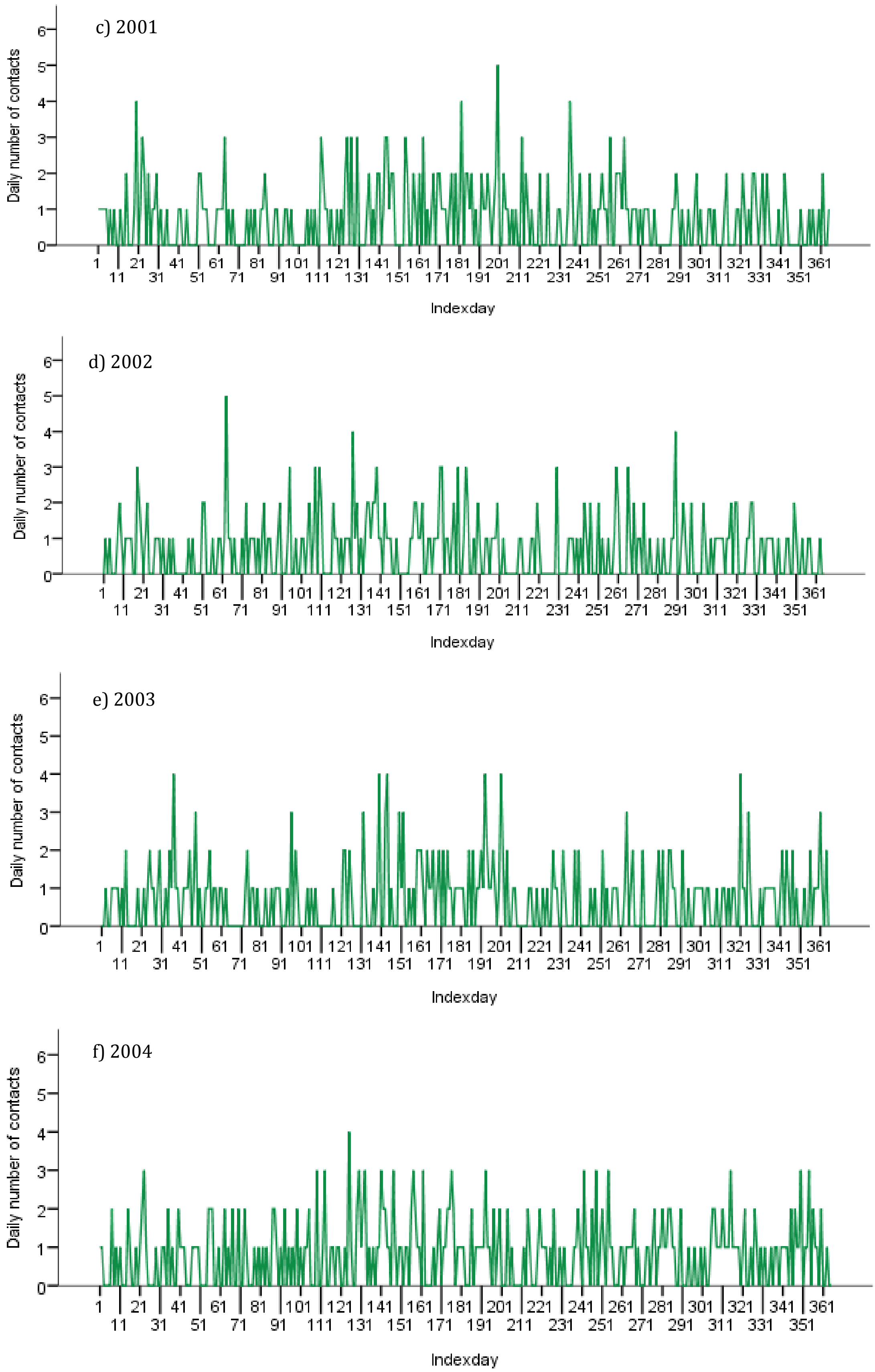
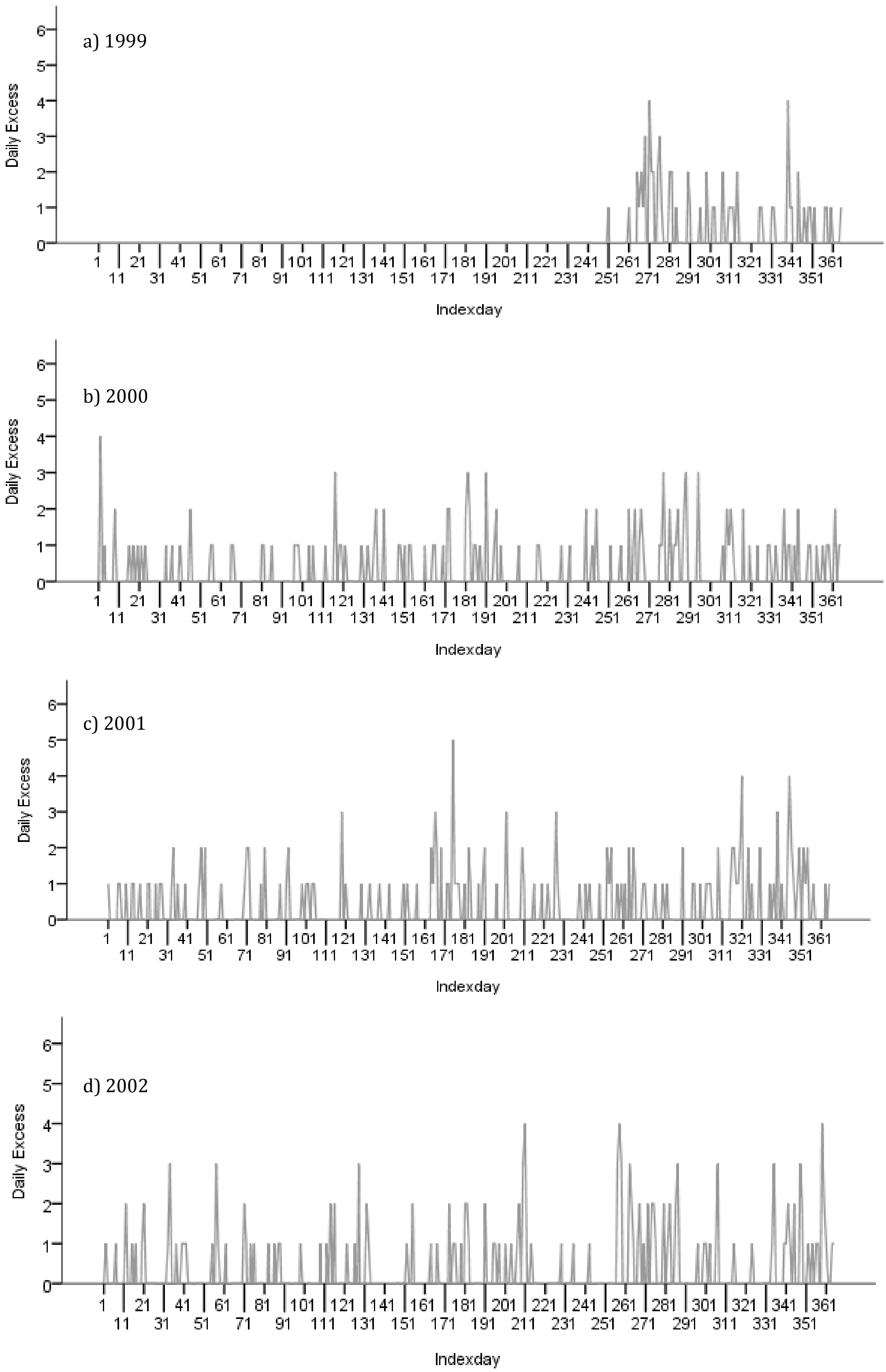


Figure C1. 74: Sheffield A&E Counts Non-asthmatics a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


a) 1999
b) 2000
c) 2001
d) 2002
Daily Excess
Indexday

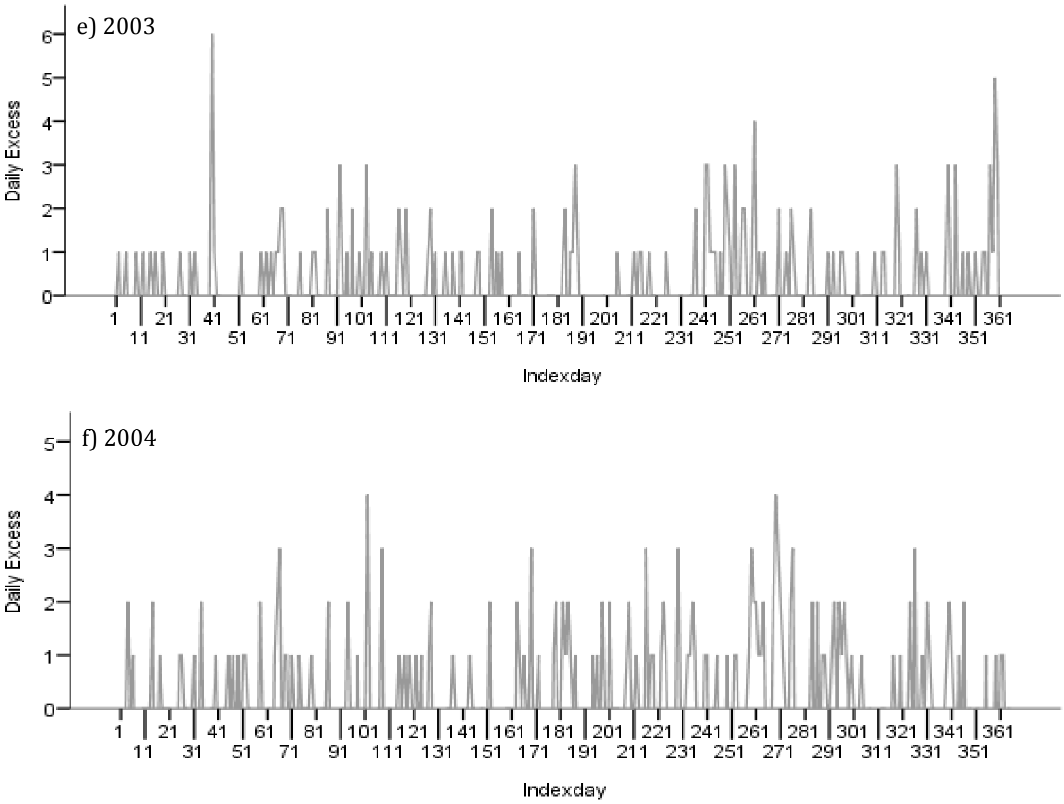


Figure C1. 75: Sheffield A&E Counts Excess a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.

C1.3.3. Sheffield Summary Statistics, histograms and monthly means for Admissions and A&E Contacts.

Table C.7: Sheffield All Medical Contacts - descriptive statistics (n=2190).

Asthmatics, Non-asthmatics or Excess	Statistics	All Counts	Admissions	A&E contacts
Asthmatics	**Mean**	0.81	0.30	0.65
	Median	1.00	0.00	0.00
	SD	1.01	0.57	0.89
	Minimum	0	0	0
	Maximum	7	4	6
	Sum	1770	656	1413
Non-asthmatics	**Mean**	0.81	0.30	0.65
	Median	1.00	0.00	0.00
	SD	0.95	0.56	0.86
	Minimum	0	0	0
	Maximum	6	4	5
	Sum	1770	657	1414
Excess	**Mean**	0.00	0.00	0.00
	Median	1.34	0.00	0.00
	SD	-5	0.80	1.21
	Minimum	7	-4	-5
	Maximum	0.00	4	6

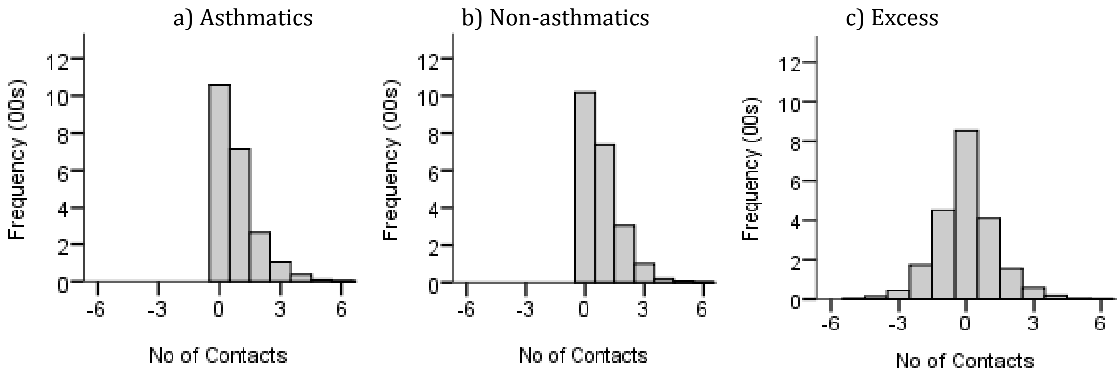


Figure C1. 76: Sheffield All Counts – distribution of the daily number of contacts a) Asthmatics, b) Non-asthmatics, and c) Excess (difference between asthmatics and non-asthmatics).

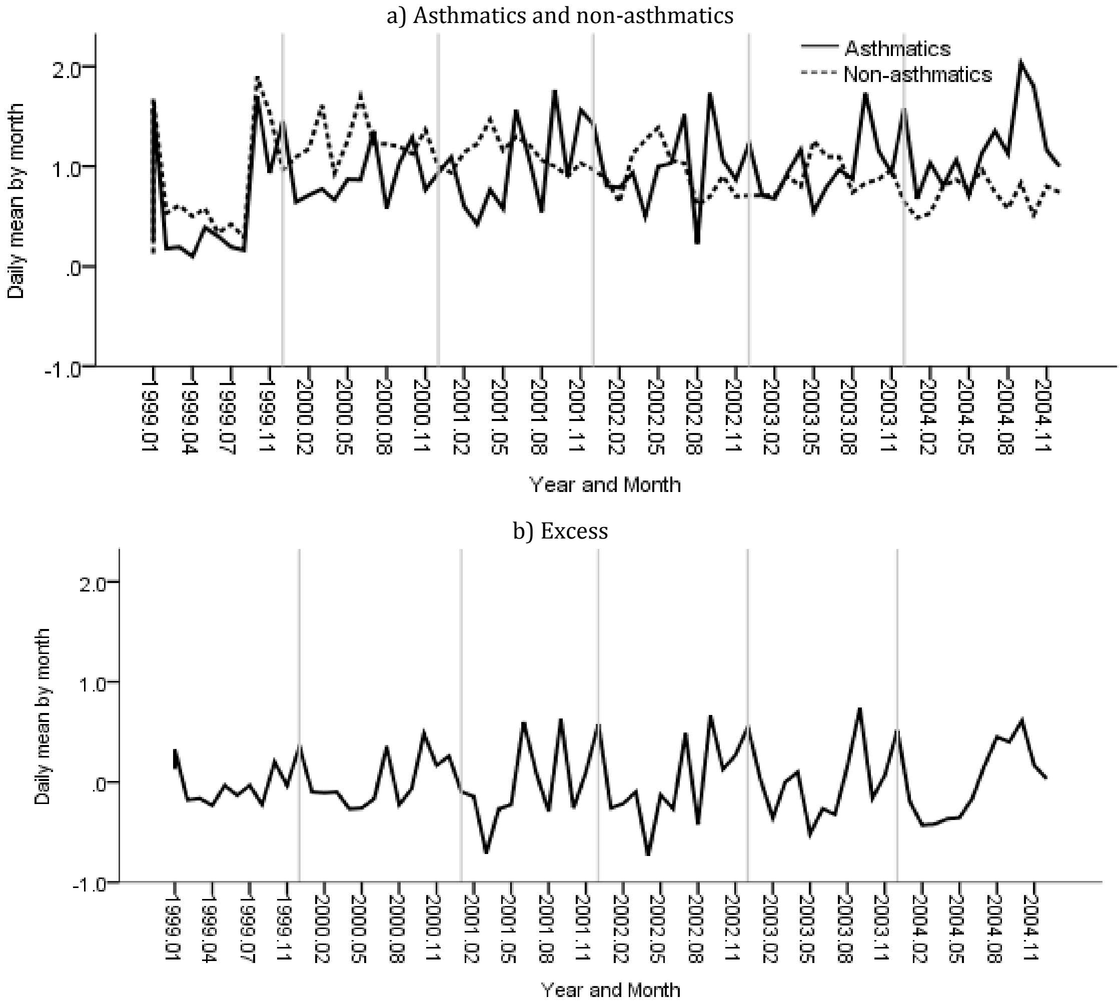


Figure C1. 77: Sheffield All Counts - plot of the daily mean number of contacts aggregated by month 1999-2004 a) Asthmatics and non-asthmatics and b) Excess.

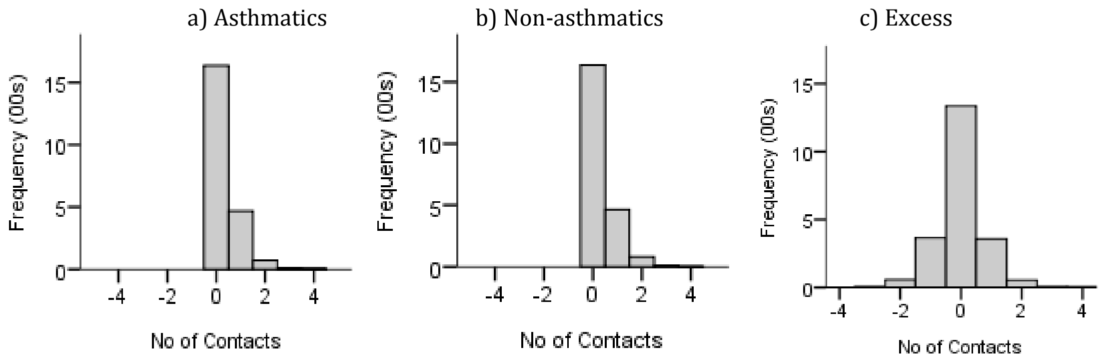


Figure C1. 78: F. Sheffield Admissions – distribution of the daily number of contact a) Asthmatics, b) Non-asthmatics and c) Excess.

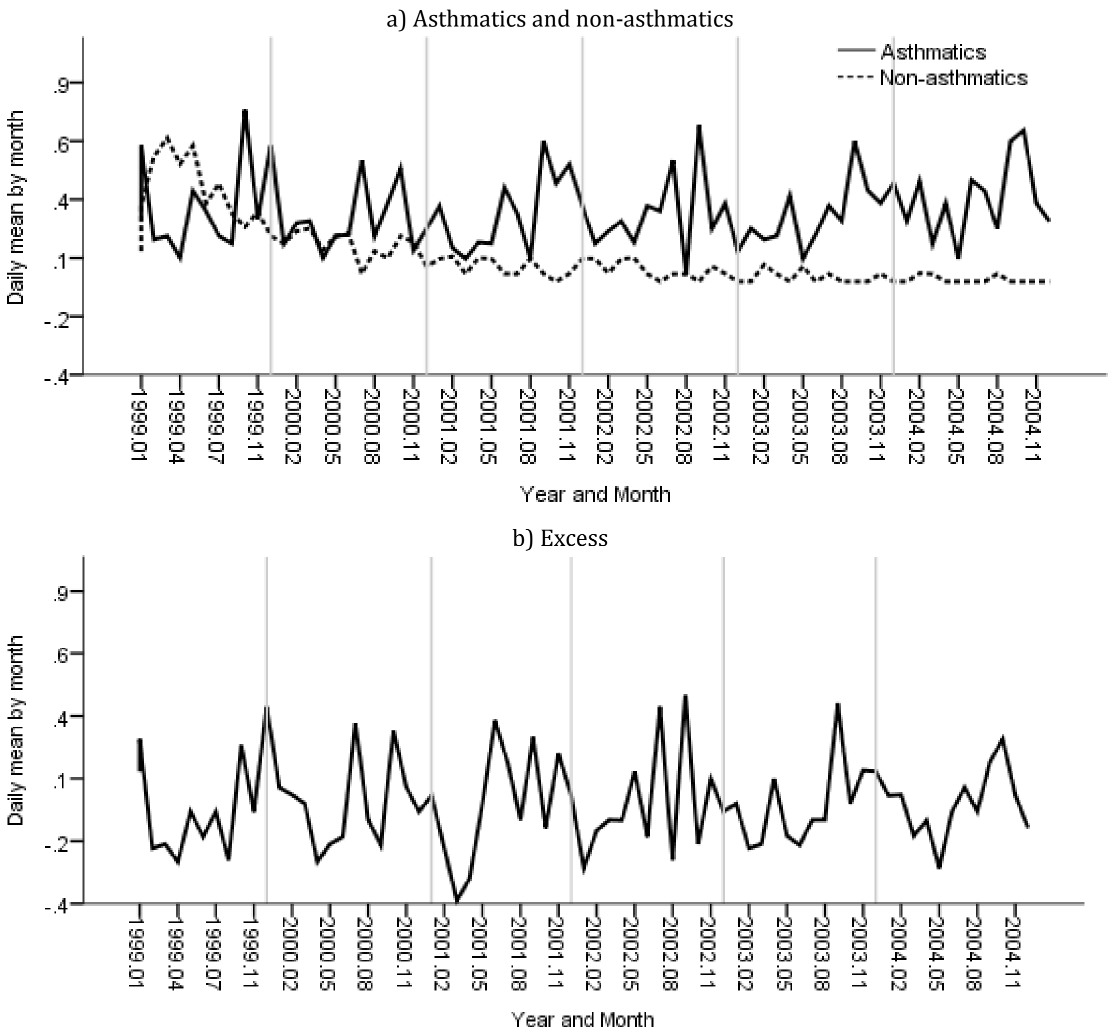


Figure C1. 79: Sheffield Admissions - plot of the daily mean number of contacts aggregated by month 1999-2004 a) Asthmatics and non-asthmatics and b) Excess.

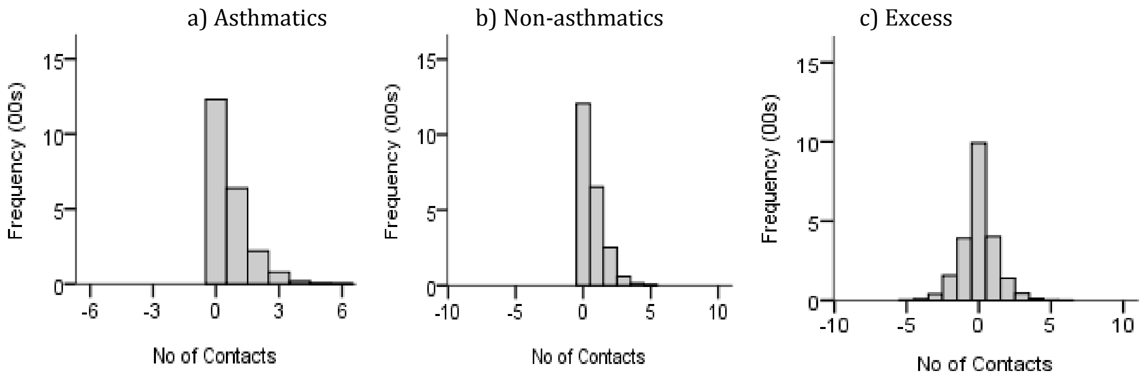


Figure C1. 80: Sheffield A&E contacts – distribution of the daily number of contact a) Asthmatics, b) Non-asthmatics and c) Excess.

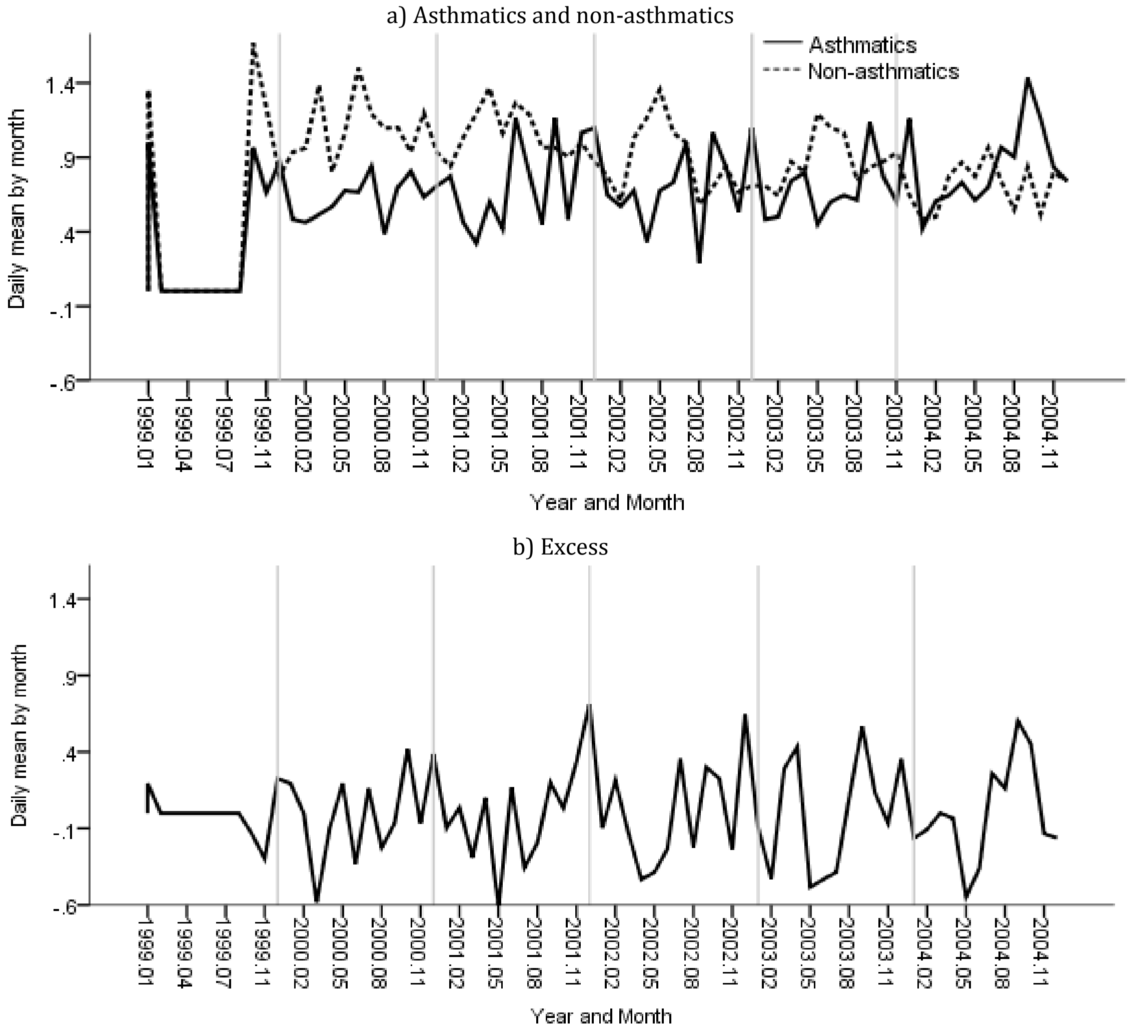


Figure C1.81: Sheffield A&E contacts - plot of the daily mean number of contacts aggregated by month 1999-2004 a) Asthmatics and non-asthmatics and b) Excess.

C1.3.4. Sheffield Spatial Data Descriptives

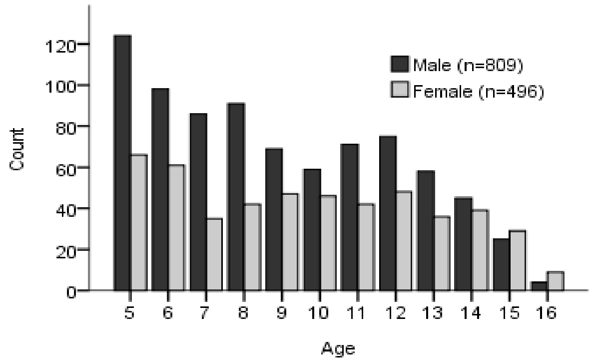


Figure C1. 82: Age and gender distribution of patients attending hospital with asthma from 2002 to 2005.

Table C.8: descriptive statistics of mean counts per MSOA (n=71 MSOAs)

Statistic	Asthmatics	Non-asthmatics	Excess
Mean	4.60	4.59	0.01
Median	4.00	4.00	-0.25
SD	3.05	1.87	2.58
Minimum	0.25	1.25	-5.25
Maximum	18.75	9.50	10.25

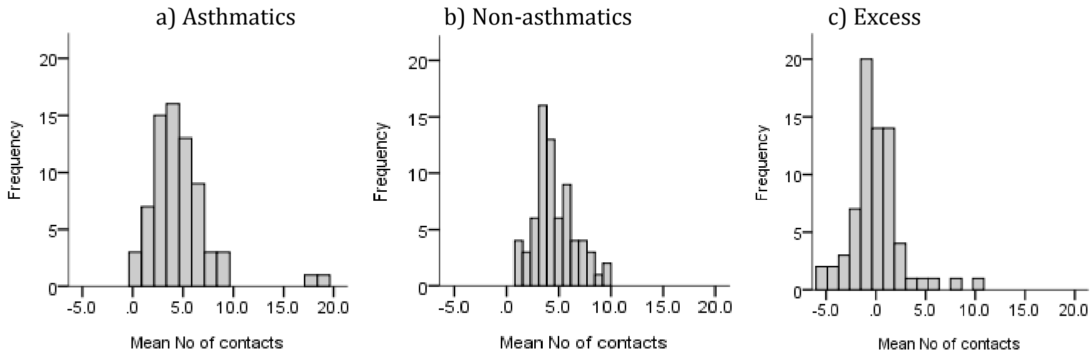


Figure C1. 83: Frequency distribution of the mean number of a) Asthmatics, b) Non-asthmatics, and c) Excess (difference between asthmatics and non-asthmatics).

C1.4. Scotland: Summary Statistics, Histograms and Plots over time (All Datasets).

C1.4.1. Demographic Information

Scotland's sample consists of 8725 asthmatics: 99.2% (8652) matched with Non-asthmatics, 0.8% (n=73) unmatched. 57% (n=4977) were males (females n=3748).

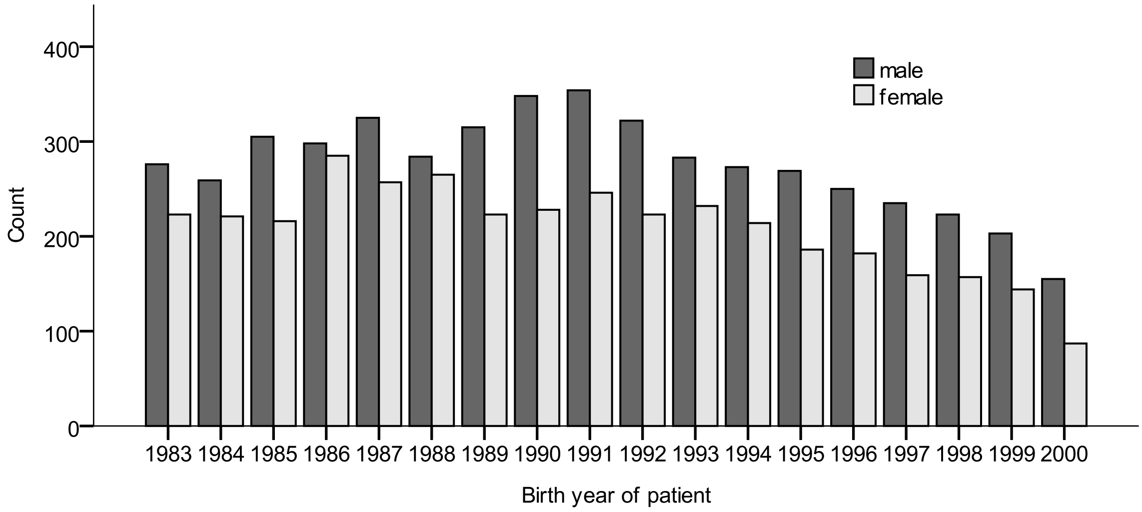
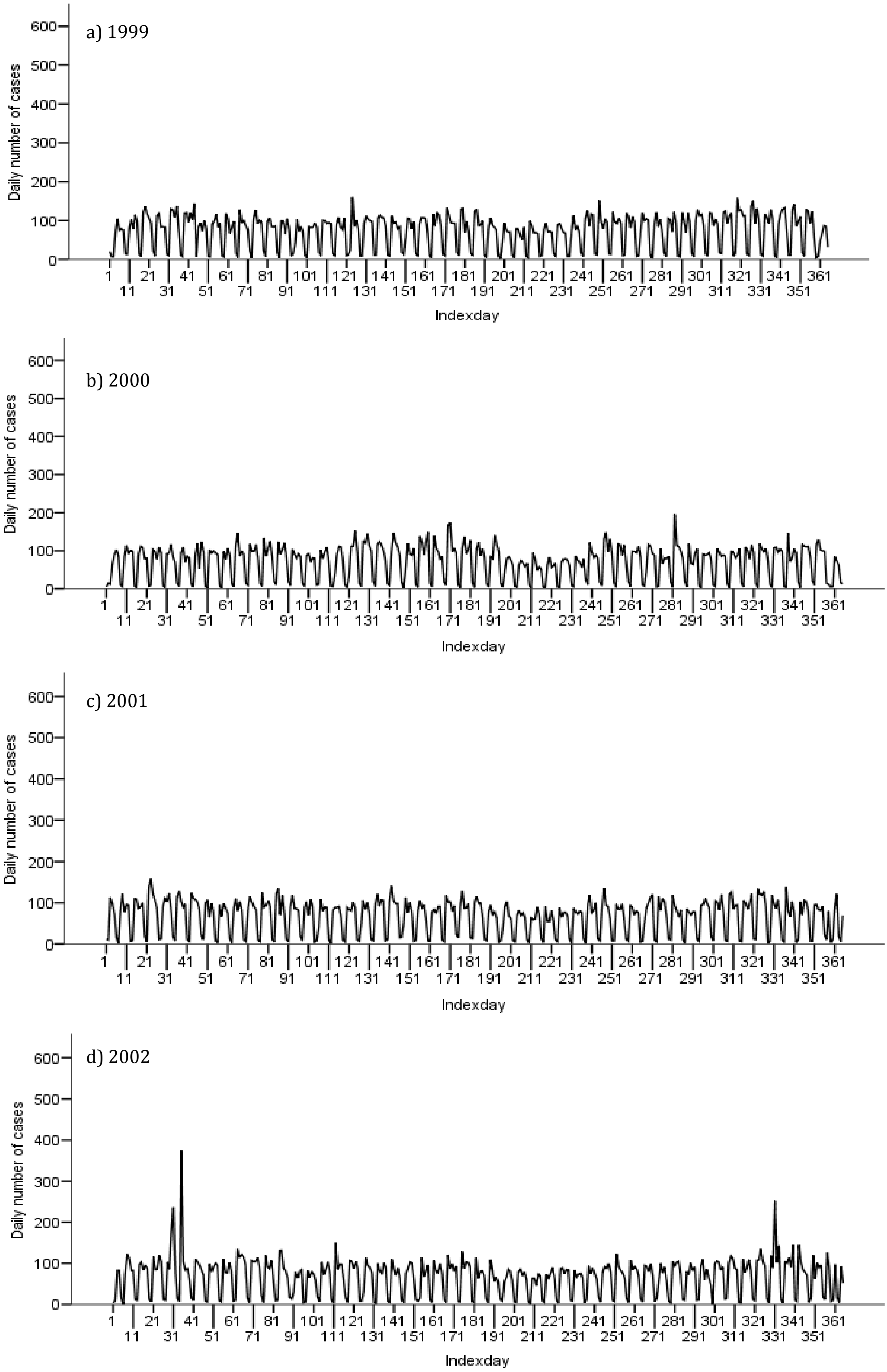
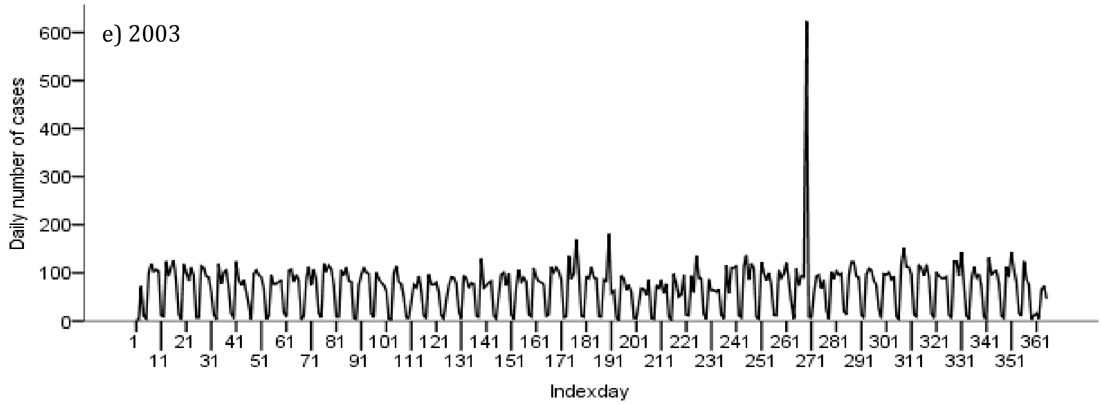


Figure C1. 84: Scotland birth year distribution by gender.

C1.4.2. Scotland Plots over time by year.


a) 1999
Daily number of cases
Indexday
b) 2000
Daily number of cases
Indexday
c) 2001
Daily number of cases
Indexday
d) 2002
Daily number of cases
Indexday



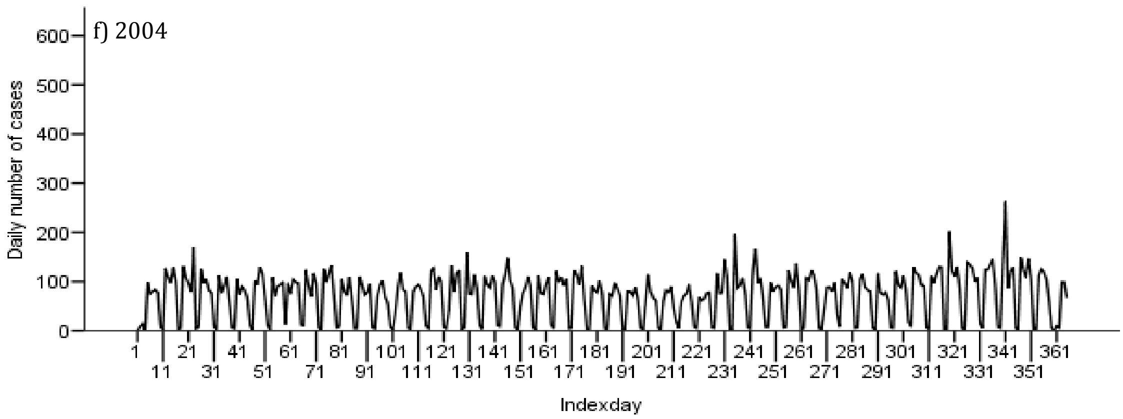
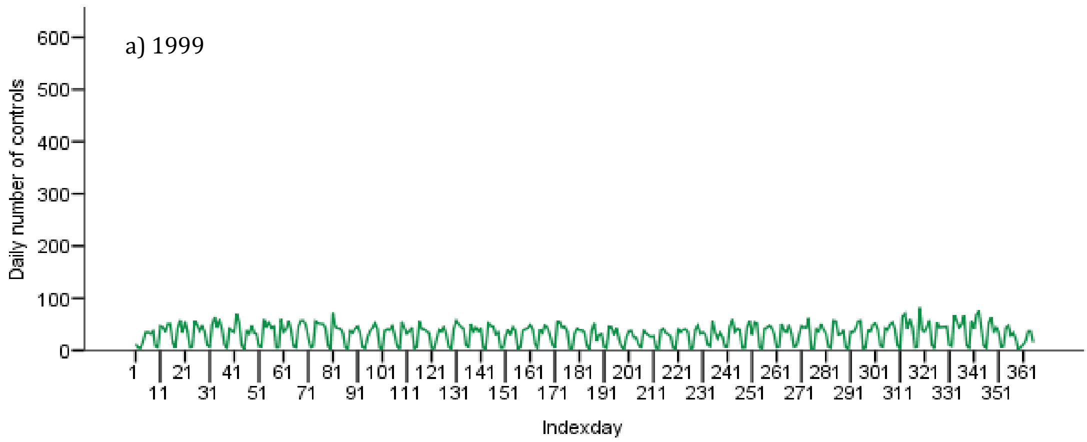
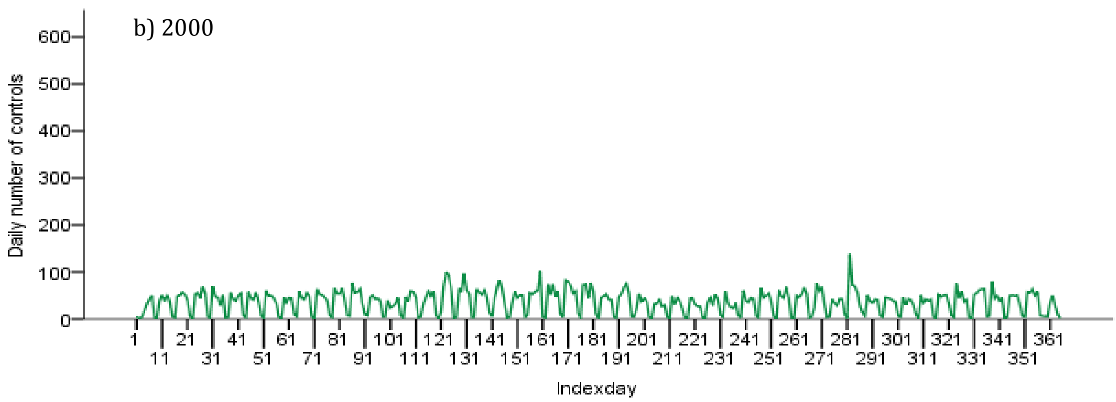
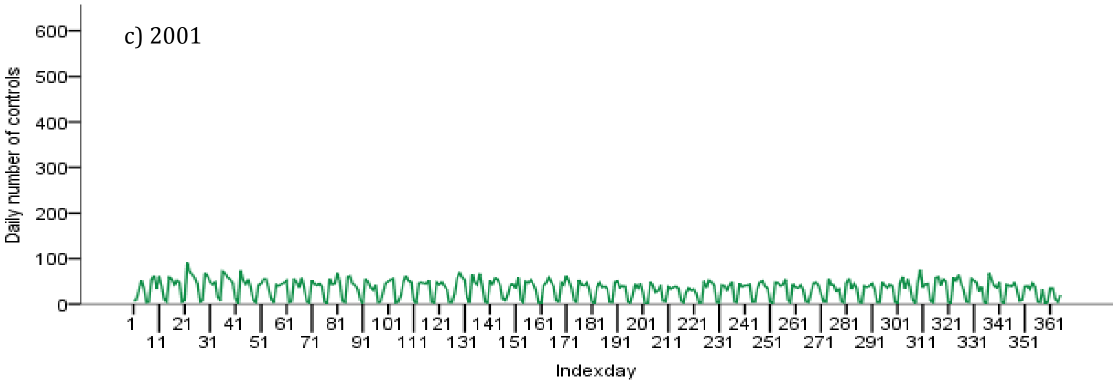
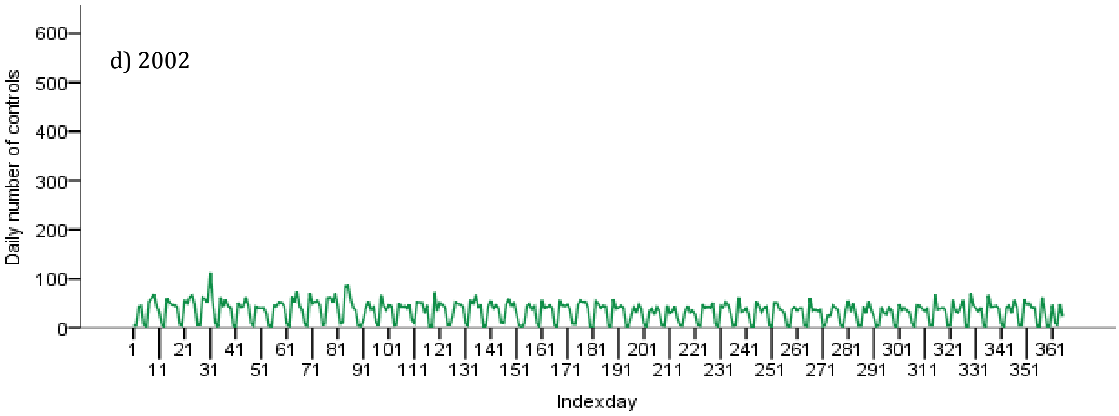


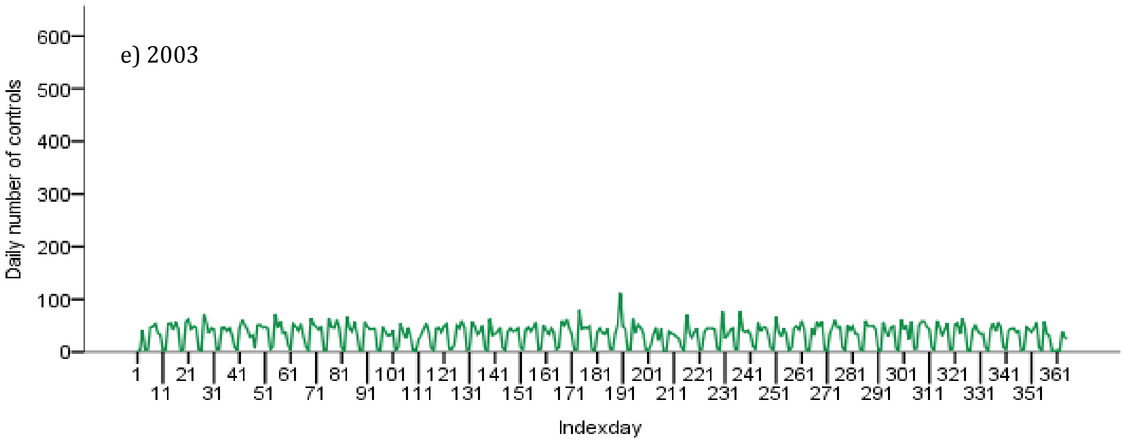
Figure C1. 85: Scotland All Counts Asthmatics a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.











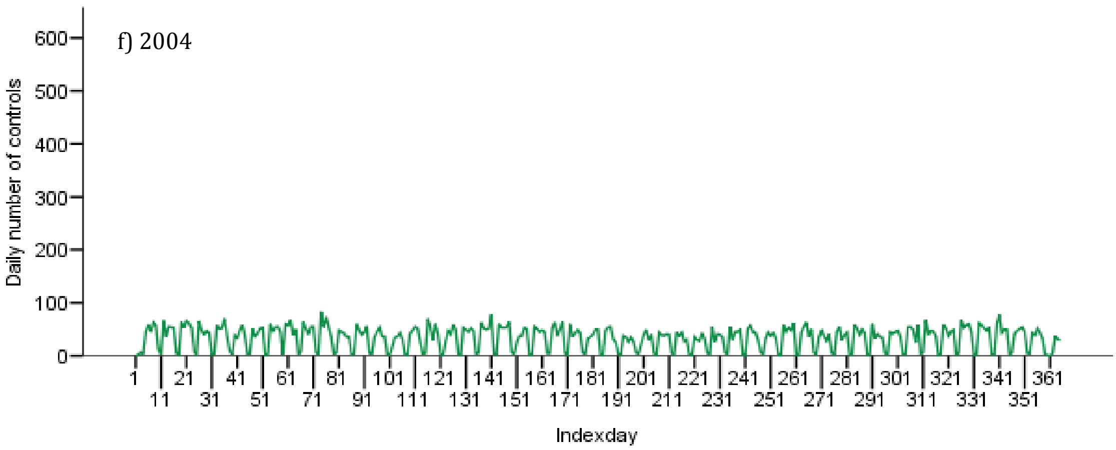
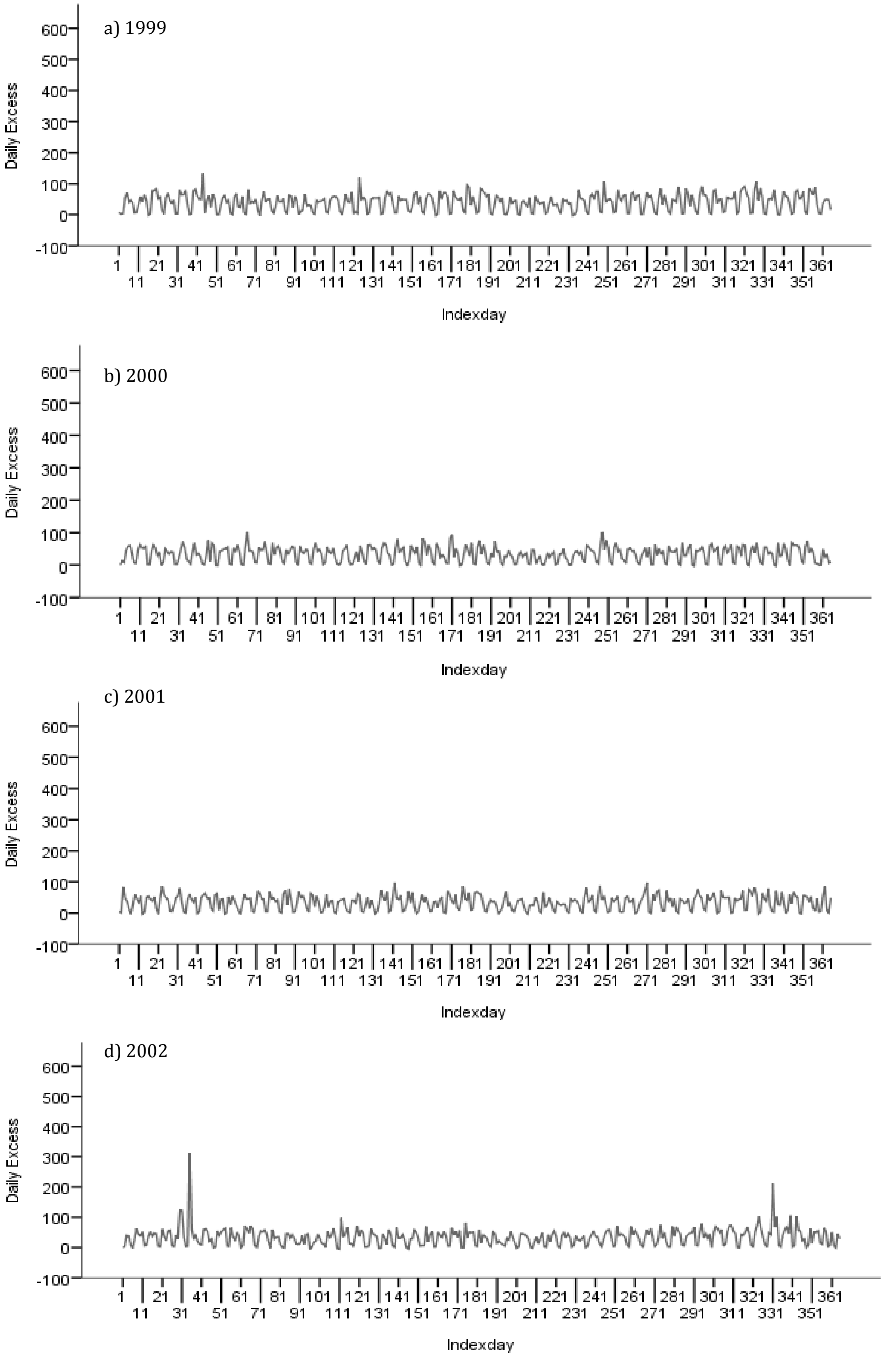


Figure C1. 86: Scotland All Counts Non-asthmatics a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


a) 1999
b) 2000
c) 2001
d) 2002
Daily Excess
Indexday
600
500
400
300
200
100
0
-100
1 21 41 61 81 101 121 141 161 181 201 221 241 261 281 301 321 341 361
11 31 51 71 91 111 131 151 171 191 211 231 251 271 291 311 331 351

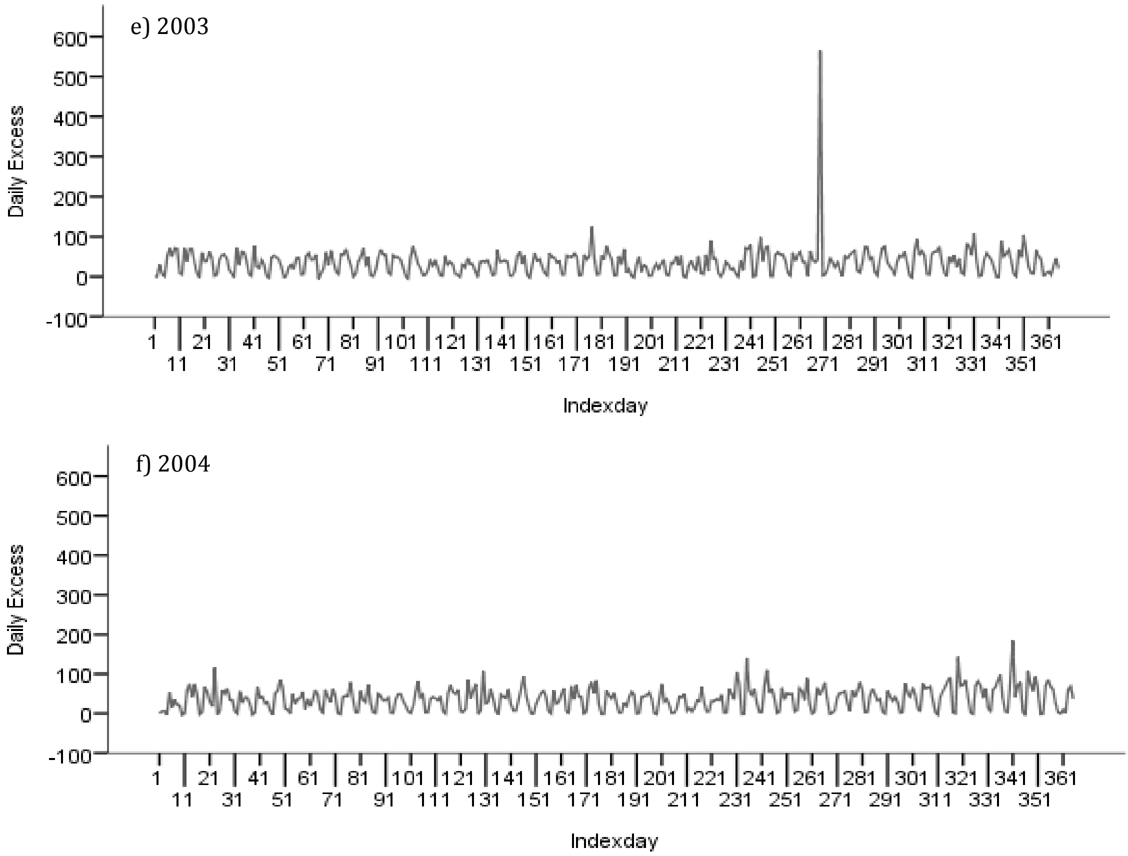
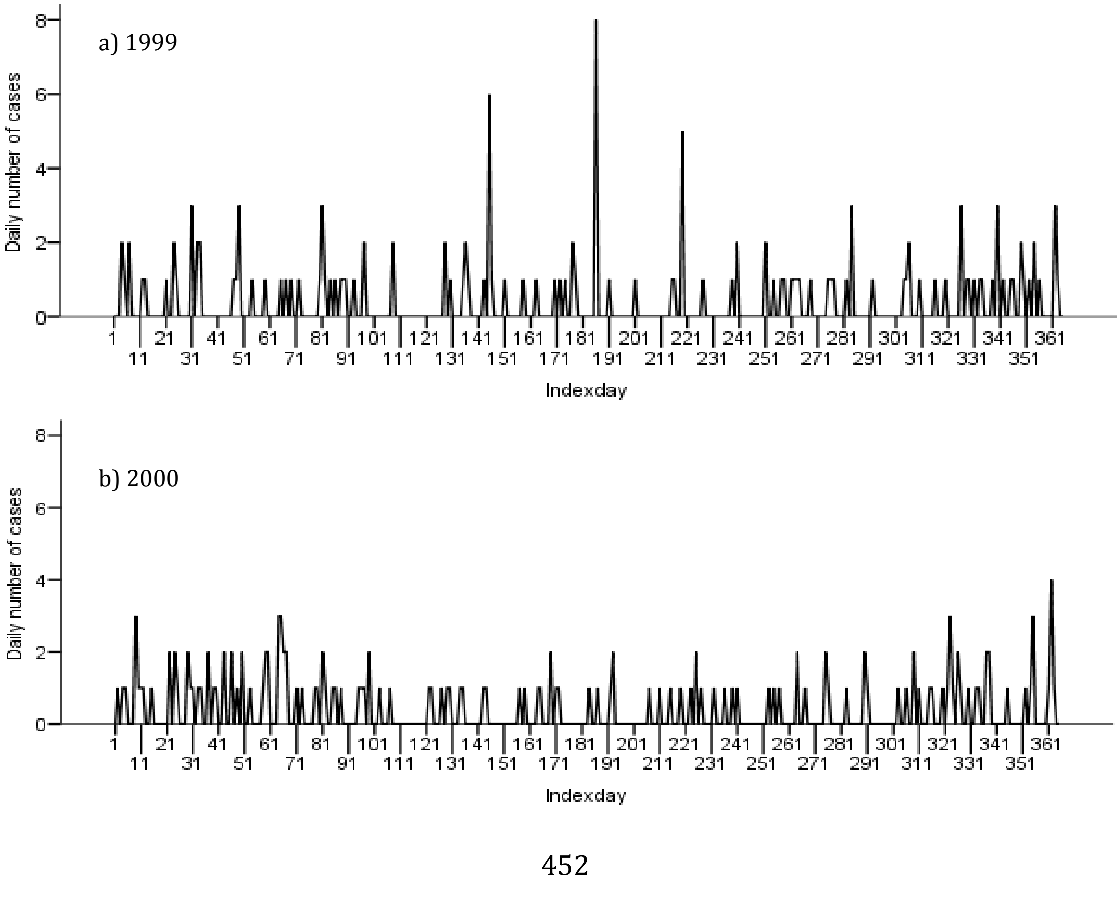


Figure C1. 87: Scotland All Counts Excess a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.



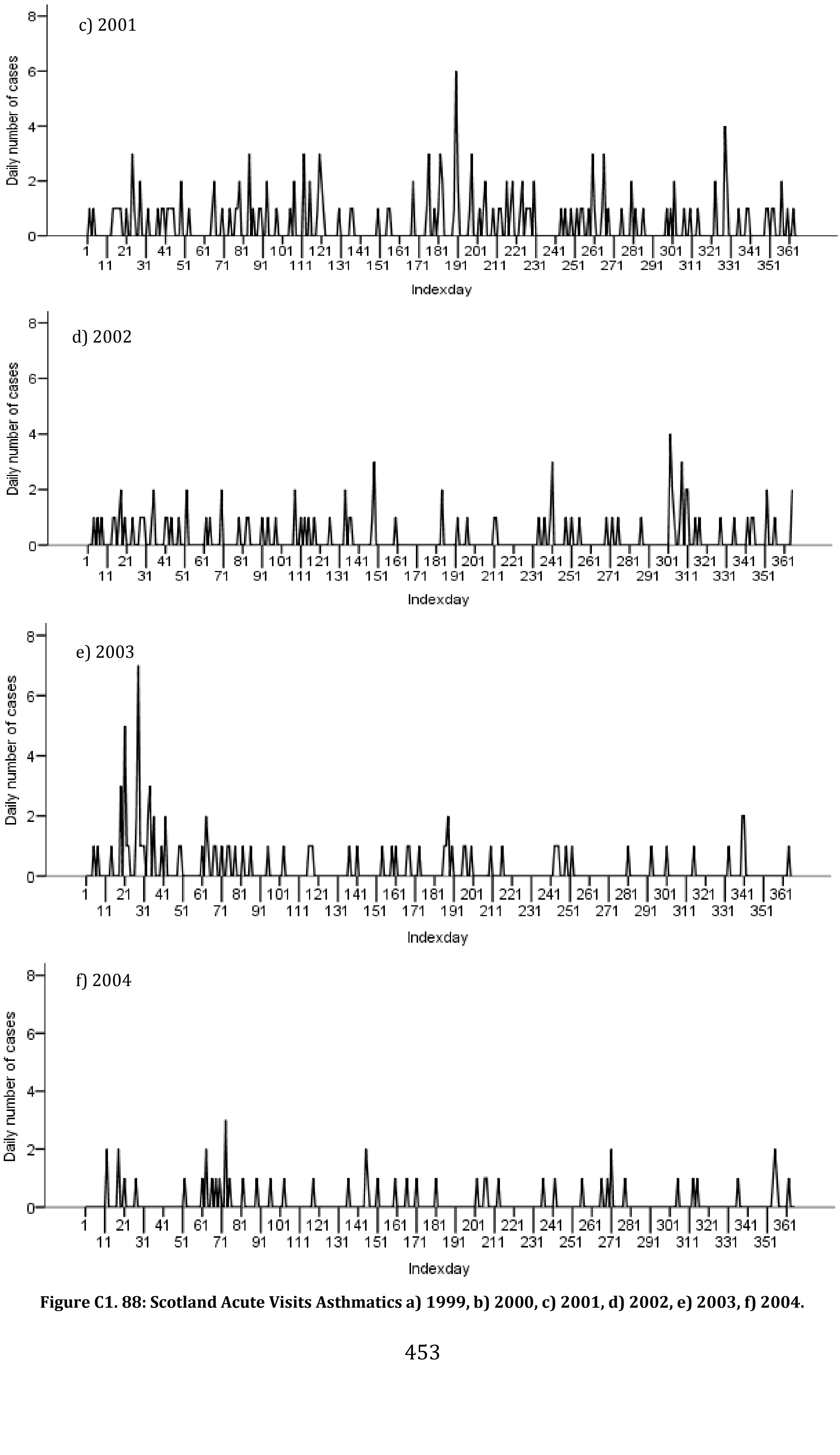
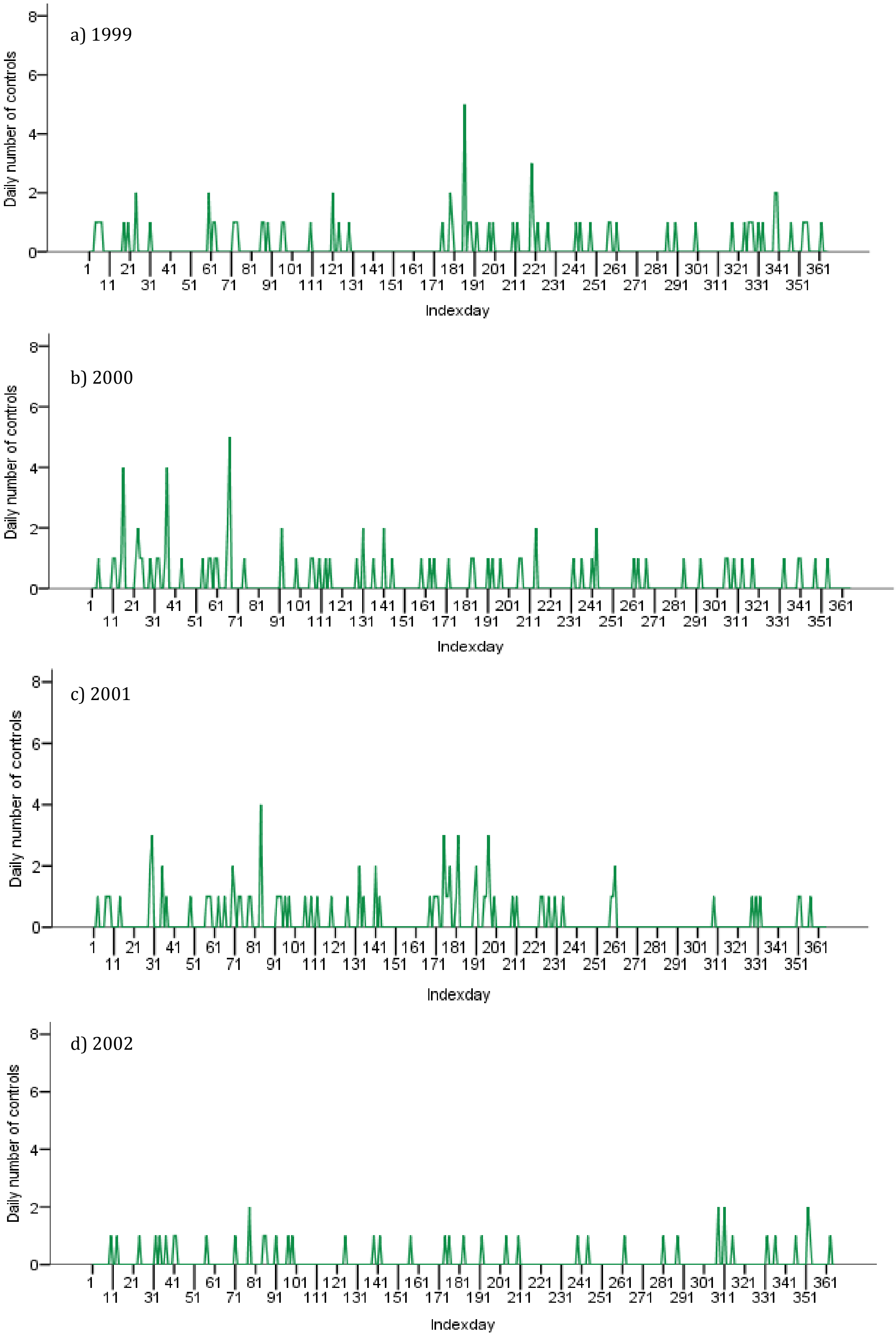


Figure C1. 88: Scotland Acute Visits Asthmatics a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


a) 1999
b) 2000
c) 2001
d) 2002
Daily number of controls
0
2
4
6
8
1 11 21 31 41 51 61 71 81 91 101 111 121 131 141 151 161 171 181 191 201 211 221 231 241 251 261 271 281 291 301 311 321 331 341 351 361
Indexday

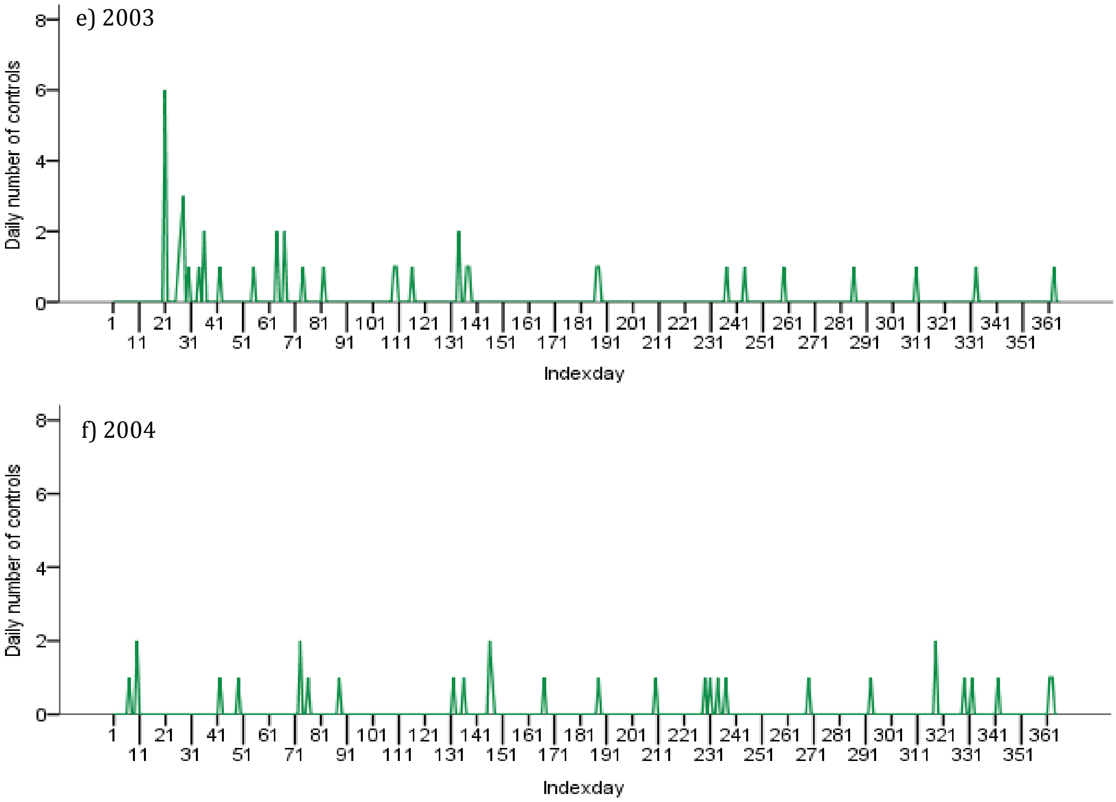
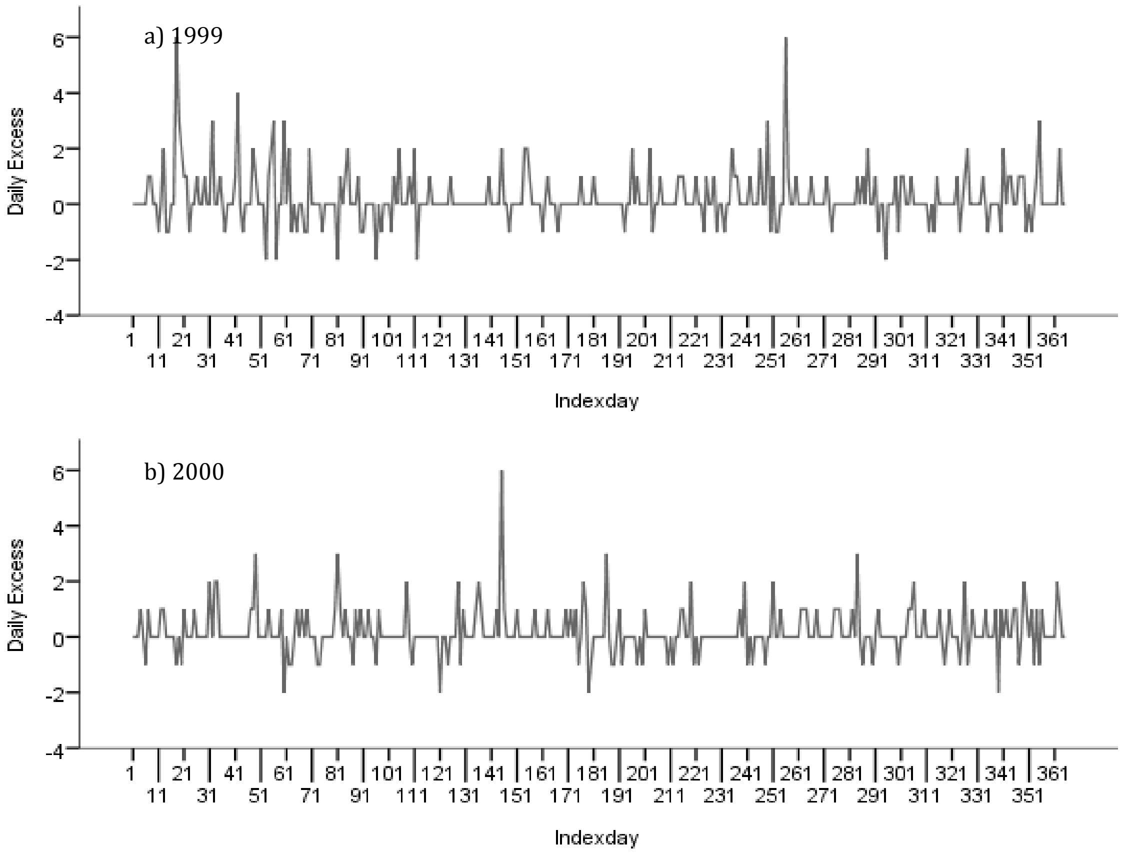


Figure C1. 89: Scotland Acute Visits Non-asthmatics a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.



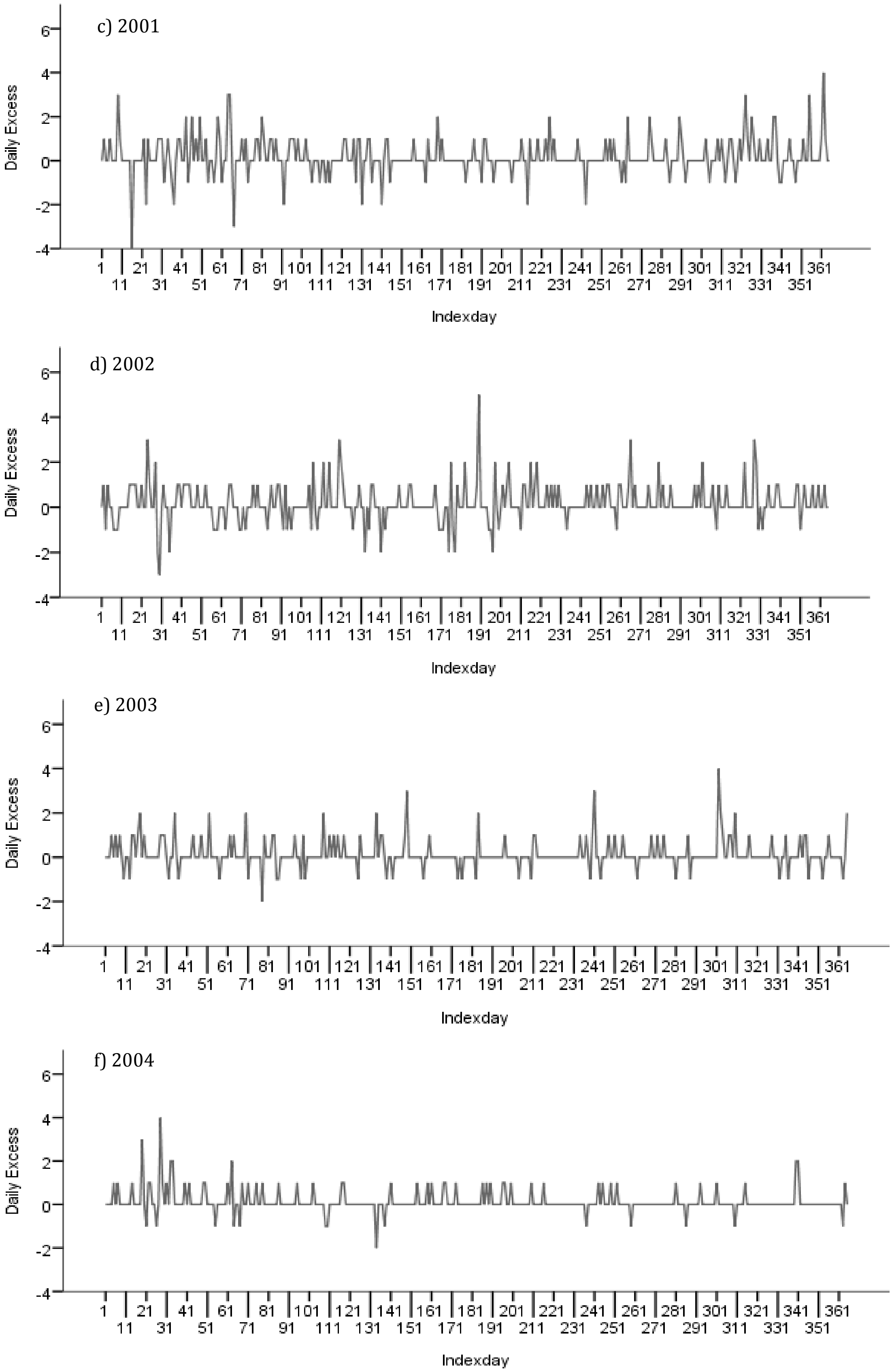
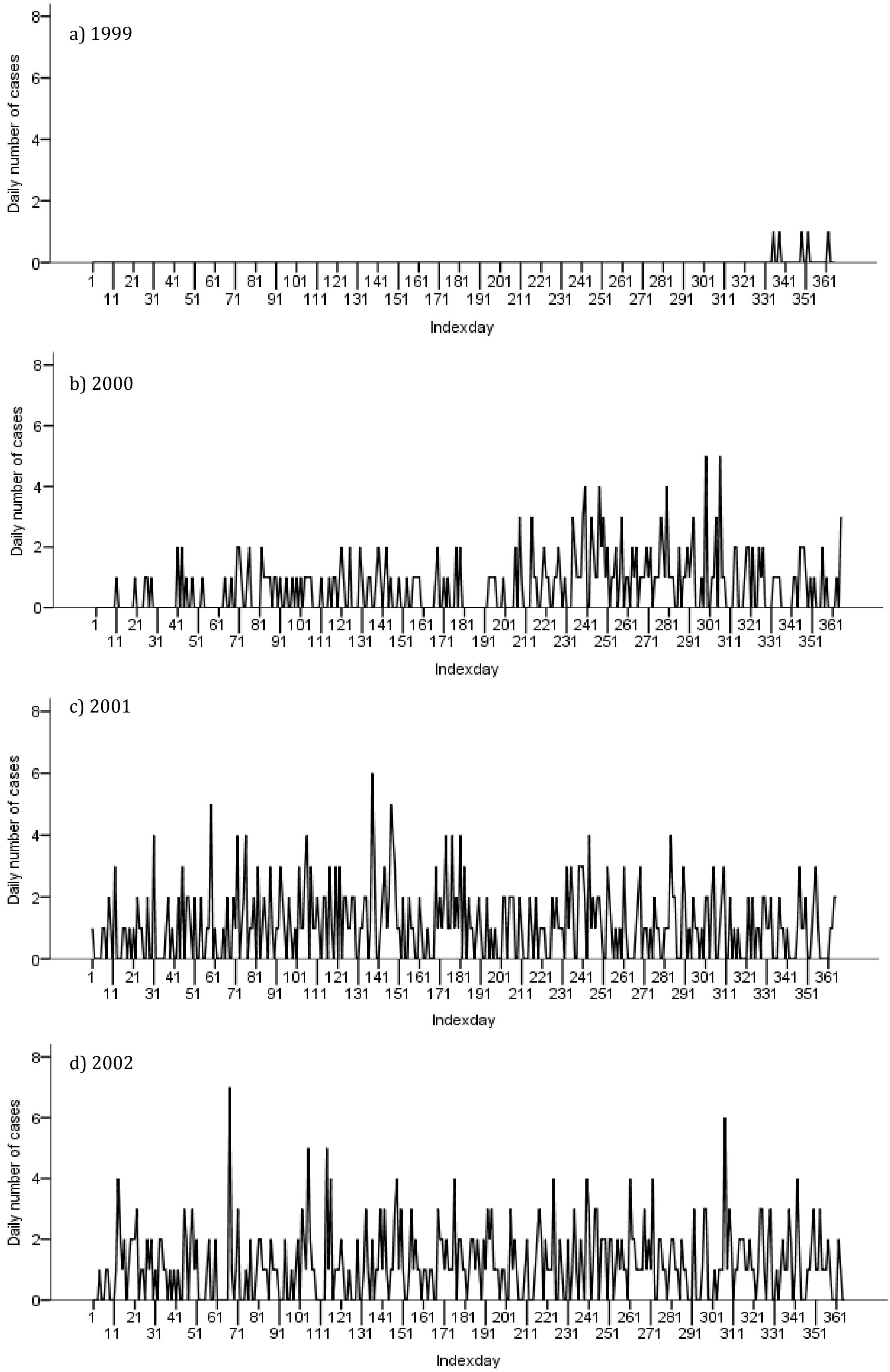
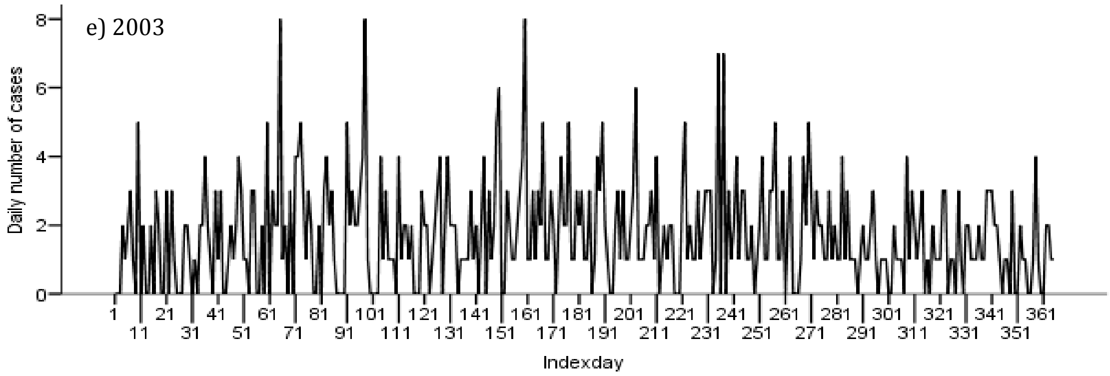


Figure C1. 90: Scotland Acute Visits Excess a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


a) 1999
Daily number of cases
Indexday
b) 2000
Daily number of cases
Indexday
c) 2001
Daily number of cases
Indexday
d) 2002
Daily number of cases
Indexday



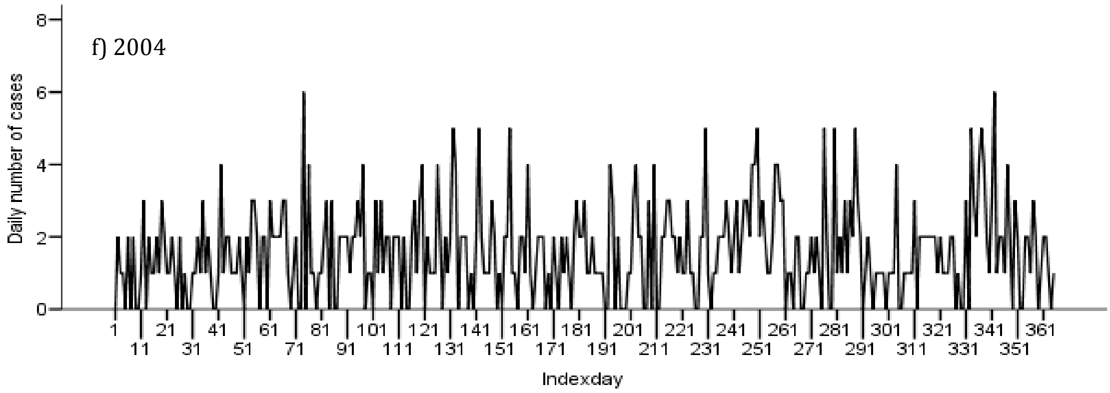
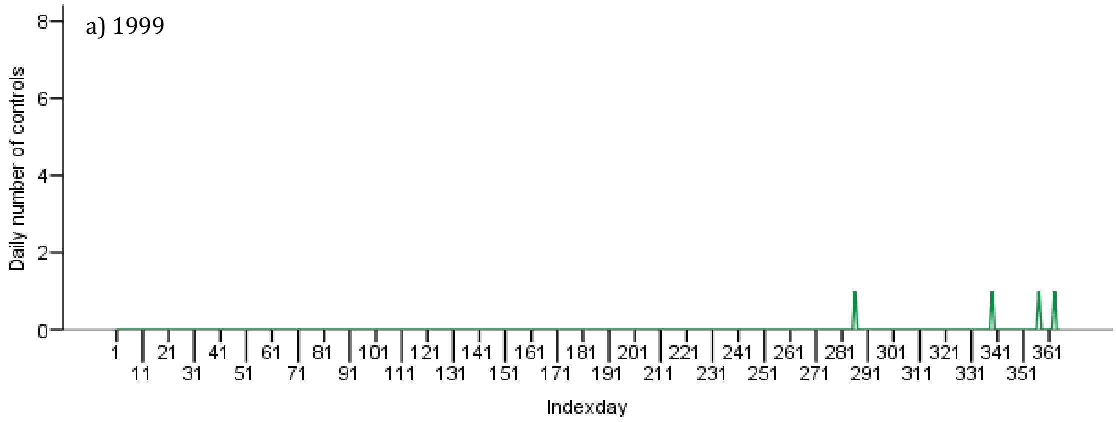
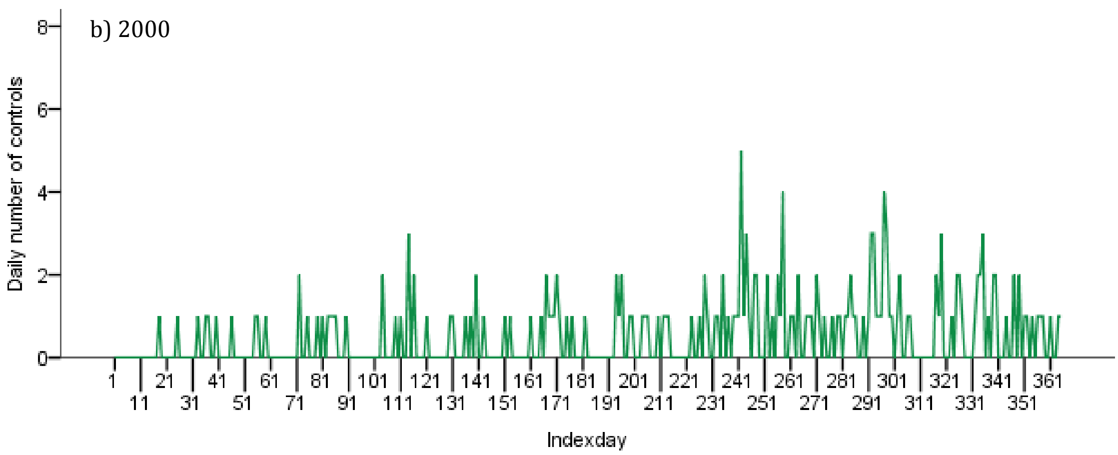


Figure C1. 91: Scotland Casualty Counts Asthmatics a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.





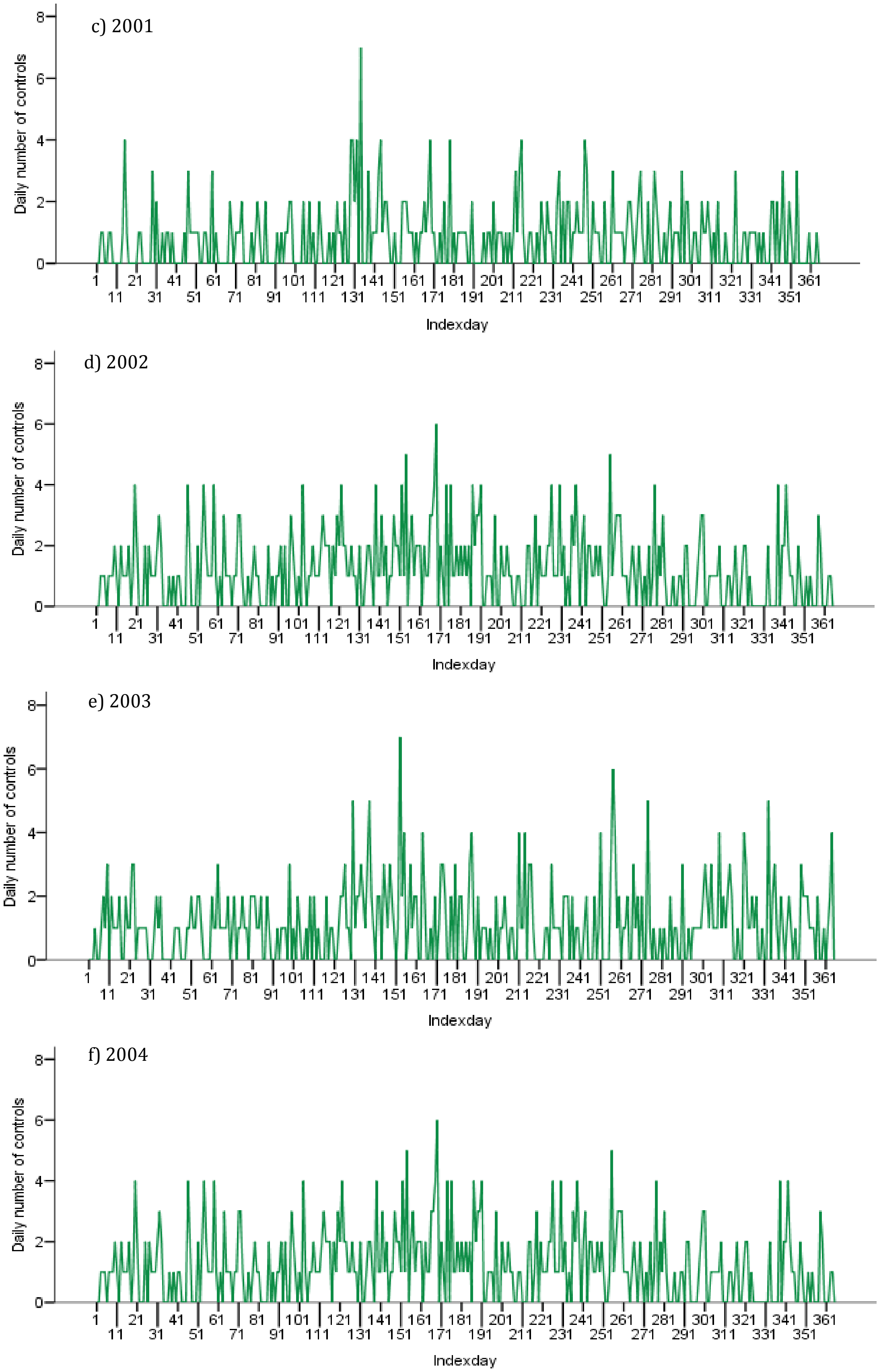
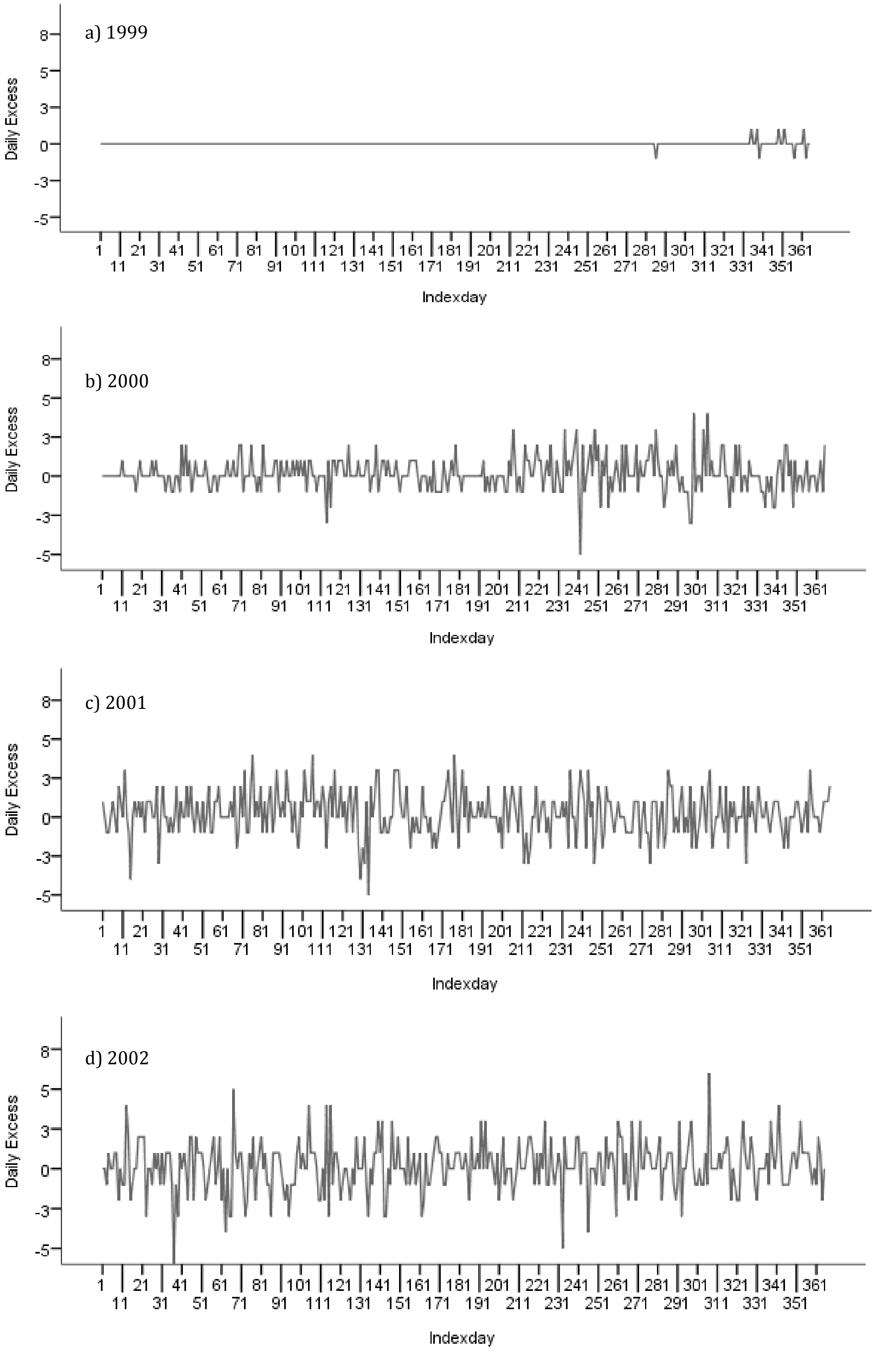
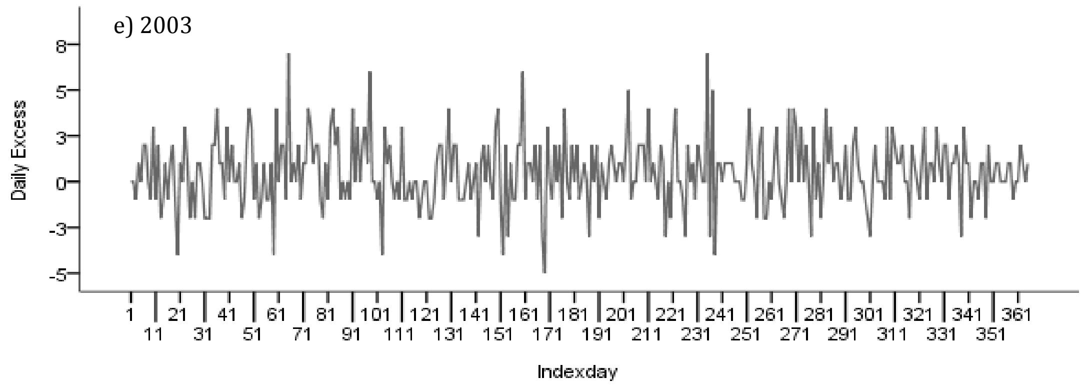


Figure C1. 92: Scotland Casualty Counts Non-asthmatics a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


a) 1999
b) 2000
c) 2001
d) 2002
Daily Excess
8
5
3
0
-3
-5
1 21 41 61 81 101 121 141 161 181 201 221 241 261 281 301 321 341 361
11 31 51 71 91 111 131 151 171 191 211 231 251 271 291 311 331 351
Indexday



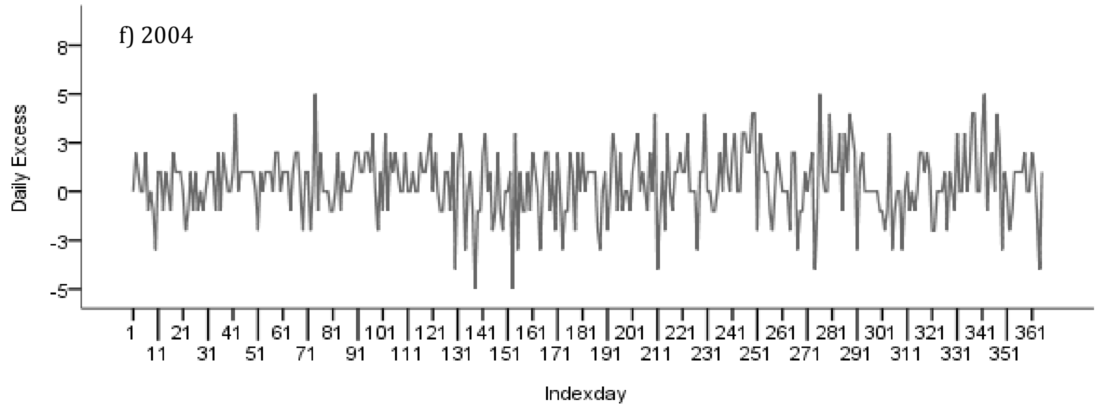
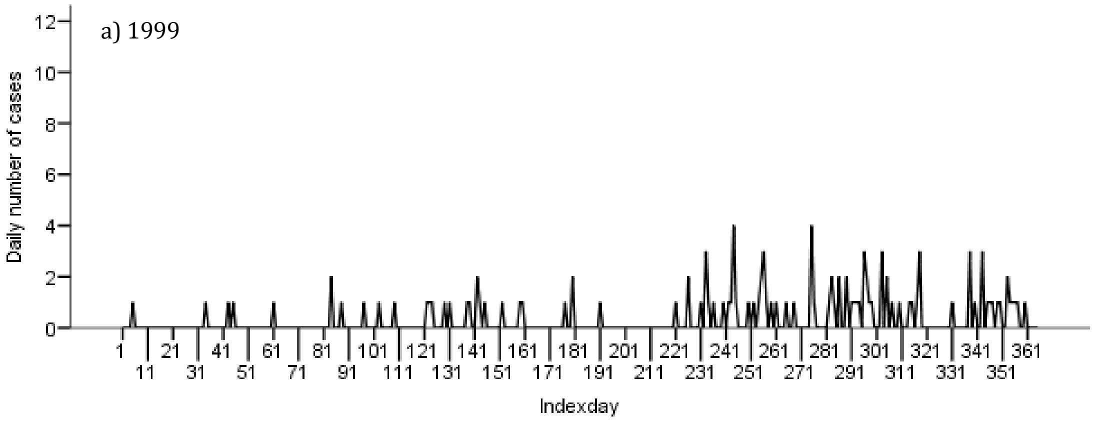
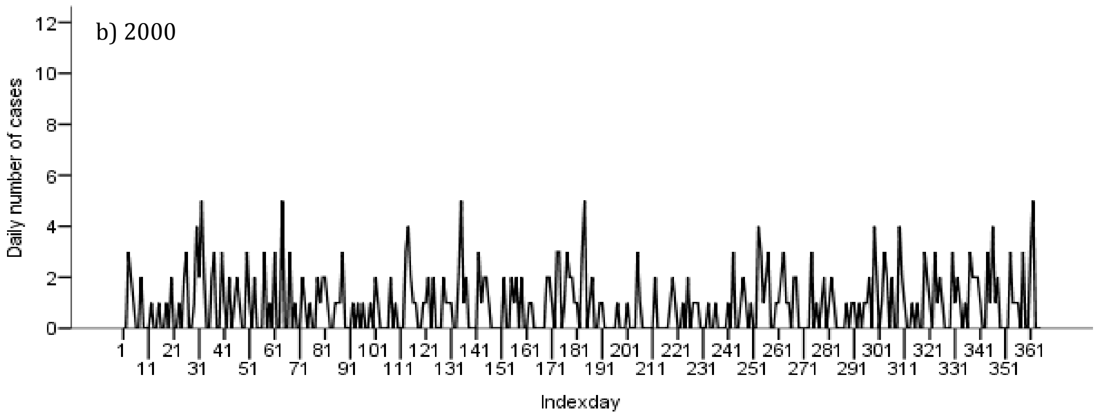


Figure C1. 93: Scotland Casualty Counts Excess a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.





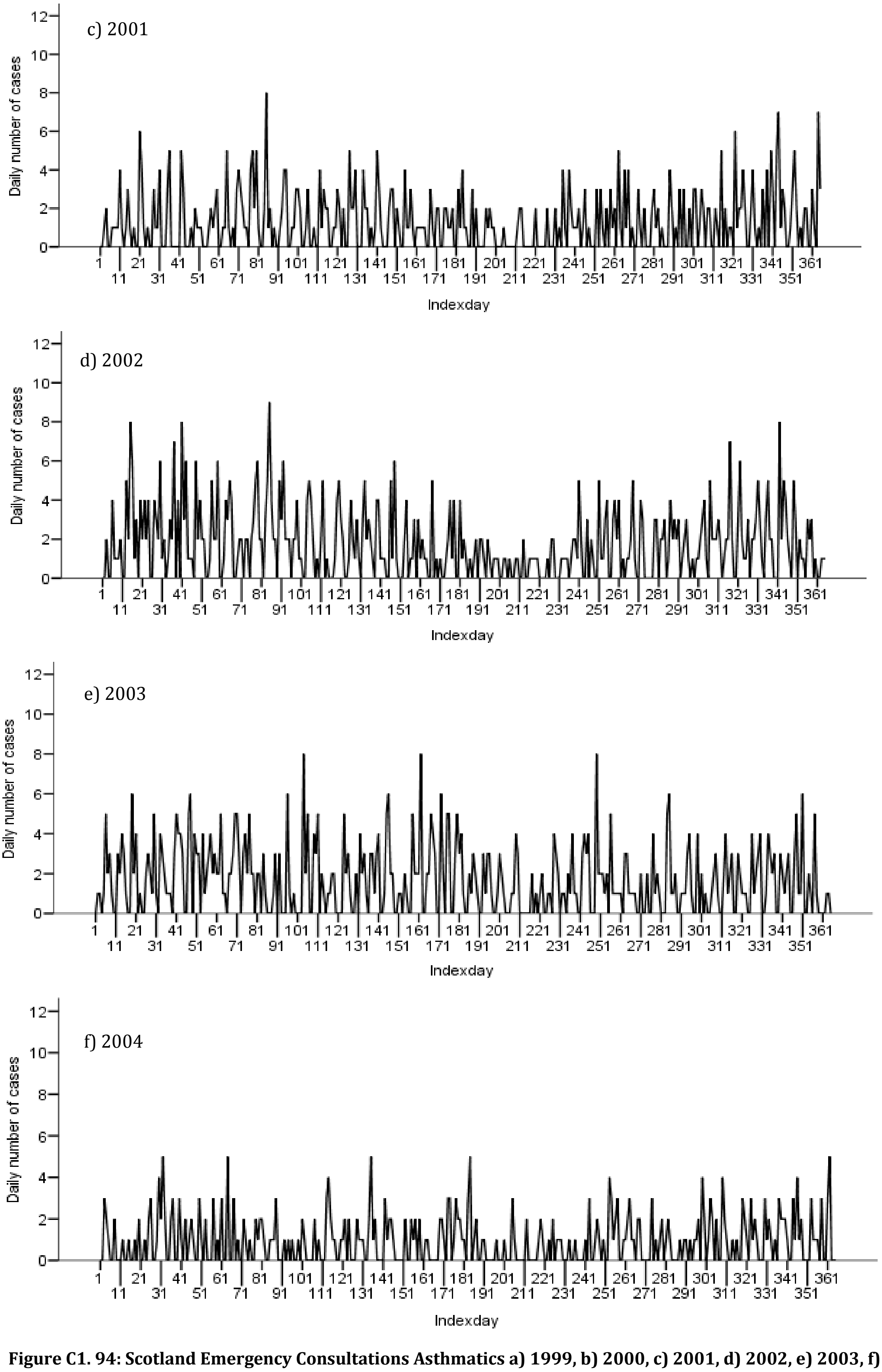
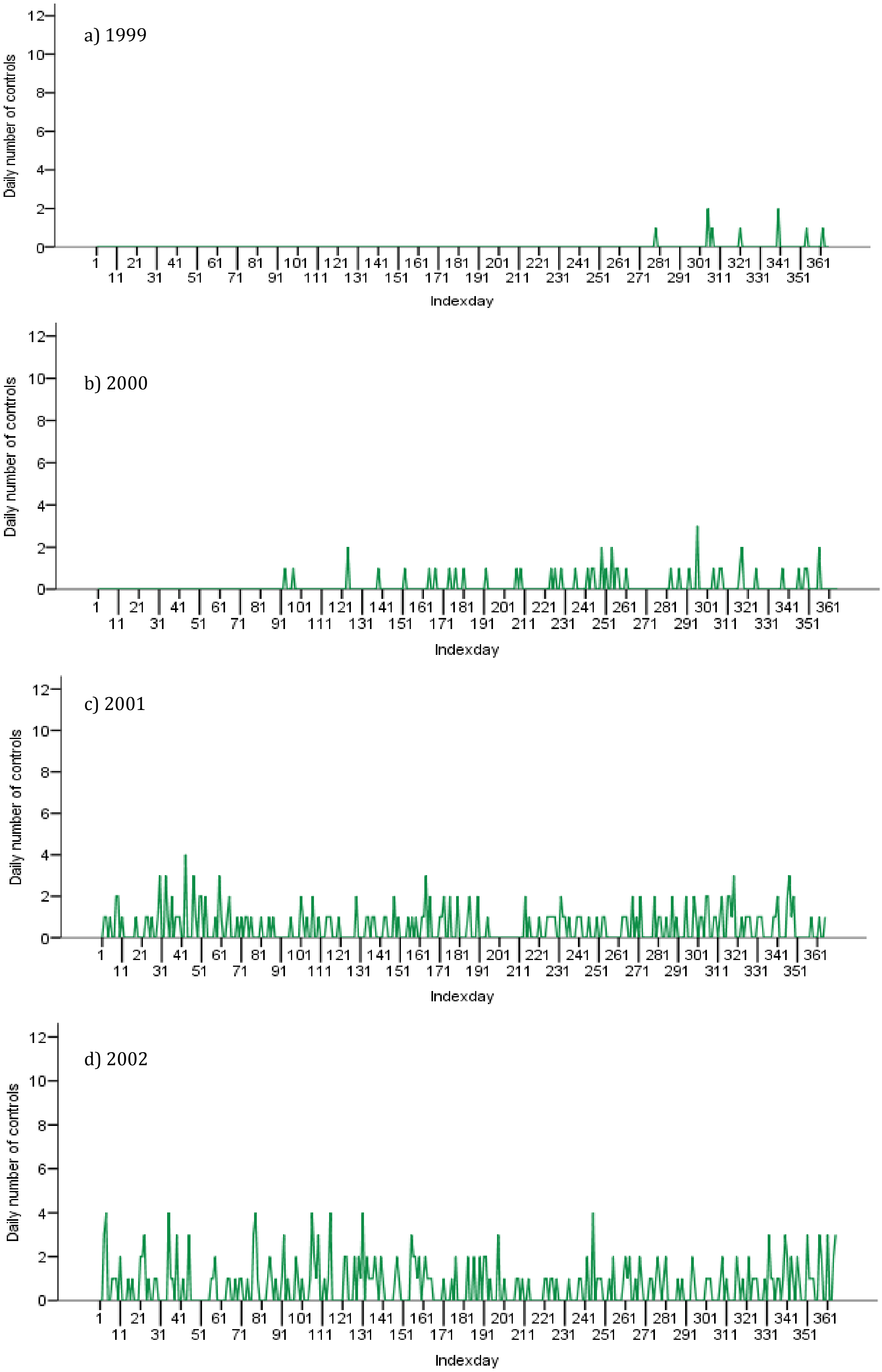


Figure C1. 94: Scotland Emergency Consultations Asthmatics a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.



a) 1999
b) 2000
c) 2001
d) 2002
Daily number of controls
Indexday

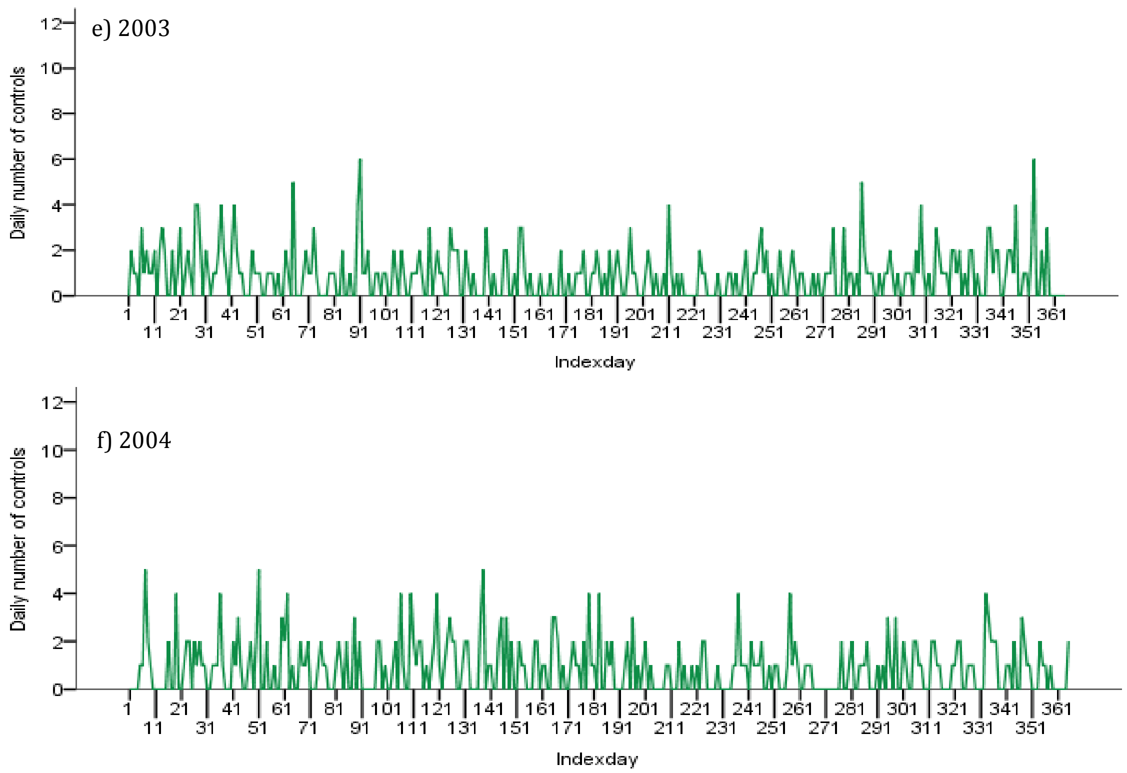
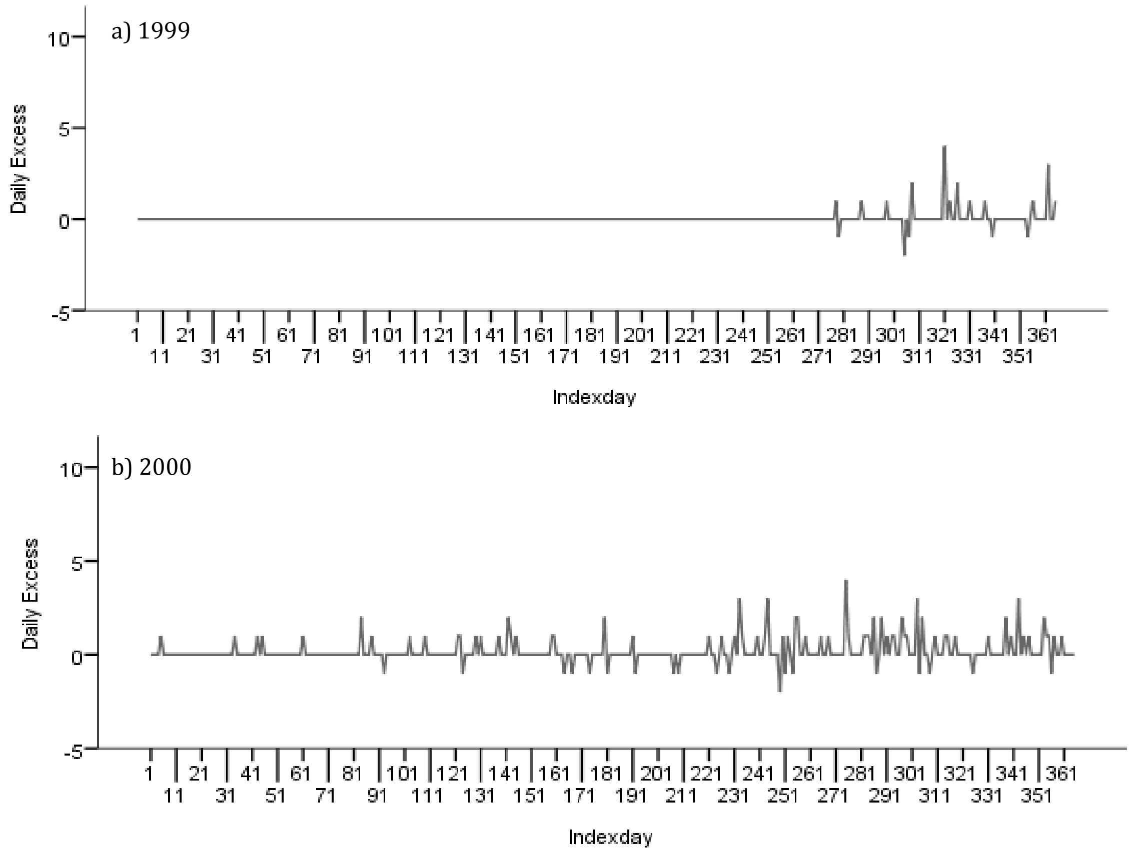


Figure C1. 95: Scotland Emergency Consultations Non-asthmatics a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.



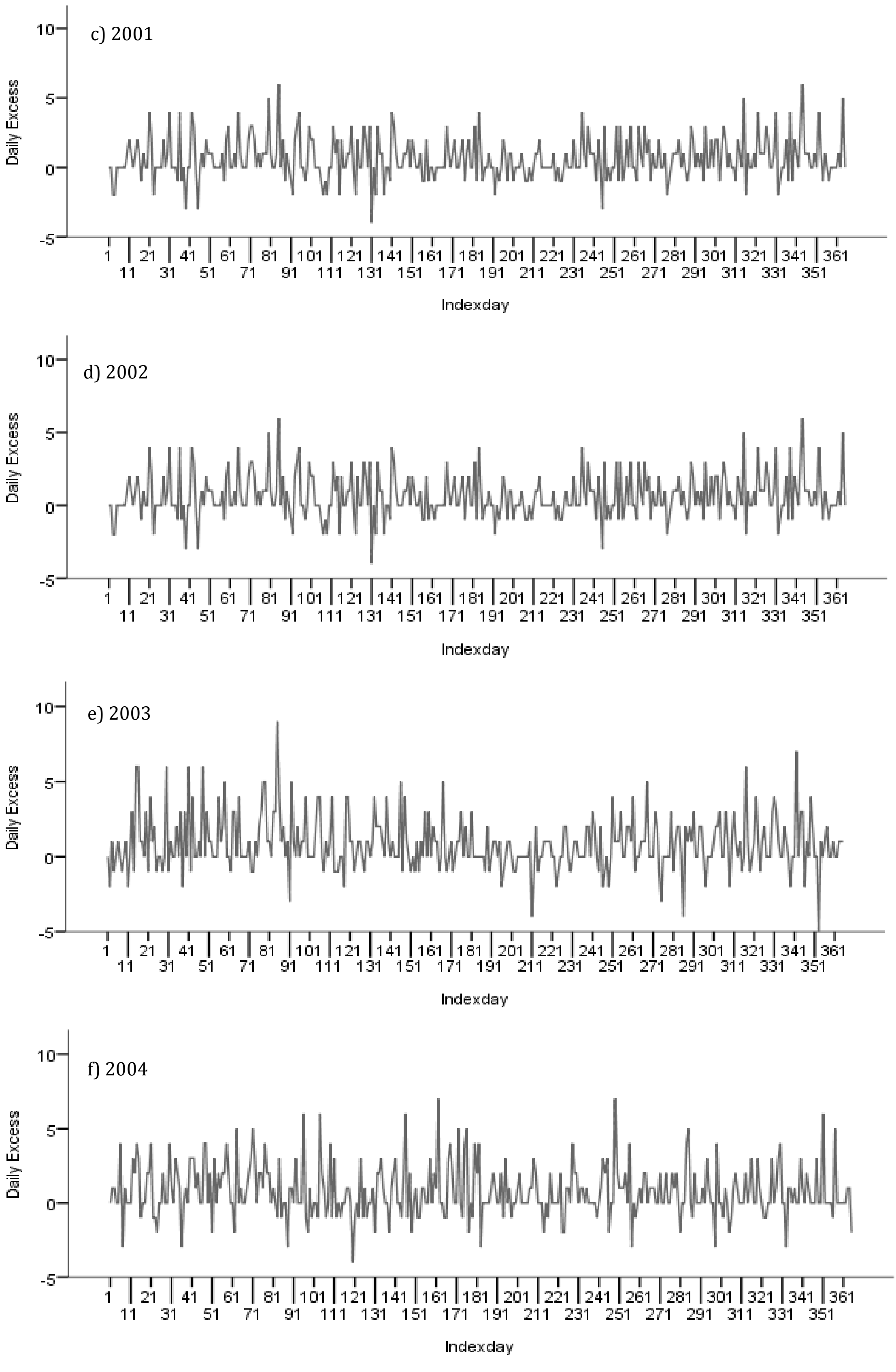
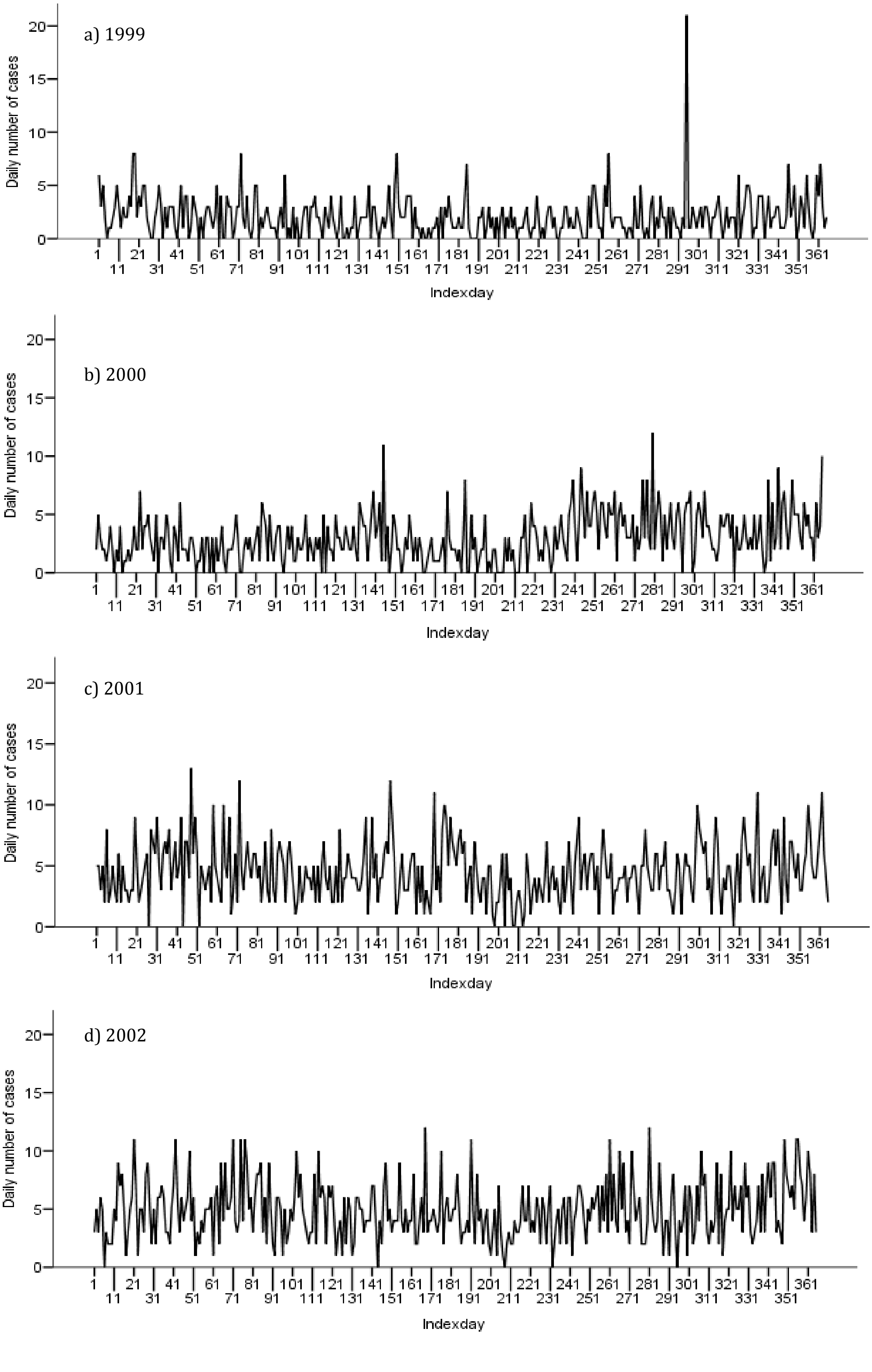
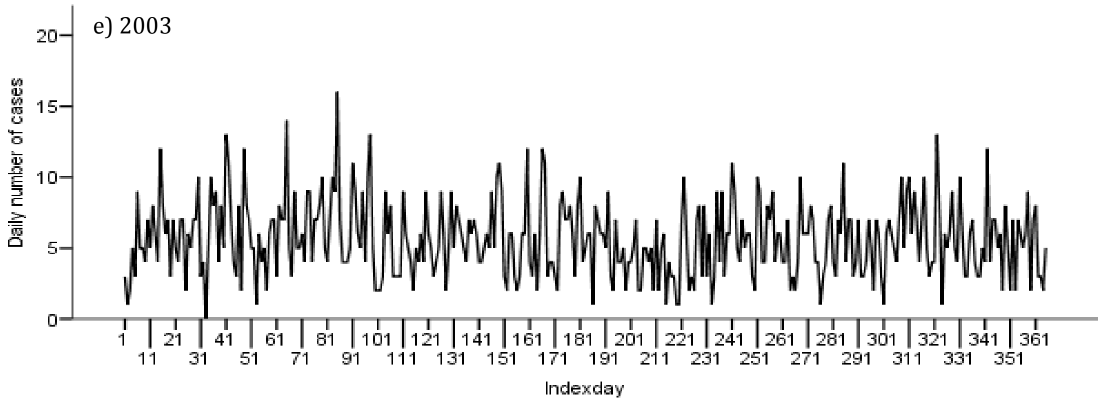


Figure C1. 96: Scotland Emergency Consultations Excess a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


a) 1999
Daily number of cases
Indexday
b) 2000
Daily number of cases
Indexday
c) 2001
Daily number of cases
Indexday
d) 2002
Daily number of cases
Indexday



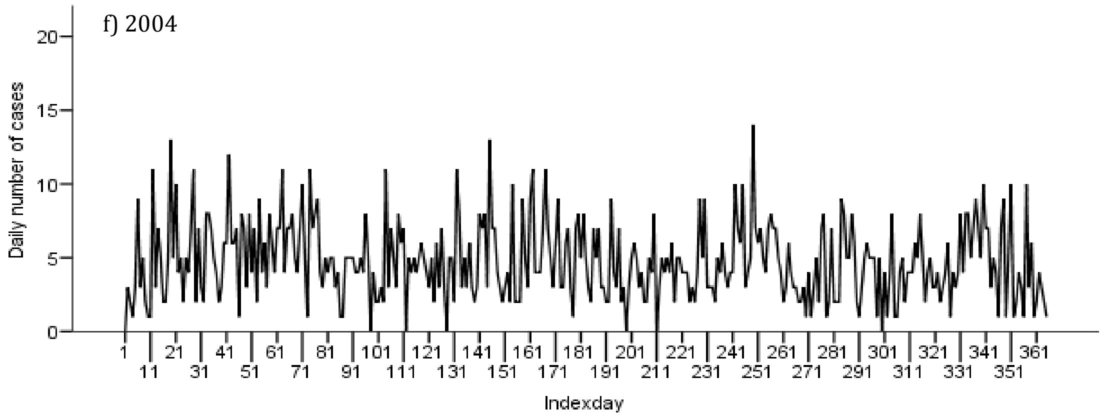
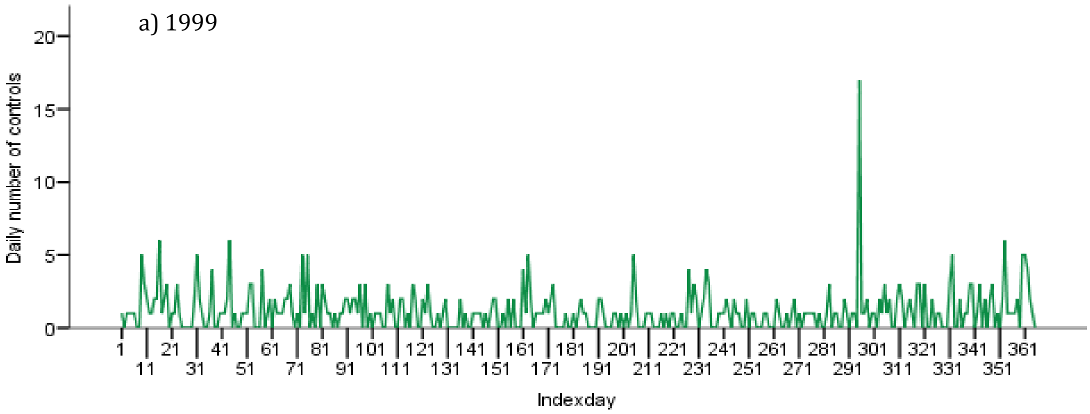
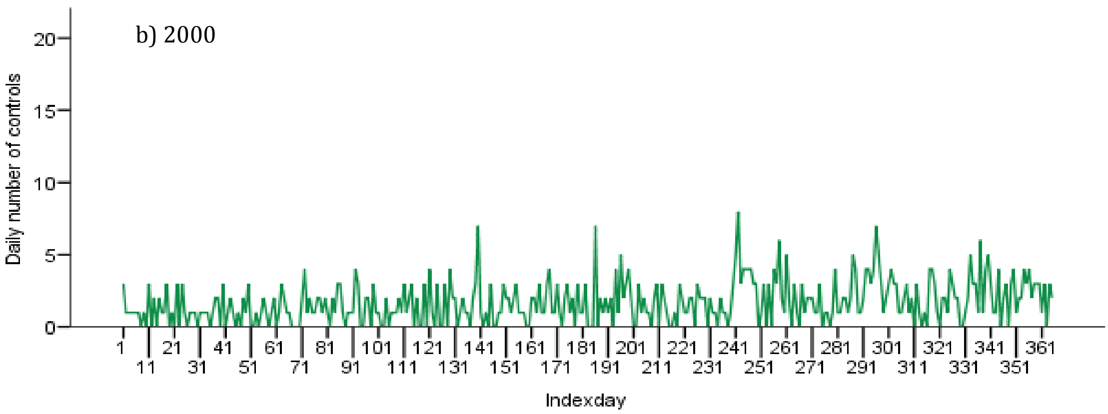


Figure C1. 97: Scotland Emergency Counts Asthmatics a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.





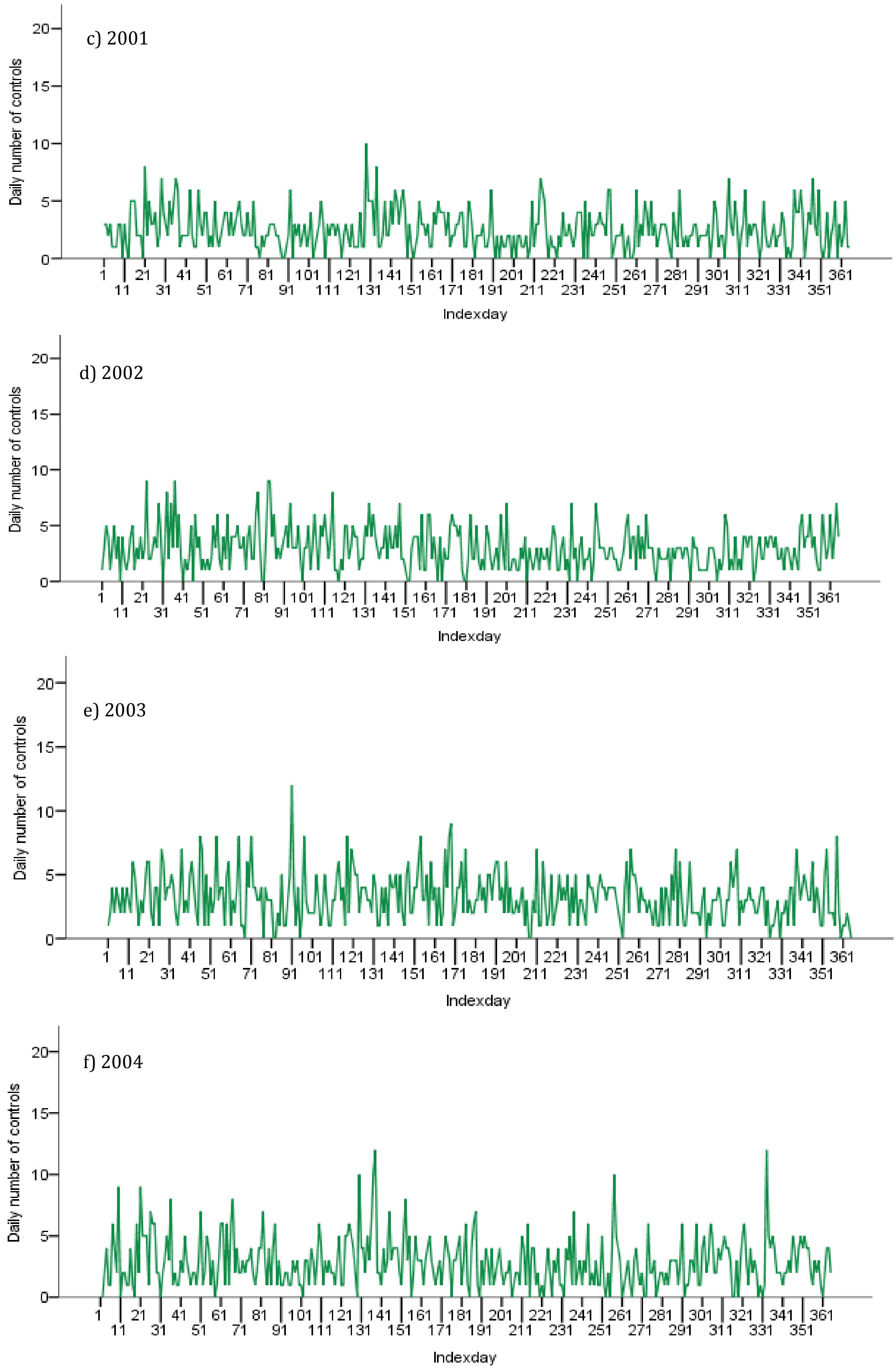
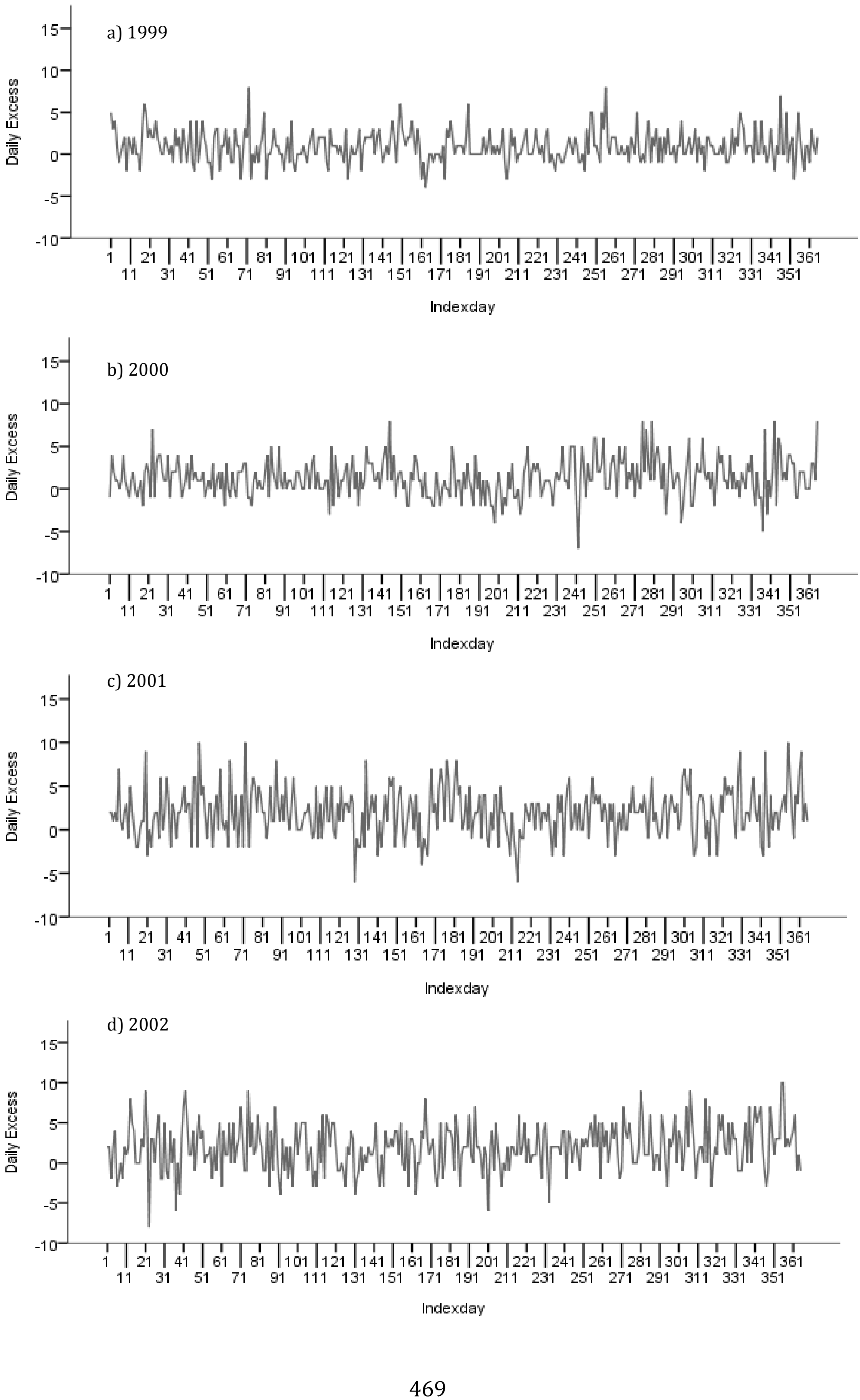
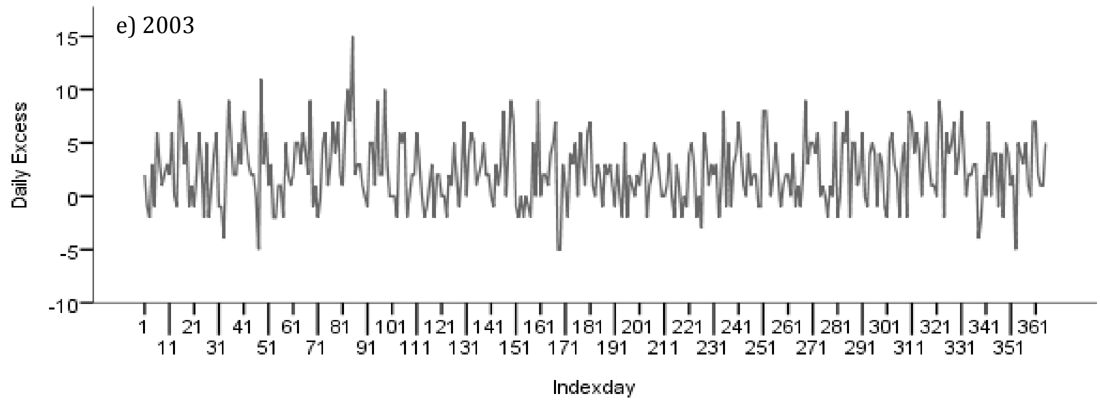


Figure C1. 98: Scotland Emergency Counts Non-asthmatics a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


a) 1999
b) 2000
c) 2001
d) 2002
Daily Excess
Indexday



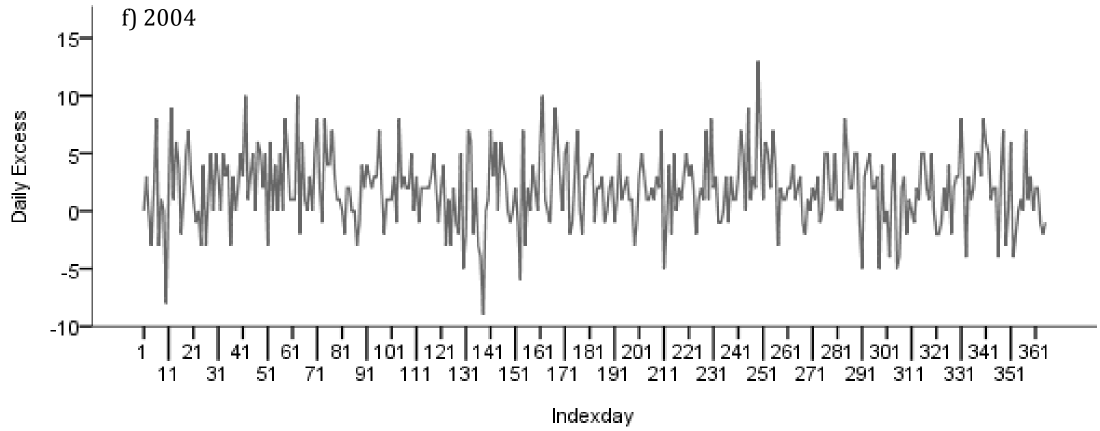
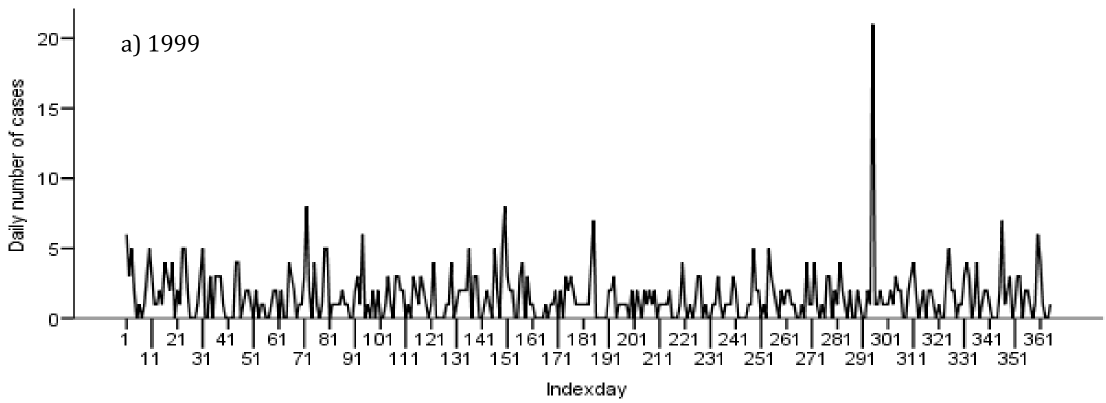
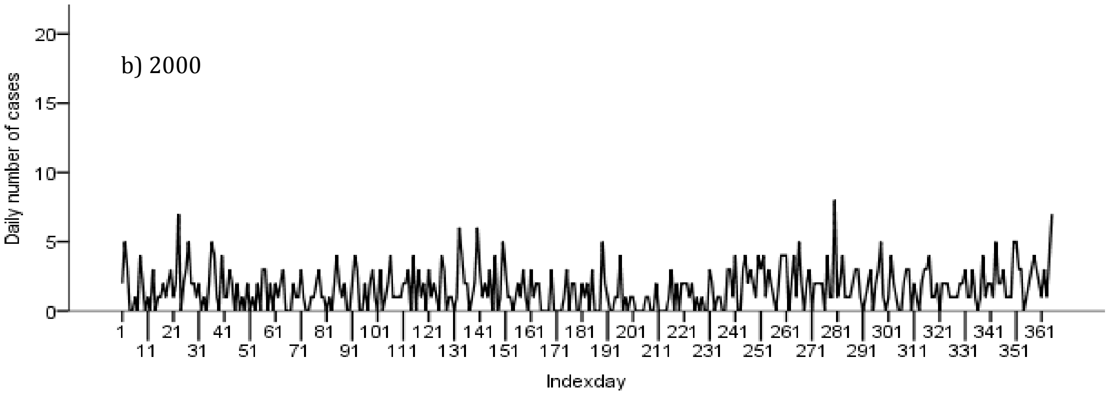


Figure C1. 99: Scotland Emergency Counts Excess a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.





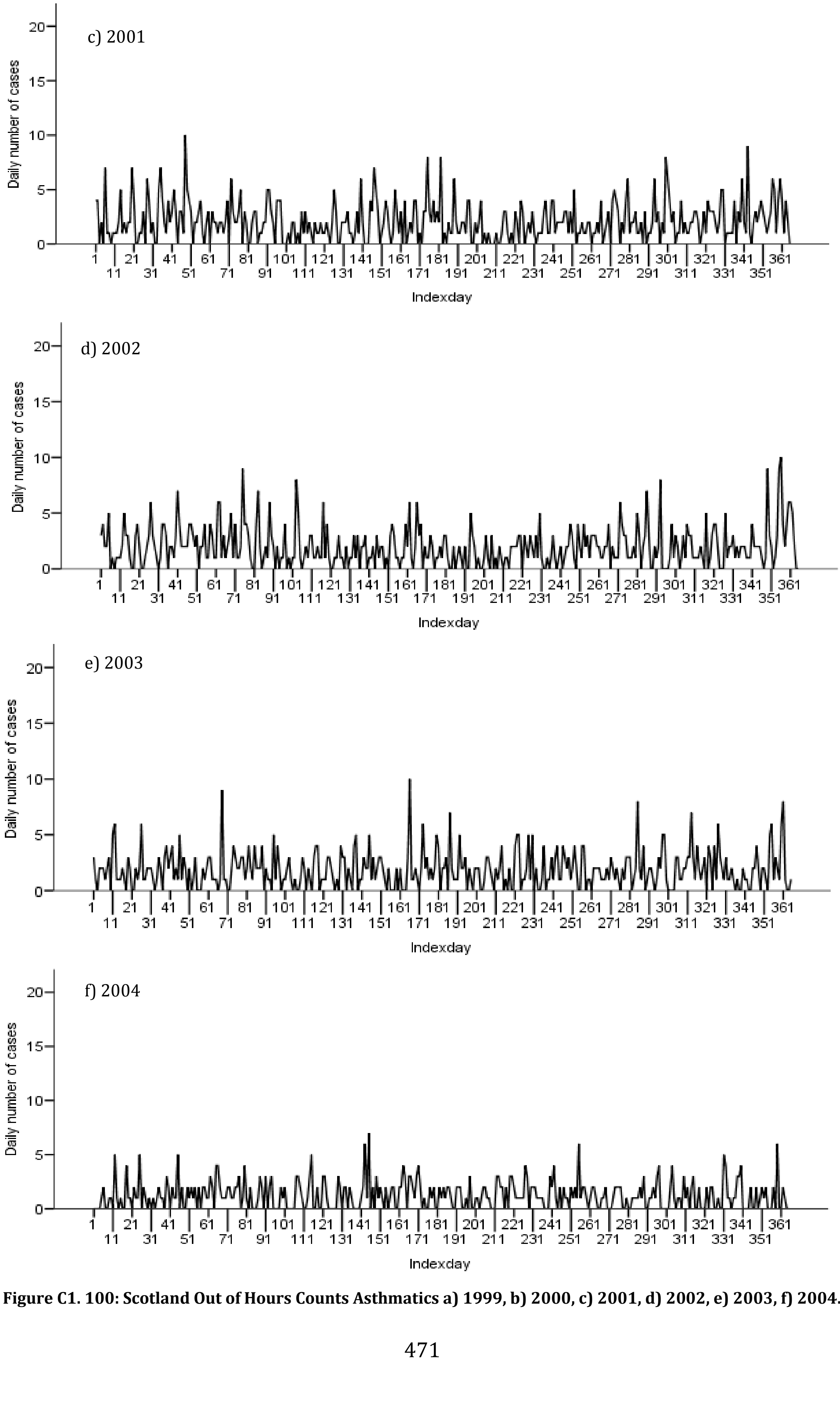
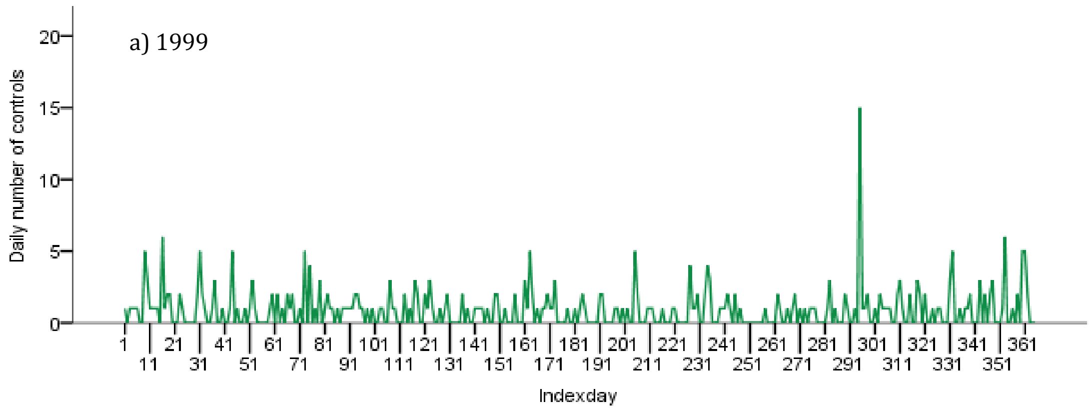
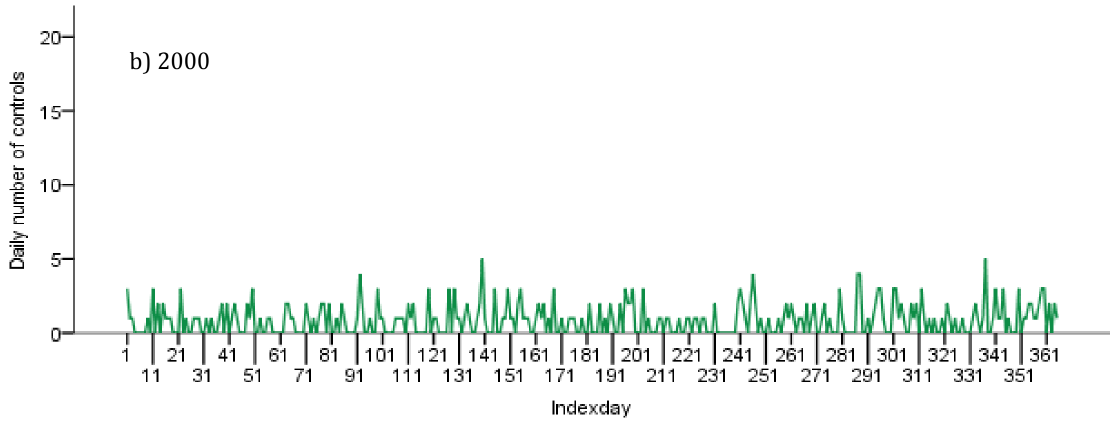
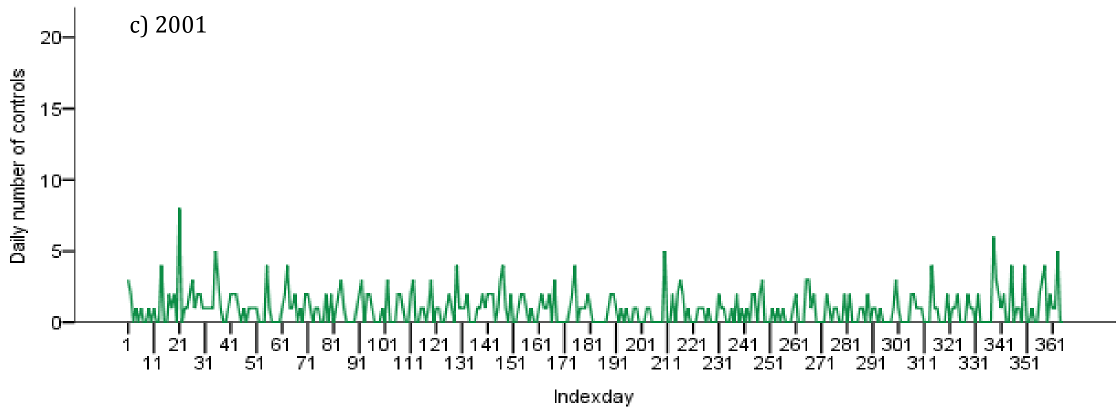
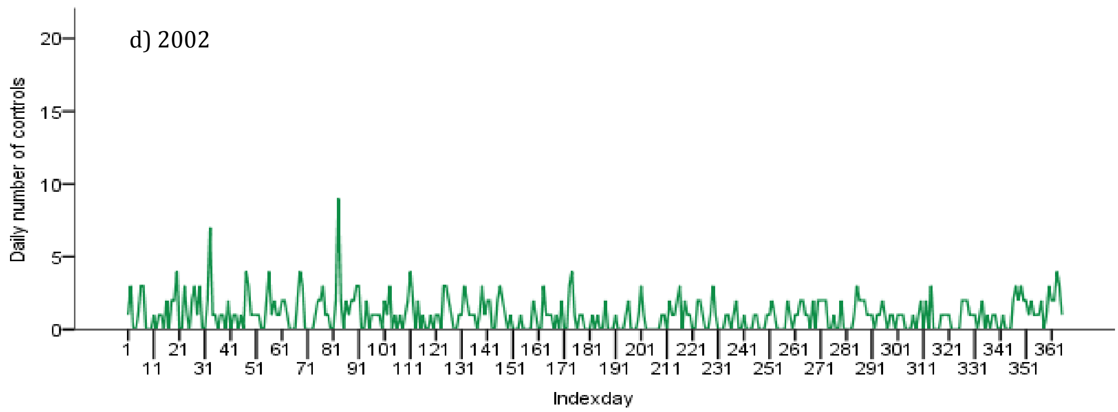


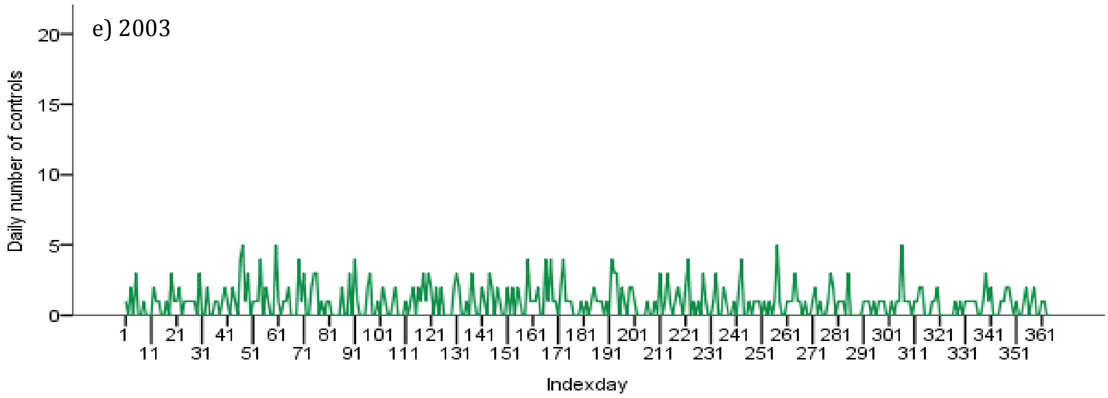
Figure C1. 100: Scotland Out of Hours Counts Asthmatics a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


a) 1999
Daily number of controls
Indexday


b) 2000
Daily number of controls
Indexday


c) 2001
Daily number of controls
Indexday


d) 2002
Daily number of controls
Indexday



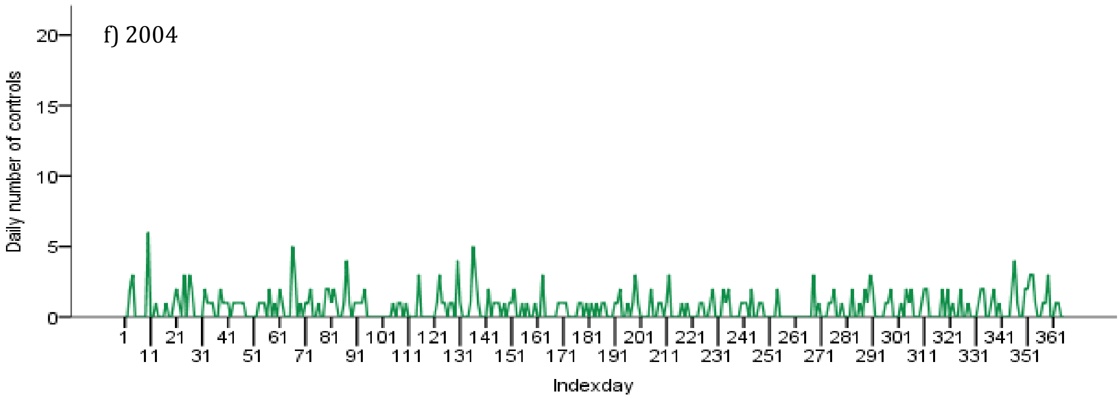
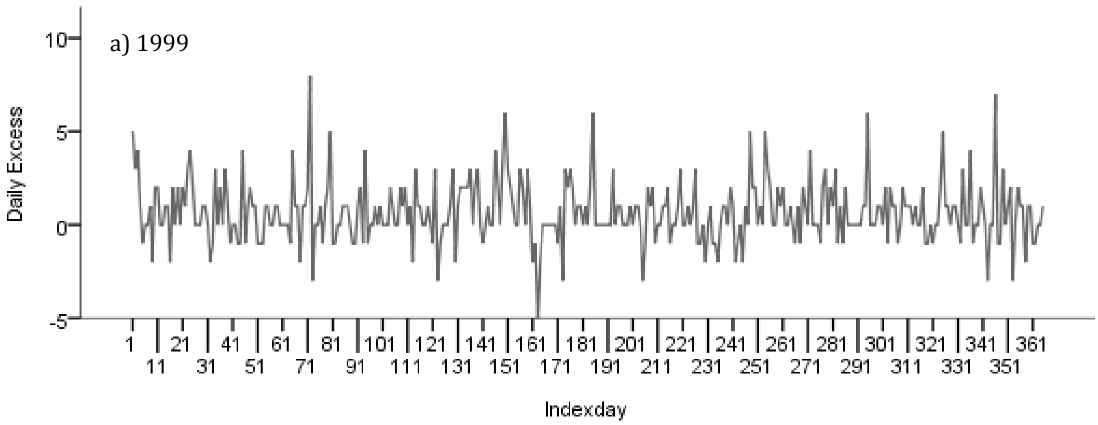
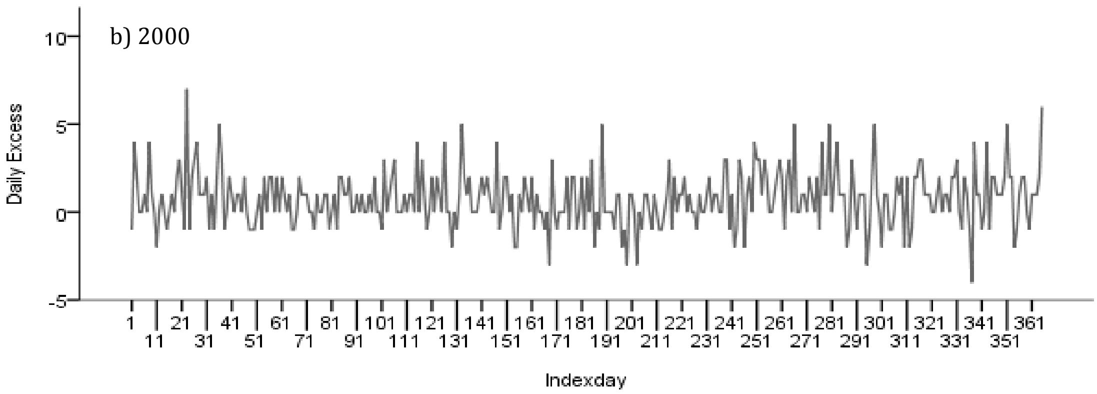


Figure C1. 101: Scotland Out of Hours Counts Non-asthmatics a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.





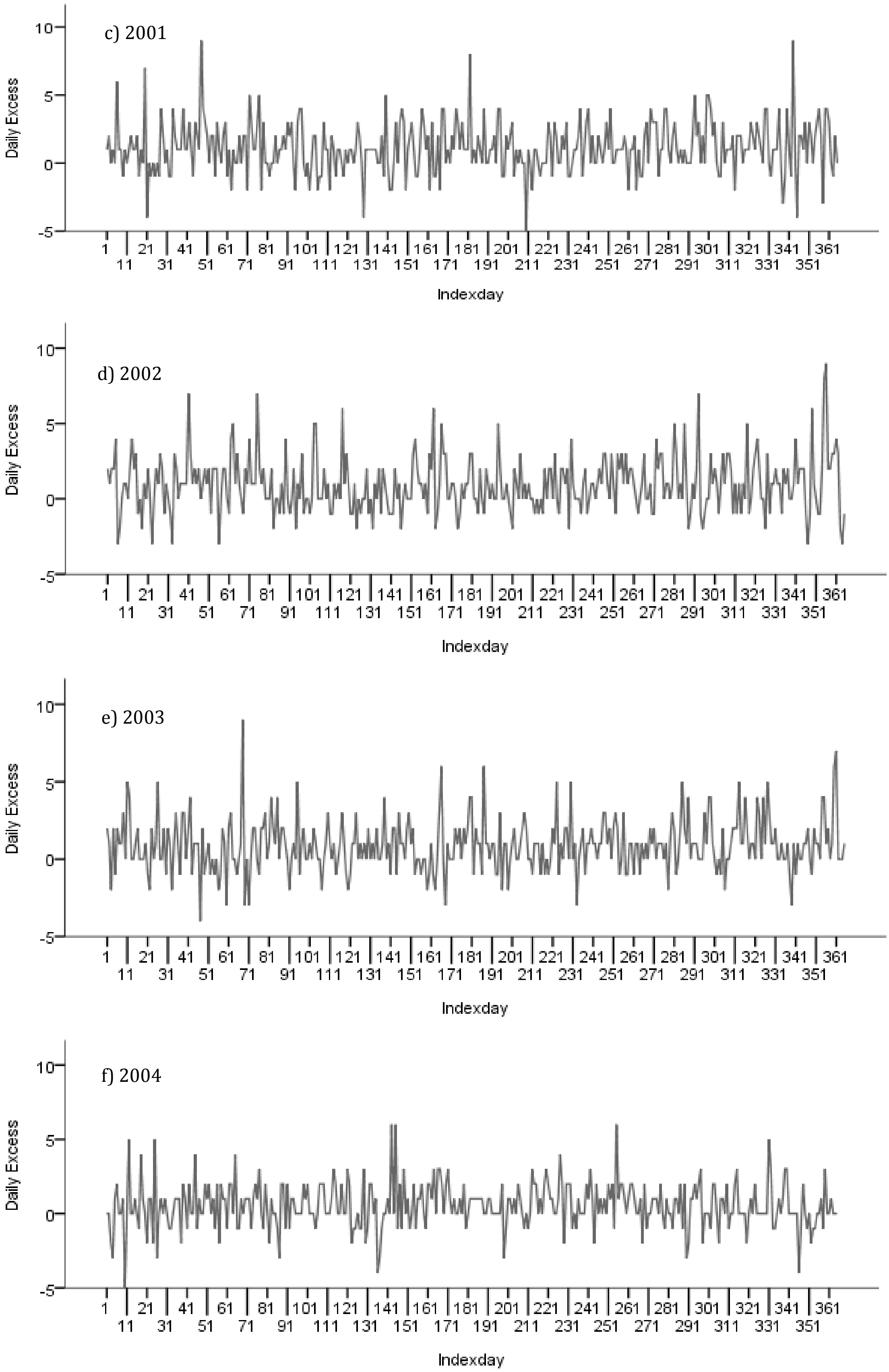


Figure C1. 102: Scotland Out of Hours Counts Excess a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.

C1.4.3. Scotland Summary Statistics, histograms and monthly means for Admissions and A&E Contacts.

Table C. 9: Scotland All Medical Contacts - descriptive statistics (n=2190)

Asthmatics, Non-asthmatics or Excess	Statistics	All Counts	Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours Counts
Asthmatics	**Mean**	69.62	0.36	1.04	1.01	4.14	1.73
	Median	82	0	1	0	4	1
	SD	45.62	0.75	1.25	1.47	2.69	1.68
	Minimum	0	0	0	0	0	0
	Maximum	623	8	8	9	21	21
Non-asthmatics	**Mean**	33.63	0.19	0.78	0.53	2.40	0.91
	Median	39	0	0	0	2	1
	SD	21.29	0.51	1.06	0.90	1.92	1.15
	Range	138	6	7	6	17	15
	Minimum	0	0	0	0	0	0
	Maximum	138	6	7	6	17	15
Excess	**Mean**	35.99	0.17	0.26	0.48	1.74	0.83
	Median	38	0	0	0	2	1
	SD	29.14	0.77	1.41	1.37	2.76	1.72
	Minimum	-6	-4	-6	-5	-9	-5
	Maximum	565	6	7	9	15	9

Table C.10: Scotland All Counts- descriptive statistics, weekday or weekend.

	Weekday			Weekend		
Statistics	**Asthmatics**	**Non-asthmatics**	**Excess**	**Asthmatics**	**Non-asthmatics**	**Excess**
Number of days	1565	1565	1565	625	625	625
Mean	93.75	45.12	48.64	9.20	4.87	4.33
Median	93	45	47	8	5	3
SD	29.15	12.98	24.64	7.46	2.98	7.14
Range	622	138	566	144	32	140
Minimum	1	0	-1	0	0	-6
Maximum	623	138	565	144	32	134

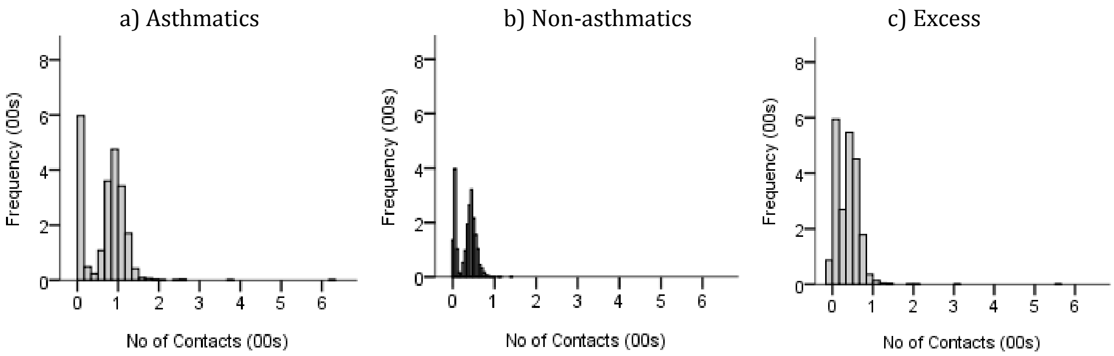


Figure C1. 103: Scotland All Counts – distribution of the daily number of contact a) Asthmatics, b) Non-asthmatics and c) Excess

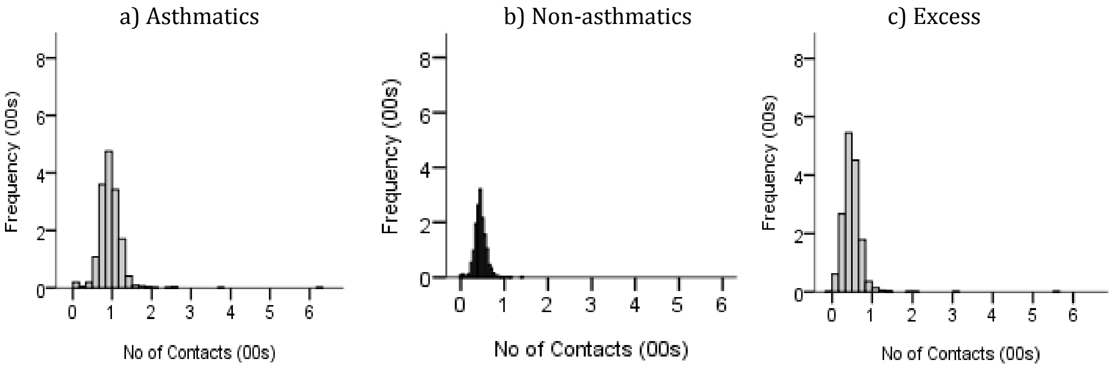


Figure C1. 104: Scotland All Counts – distribution of the daily number of contact Weekday only a) Asthmatics, b) Non-asthmatics and c) Excess

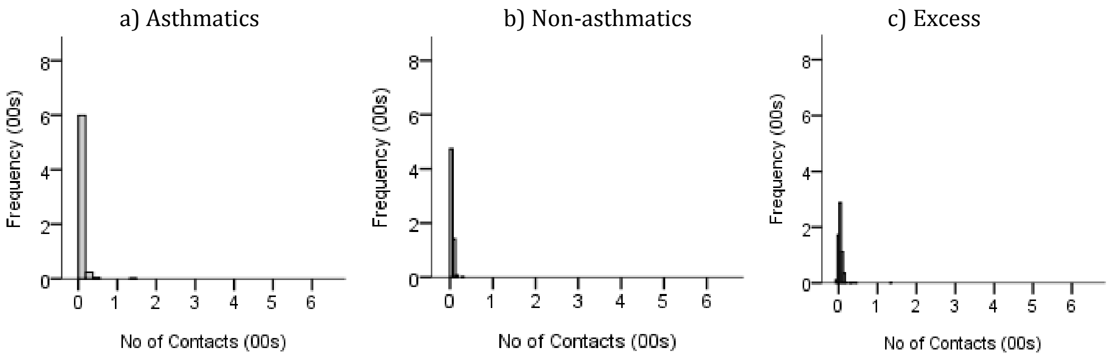
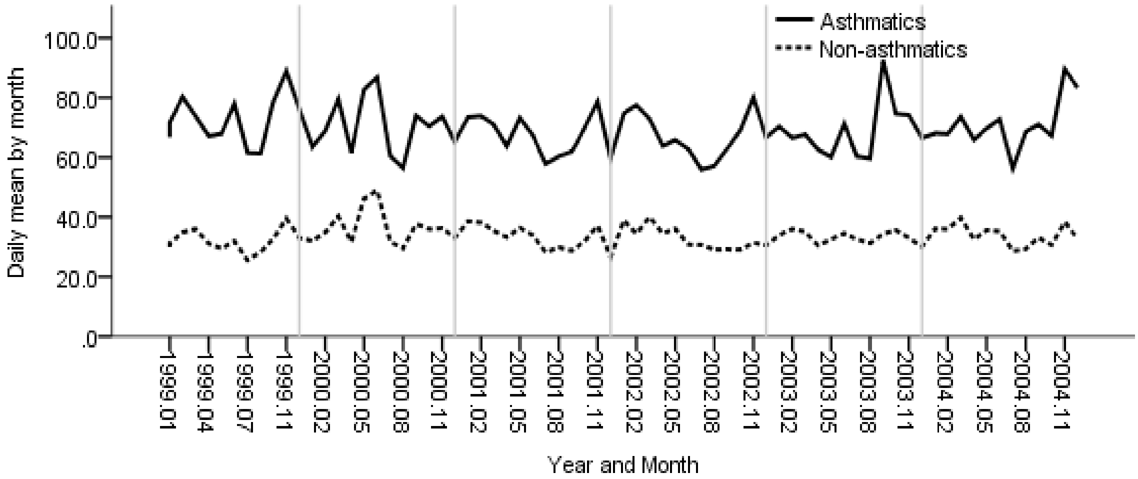


Figure C1. 105: Scotland All Counts – distribution of the daily number of contact Weekend only a) Asthmatics, b) Non-asthmatics and c) Excess

a) Asthmatics and non-asthmatics



b) Excess

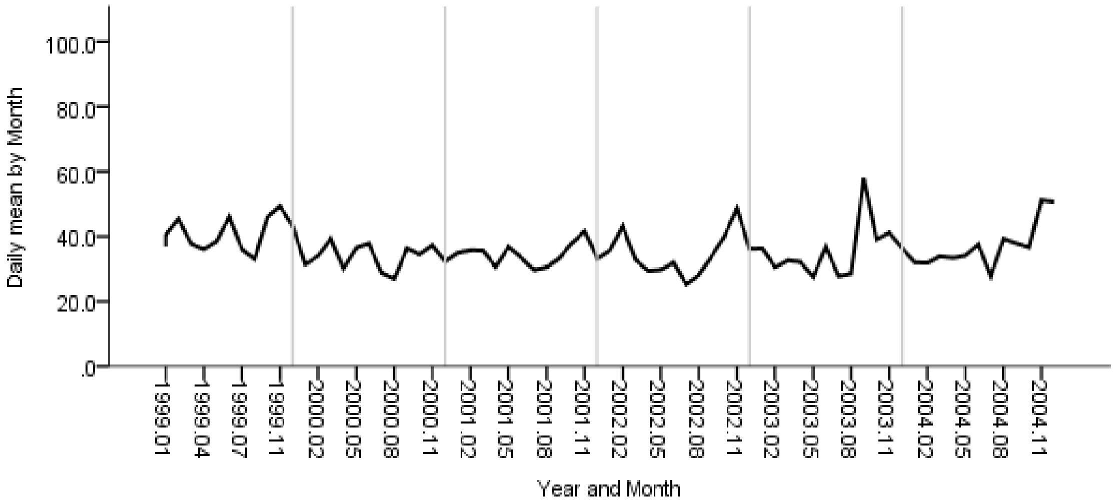


Figure C1.106: Scotland All Counts - plot of the daily mean number of contacts aggregated by month 1999-2004 a) Asthmatics and non-asthmatics and b) Excess.

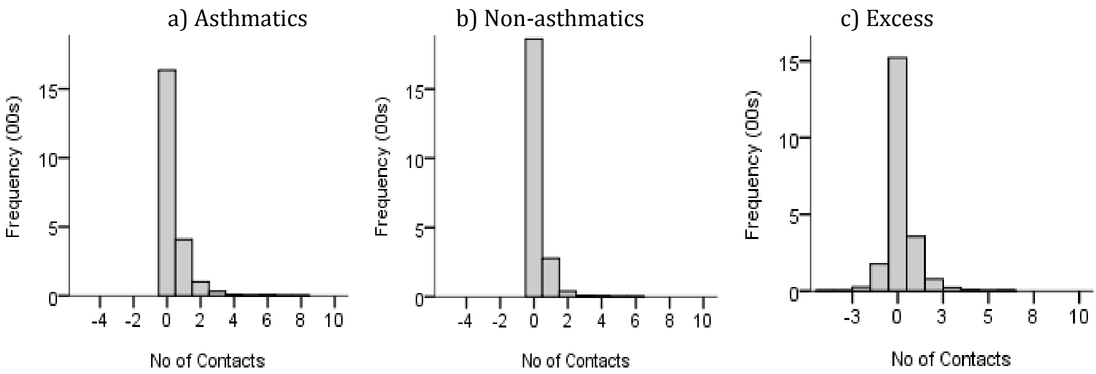


Figure C1.107: Scotland Acute Visits – distribution of the daily number of contact a) Asthmatics, b) Non-asthmatics and c) Excess.

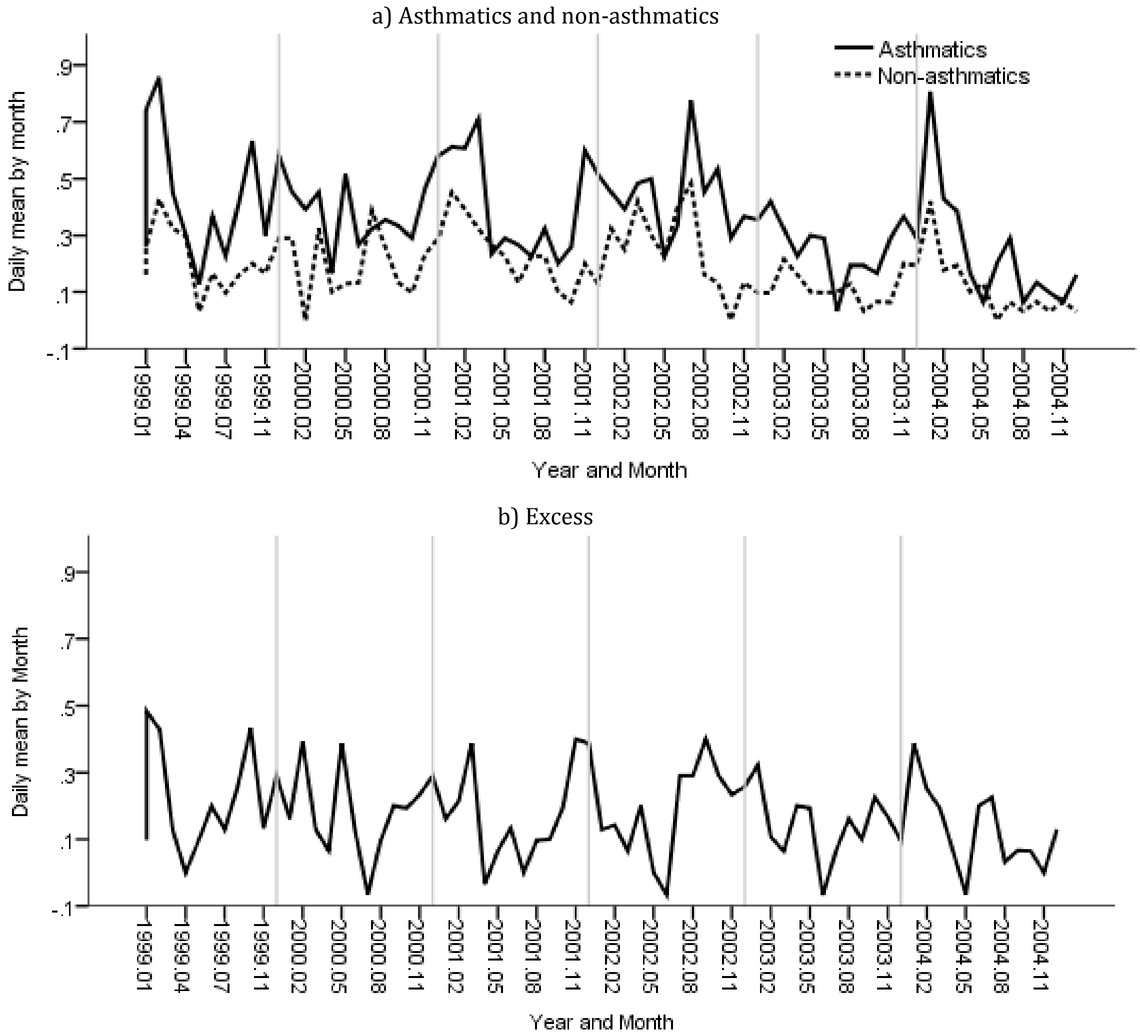


Figure C1. 108: Scotland Acute Visits - plot of the daily mean number of contacts aggregated by month 1999-2004 a) Asthmatics and non-asthmatics and b) Excess.

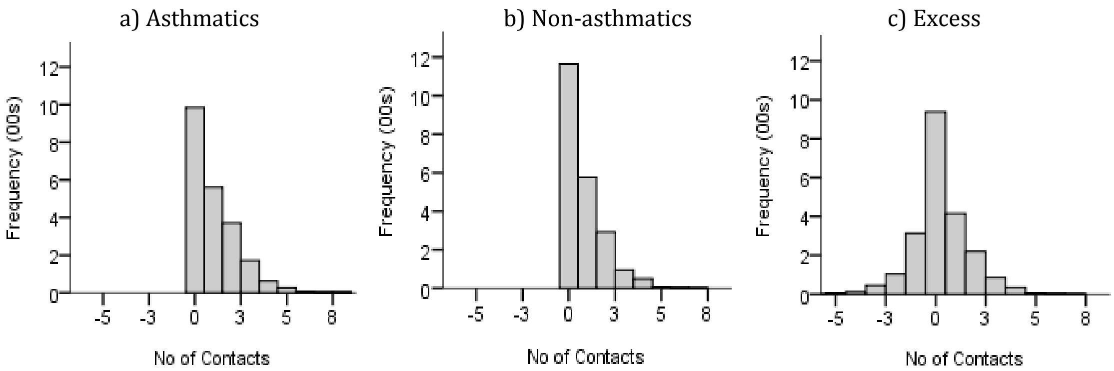


Figure C1. 109: Scotland Casualty Counts– distribution of the daily number of contact a) Asthmatics, b) Non-asthmatics and c) Excess.

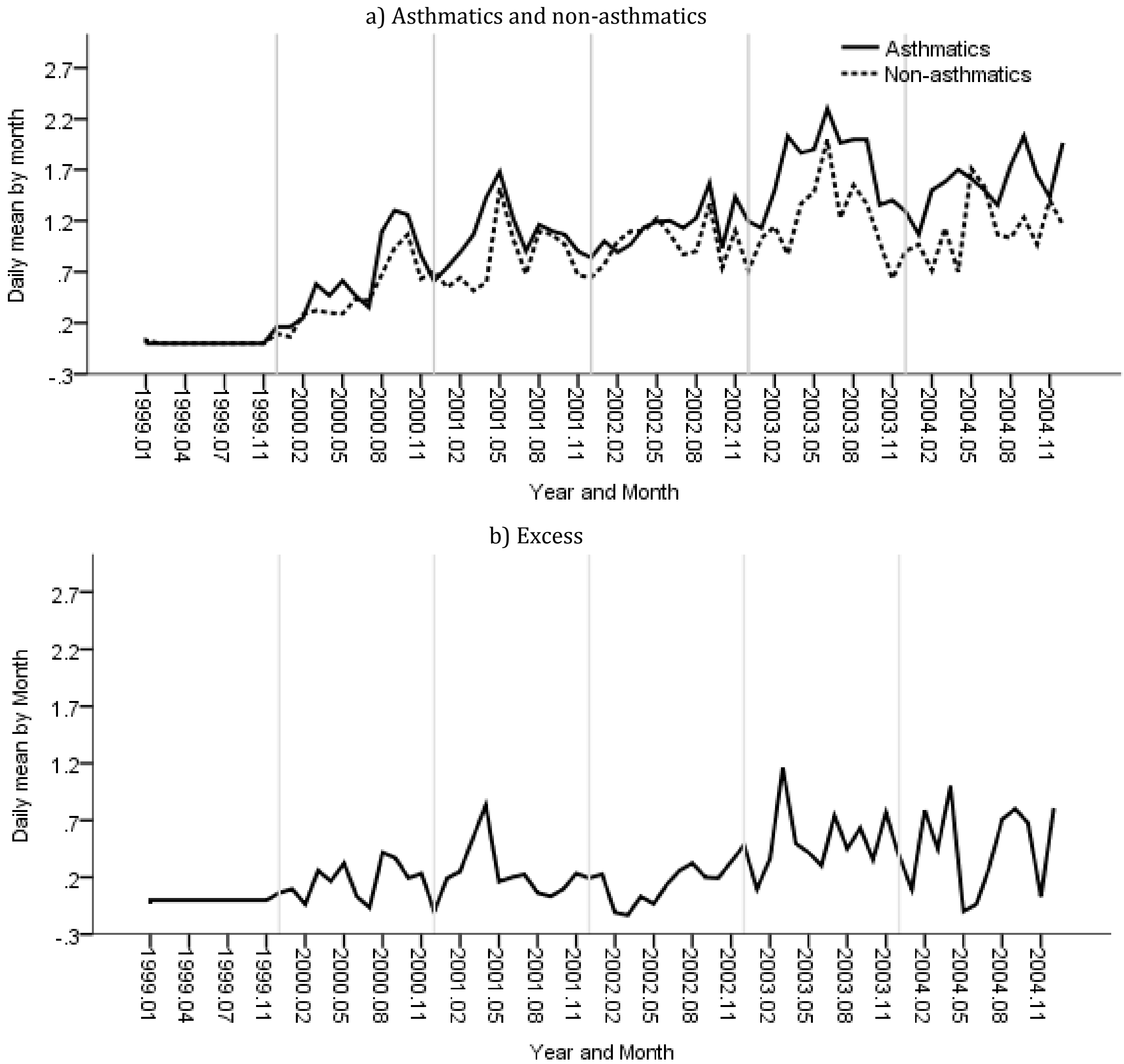


Figure C1. 110: Scotland Casualty Counts- plot of the daily mean number of contacts aggregated by month 1999-2004 a) Asthmatics and non-asthmatics and b) Excess.

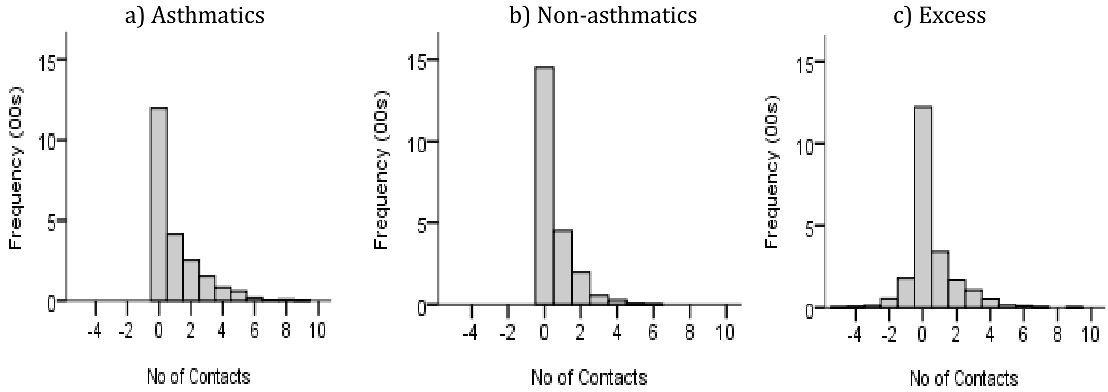


Figure C1. 111: Scotland Emergency Consultations – distribution of the daily number of contact a) Asthmatics, b) Non-asthmatics and c) Excess.

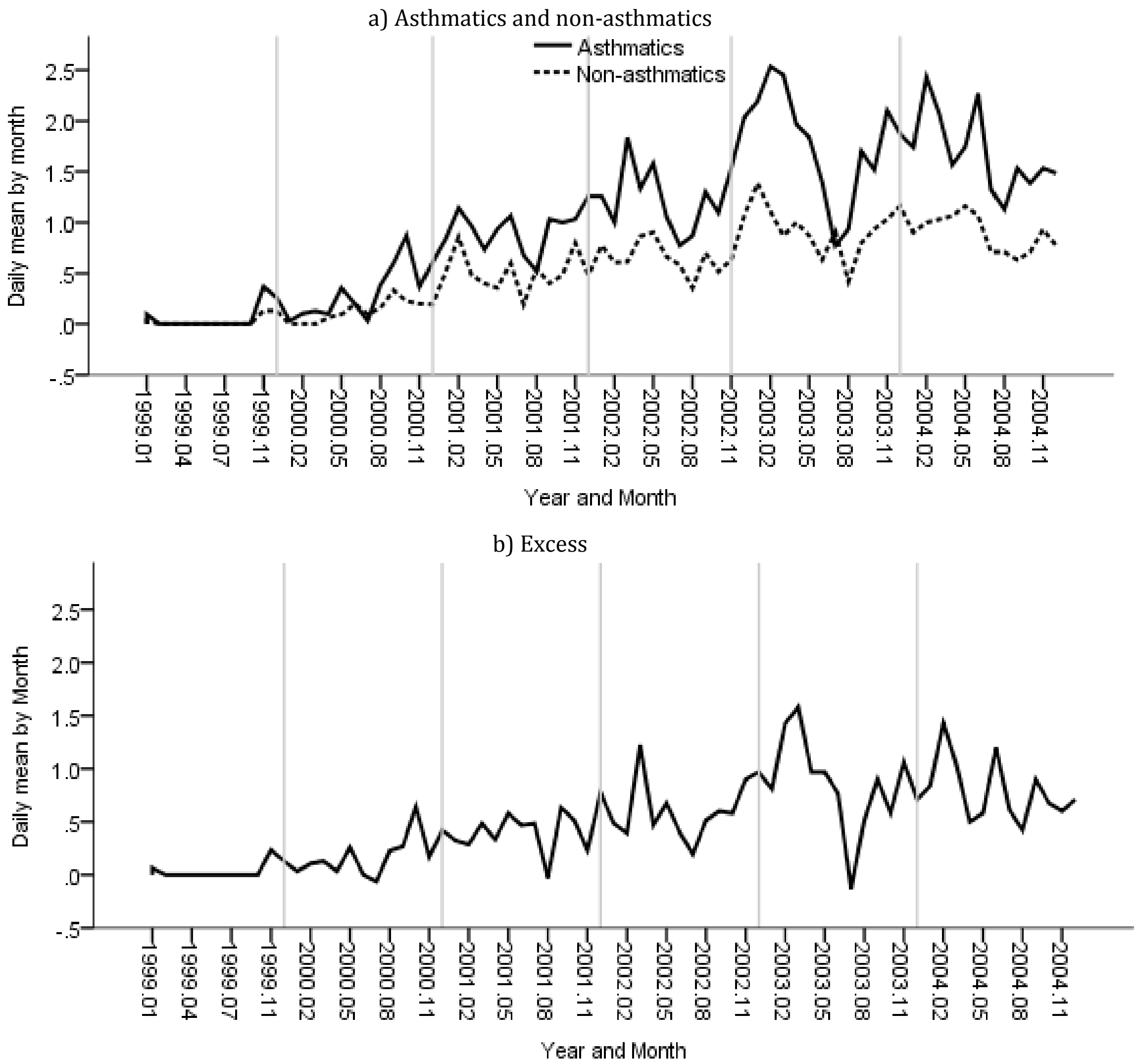


Figure C1. 112: Scotland Emergency Consultations - plot of the daily mean number of contacts aggregated by month 1999-2004 a) Asthmatics and non-asthmatics and b) Excess.

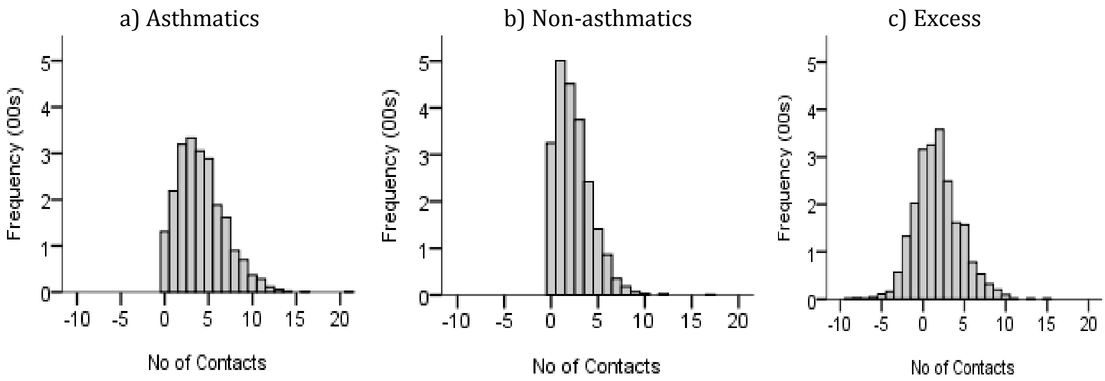


Figure C1. 113: Scotland Emergency Counts – distribution of the daily number of contact a) Asthmatics, b) Non-asthmatics and c) Excess.

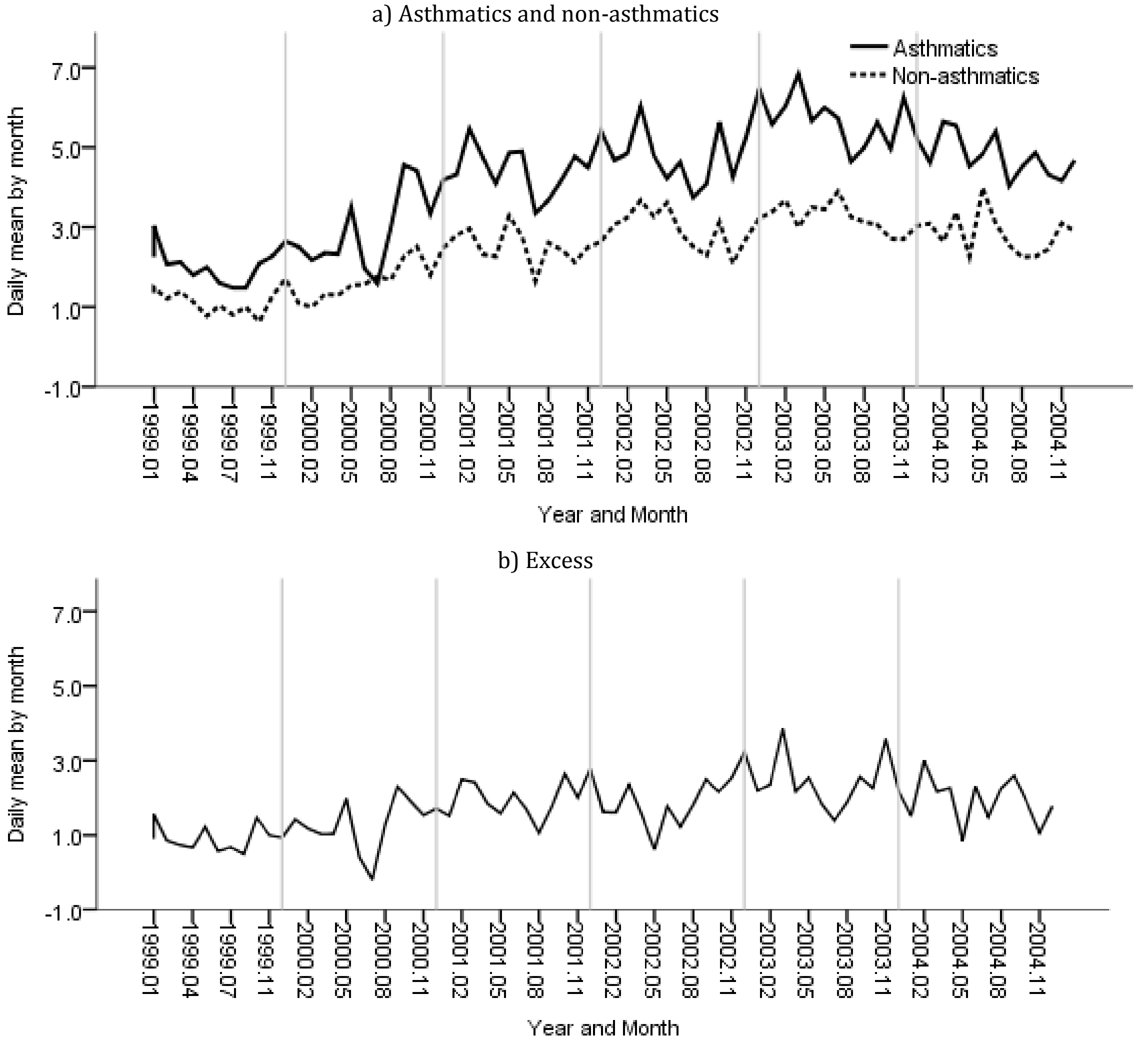


Figure C1. 114: Scotland Emergency Counts - plot of the daily mean number of contacts aggregated by month 1999-2004 a) Asthmatics and non-asthmatics and b) Excess.

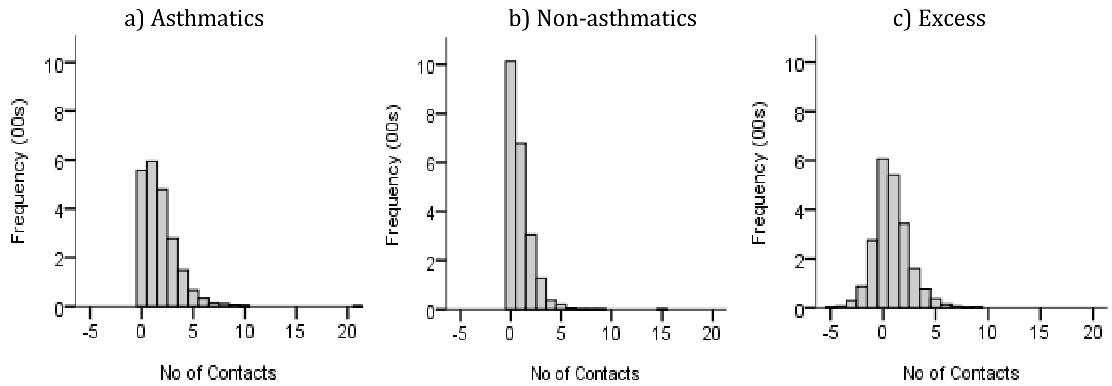


Figure C1. 115: Scotland Out of Hours Counts – distribution of the daily number of contact a) Asthmatics, b) Non-asthmatics and c) Excess.

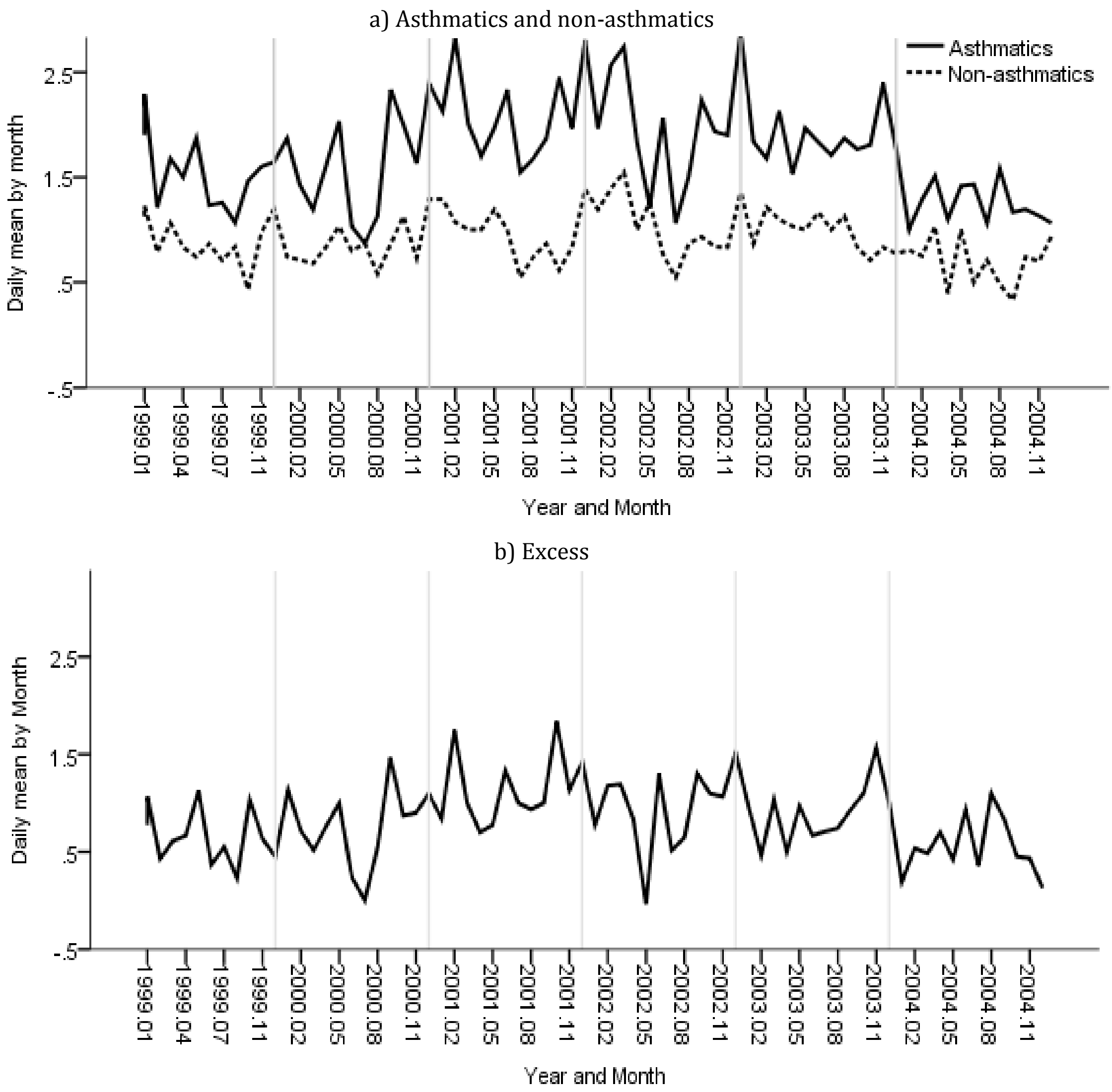


Figure C1. 116: Scotland Out of Hours Counts - plot of the daily mean number of contacts aggregated by month 1999-2004 a) Asthmatics and non-asthmatics and b) Excess.

Table C. 11: Scotland - sum of the total number of daily counts

Medical Contacts	Asthmatics	Non-asthmatics
All Counts	152477	73652
Acute Visits	784	407
Casualty Counts	2281	1716
Emergency Consultations	2213	1157
Emergency Counts	9075	5264
Out of Hours Counts	3792	1984

C2. Environmental Datasets

C2.1. Bland Altman Investigation England

Table C. 12: Results from the Bland-Altman investigation, mean pollutant measures only.

Pollutant exposure	Difference between		Mean	SD	Lower limit of agreement	Upper limit of agreement	Nº of points outside limits (n=72)
NO	Bristol	Sheffield	5.17	11.00	-16.39	26.73	3
	Birmingham		-12.70	6.47	-25.39	-0.02	3
	London		-12.79	8.64	-29.72	4.14	3
	Manchester		-2.47	9.73	-21.53	16.59	6
	Newcastle		-10.34	8.48	-26.97	6.28	5
	Cardiff		-14.82	8.72	-31.90	2.27	3
NO_2	Bristol	Sheffield	1.22	6.13	-10.80	13.23	3
	Birmingham		-1.07	4.97	-10.82	8.67	3
	London		-1.93	6.08	-13.85	9.99	3
	Manchester		6.60	5.28	-3.74	16.94	6
	Newcastle		-4.81	5.43	-15.45	5.83	2
	Cardiff		-3.58	4.93	-13.24	6.07	4
NOD	Bristol	Sheffield	9.14	19.90	-29.87	48.15	4
	Birmingham		-20.33	12.84	-45.51	4.84	3
	London		-21.33	16.08	-52.85	10.18	4
	Manchester		2.85	18.45	-33.31	39.00	5
	Newcastle		-20.56	17.02	-53.92	12.80	3
	Cardiff		17.96	13.94	-9.36	45.29	3
SO_2	Bristol	Sheffield	-1.27	2.46	-6.10	3.56	2
	Birmingham		-0.76	2.15	-4.98	3.45	4
	London		-4.62	2.62	-9.76	0.52	7
	Manchester		3.63	3.87	-3.95	11.21	0
	Newcastle		-2.57	2.77	-8.00	2.86	1
	Cardiff		-3.24	2.11	-7.38	0.89	2
PM_{10}	Bristol	Sheffield	1.01	3.01	-4.88	6.90	1
	Birmingham		-1.77	2.52	-6.70	3.16	4
	London		-1.27	2.91	-6.97	4.43	1
	Manchester		4.20	6.77	-9.06	17.46	4
	Newcastle		-6.01	2.88	-11.66	-0.35	5
	Cardiff		3.05	4.15	-5.09	11.18	4
O_3	Bristol	Sheffield	3.60	5.30	-6.79	13.99	4
	Birmingham		2.40	4.44	-6.30	11.11	2
	London		1.44	7.84	-13.93	16.80	2
	Manchester		-9.74	4.67	-18.91	-0.58	3
	Newcastle		3.91	4.64	-5.19	13.00	4
	Cardiff		-35.82	9.39	-54.21	-17.42	1
CO	Bristol	Sheffield	0.12	0.12	-0.11	0.35	2
	Birmingham		-0.01	0.12	-0.25	0.24	1
	London		-0.13	0.13	-0.37	0.12	3
	Manchester		0.00	0.10	-0.20	0.20	5
	Newcastle		-0.03	0.17	-0.36	0.30	0
	Cardiff		-0.01	0.12	-0.24	0.23	1

For pollutant measures, the number of data points that fall outside the CIs ranged from 0 to 7 (Table C.12). The vast majority of data points comparing the six locations and Sheffield fall within the limits of agreement. Data points falling outside the CIs exceeded 4 on only 7 occasions (out of a possible 42 comparisons).

Table C. 13: Results from the Bland-Altman investigation, weather exposures.

Weather exposure	Difference between		Mean	SD	Lower limit of agreement	Upper limit of agreement	Nº of points outside limits (n=72)
Temperature minimum	Whitby	Sheffield	-0.21	0.60	-1.39	0.97	2
	Yeovilton		-0.49	1.02	-2.48	1.50	3
	Eastbourne		1.90	0.82	0.28	3.51	1
	Heathrow		1.03	0.84	-0.61	2.67	1
	Bradford		-0.51	0.55	-1.59	0.56	1
	Cwmystmyth		-1.42	0.82	-3.02	0.18	3
Temperature maximum	Whitby	Sheffield	-0.64	0.92	-2.43	1.16	1
	Yeovilton		1.01	0.85	-0.66	2.67	2
	Eastbourne		0.64	1.09	-1.49	2.77	2
	Heathrow		1.73	0.82	0.12	3.33	2
	Bradford		-0.54	0.53	-1.59	0.51	2
	Cwmystmyth		-1.56	1.09	-3.69	0.57	1
Sun	Whitby	Sheffield	-18.52	19.10	-55.94	18.91	1
	Yeovilton		-26.20	23.31	-71.90	19.50	4
	Eastbourne		6.80	30.51	-52.99	66.60	2
	Heathrow		-11.56	23.87	-58.35	35.24	2
	Bradford		-83.52	75.38	-231.26	64.21	4
	Cwmystmyth		-61.05	28.88	-117.65	-4.46	3
Rain	Whitby	Sheffield	-43.25	28.34	-98.79	12.29	4
	Yeovilton		-37.82	30.53	-97.67	22.02	4
	Eastbourne		-31.93	40.63	-111.57	47.71	4
	Heathrow		-45.72	33.38	-111.14	19.70	4
	Bradford		10.28	69.77	-126.47	147.04	2
	Cwmystmyth		64.27	69.57	-72.08	200.63	5

For weather measures, the number of data points that fall outside the CIs ranged from 0 to 5 (Table C.13). The vast majority of data points comparing the six locations and Sheffield fall within the limits of agreement. Data points falling outside the CIs exceeded 4 on only 1 occasion (out of a possible 24 comparisons).

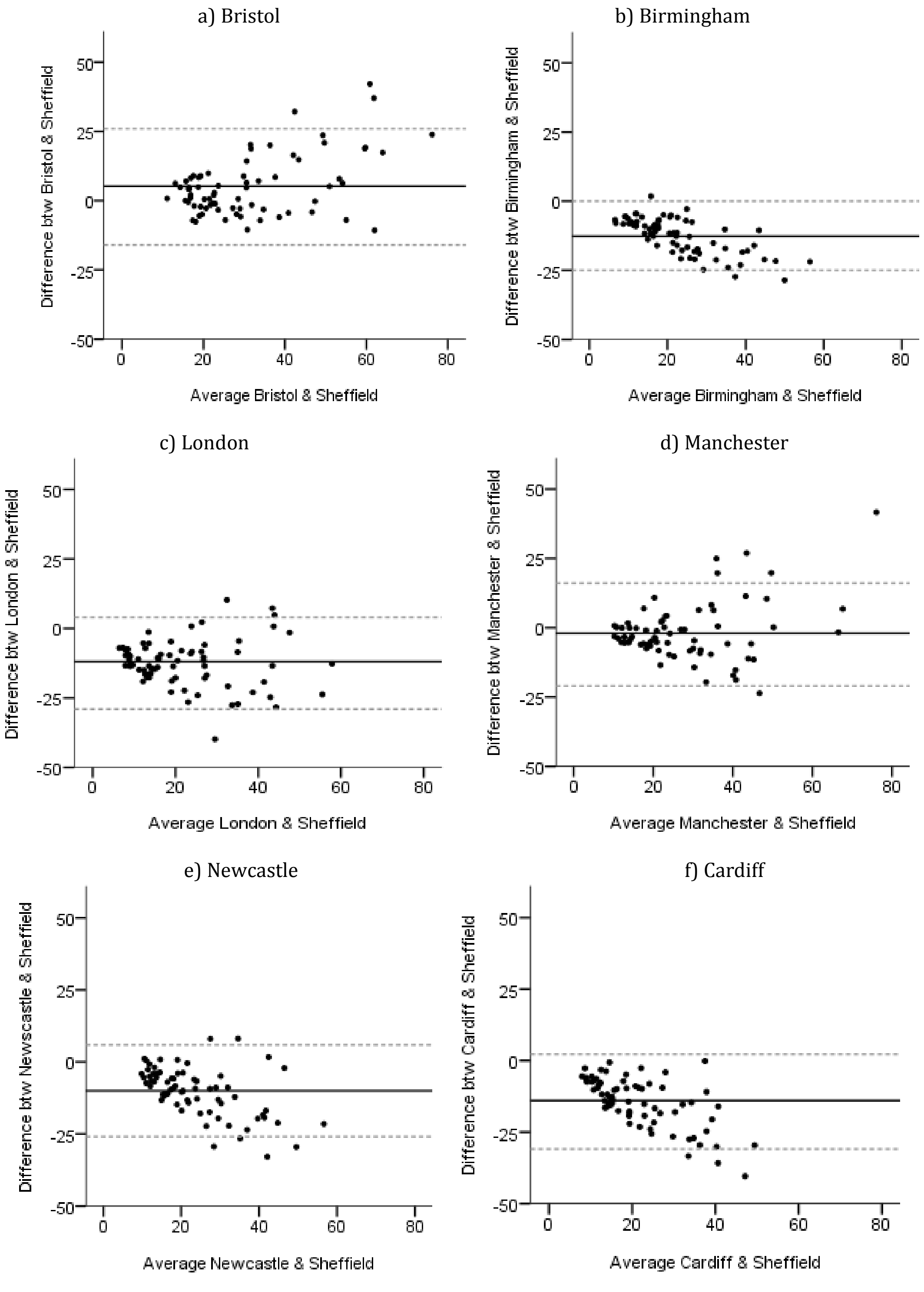


Figure C2. 1: England and Wales - NO mean Bland-Altman Plots.

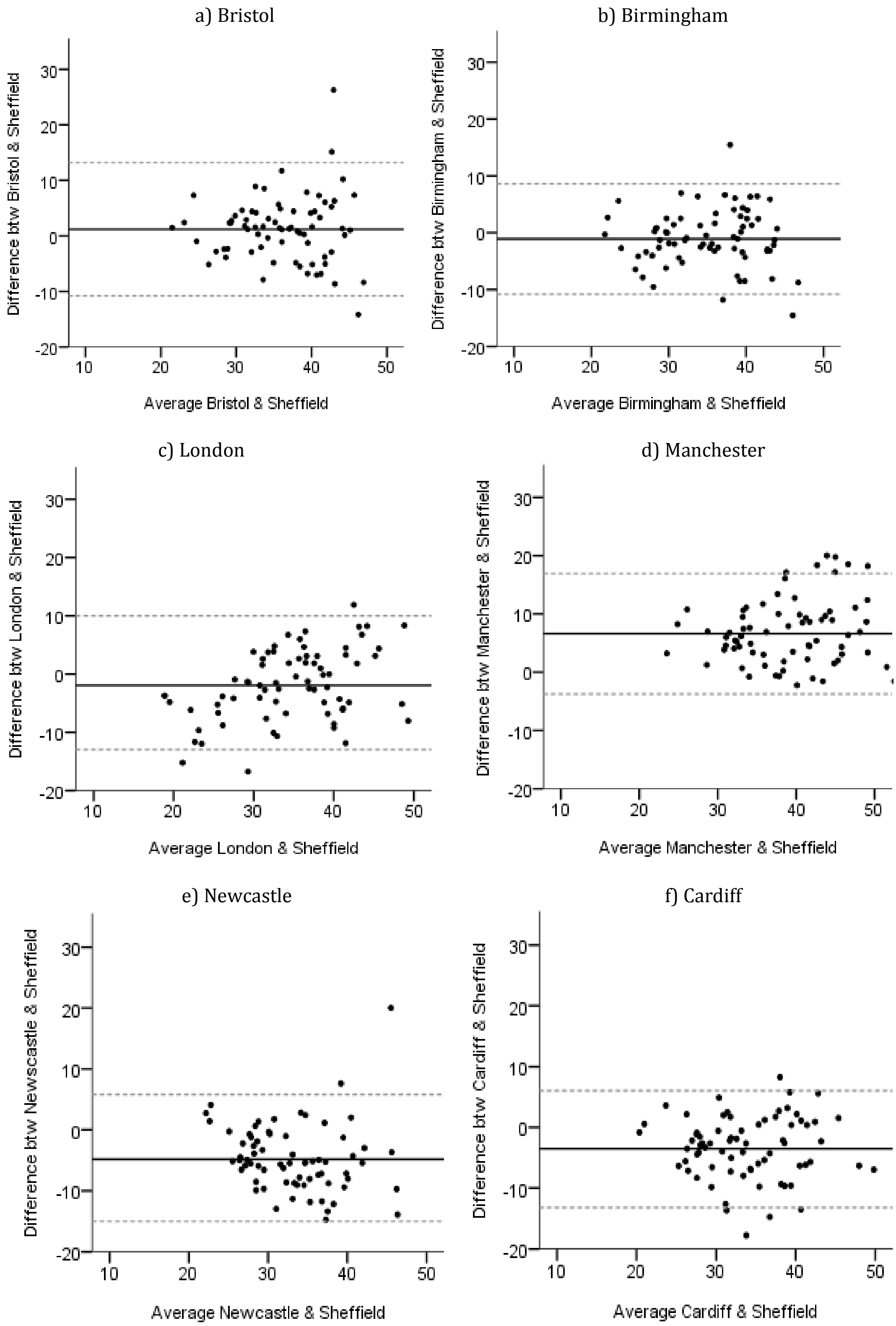


Figure C2. 2: England and Wales - NO_2 mean Bland-Altman Plots.

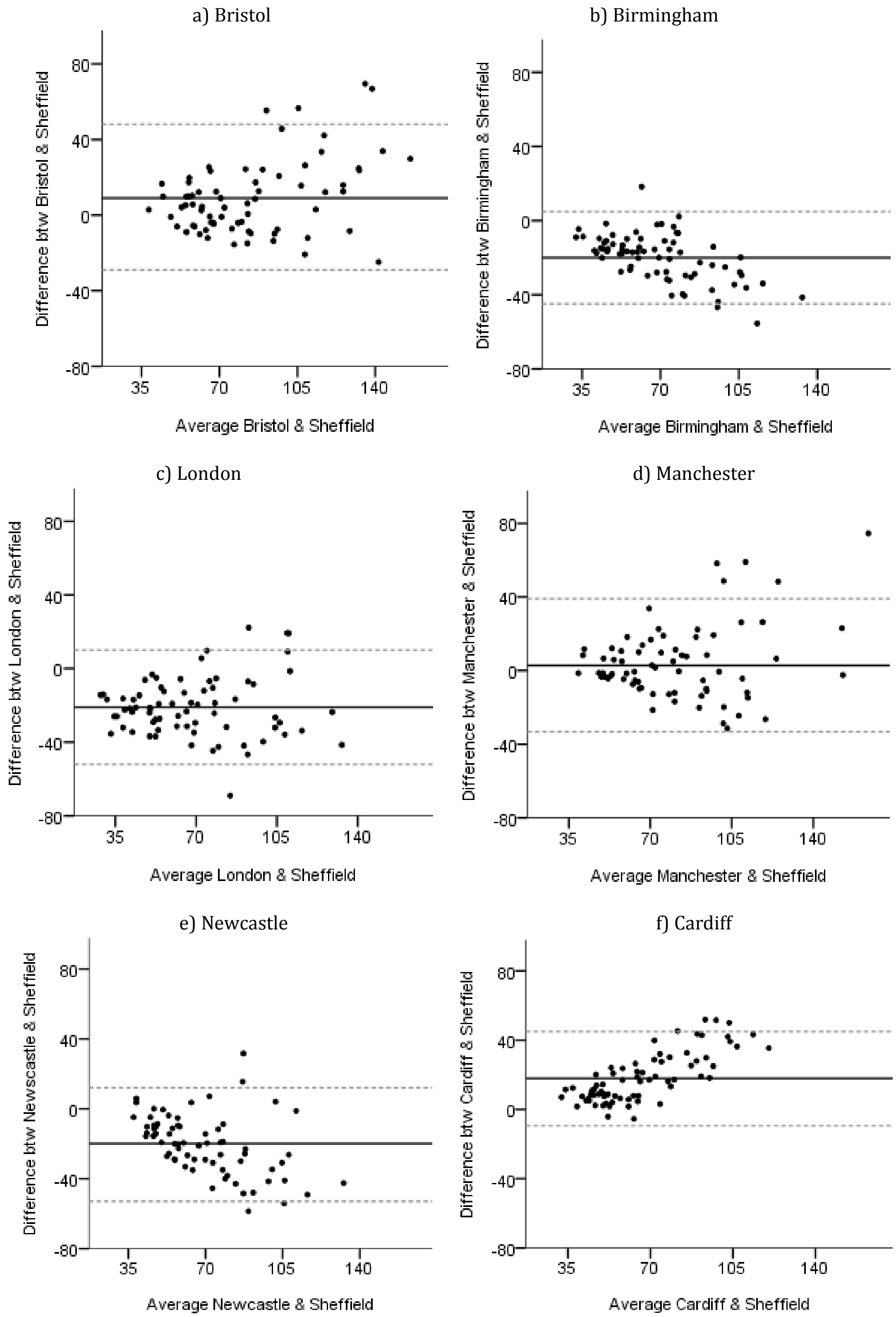


Figure C2. 3: England and Wales - NOD mean Bland-Altman Plots.

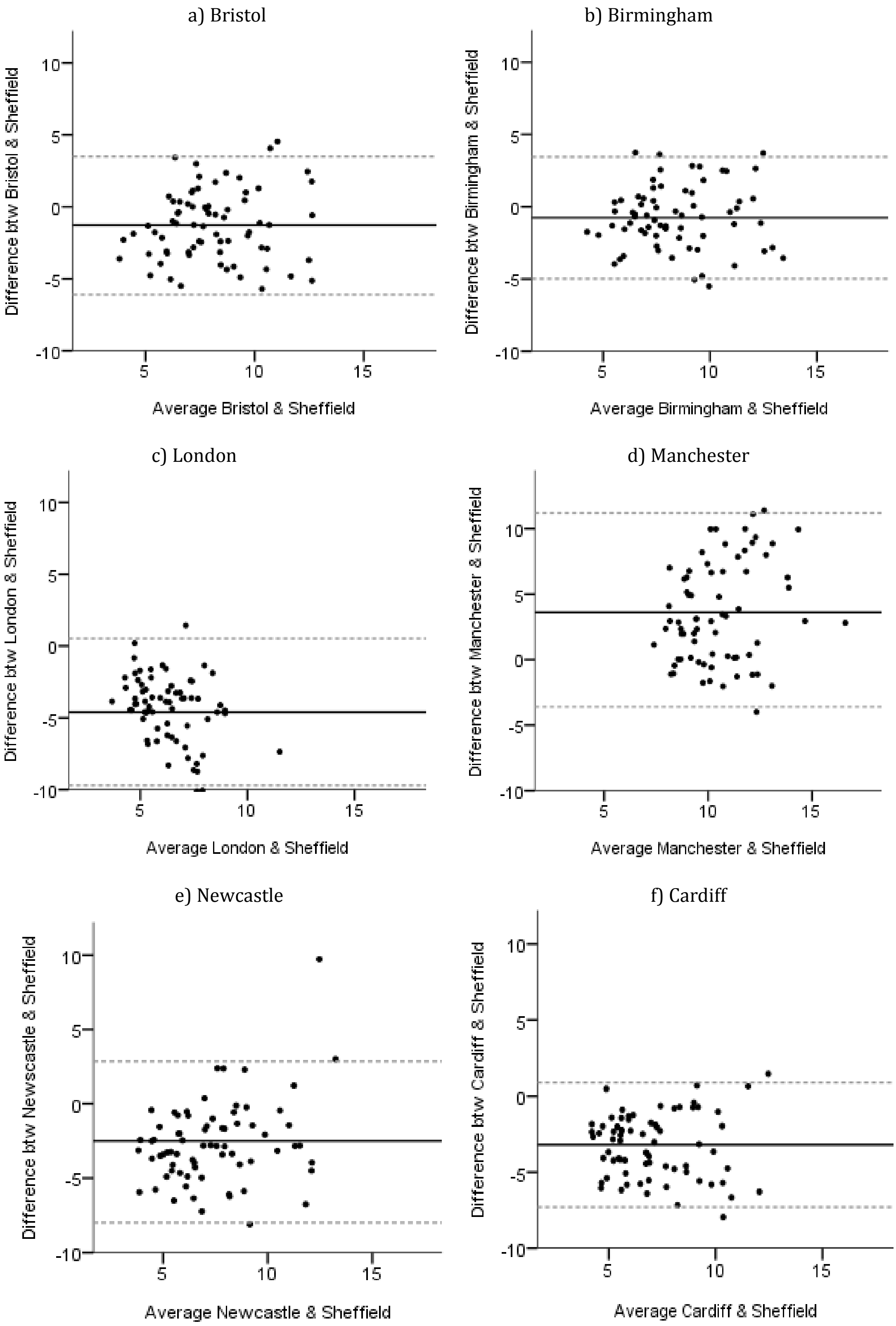


Figure C2. 4: England and Wales - SO_2 mean Bland-Altman Plots.

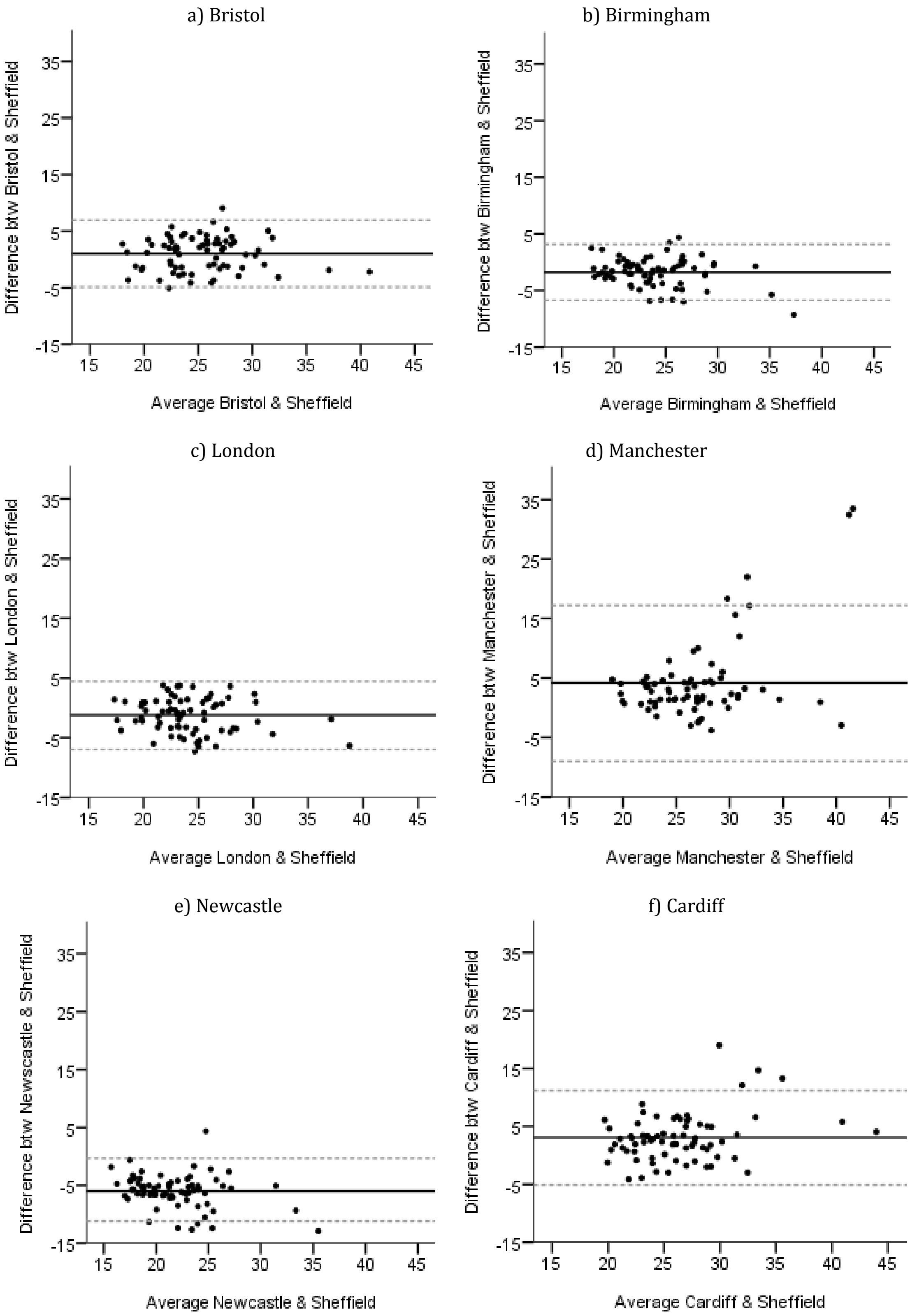


Figure C2. 5: England and Wales - PM_{10} mean Bland-Altman Plots.

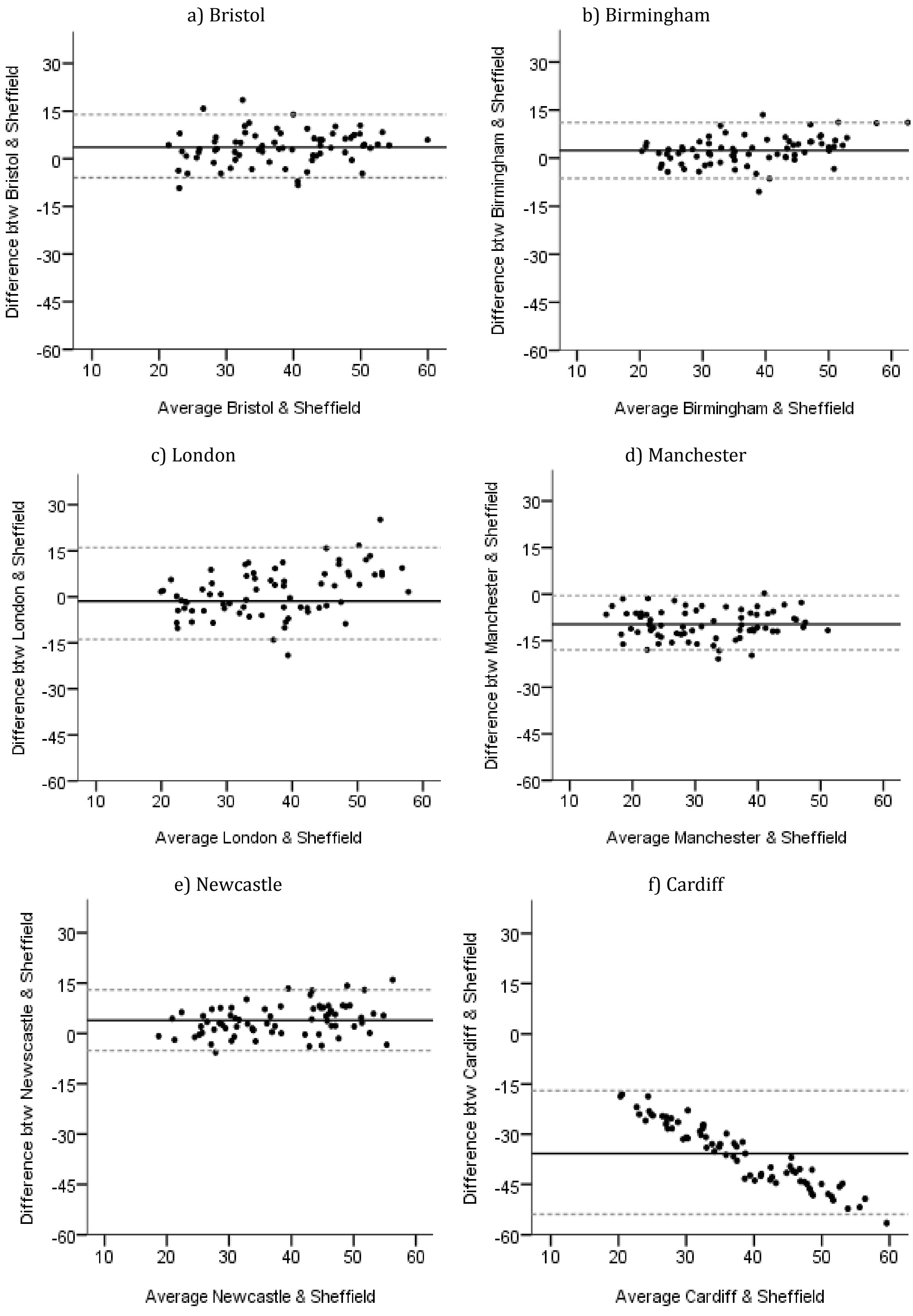


Figure C2. 6: England and Wales - O_3mean Bland-Altman Plots.

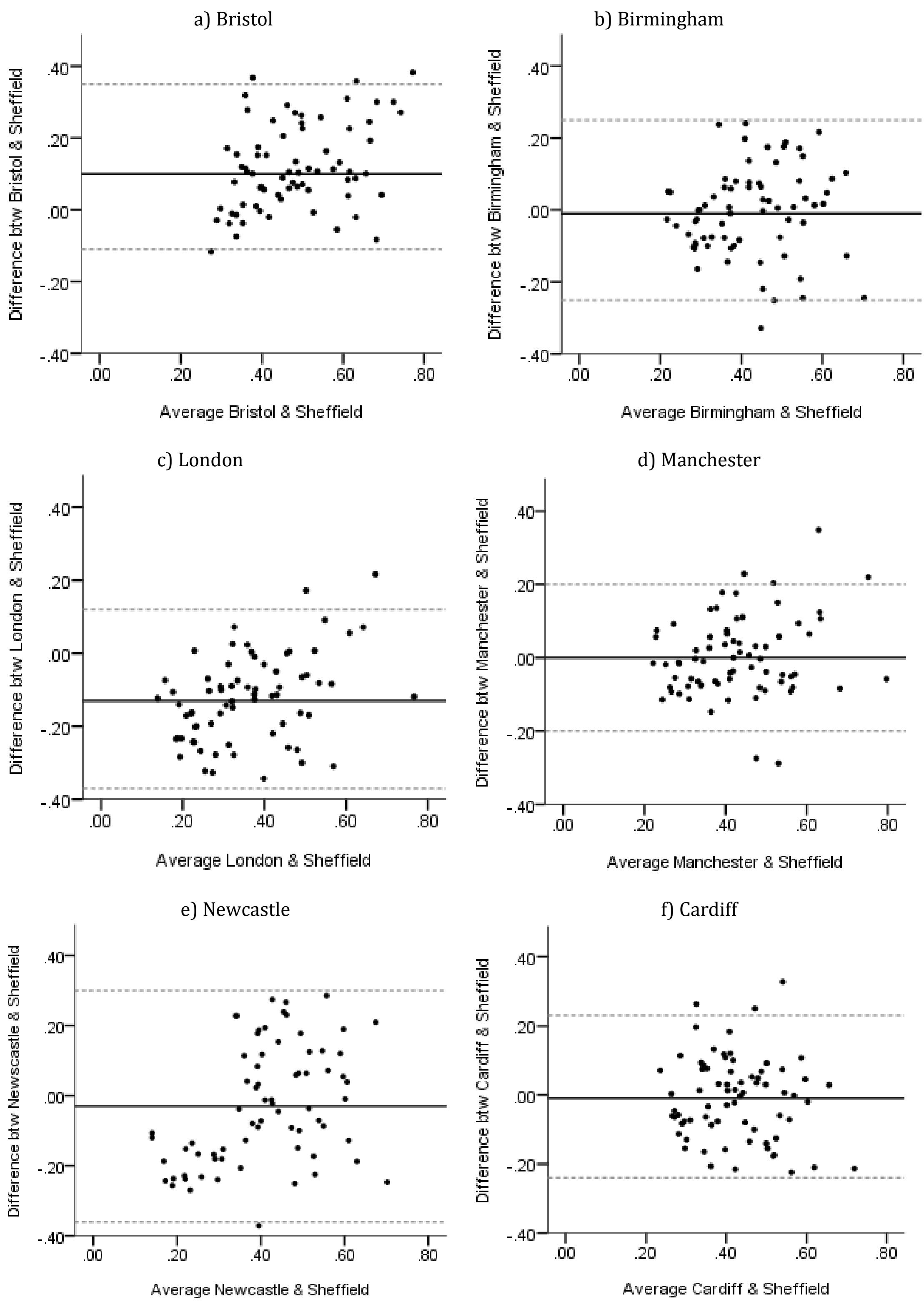


Figure C2. 7: England and Wales - CO mean Bland-Altman Plots.

Plots illustrating Sheffield’s measures amongst other locations

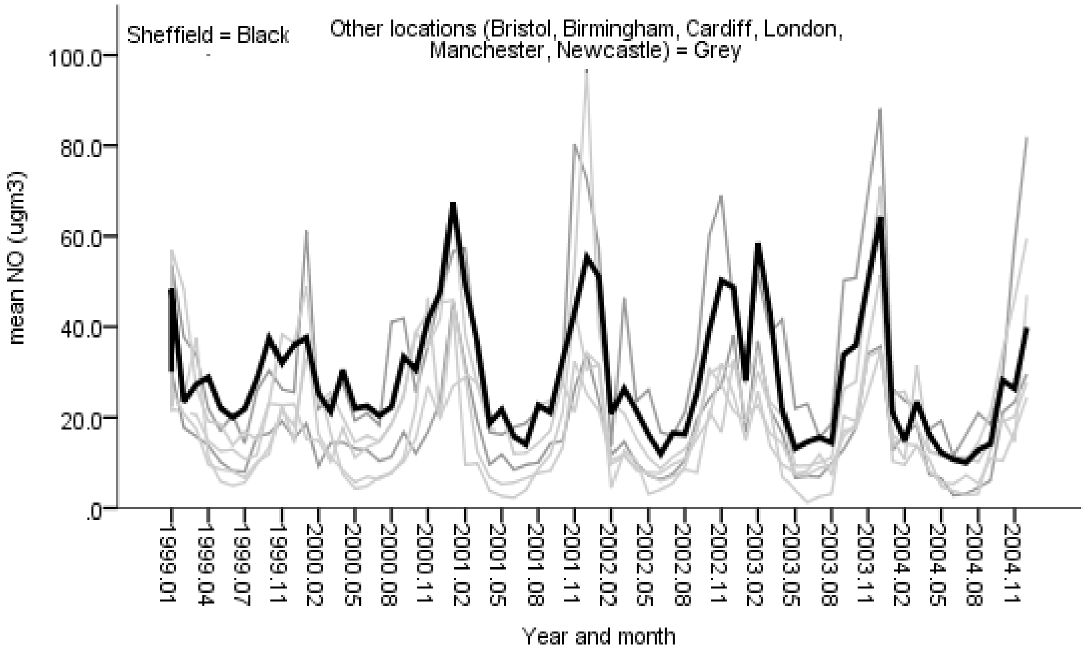


Figure C2. 8: England and Wales - Plot of Monthly Means NO.

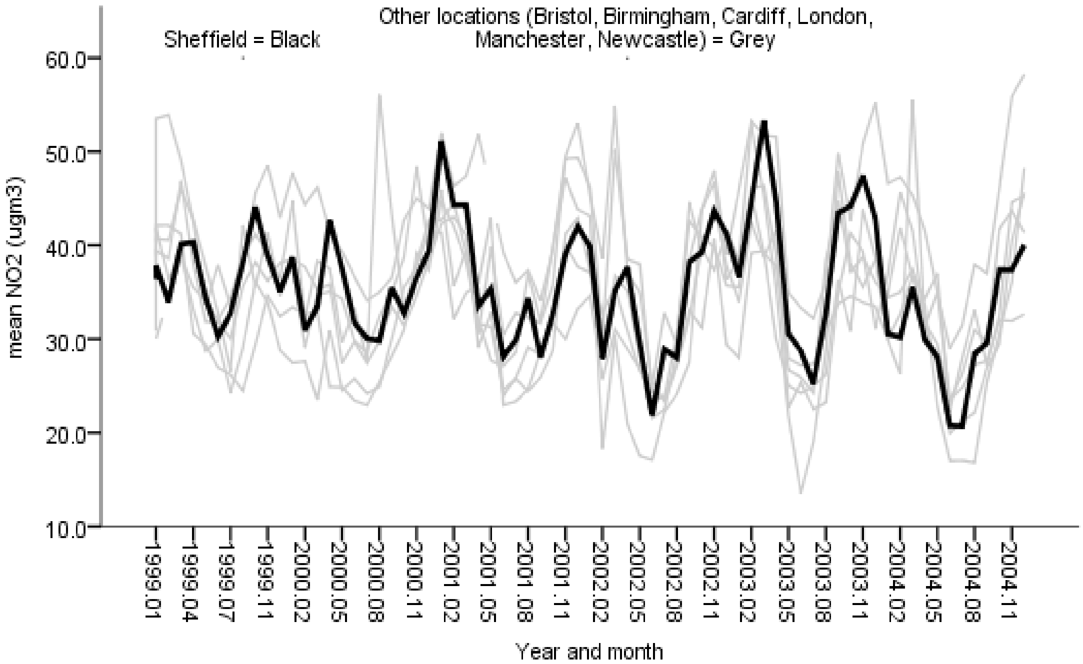


Figure C2. 9: England and Wales - Plot of Monthly Means NO_2.

Outliers, Manchester

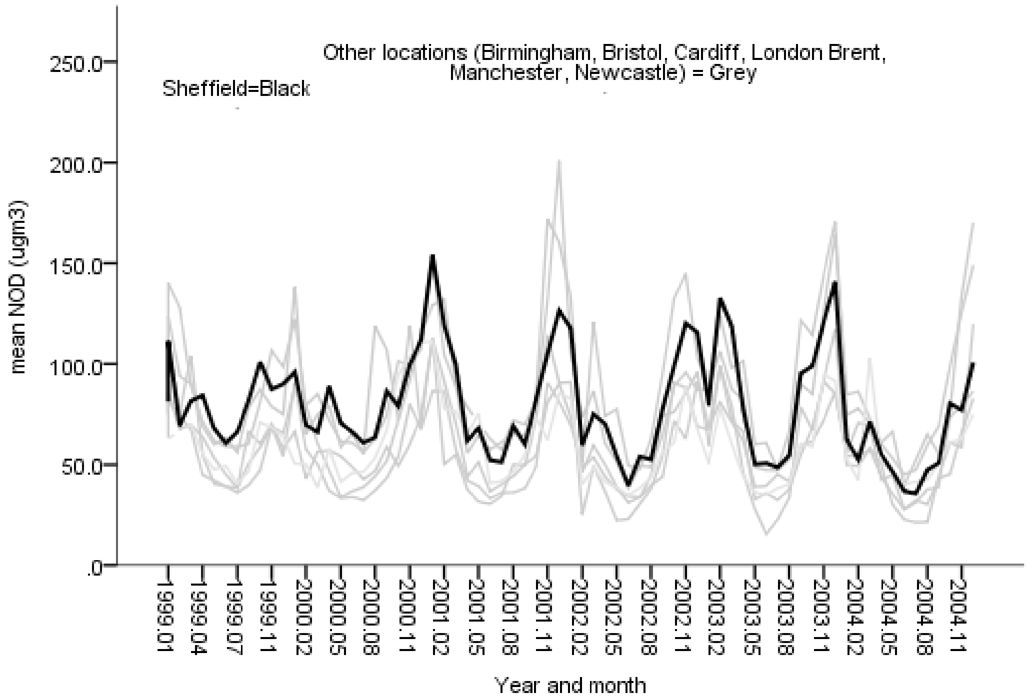


Figure C2. 10: England and Wales - Plot of Monthly Means NOD.

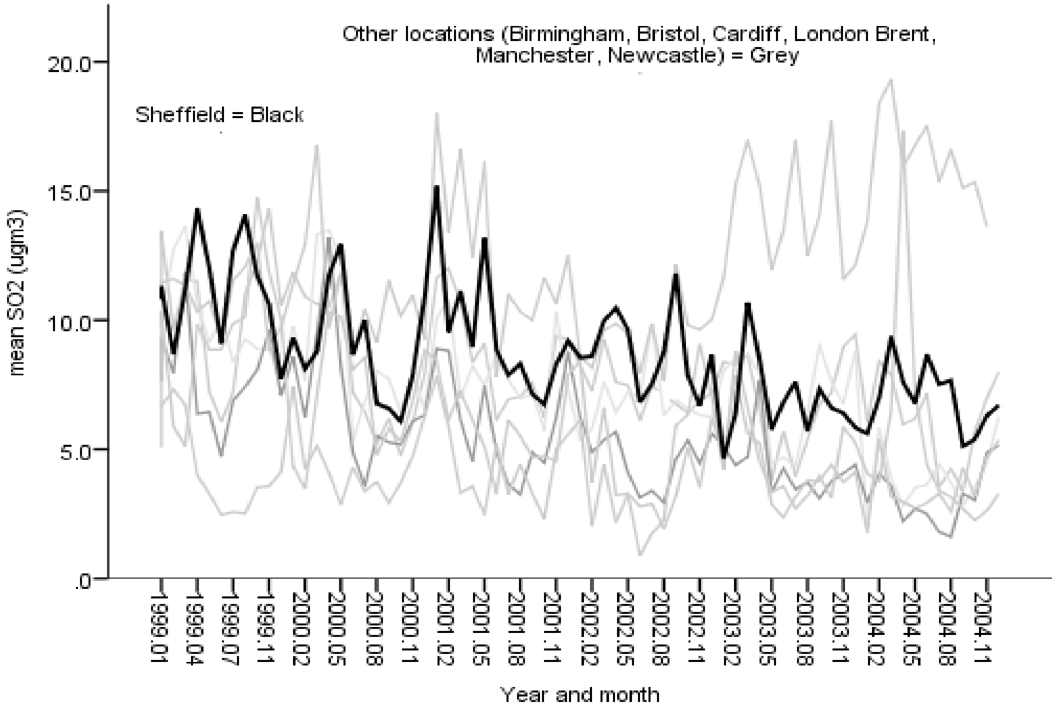


Figure C2. 11: England and Wales - Plot of Monthly Means SO_2.

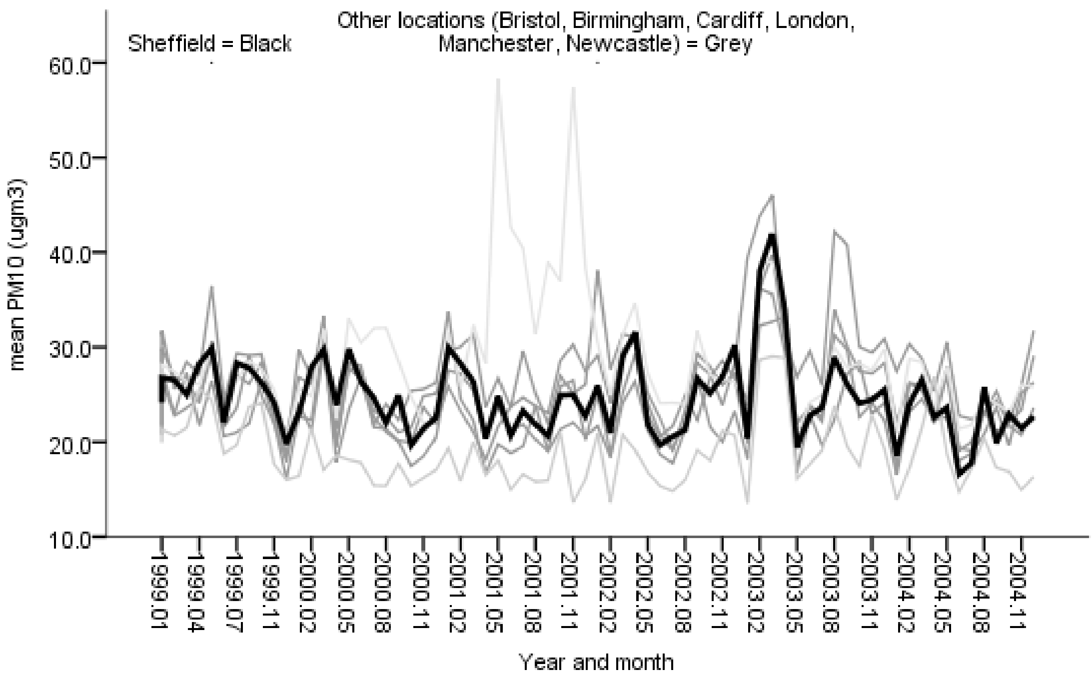


Figure C2. 12: England and Wales - Plot of Monthly Means PM_{10}.

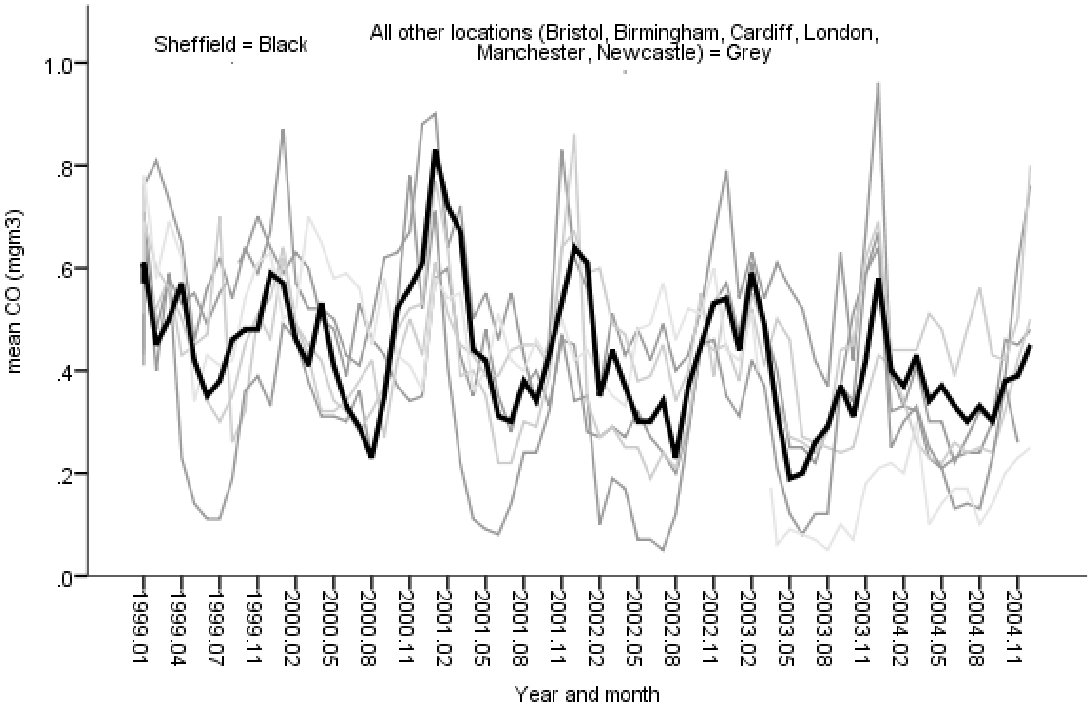


Figure C2. 13: England and Wales - Plot of Monthly Means CO.

England Weather

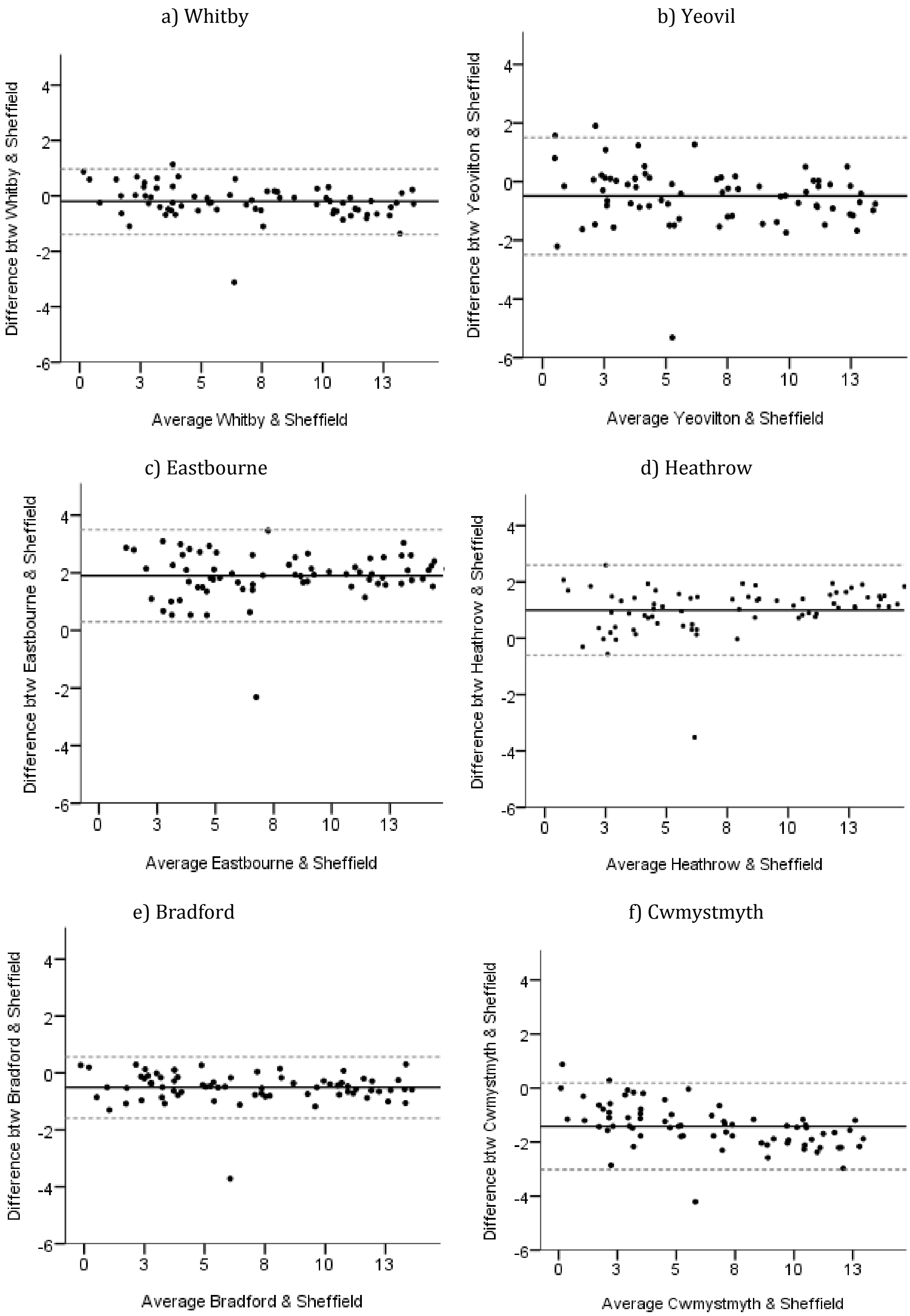


Figure C2. 14: England and Wales - Temperature minimum Bland-Altman Plots.

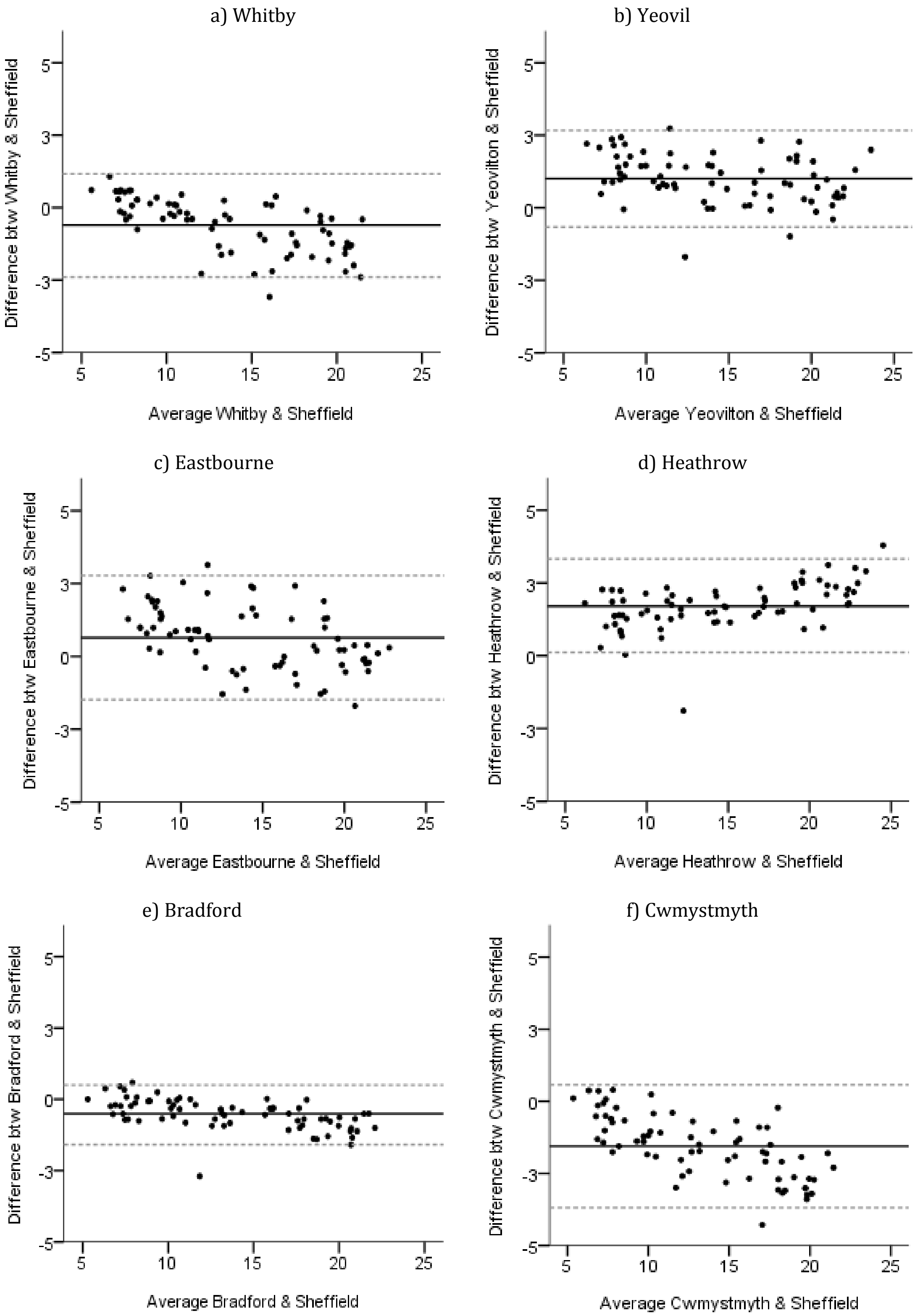


Figure C2. 15: England and Wales - Temperature maximum Bland-Altman Plots.

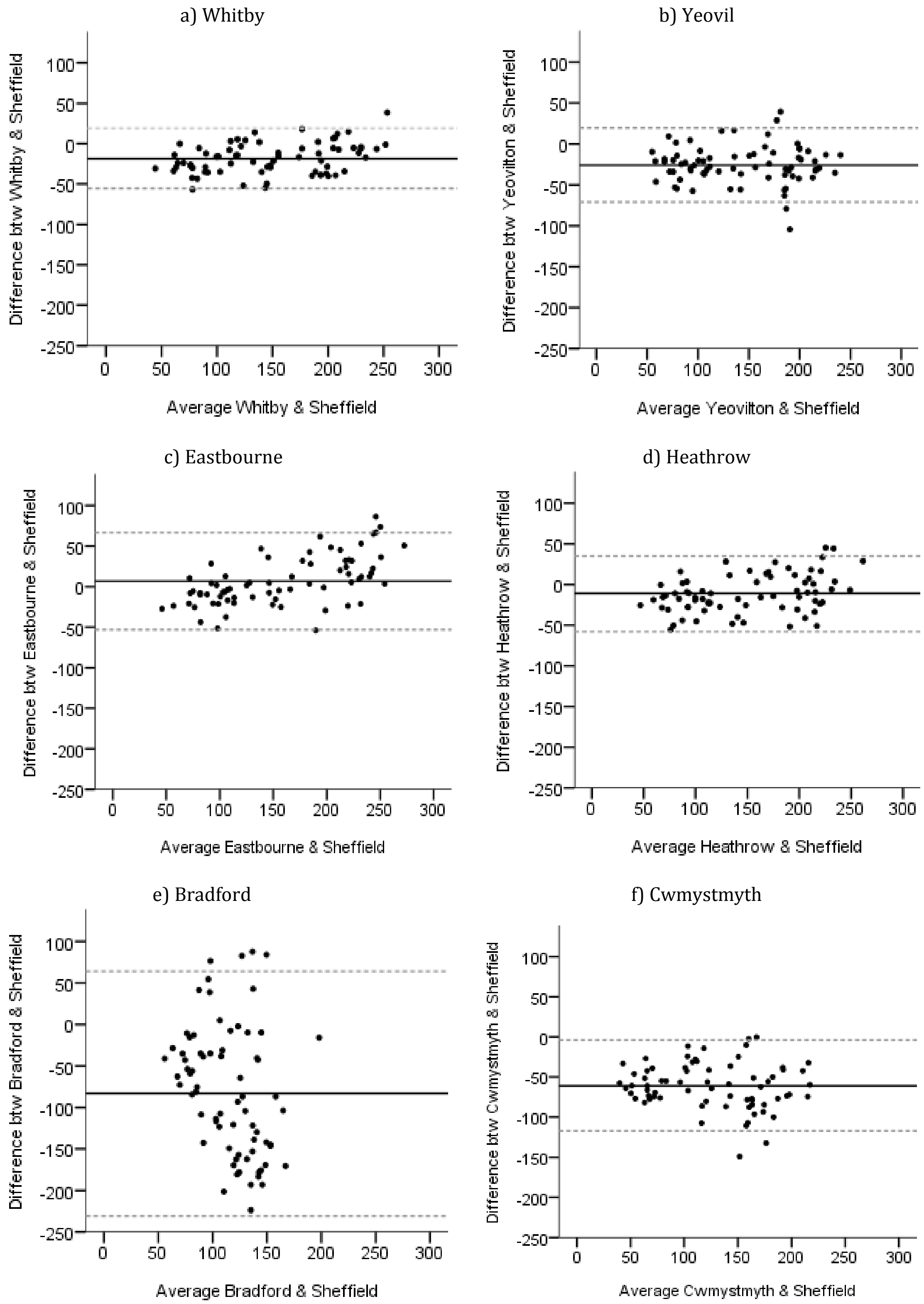


Figure C2. 16: England and Wales - Sun Bland-Altman Plots.

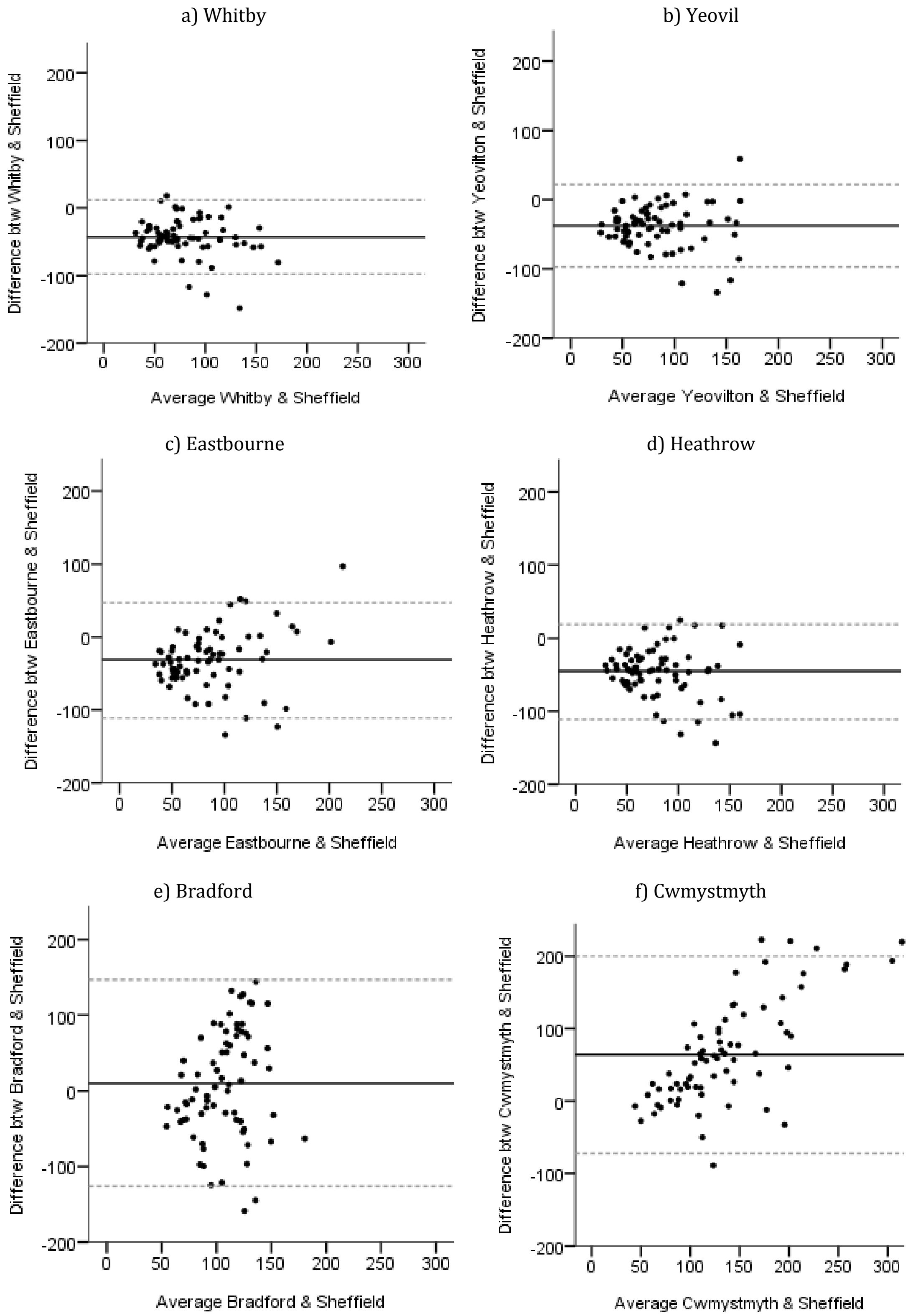


Figure C2. 17: England and Wales - Rain Bland-Altman Plots,

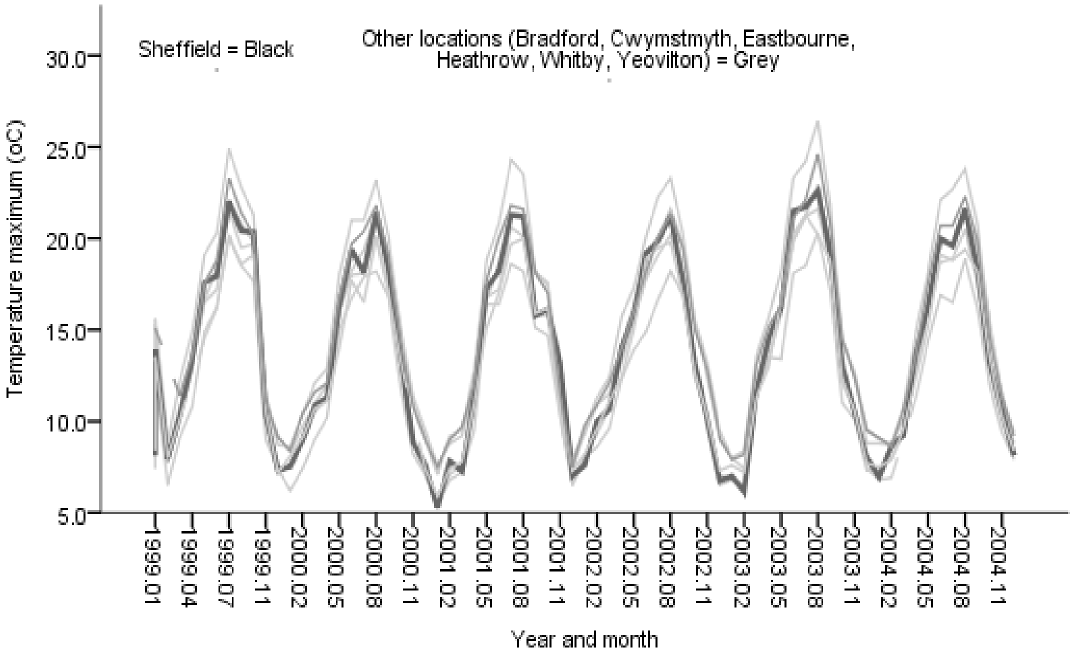


Figure C2. 18: England and Wales - Plot of Monthly Means Temperature maximum.

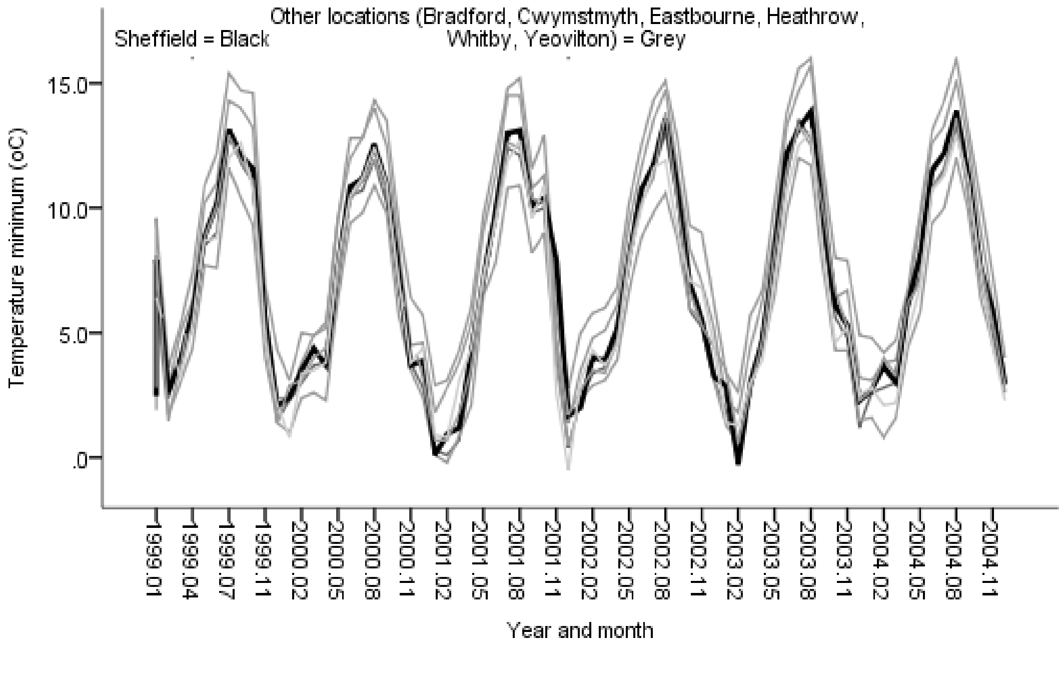


Figure C2. 19: England and Wales - Plot of Monthly Means Temperature minimum.

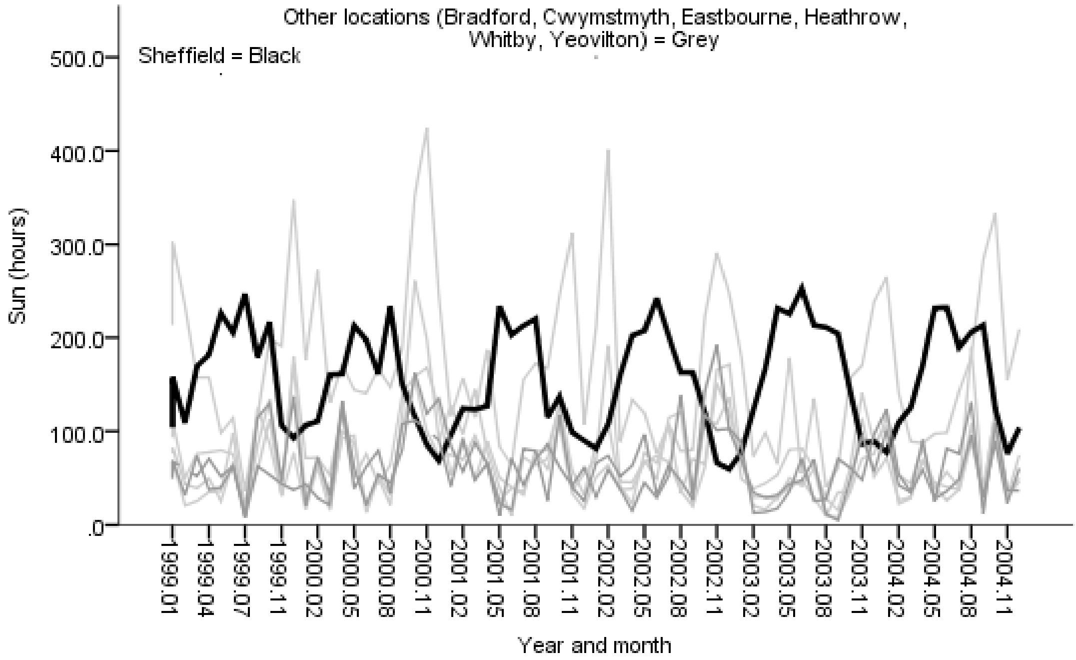


Figure C2. 20: England and Wales - Plot of Monthly Means Sun.

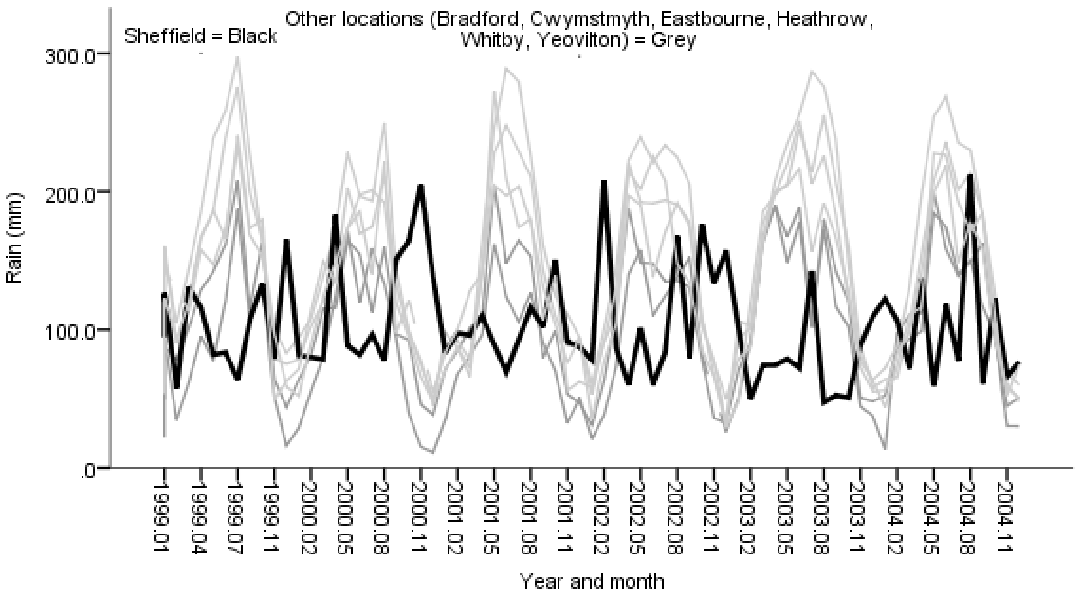


Figure C2. 21: England and Wales - Plot of Monthly Means Rain.

Scotland Pollution

Majority of AURN sites in Scotland are not urban background sites. If the site were urban background sites, then a number of the data were missing.

Scotland Weather

Table C. 14: Scotland Results from the Bland-Altman Investigation, Weather Exposures.

Measure	Difference Between		Mean	SD	Lower CI	Upper CI	No of Data points
Temperature minimum	Wick Airport	Aberdeen	-0.45	0.64	-1.70	0.81	3
	Dunstaffnage		0.93	0.70	-0.44	2.30	1
	Paisley		0.73	0.68	-0.60	2.07	3
	Eskdalemuir		-1.56	0.67	-2.87	-0.26	2
Temperature maximum	Wick Airport	Aberdeen	-0.90	0.73	-2.33	0.54	1
	Dunstaffnage		1.01	0.93	-0.81	2.84	4
	Paisley		1.48	0.90	-0.29	3.25	3
	Eskdalemuir		-0.45	0.73	-1.88	0.99	5
Rainfall	Wick Airport	Aberdeen	1.36	34.32	-65.90	68.62	3
	Dunstaffnage		68.22	72.50	-73.88	210.31	5
	Paisley		30.40	55.23	-77.85	138.65	1
	Eskdalemuir		33.75	73.77	-110.83	178.33	4
Sun	Paisley	Aberdeen	-14.95	23.62	-61.247	31.34	2
	Eskdalemuir		16.44	103.12	-185.67	218.54	3

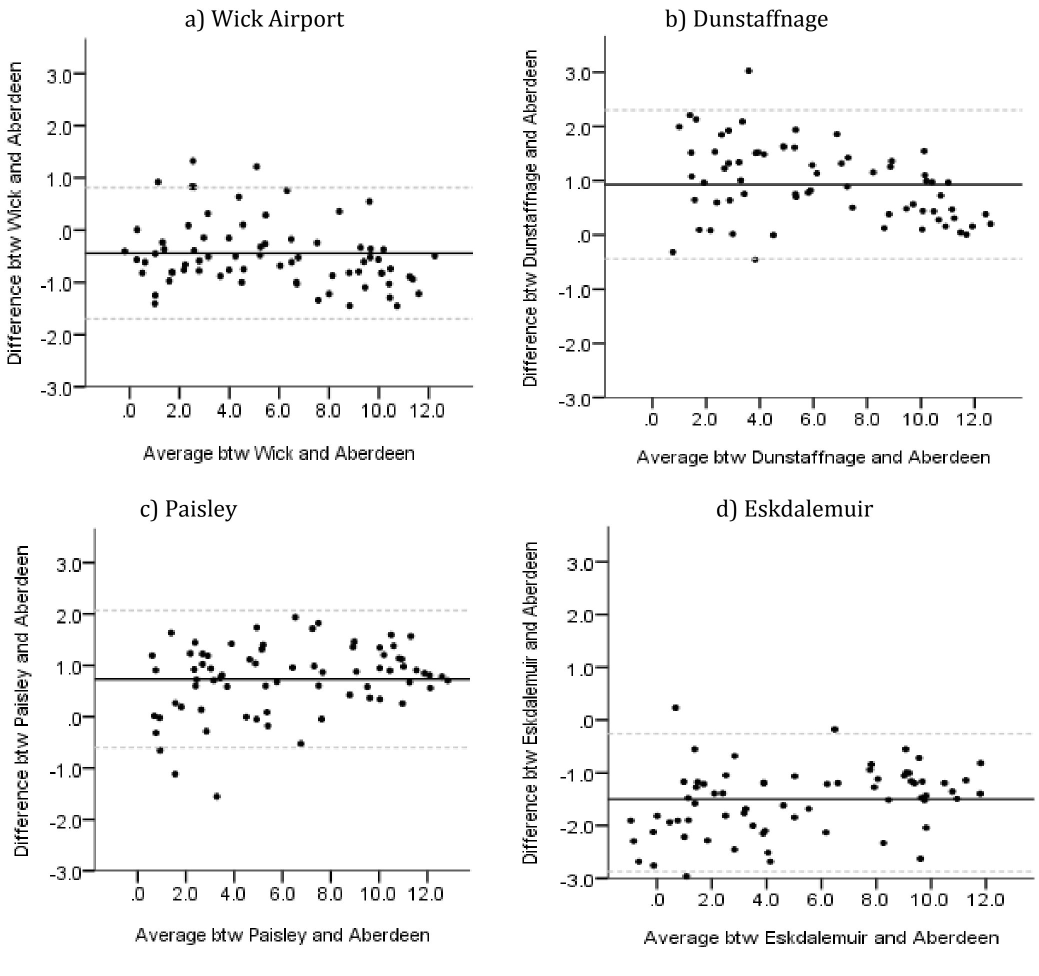


Figure C2. 22: Scotland Temperature minimum Bland-Altman Plot.

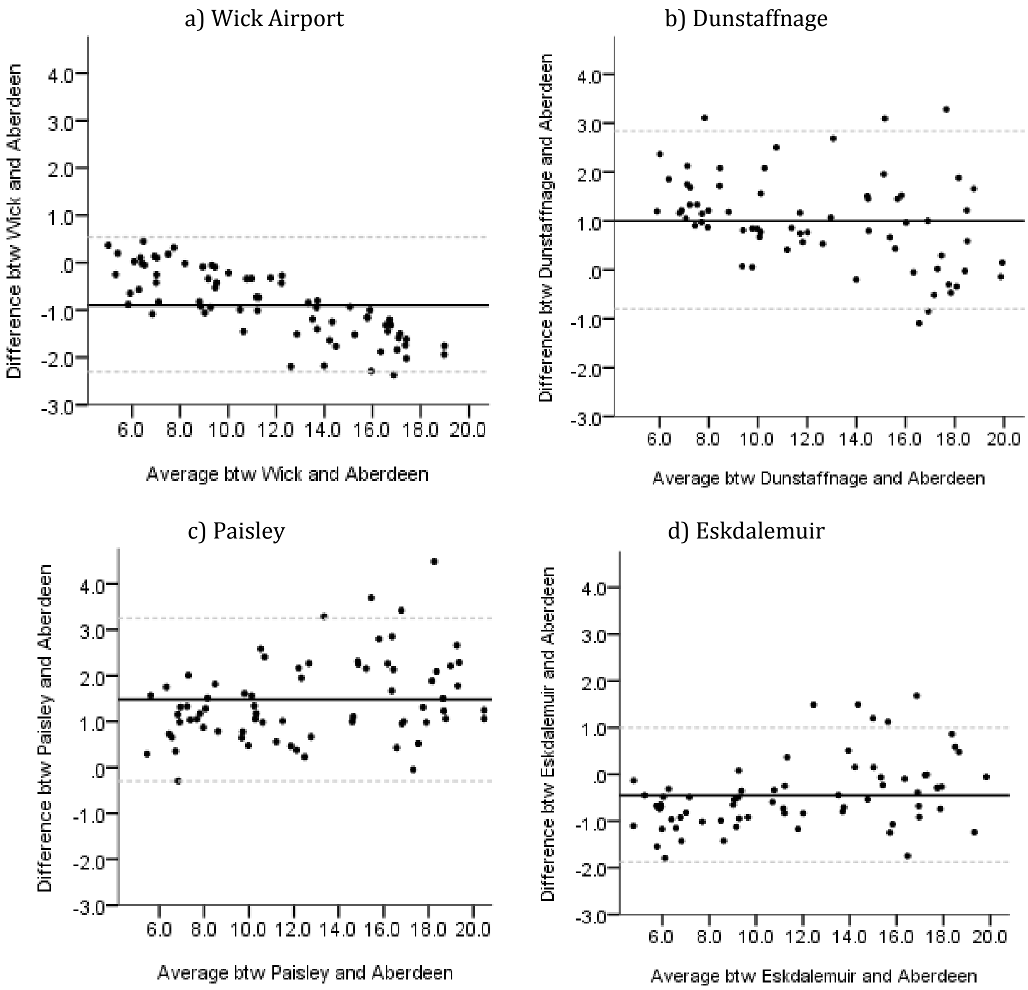


Figure C2. 23: Scotland Temperature maximum Bland-Altman Plot.

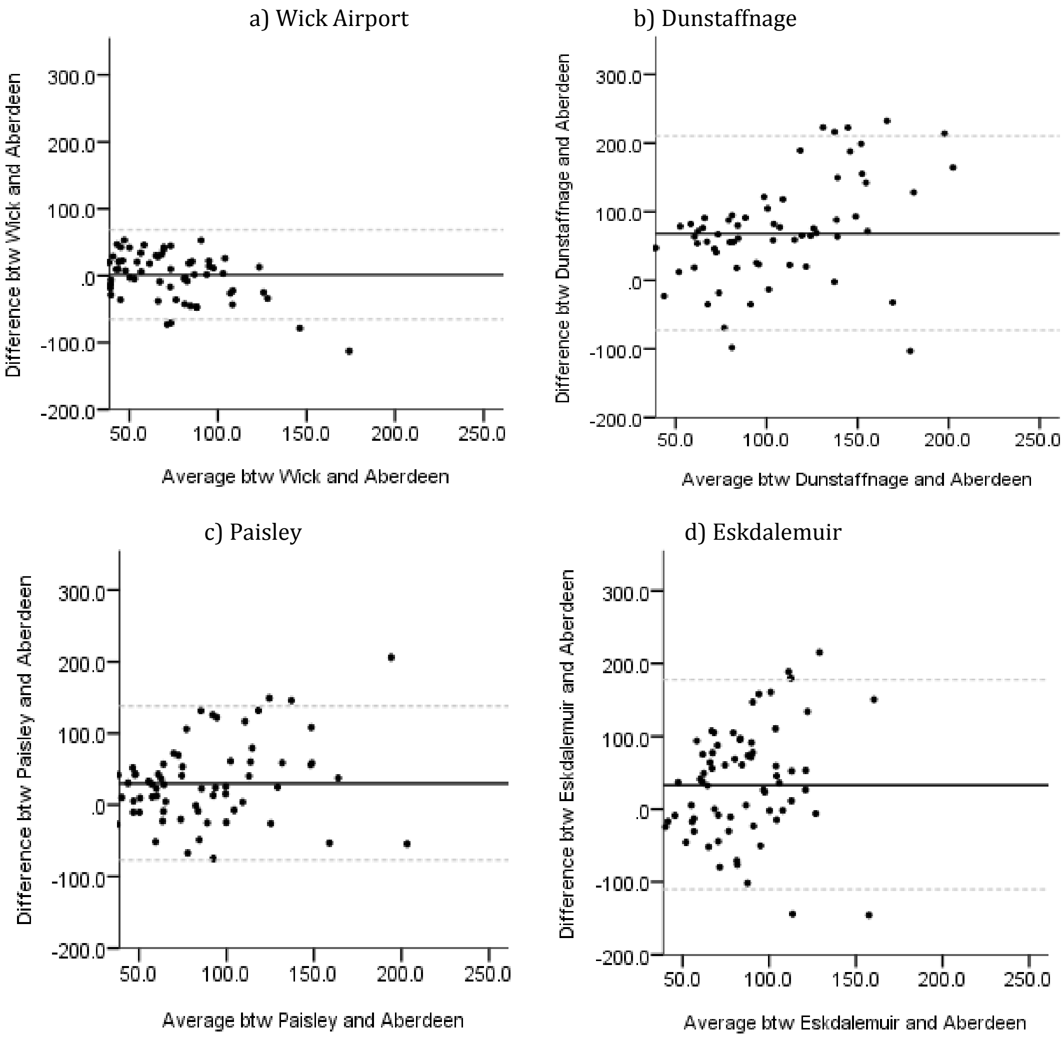


Figure C2. 24: Rain Bland-Altman Plot.

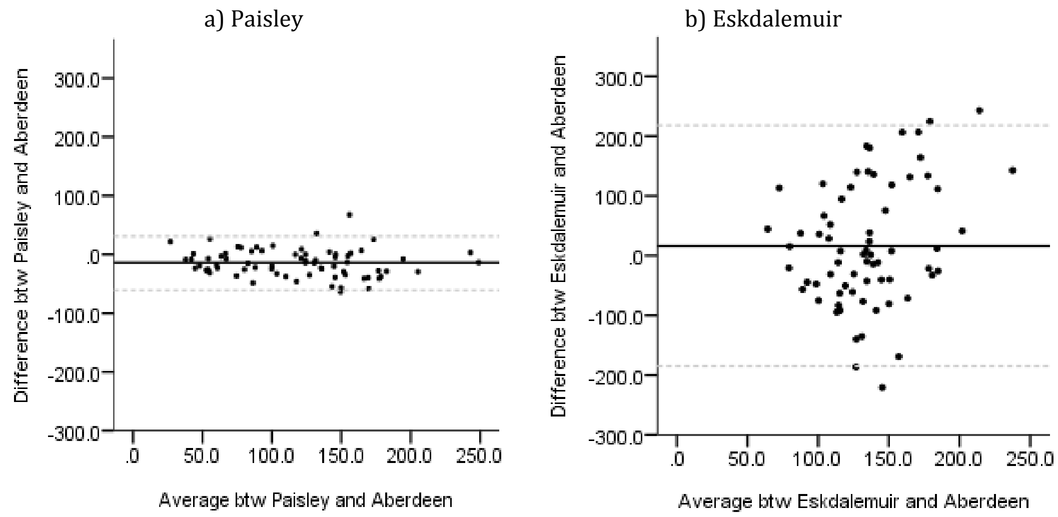


Figure C2. 25: Scotland Sun Bland-Altman Plot.

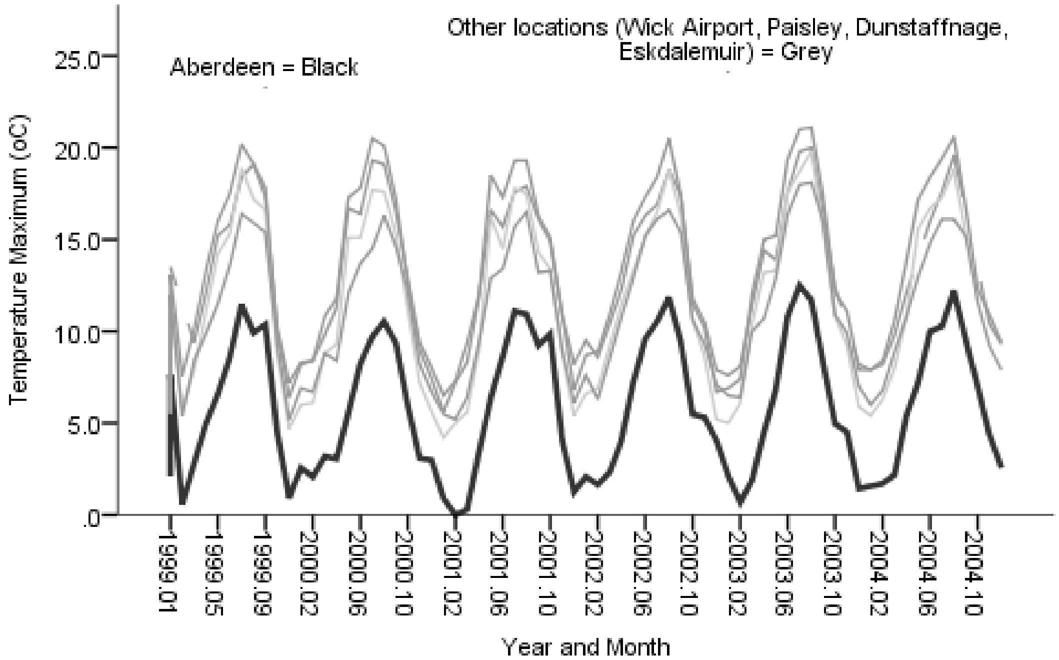


Figure C2. 26: Scotland - Plot of Monthly Means Temperature maximum.

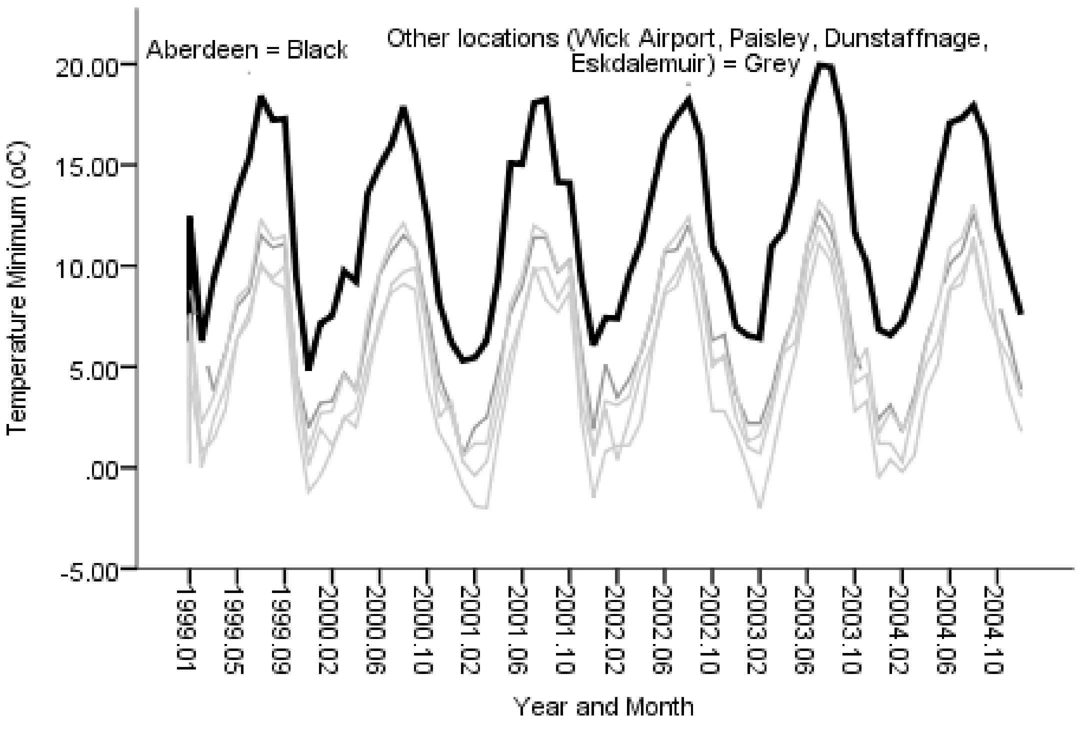


Figure C2. 27: Scotland - Plot of Monthly Means Temperature minimum.

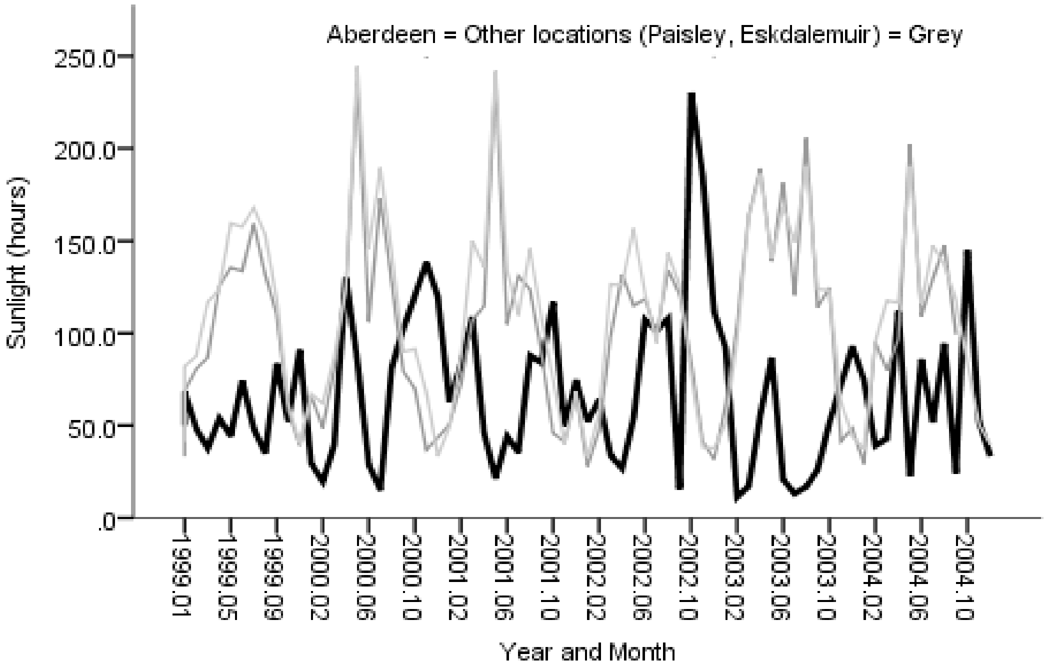


Figure C2. 28: Scotland - Plot of Monthly Means Sun.

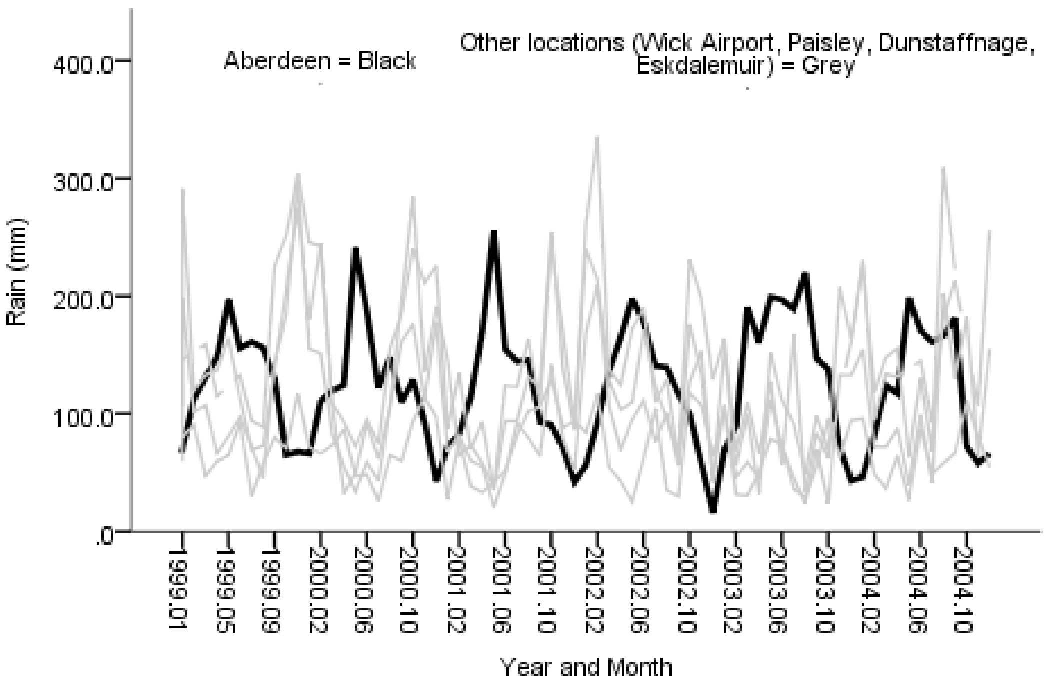
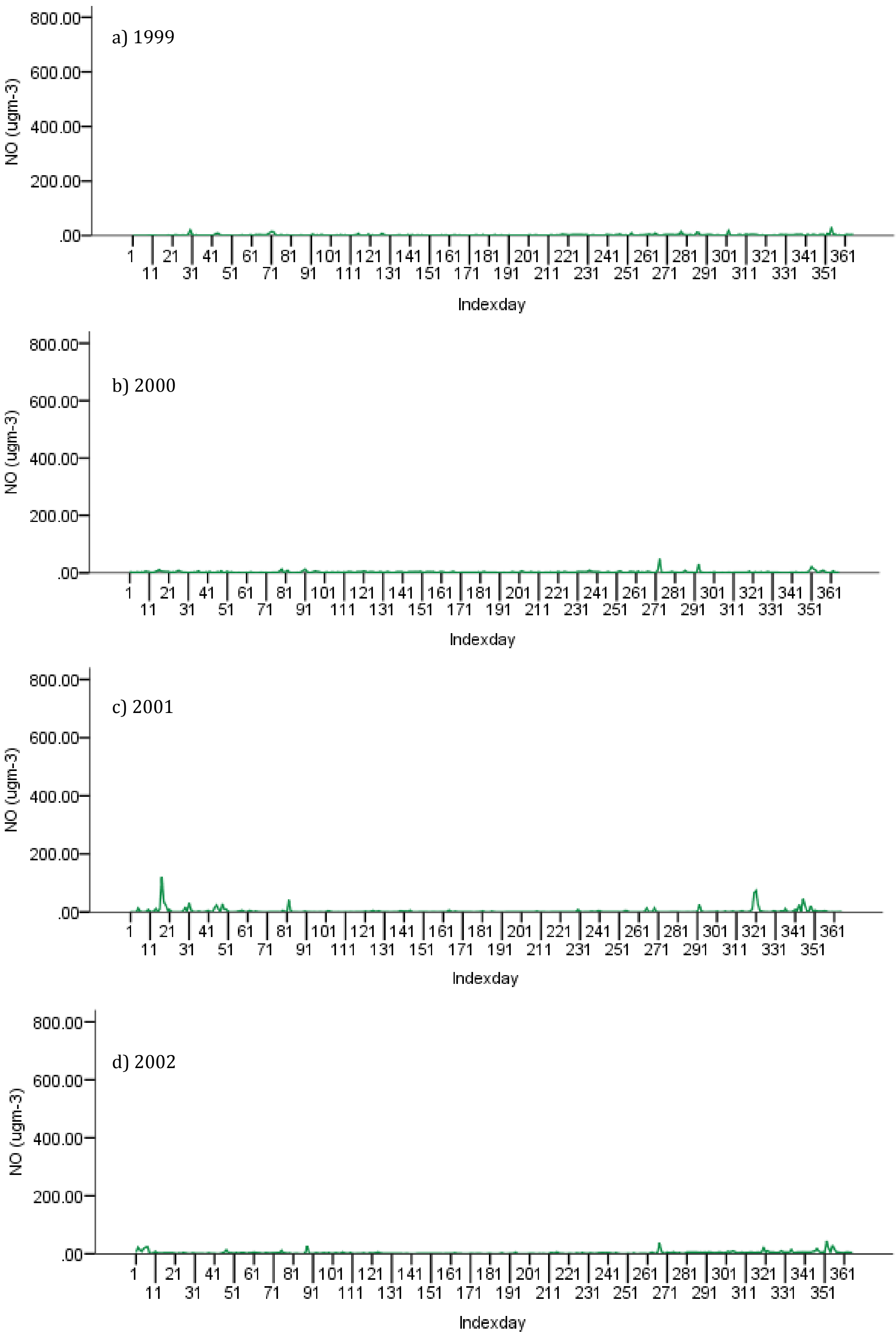


Figure C2. 29: Scotland - Plot of Monthly Means Rainfall.

C2.2. England Plots by Year



a) 1999
b) 2000
c) 2001
d) 2002
NO (ugm-3)
800.00
600.00
400.00
200.00
.00
1 21 41 61 81 101 121 141 161 181 201 221 241 261 281 301 321 341 361
11 31 51 71 91 111 131 151 171 191 211 231 251 271 291 311 331 351
Indexday

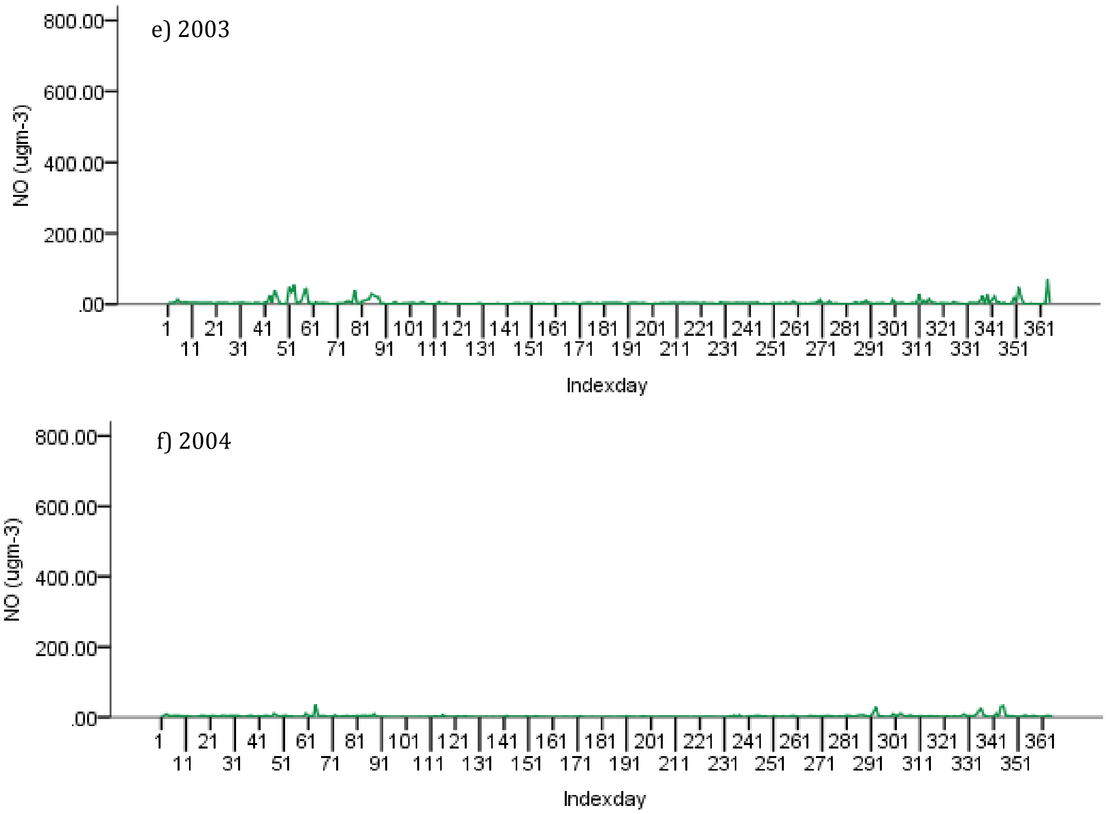
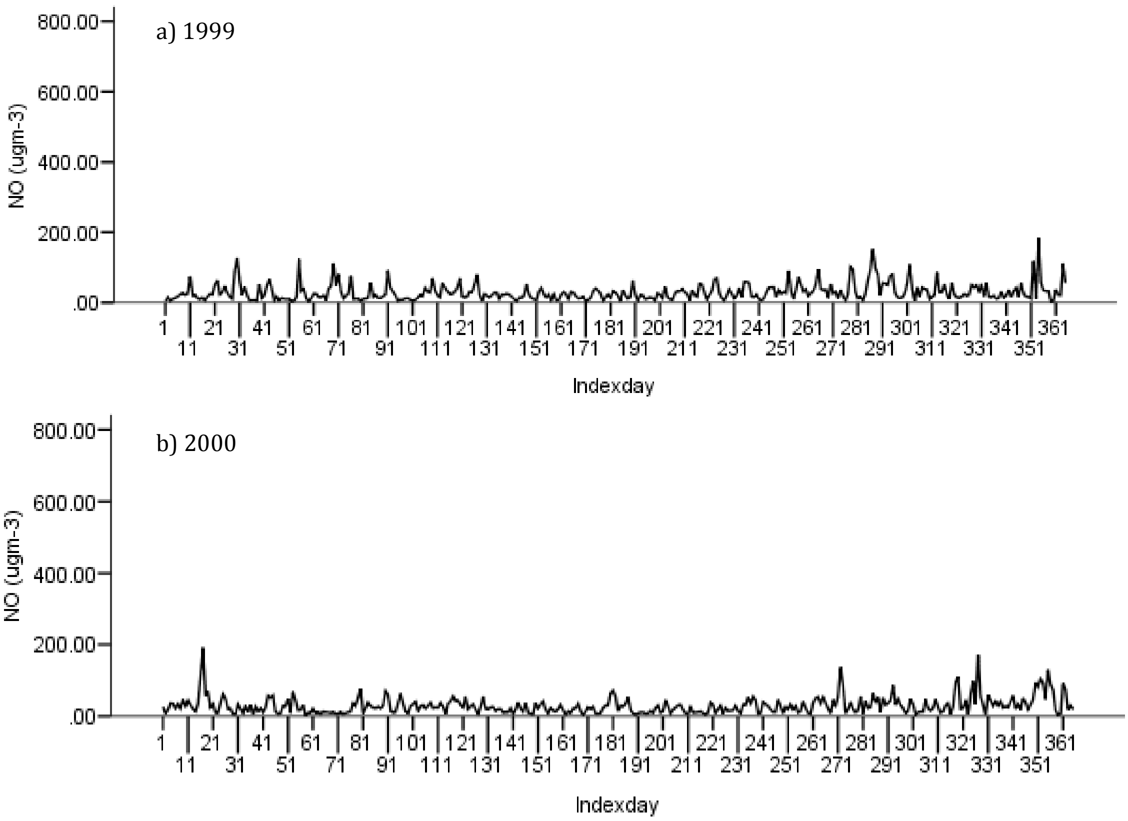


Figure C2. 30: England NO Minimum Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.



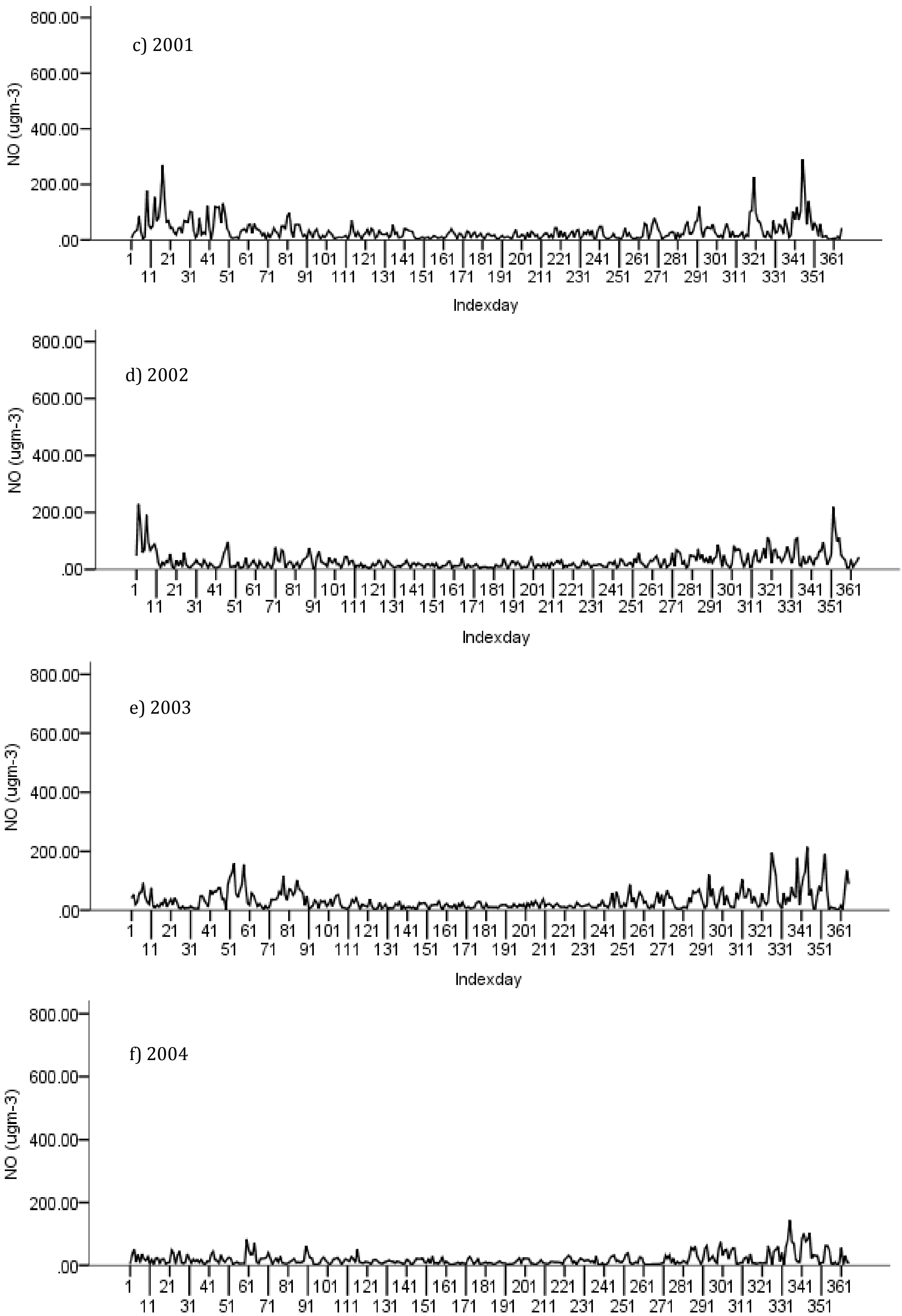
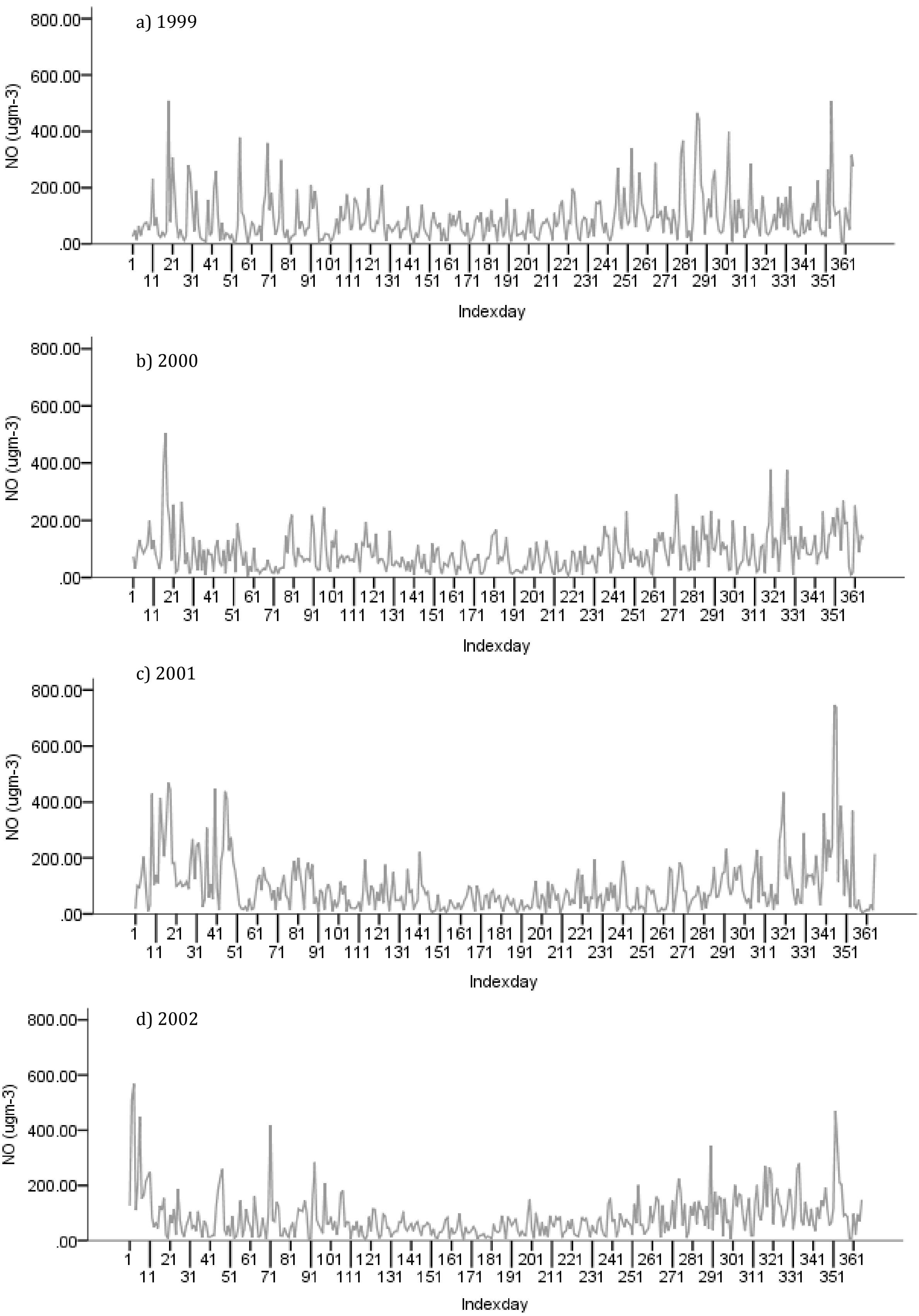
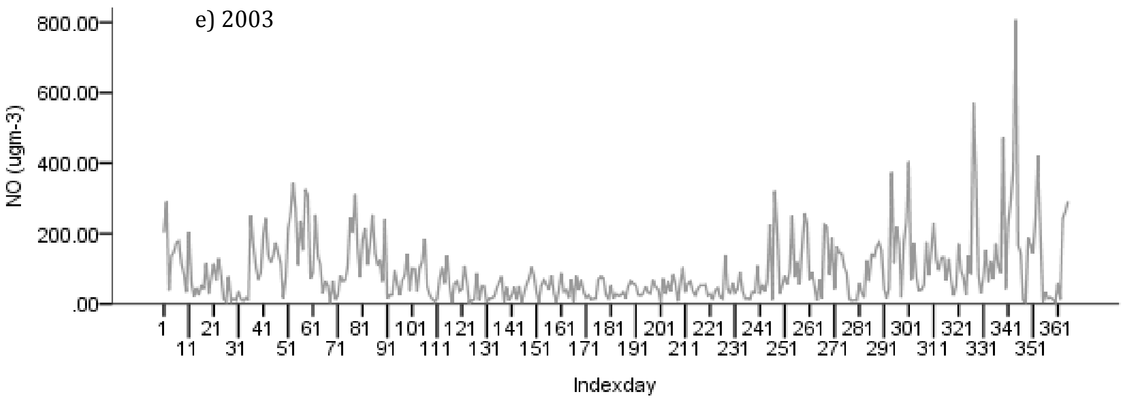


Figure C2. 31: England NO Mean Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


a) 1999
b) 2000
c) 2001
d) 2002
NO (ugm-3)
800.00
600.00
400.00
200.00
.00
Indexday
1 11 21 31 41 51 61 71 81 91 101 111 121 131 141 151 161 171 181 191 201 211 221 231 241 251 261 271 281 291 301 311 321 331 341 351 361



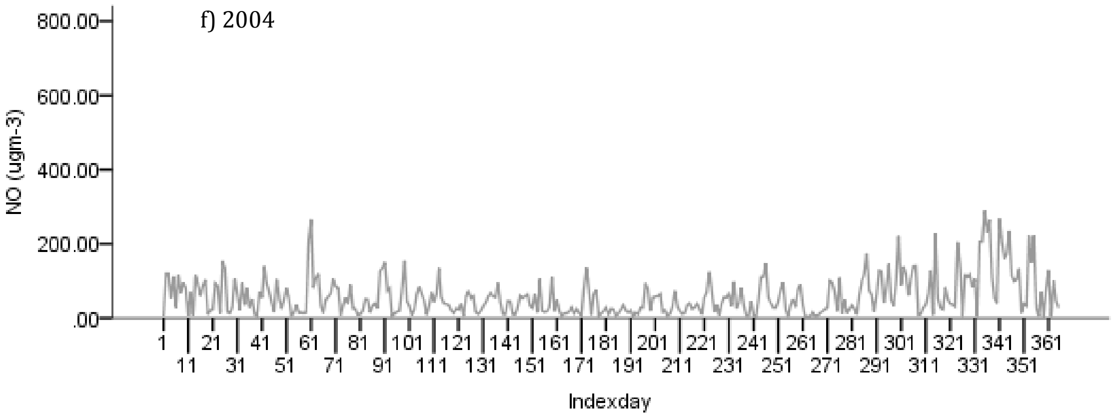
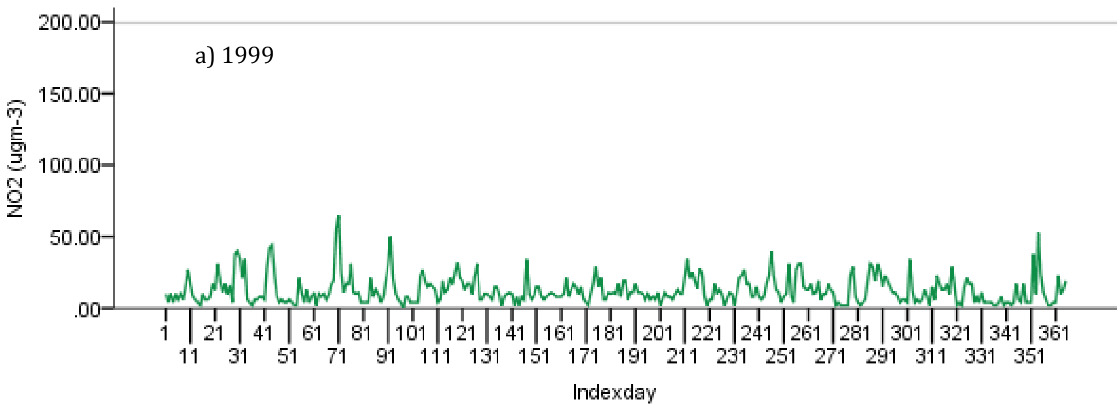
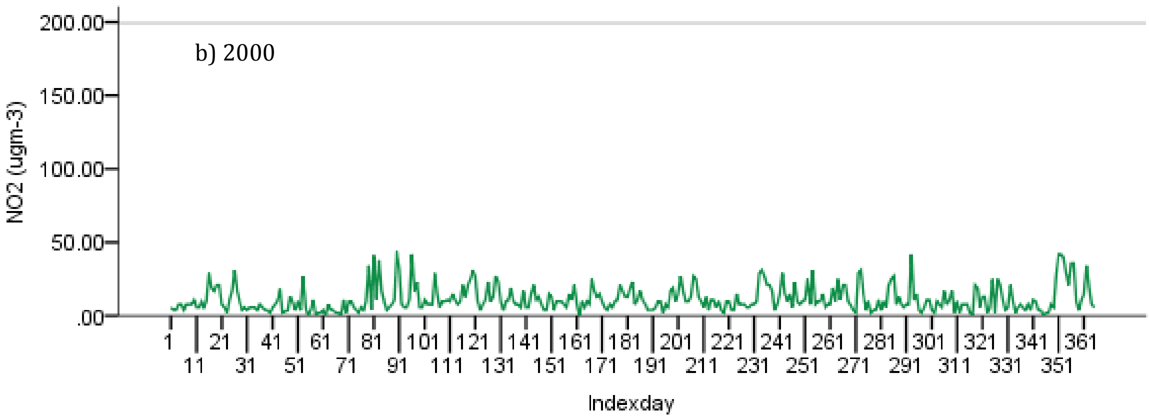


Figure C2. 32: England NO Maximum Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.





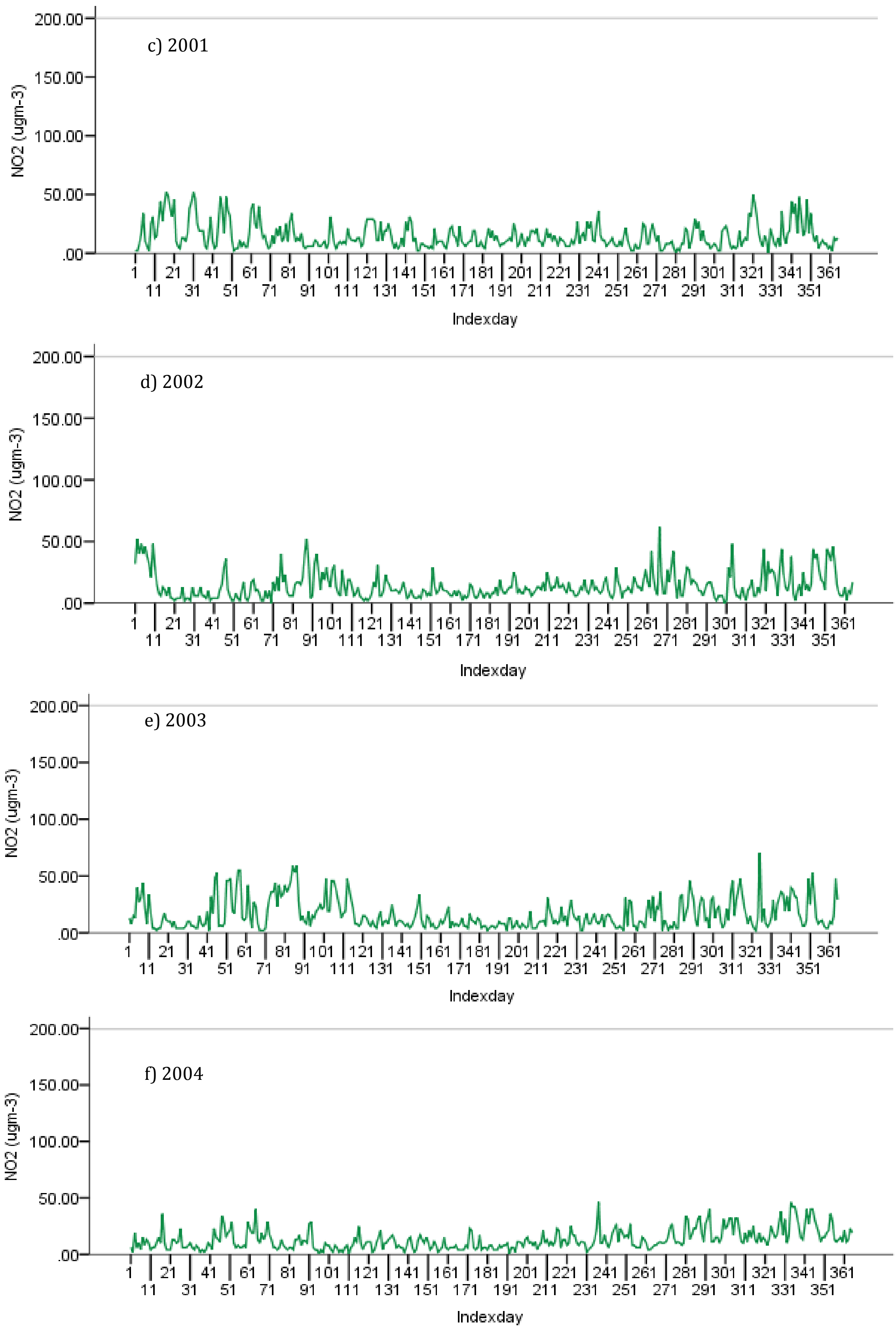
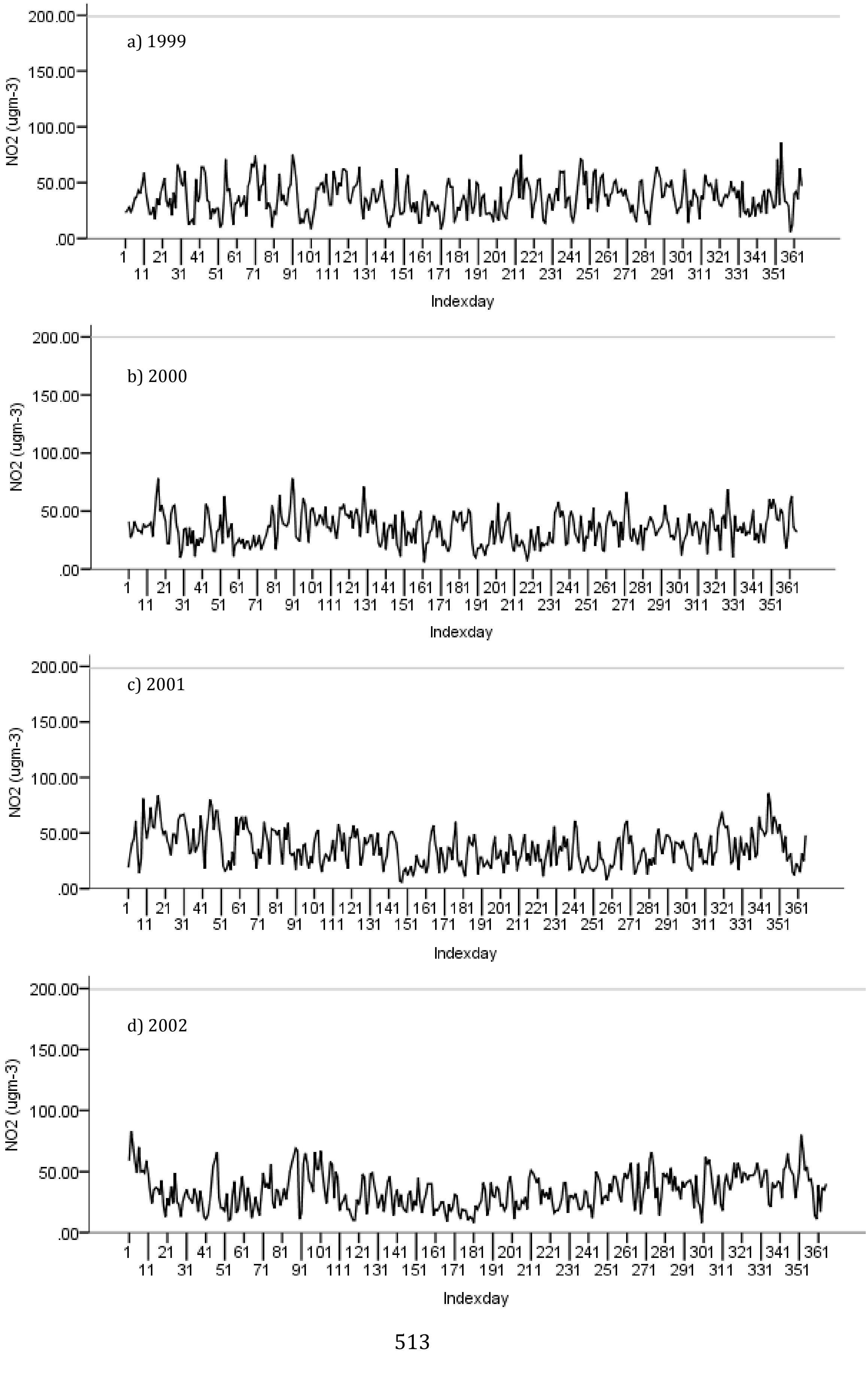
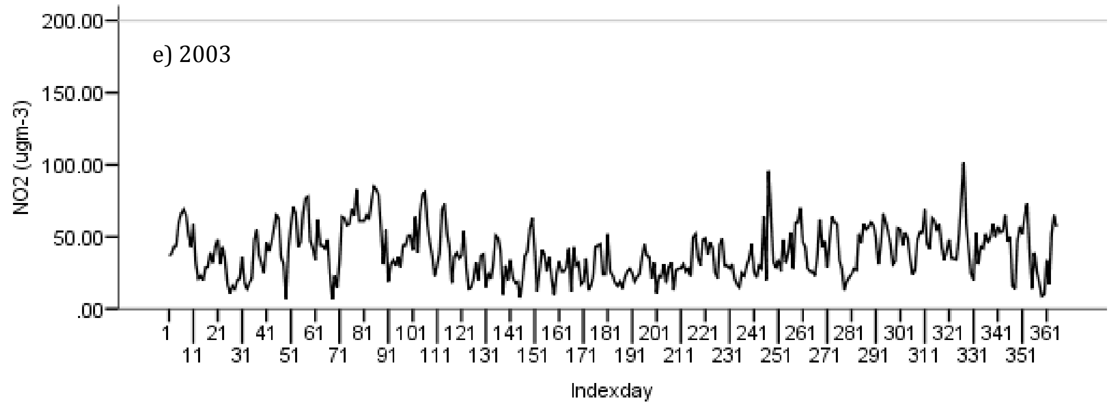


Figure C2. 33: England NO_2 Minimum Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


a) 1999
b) 2000
c) 2001
d) 2002
NO2 (ugm-3)
200.00
150.00
100.00
50.00
.00
Indexday



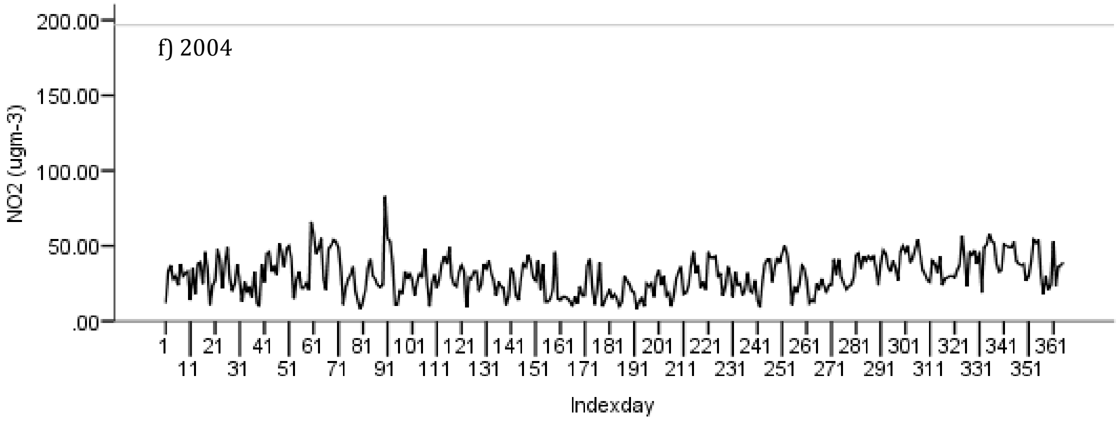
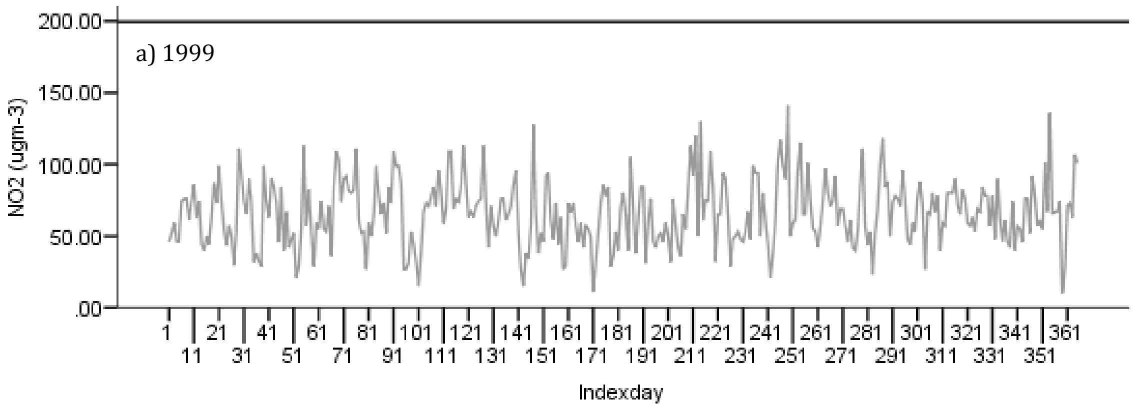
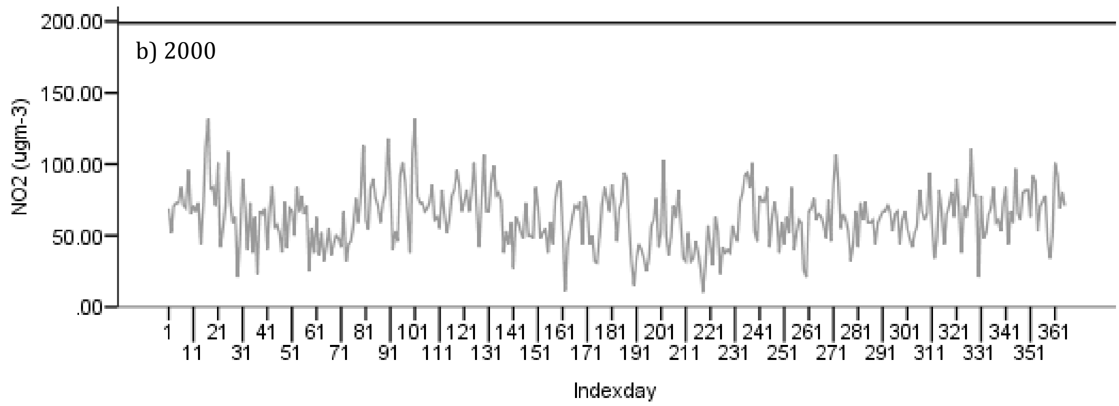


Figure C2.34: England NO_2 Mean Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.





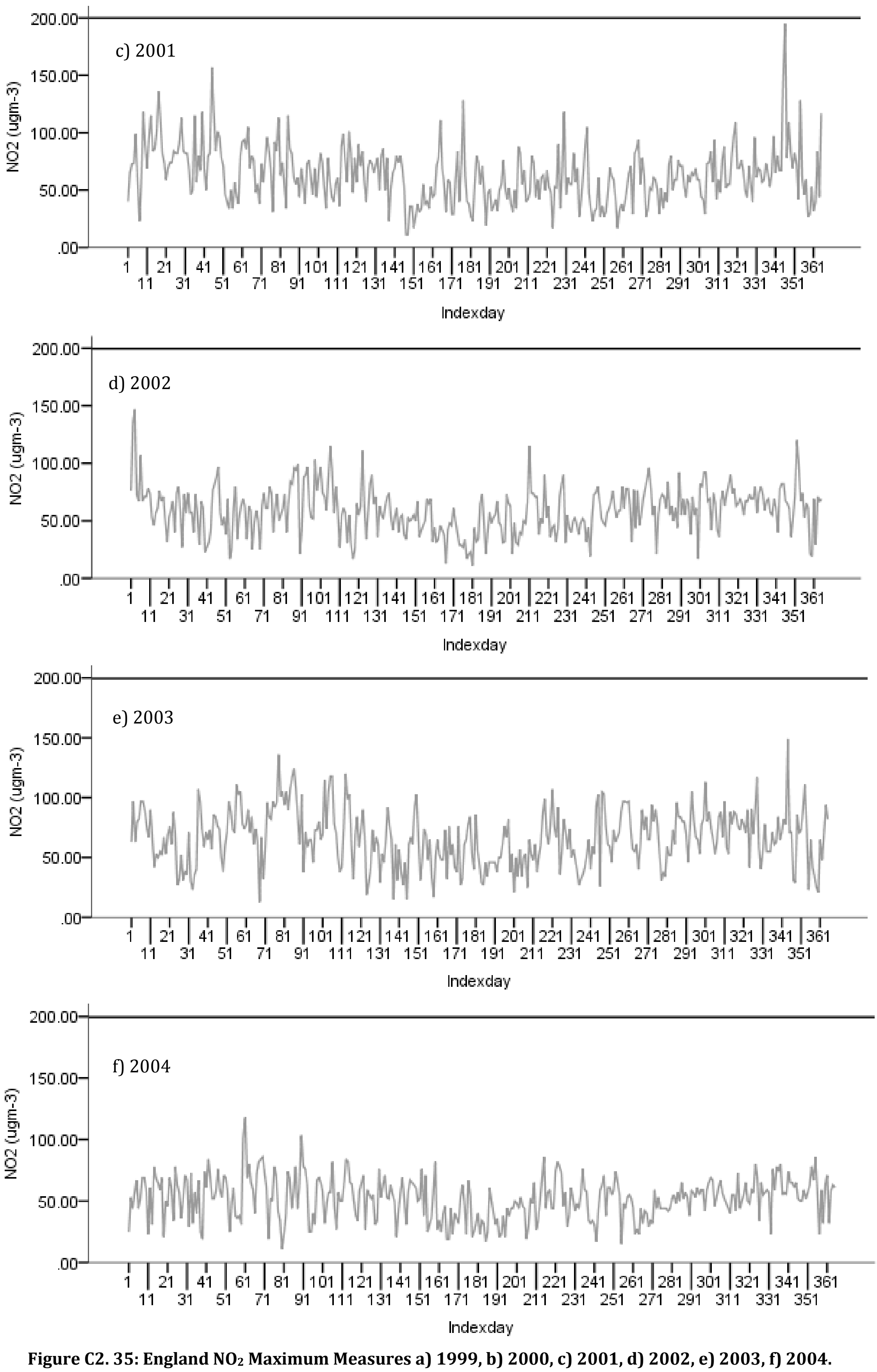
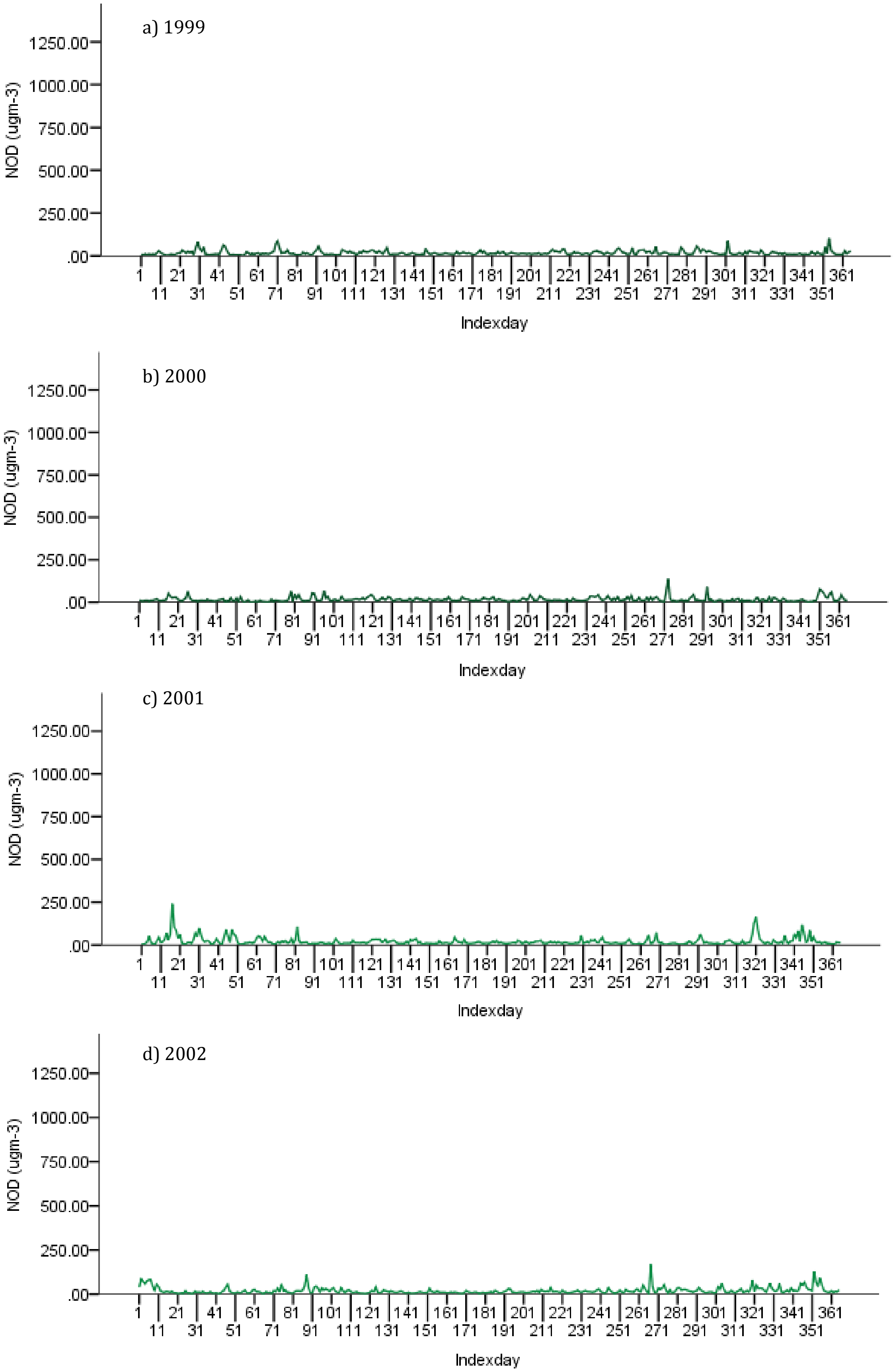
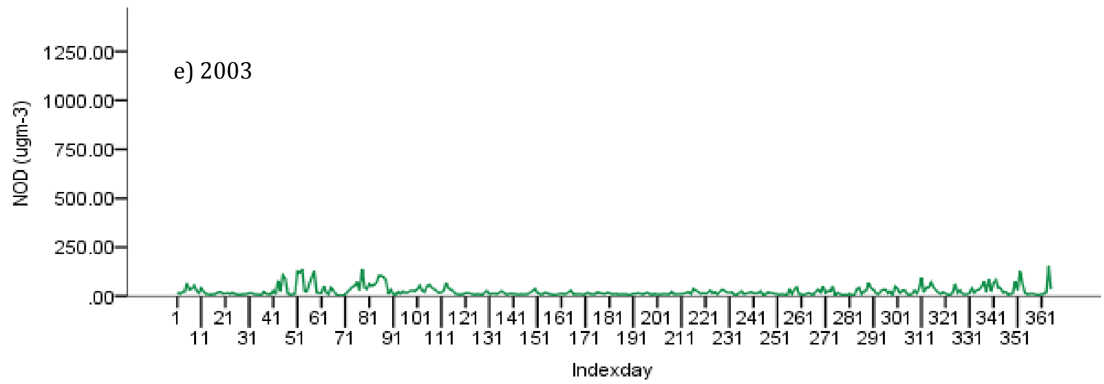


Figure C2. 35: England NO_2 Maximum Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


a) 1999
b) 2000
c) 2001
d) 2002
NOD (ugm-3)
1250.00
1000.00
750.00
500.00
250.00
.00
Indexday



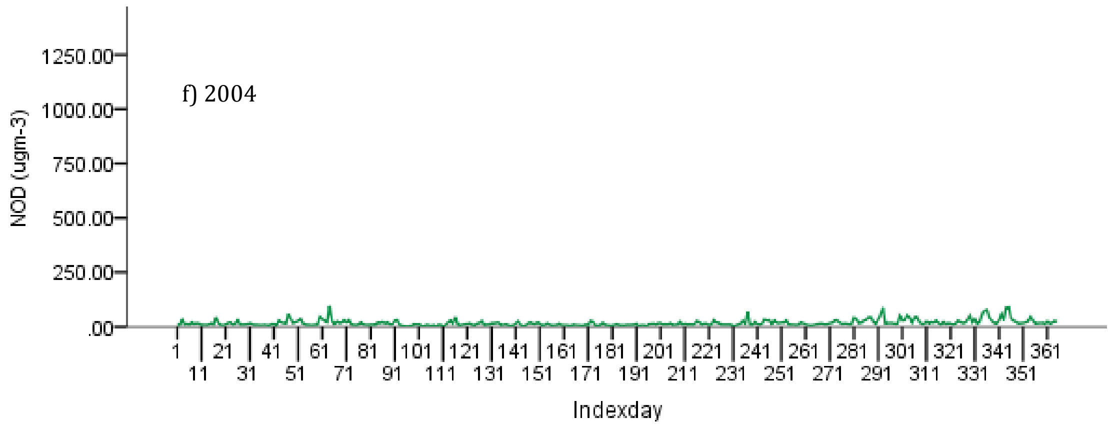
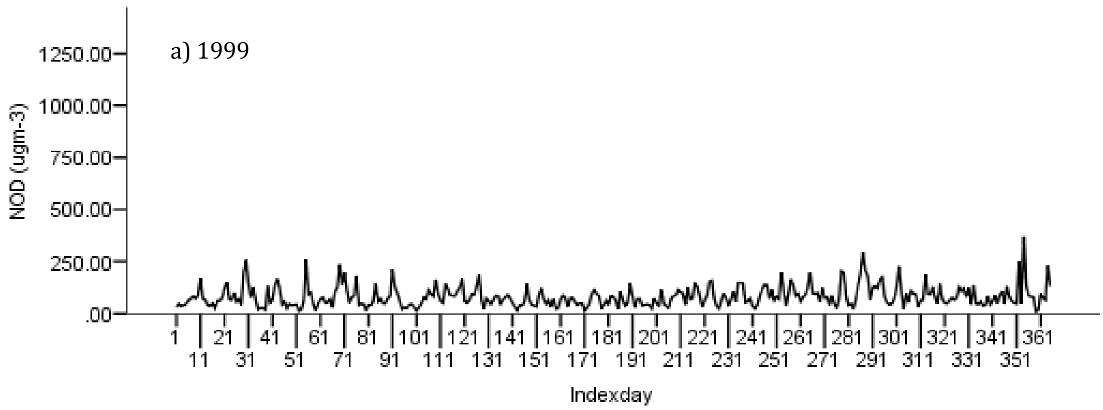
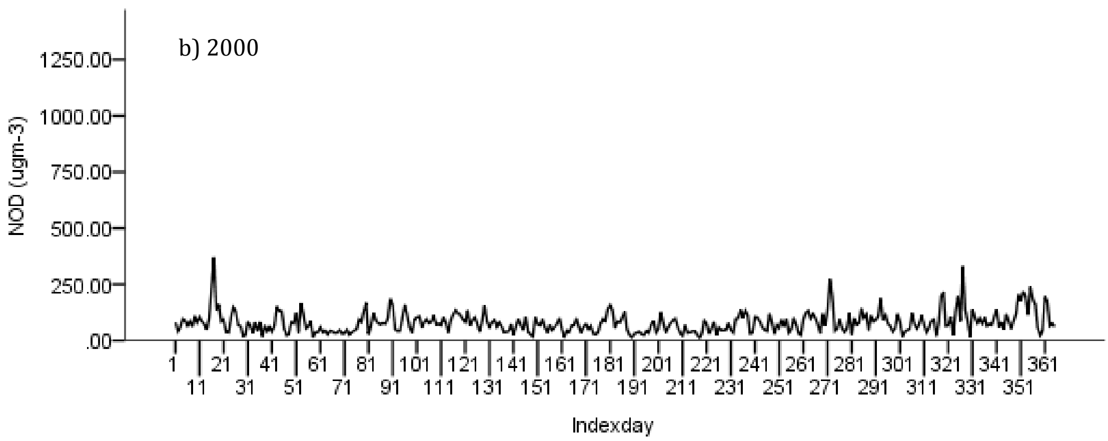


Figure C2. 36: England NOD Minimum Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.





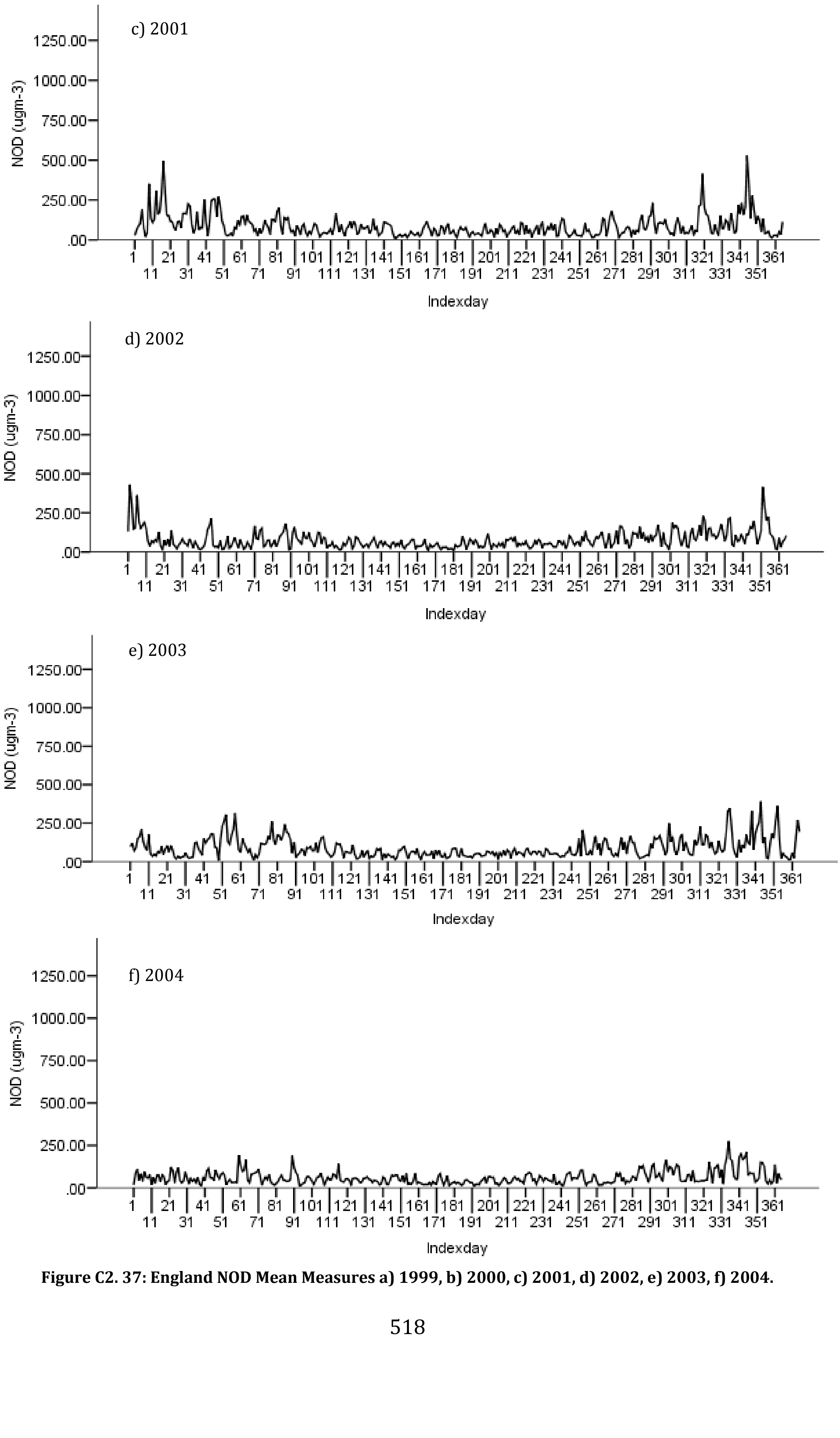
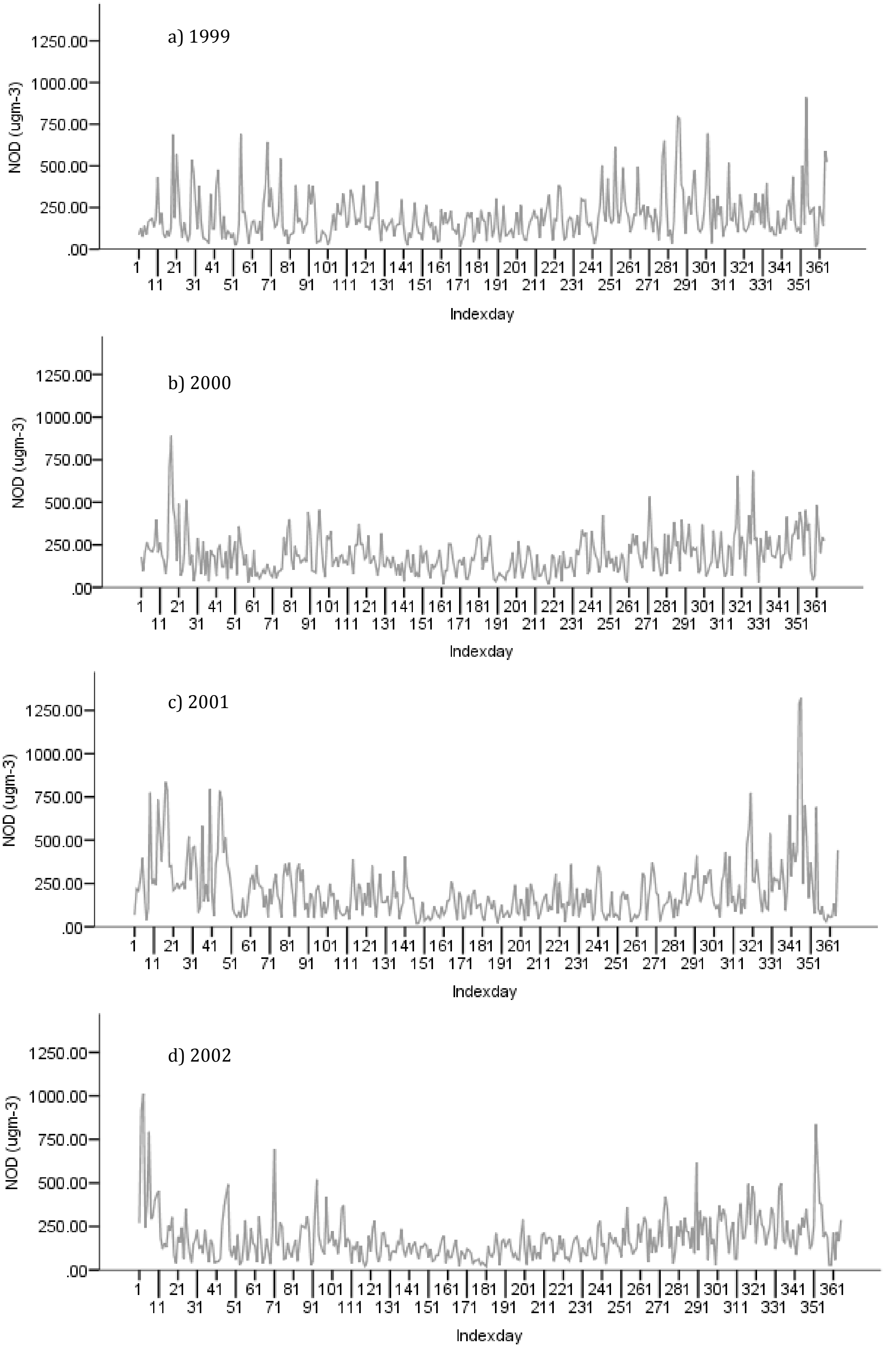
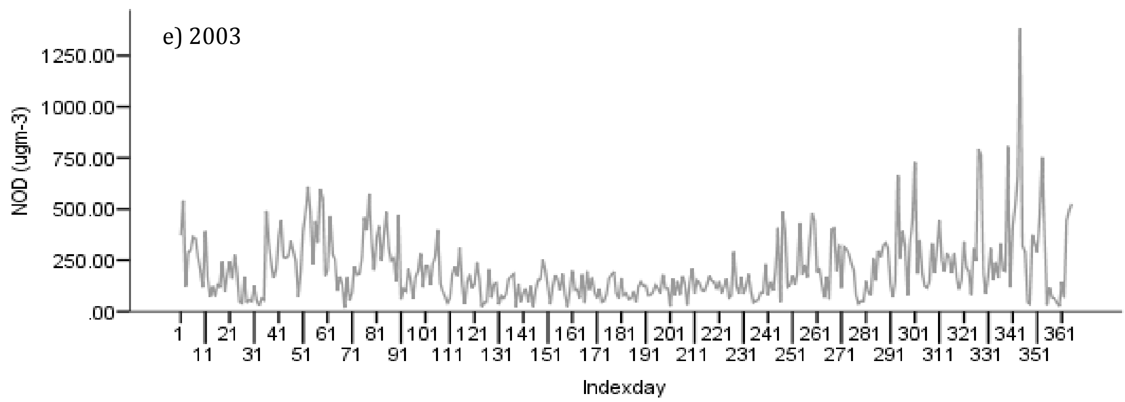


Figure C2. 37: England NOD Mean Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


a) 1999
b) 2000
c) 2001
d) 2002
NOD (ugm-3)
1250.00
1000.00
750.00
500.00
250.00
.00
Indexday
1 11 21 31 41 51 61 71 81 91 101 111 121 131 141 151 161 171 181 191 201 211 221 231 241 251 261 271 281 291 301 311 321 331 341 351 361



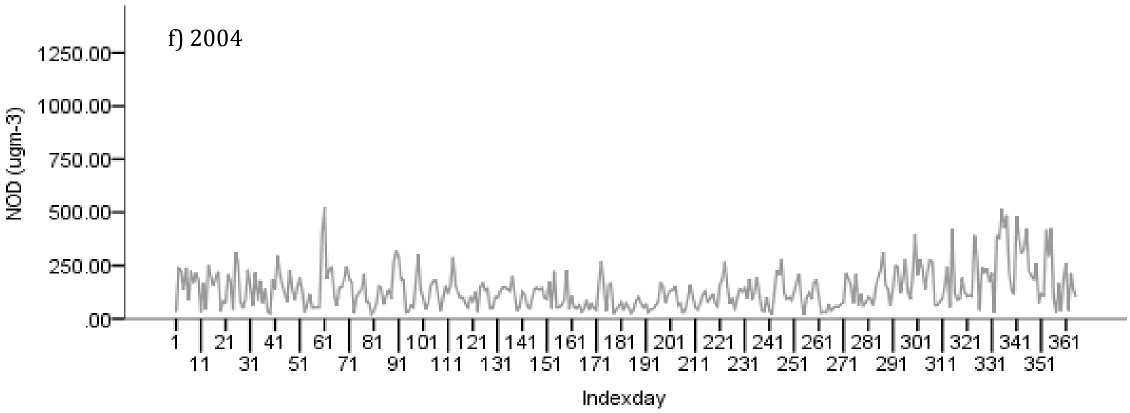
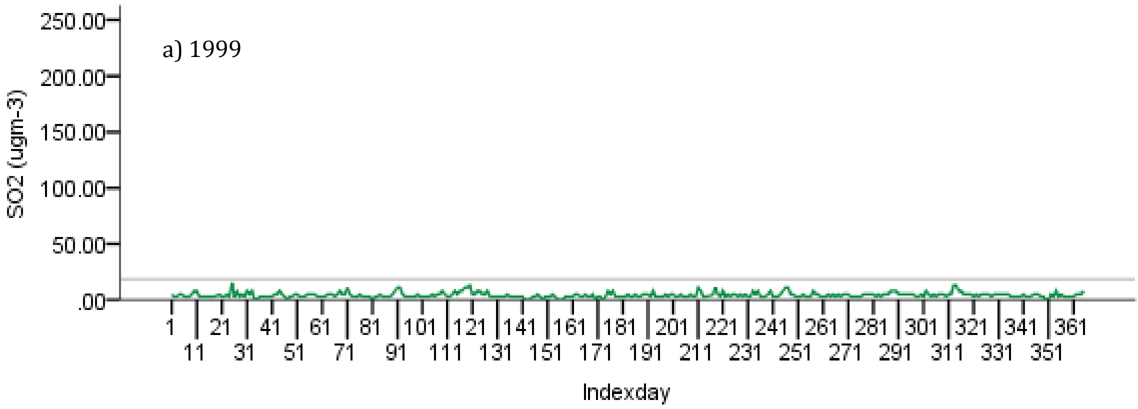
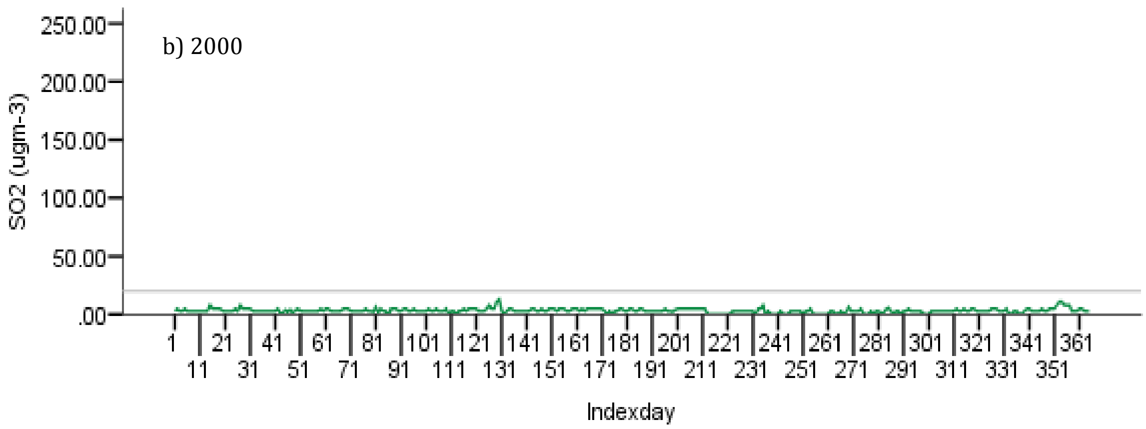


Figure C2. 38: England NOD Maximum Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.





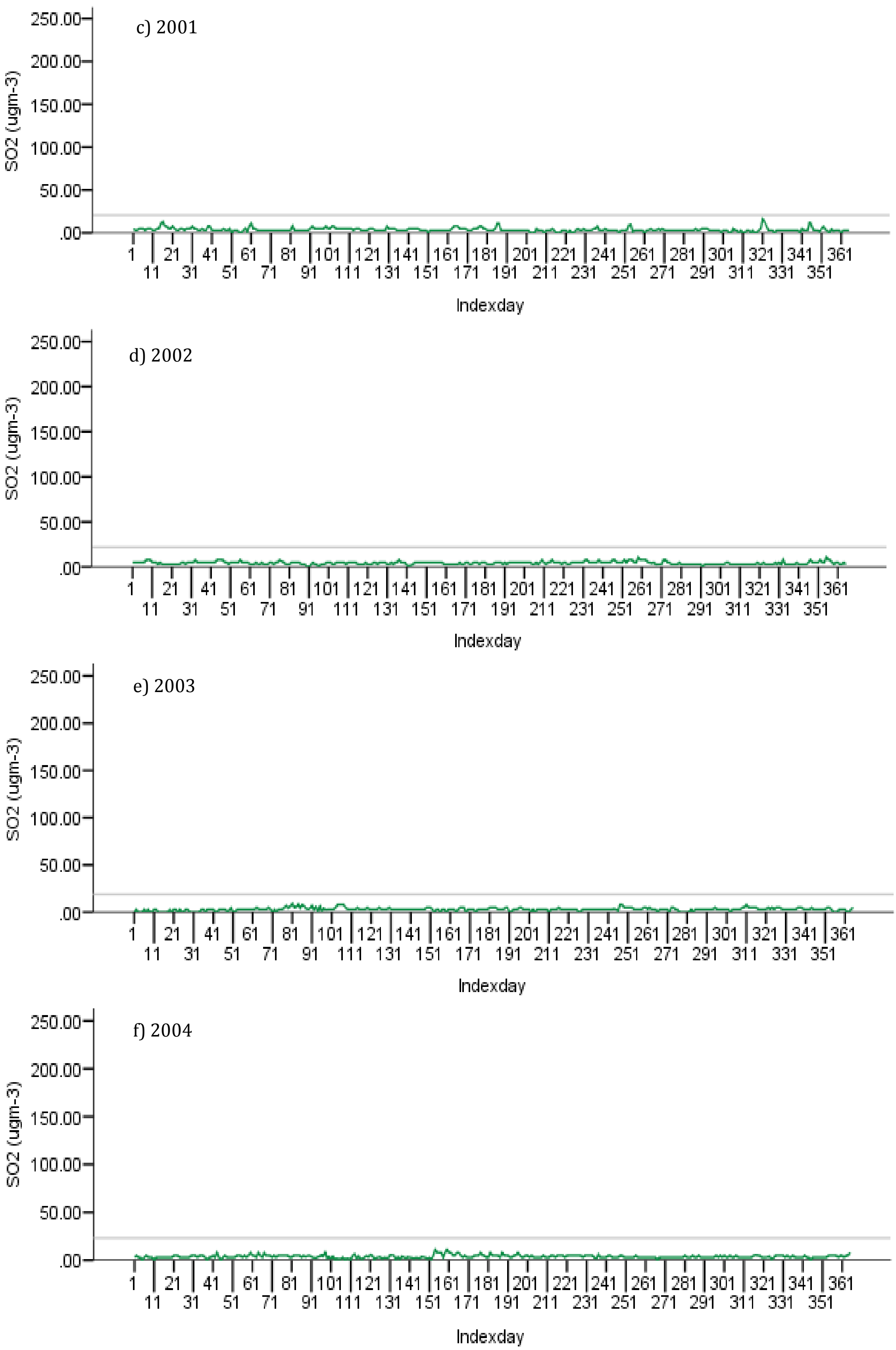
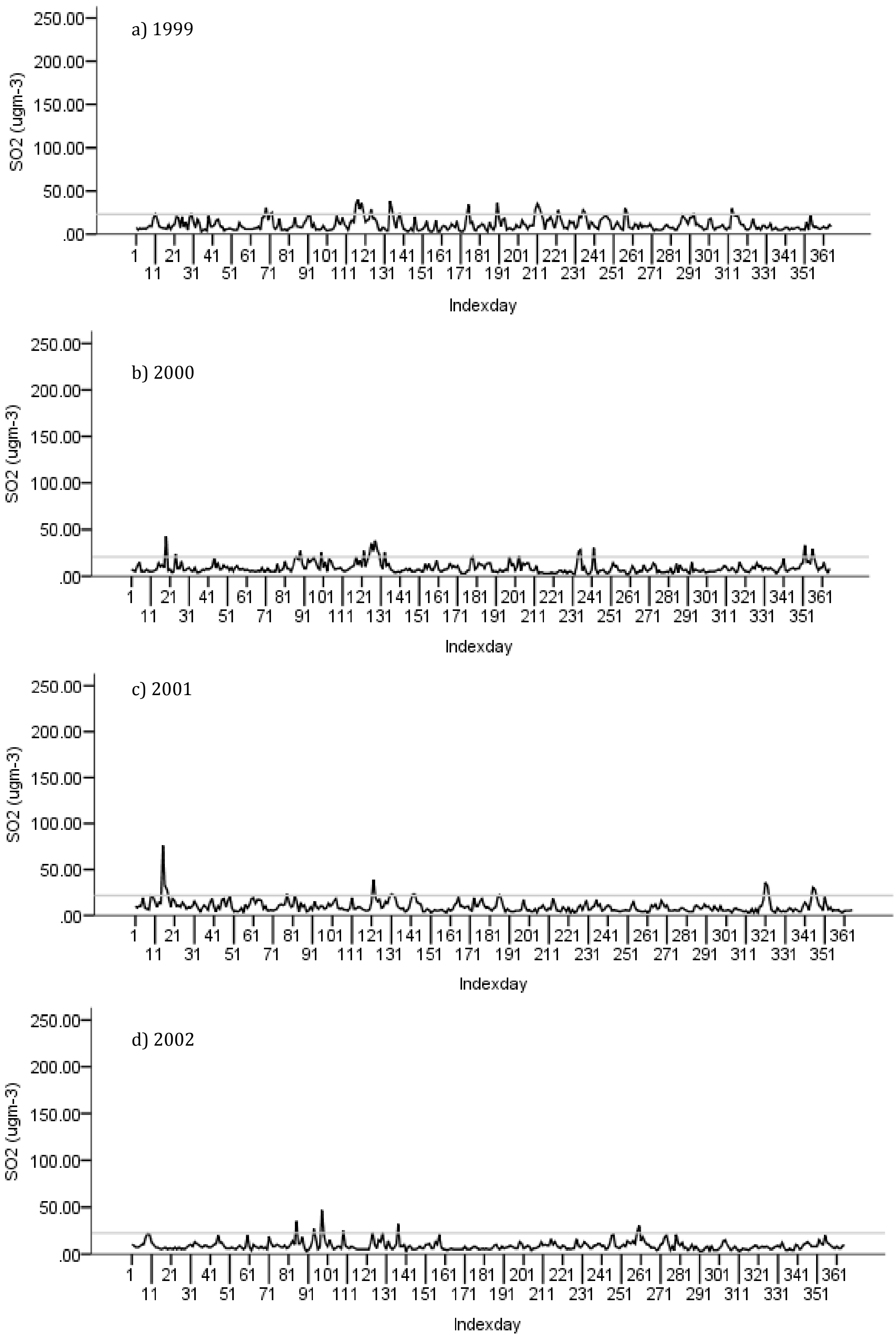
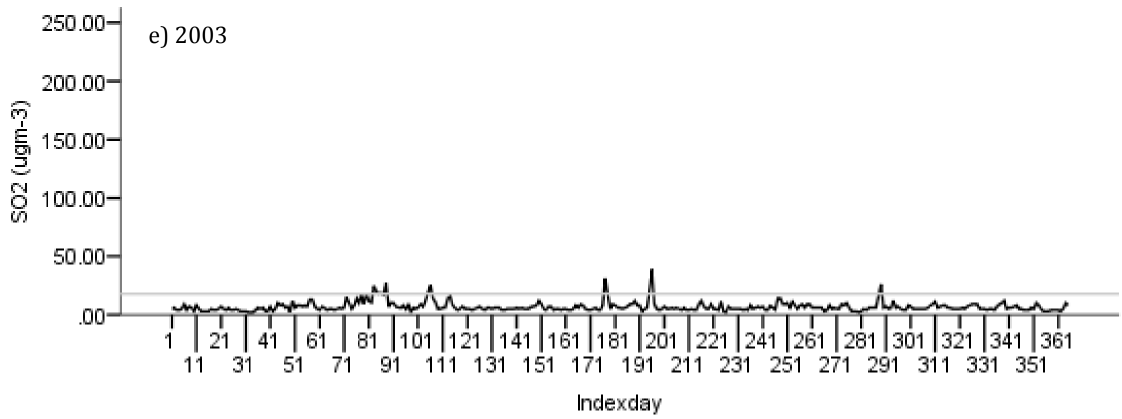


Figure C2. 39: England SO_2 Minimum Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


a) 1999
b) 2000
c) 2001
d) 2002
SO2 (ugm-3)
250.00
200.00
150.00
100.00
50.00
.00
1 11 21 31 41 51 61 71 81 91 101 111 121 131 141 151 161 171 181 191 201 211 221 231 241 251 261 271 281 291 301 311 321 331 341 351 361
Indexday



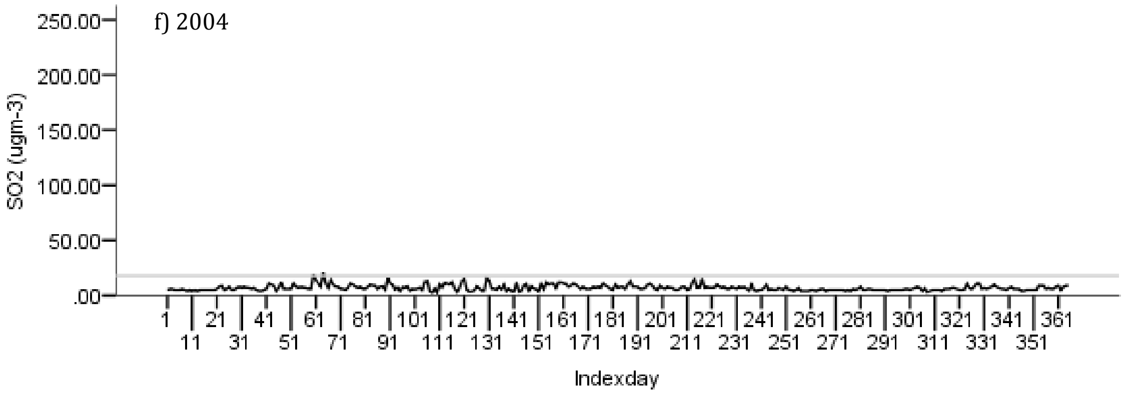
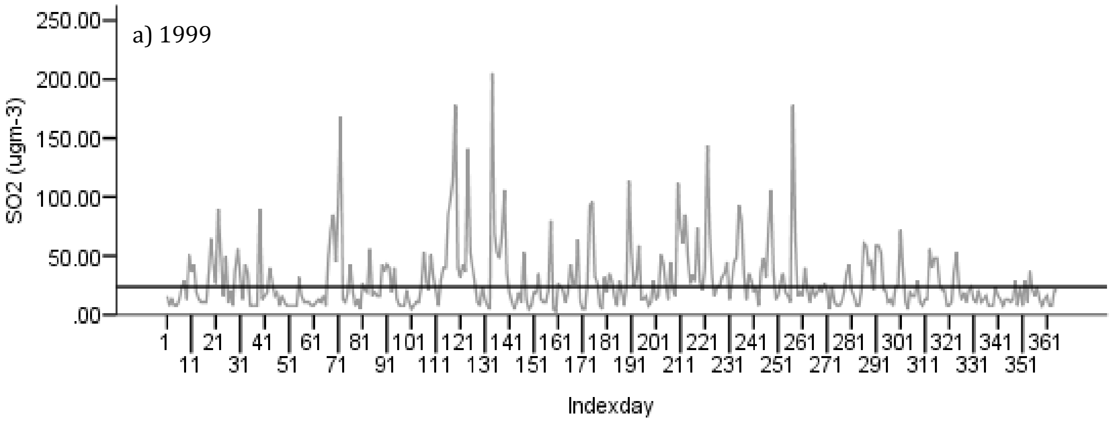
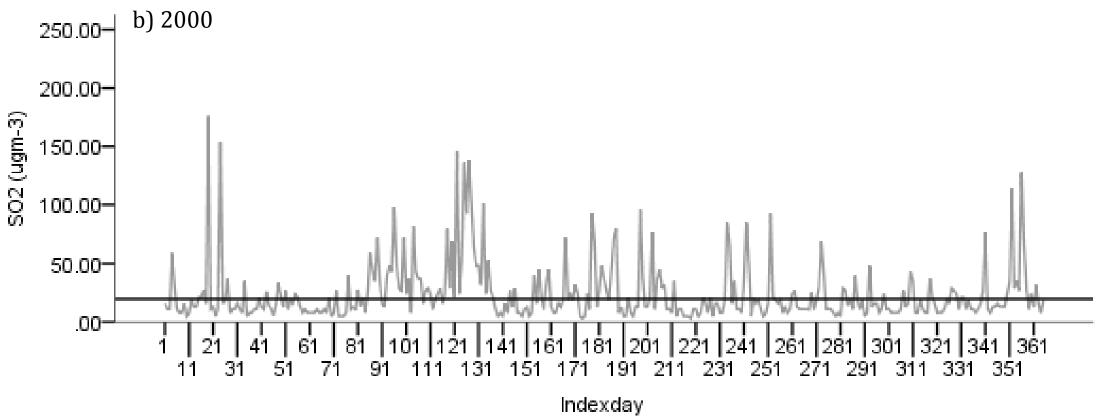


Figure C2. 40: England SO_2 Mean Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.





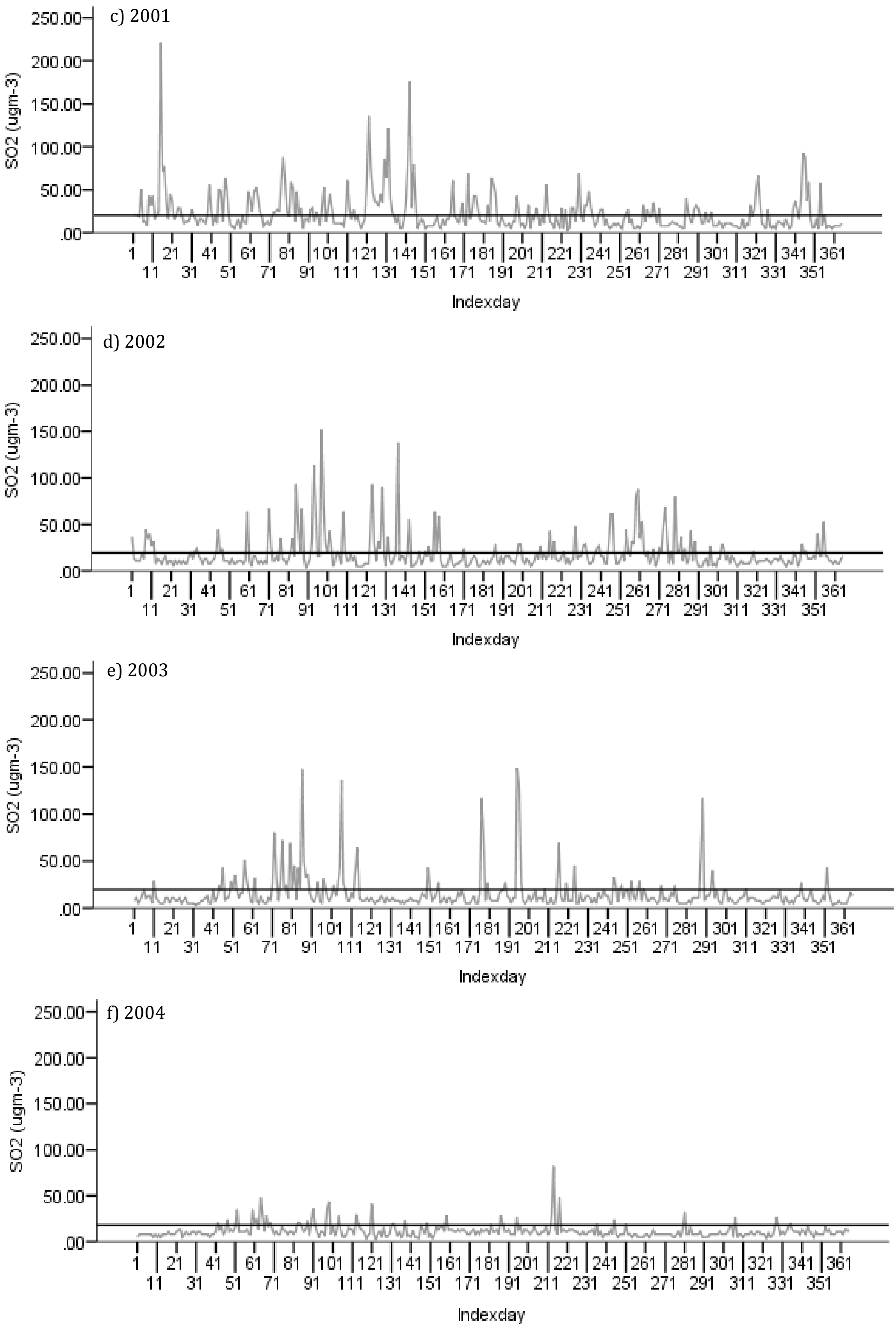
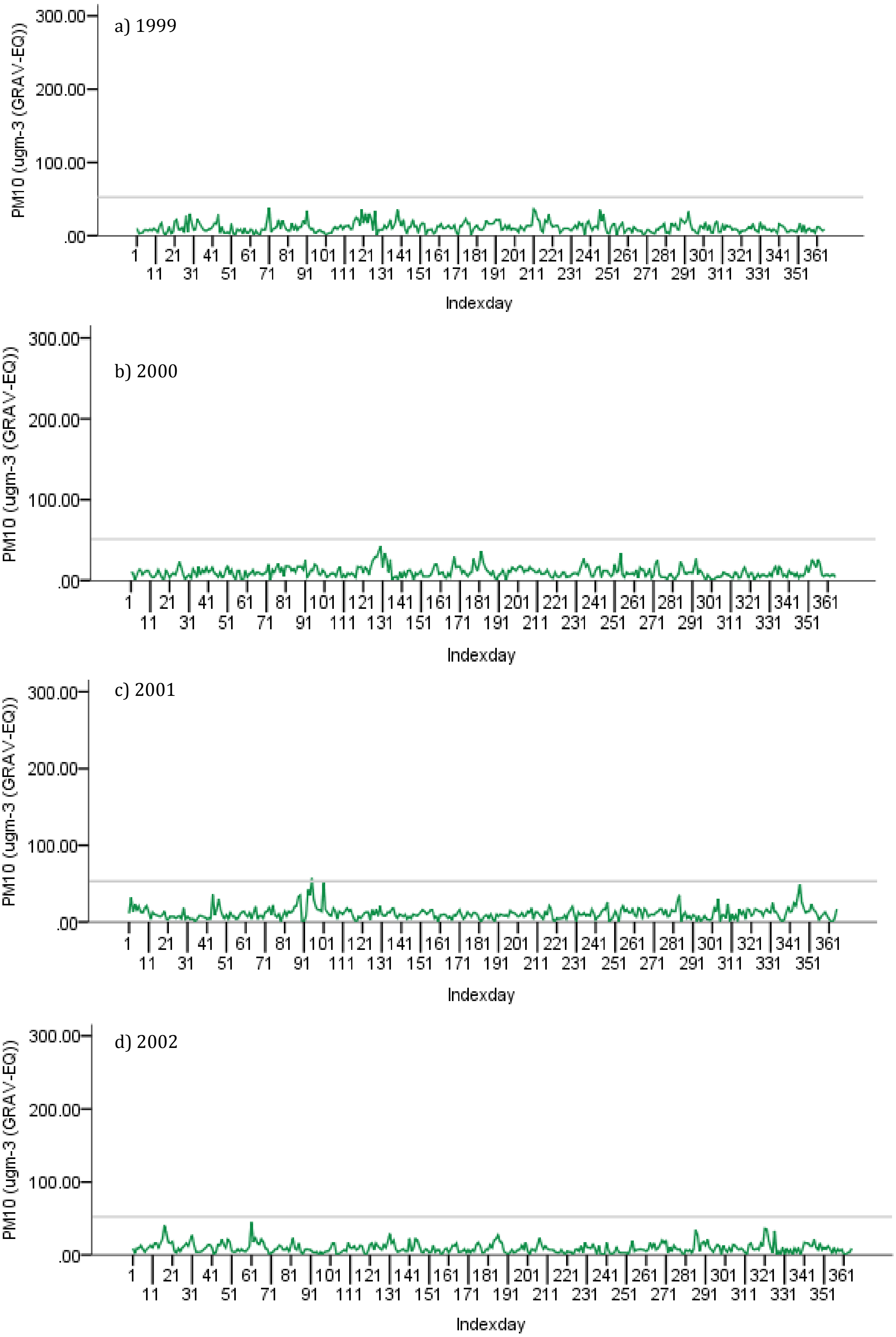
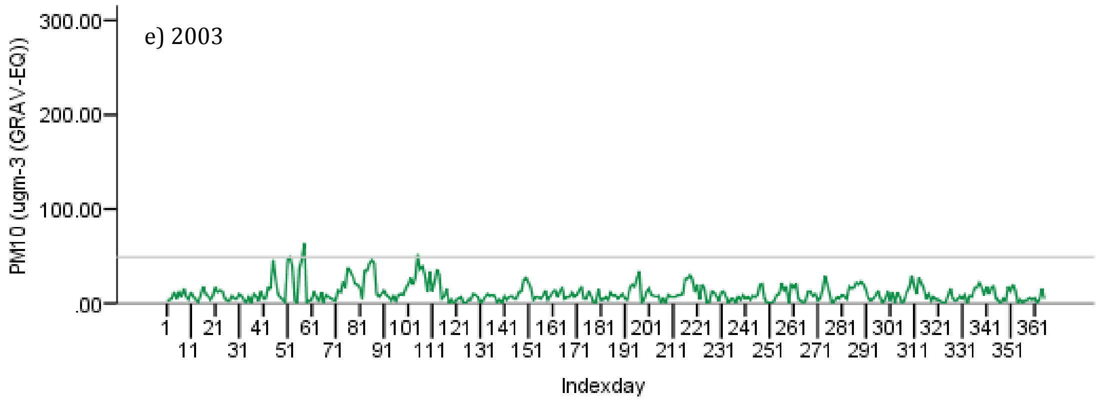


Figure C2. 41: England SO_2 Maximum Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.



a) 1999
b) 2000
c) 2001
d) 2002
PM10 (ugm-3 (GRAV-EQ))
300.00
200.00
100.00
.00
Indexday



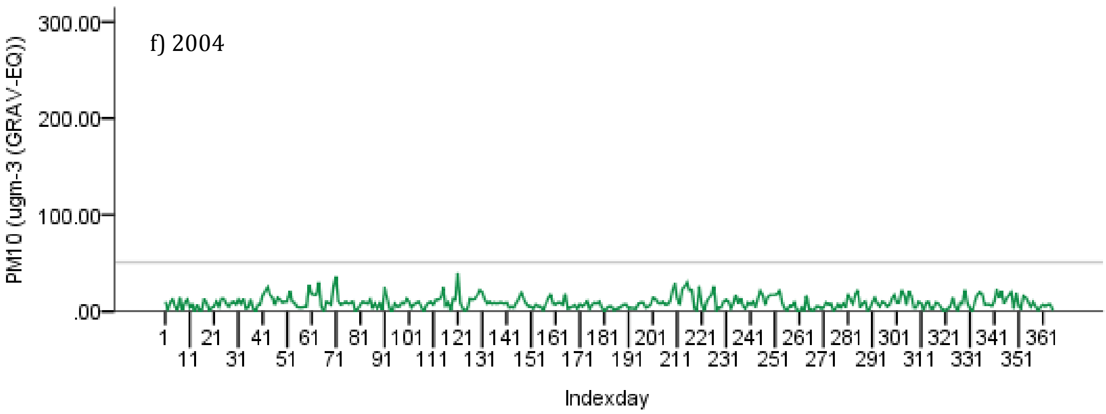
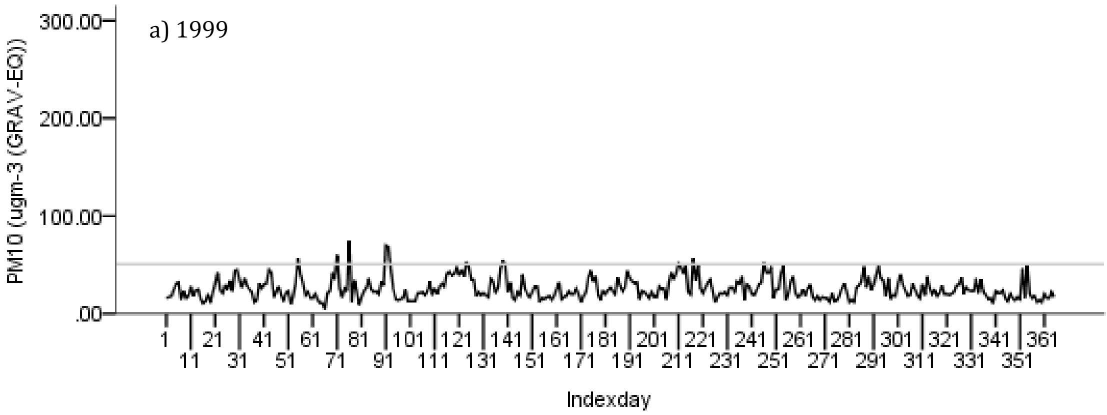
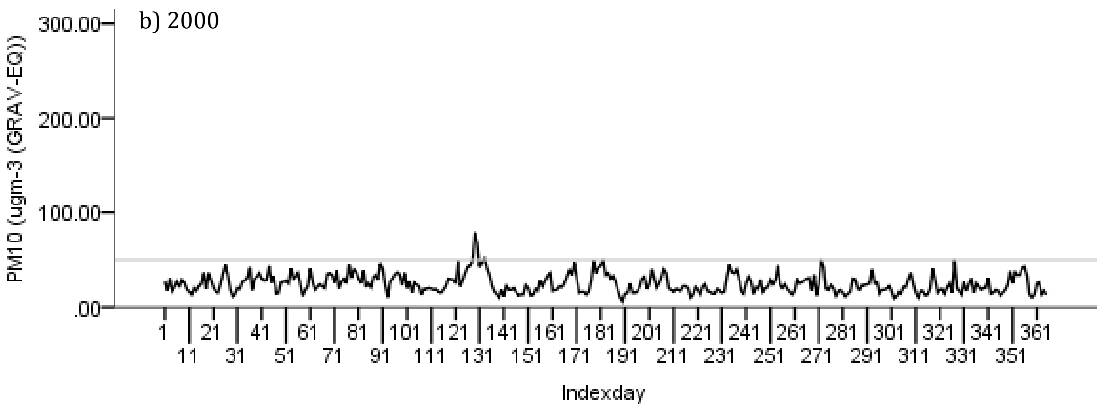


Figure C2. 42: England PM_{10} Minimum Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.





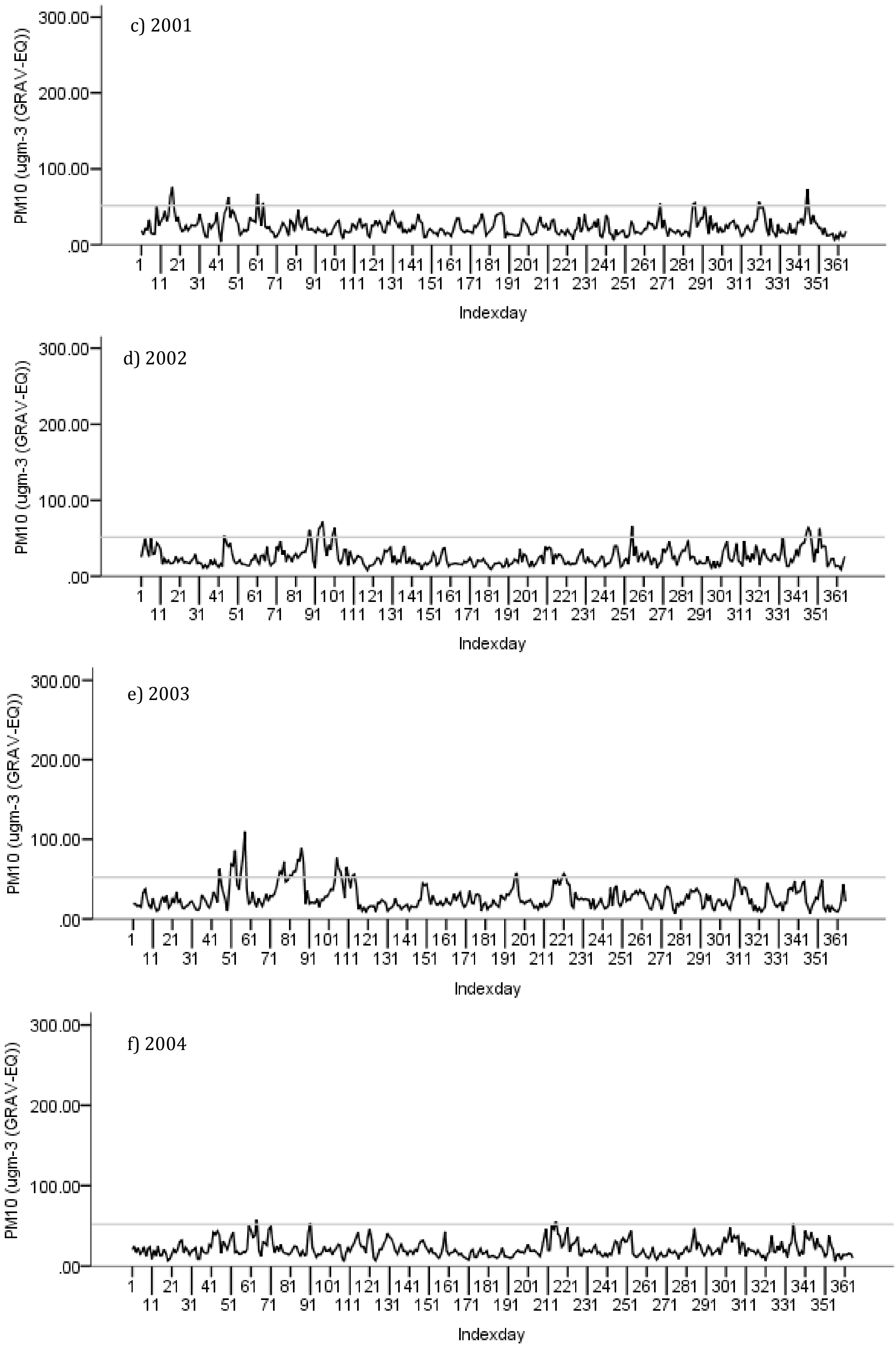
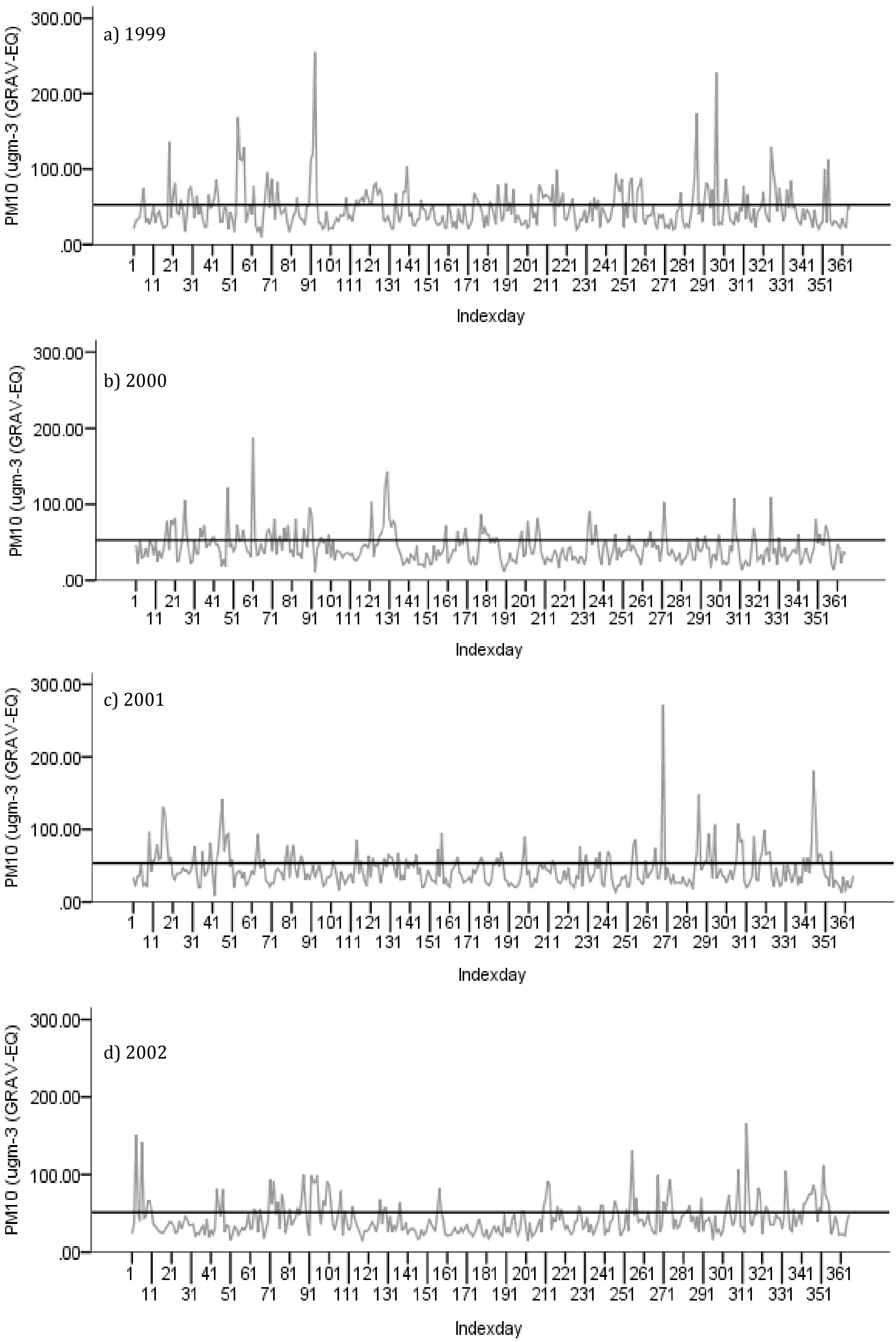


Figure C2. 43: England PM_{10} Mean Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.



a) 1999
b) 2000
c) 2001
d) 2002
PM10 (ugm-3 (GRAV-EQ)
300.00
200.00
100.00
.00
1 11 21 31 41 51 61 71 81 91 101 111 121 131 141 151 161 171 181 191 201 211 221 231 241 251 261 271 281 291 301 311 321 331 341 351 361
Indexday

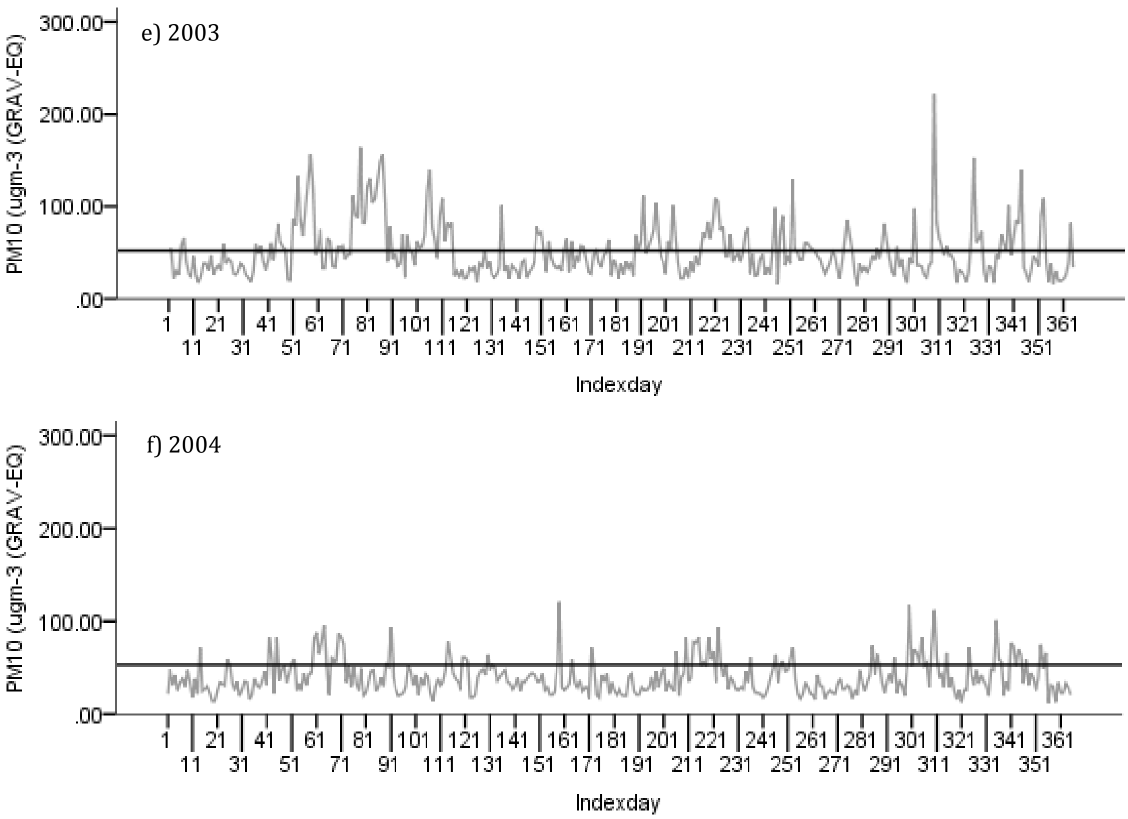
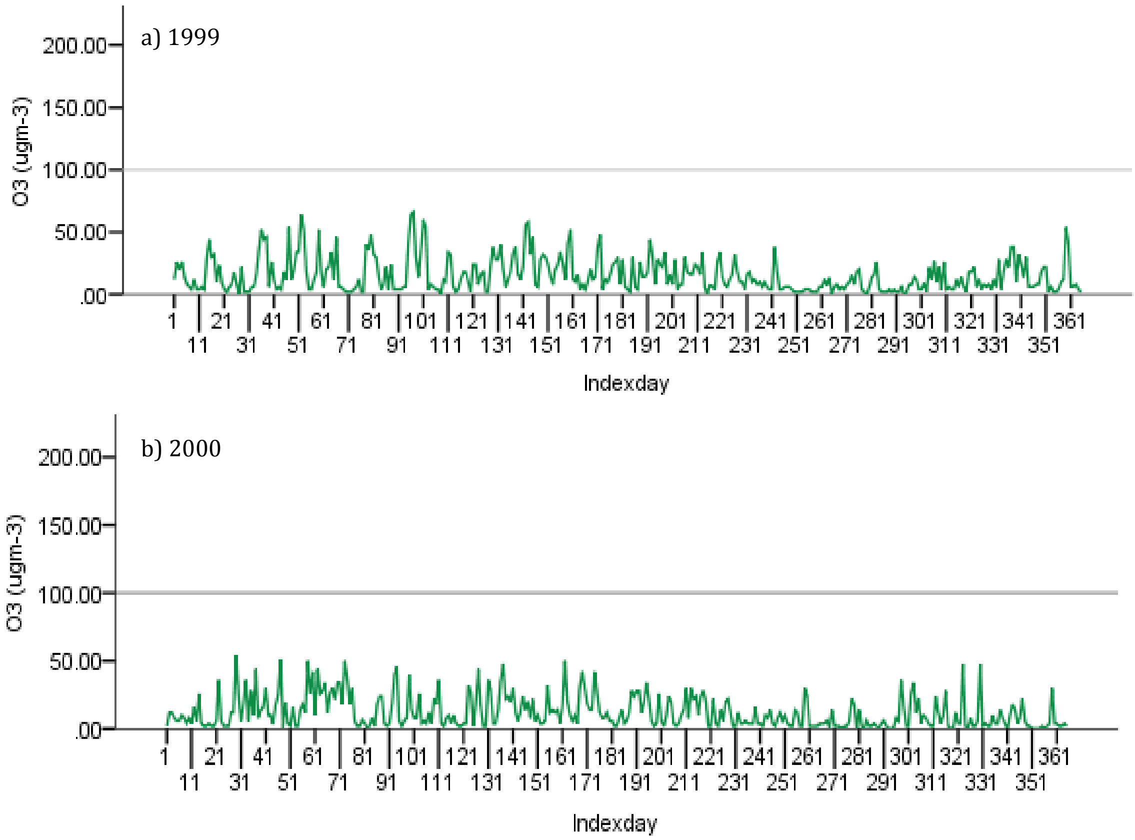


Figure C2. 44: England PM_{10} Mean Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.



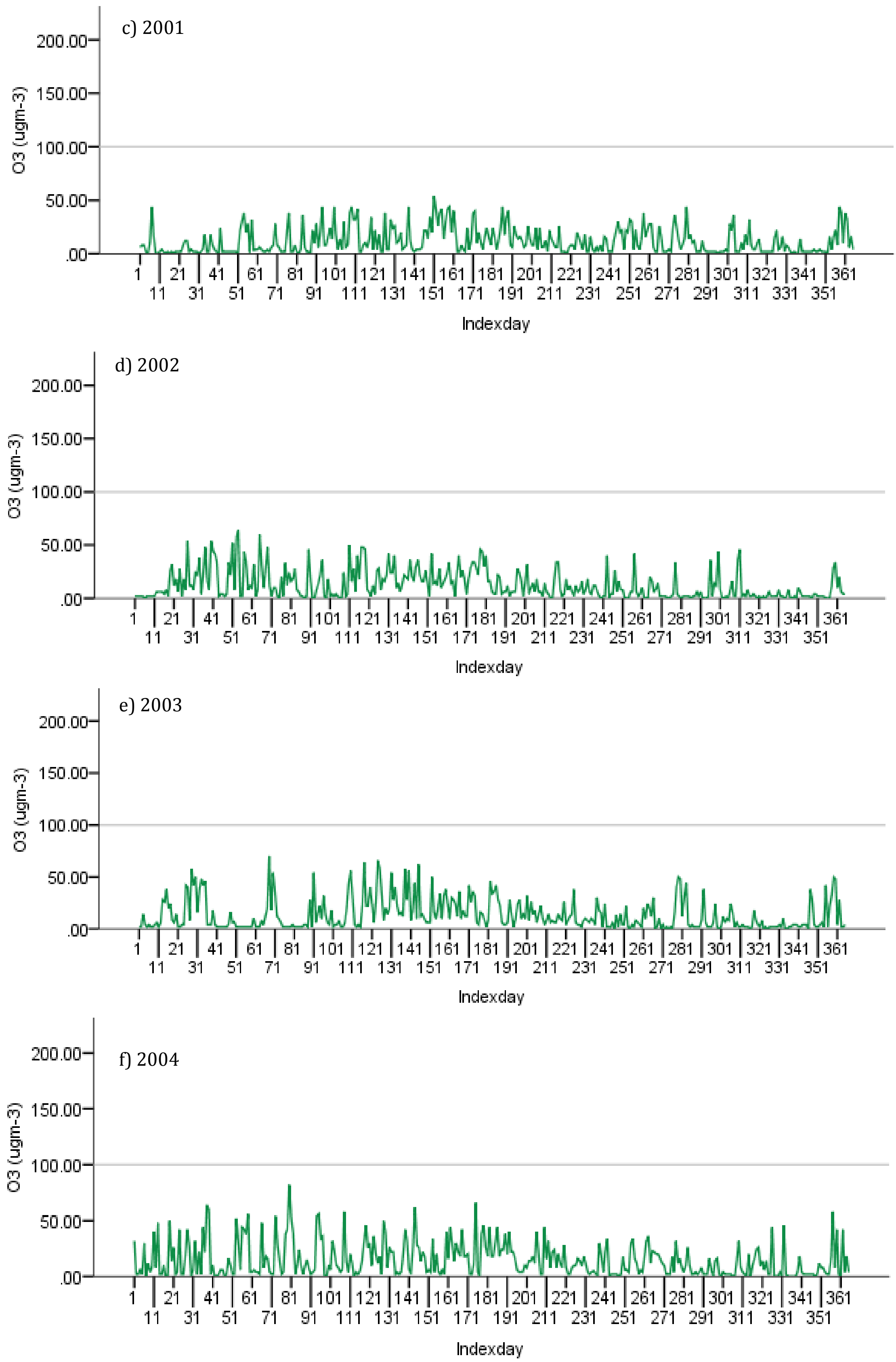
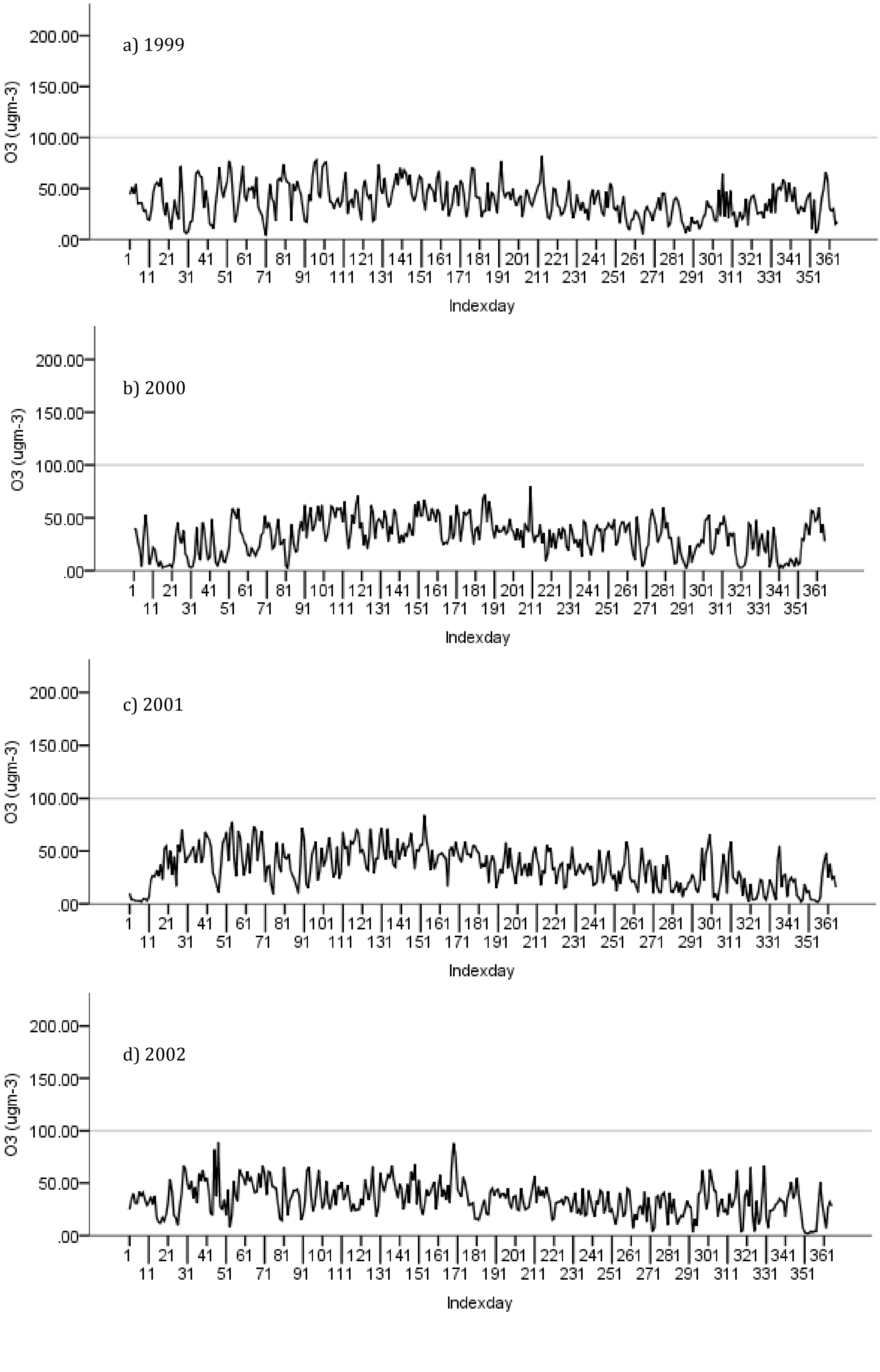
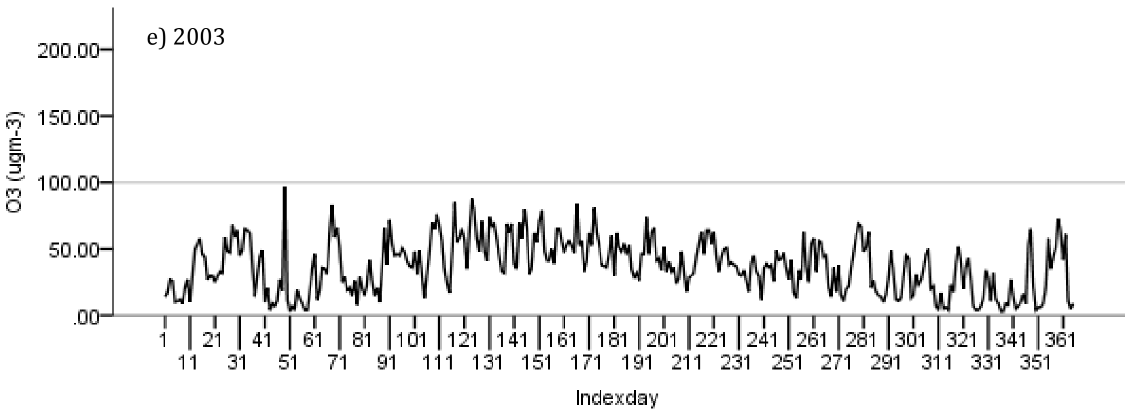


Figure C2. 45: England O_3 Minimum Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


a) 1999
b) 2000
c) 2001
d) 2002
O3 (ugm-3)
200.00
150.00
100.00
50.00
.00
Indexday
1 11 21 31 41 51 61 71 81 91 101 111 121 131 141 151 161 171 181 191 201 211 221 231 241 251 261 271 281 291 301 311 321 331 341 351 361



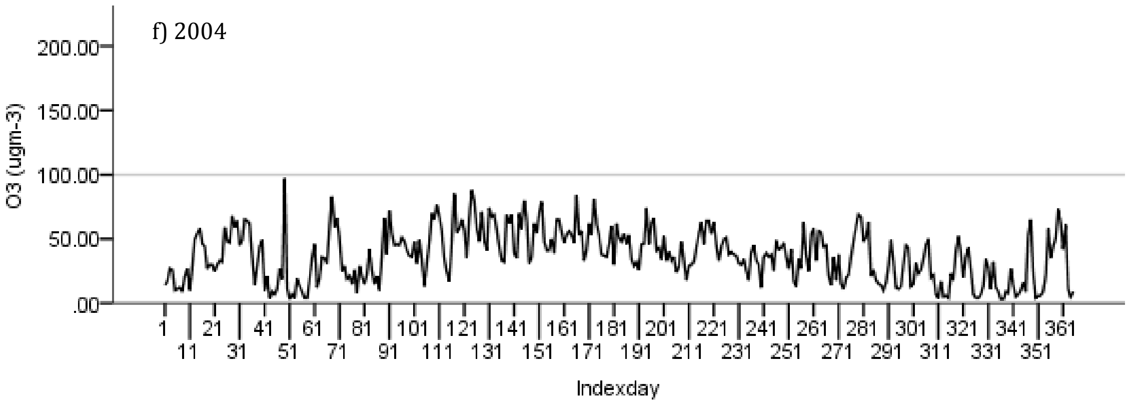
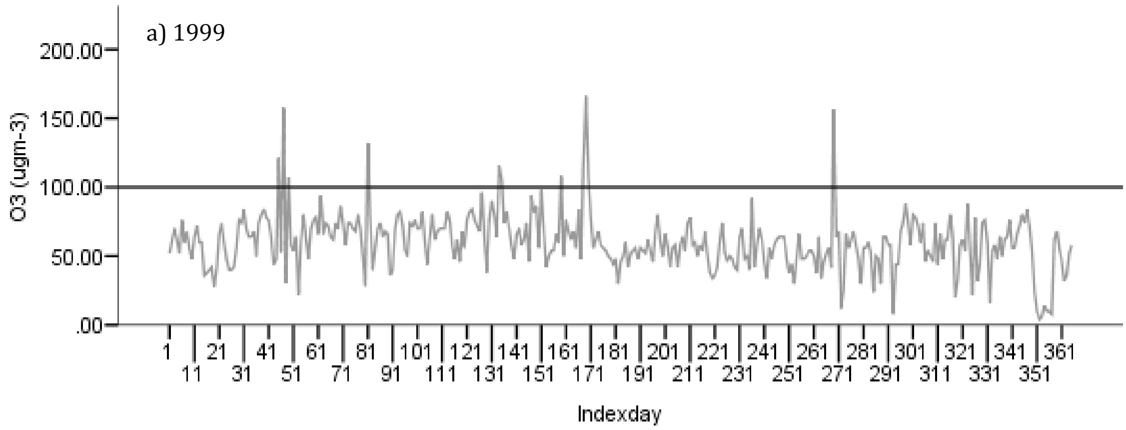
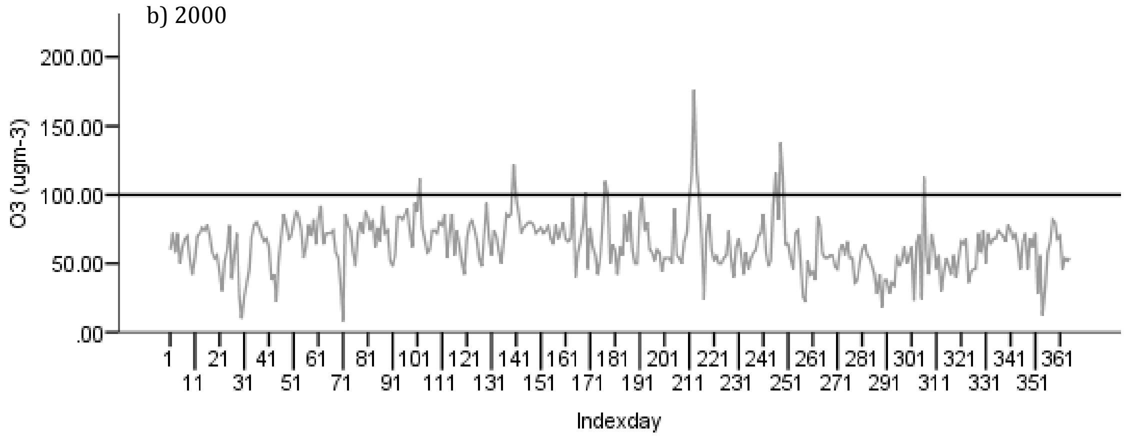


Figure C2. 46: England O_3 Mean Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.





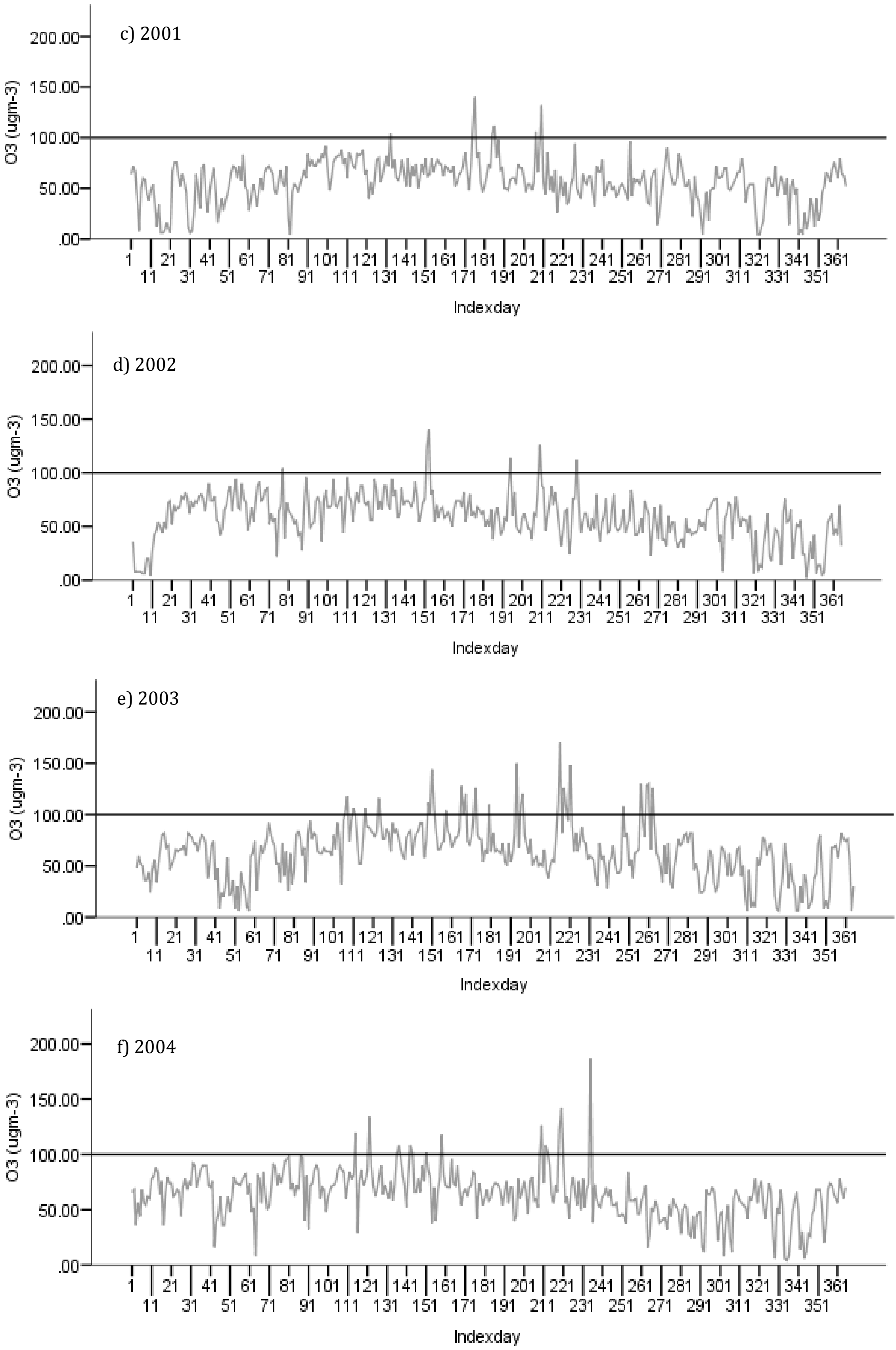
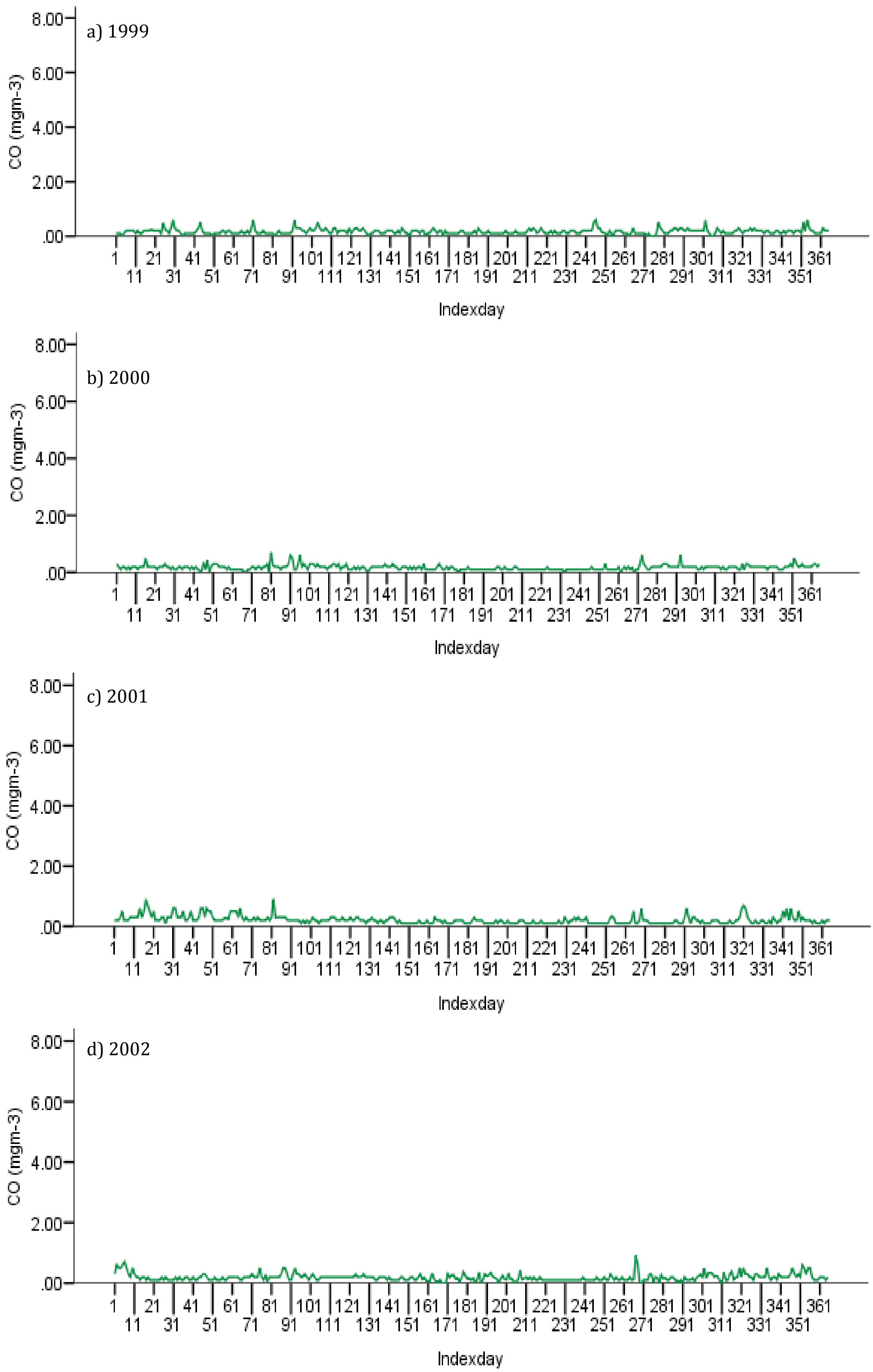
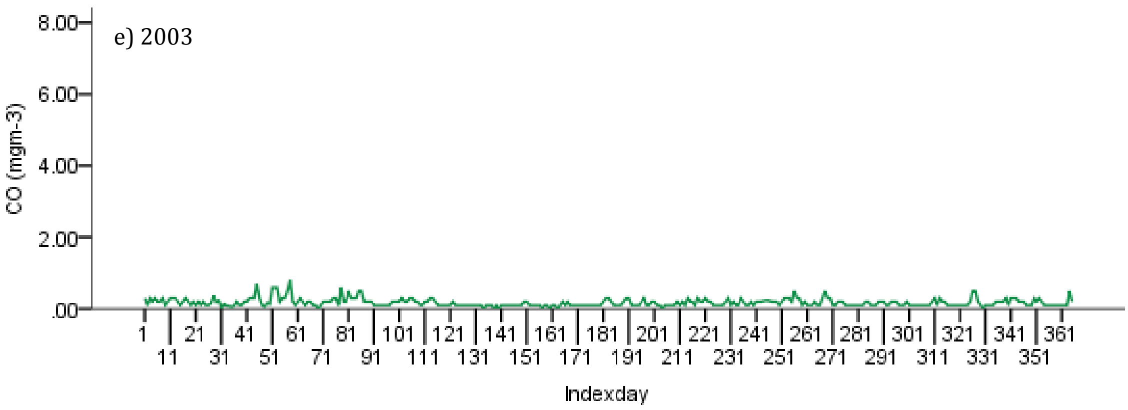


Figure C2. 47: England O_3 Maximum Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


a) 1999
b) 2000
c) 2001
d) 2002
CO (mgm-3)
8.00
6.00
4.00
2.00
.00
1 11 21 31 41 51 61 71 81 91 101 111 121 131 141 151 161 171 181 191 201 211 221 231 241 251 261 271 281 291 301 311 321 331 341 351 361
Indexday



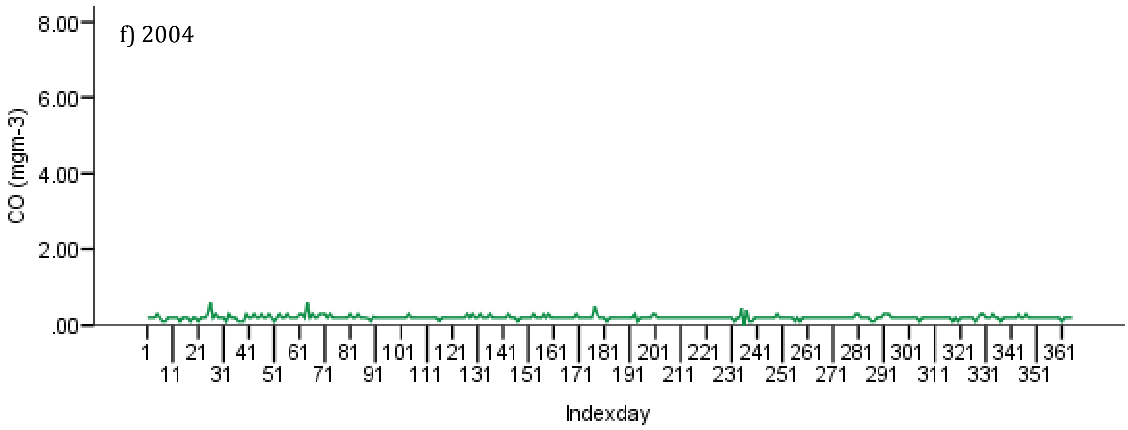
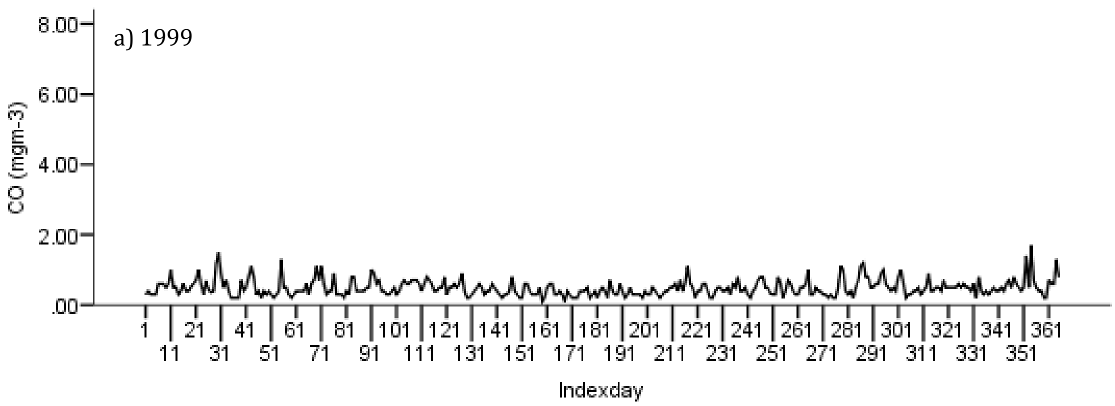
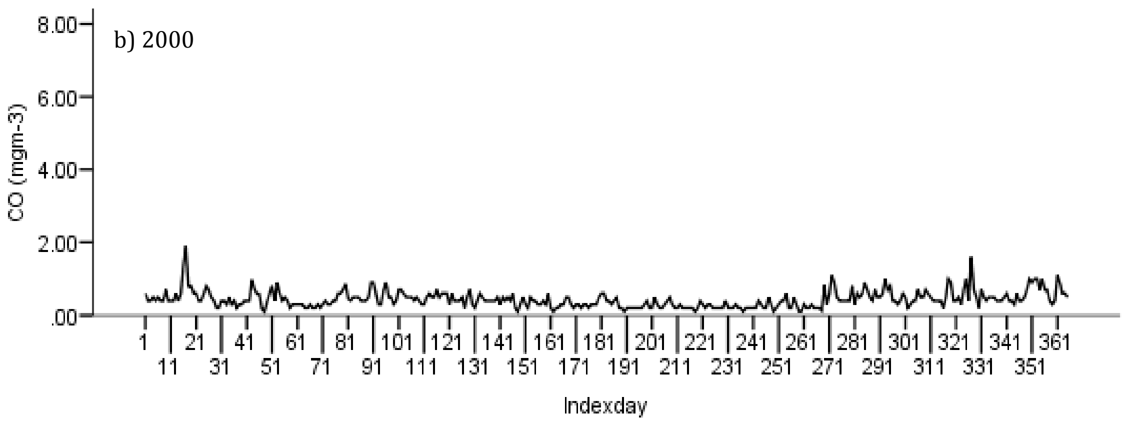


Figure C2.48: England CO Minimum Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.





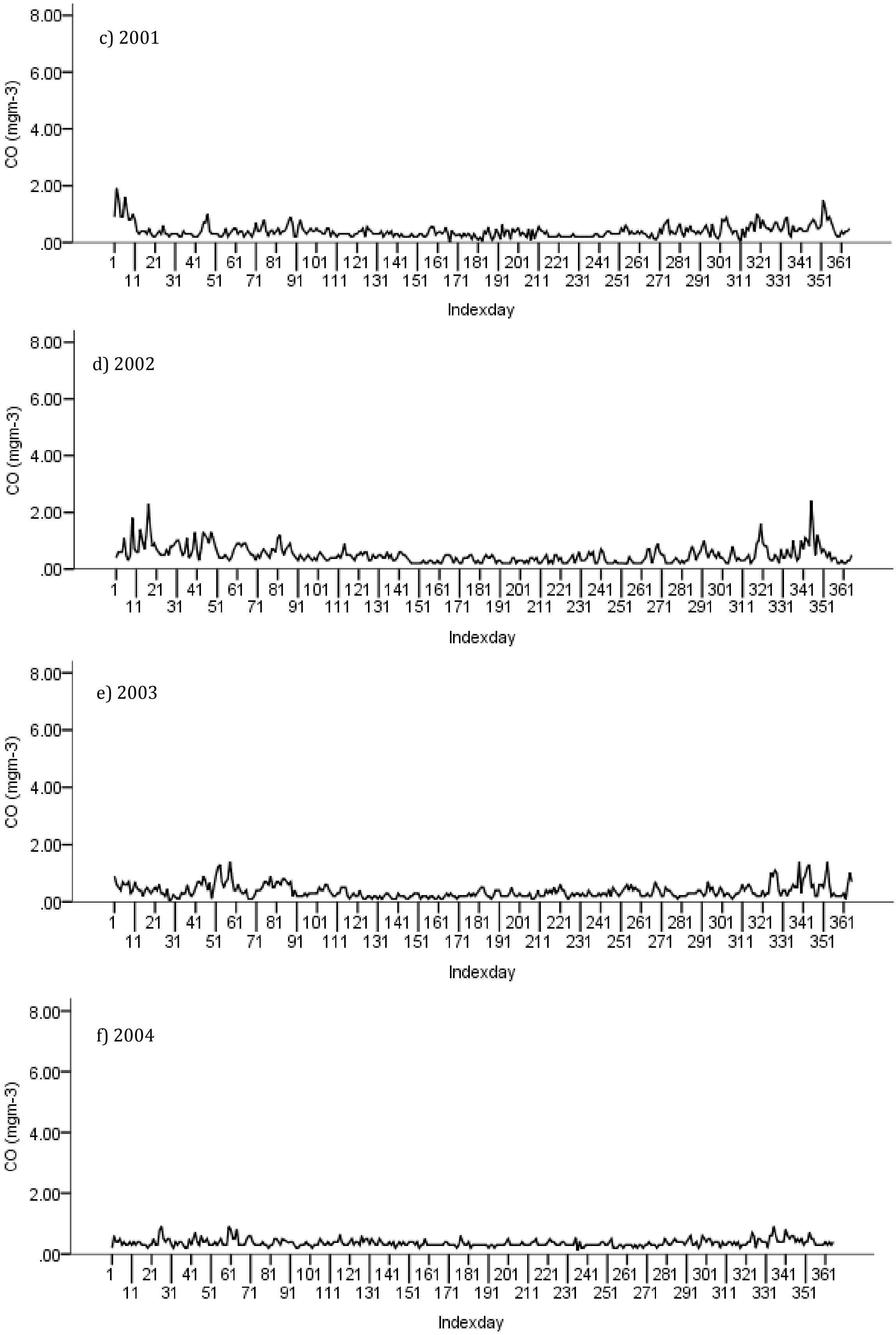
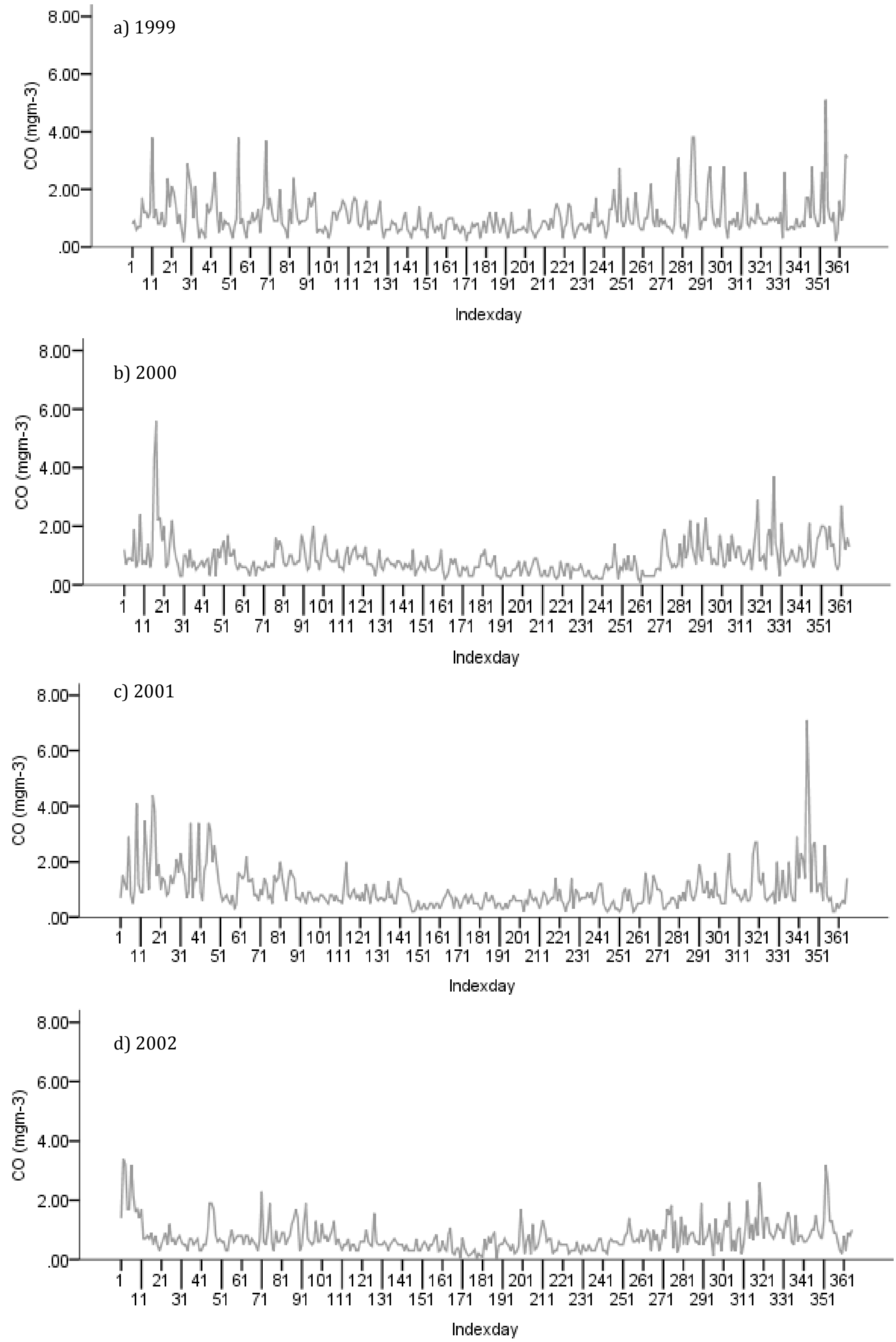
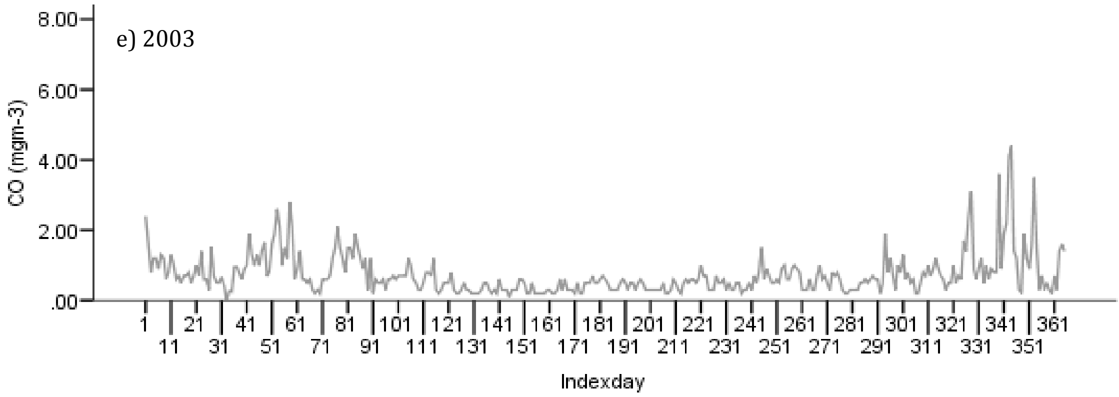


Figure C2. 49: England CO Mean Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


a) 1999
b) 2000
c) 2001
d) 2002
CO (mgm-3)
8.00
6.00
4.00
2.00
.00
1 11 21 31 41 51 61 71 81 91 101 111 121 131 141 151 161 171 181 191 201 211 221 231 241 251 261 271 281 291 301 311 321 331 341 351 361
Indexday



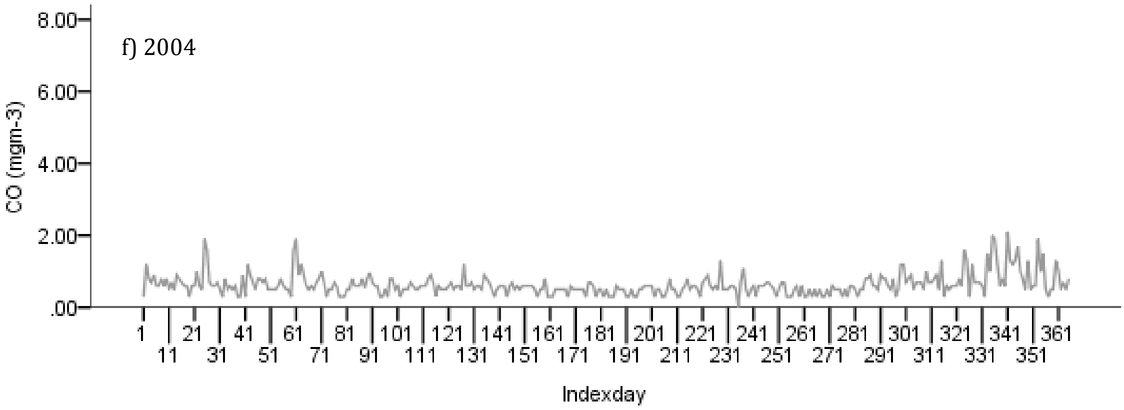
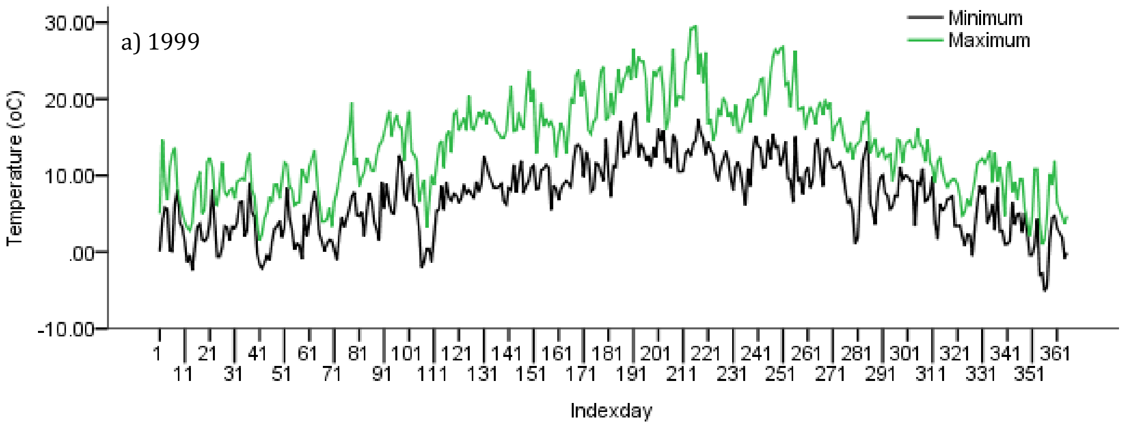
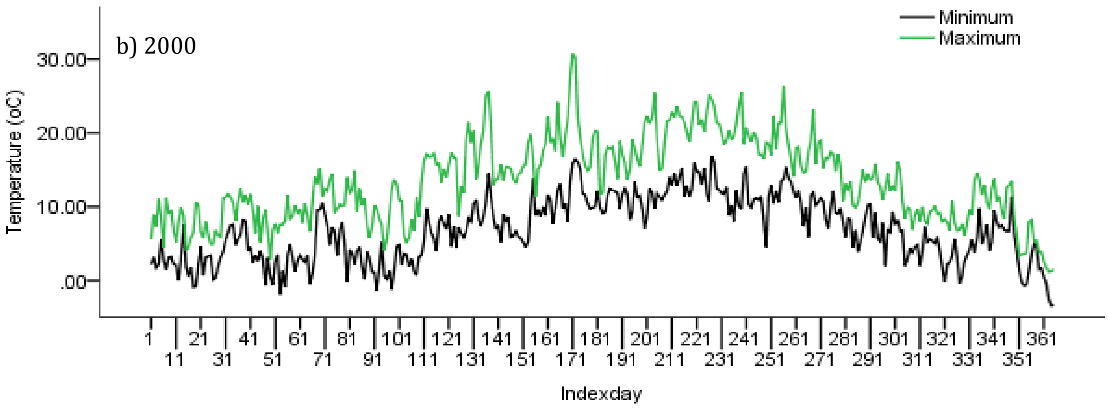


Figure C2. 50: England CO Maximum Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.





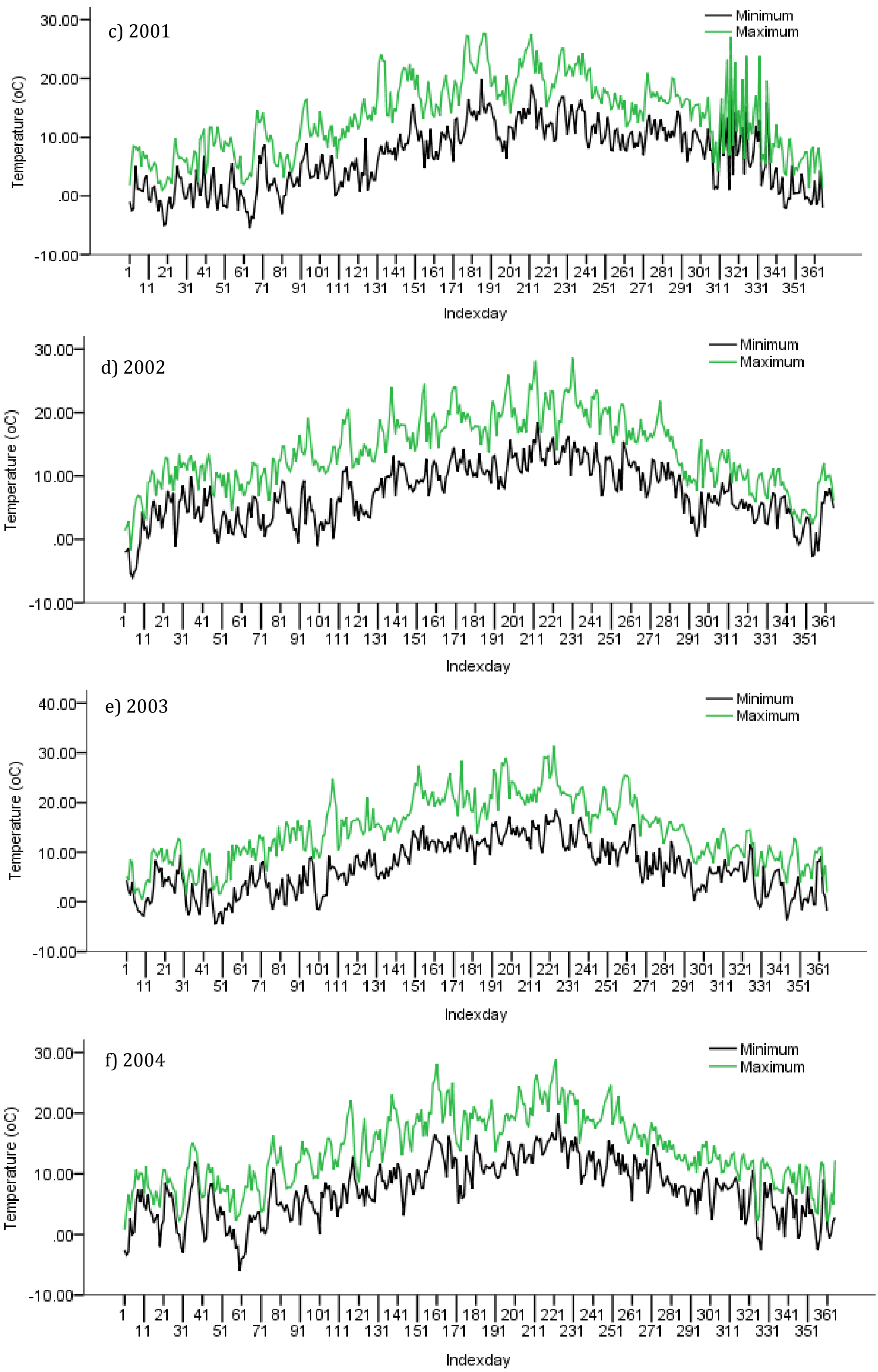
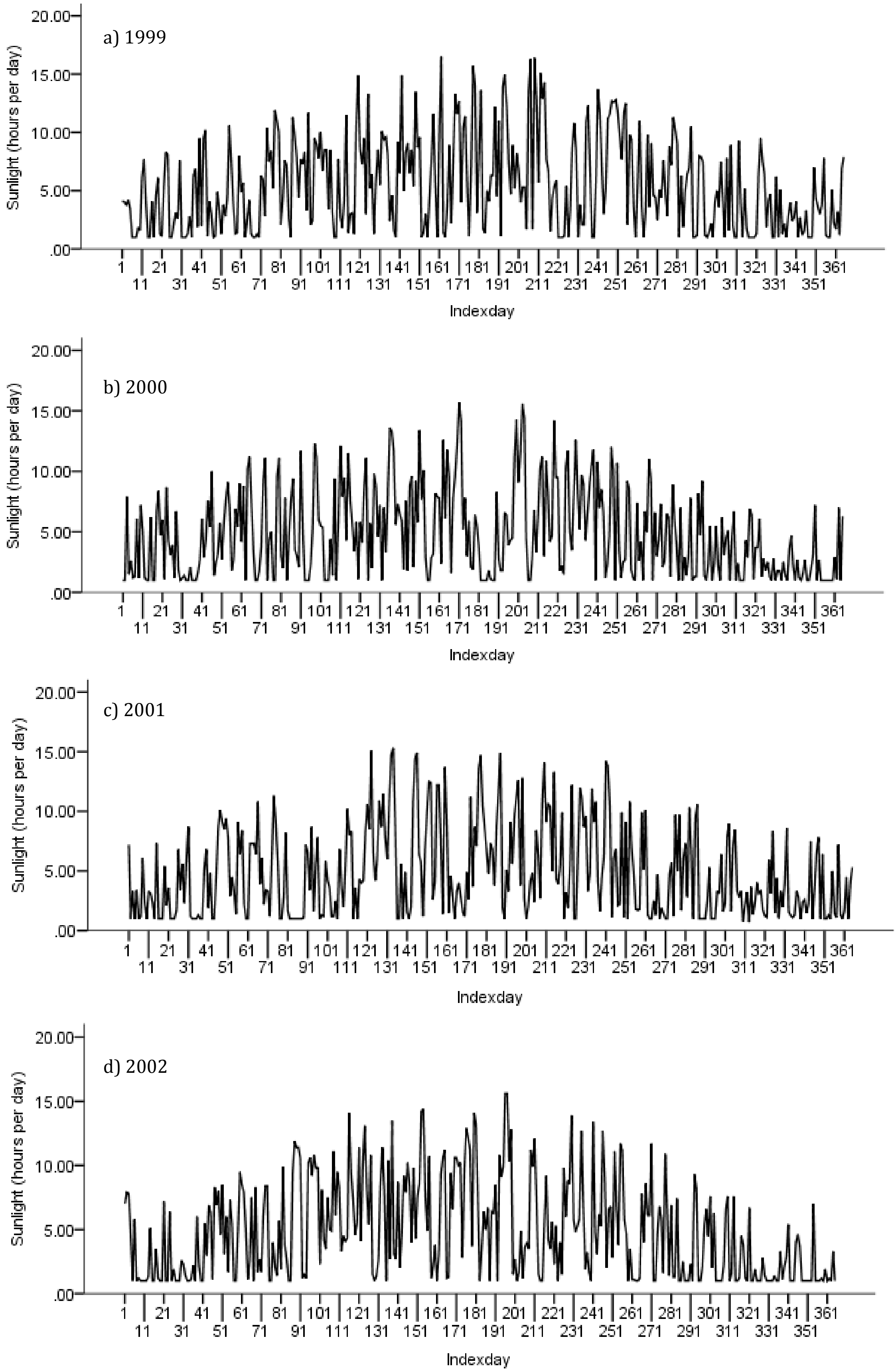


Figure C2. 51: England Temperature Minimum and Maximum Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


a) 1999
b) 2000
c) 2001
d) 2002
Sunlight (hours per day)
20.00
15.00
10.00
5.00
.00
1 21 41 61 81 101 121 141 161 181 201 221 241 261 281 301 321 341 361
11 31 51 71 91 111 131 151 171 191 211 231 251 271 291 311 331 351
Indexday

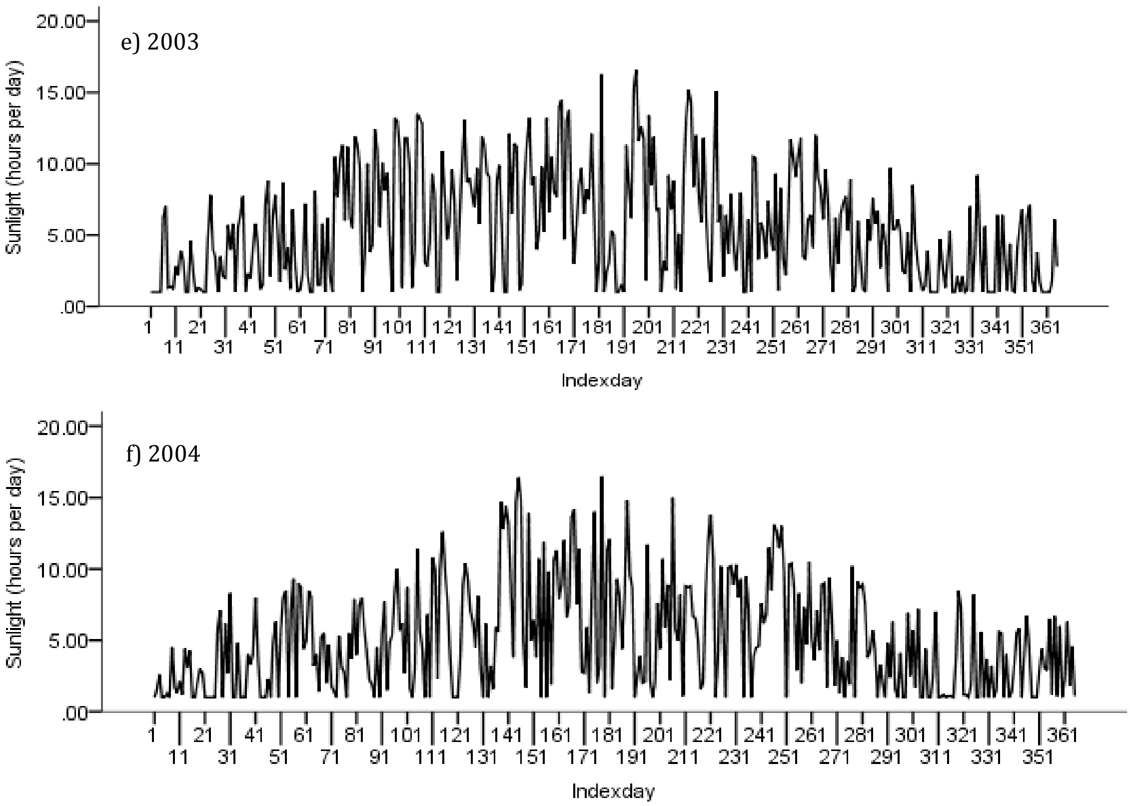
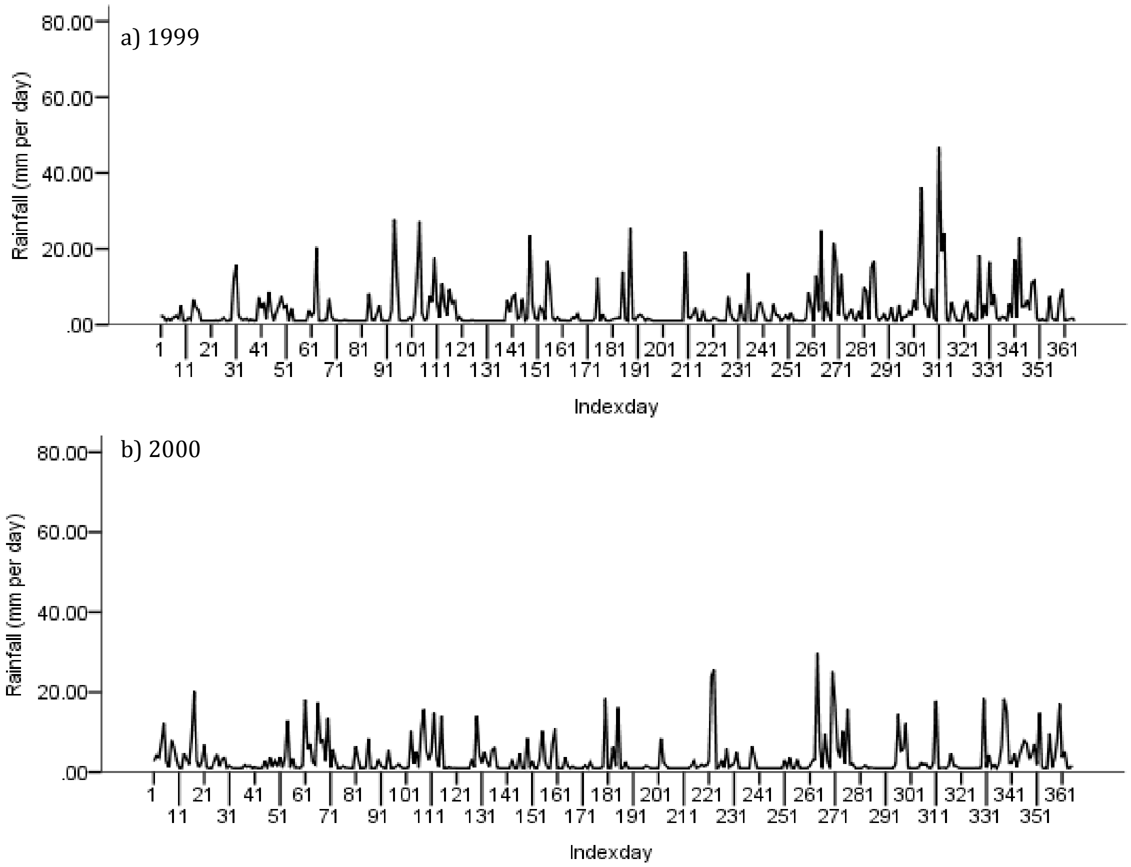


Figure C2. 52: England Sun light Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.



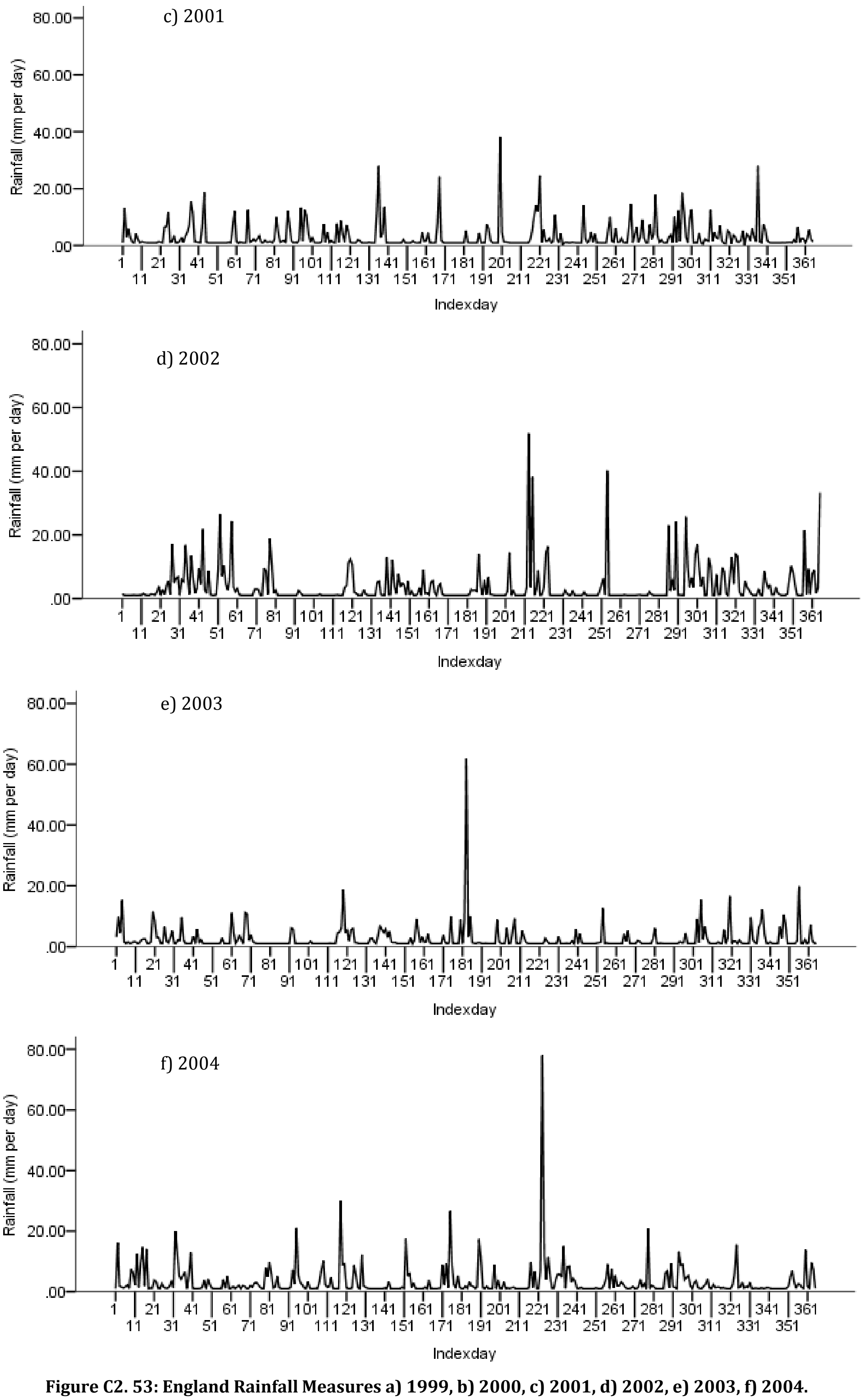
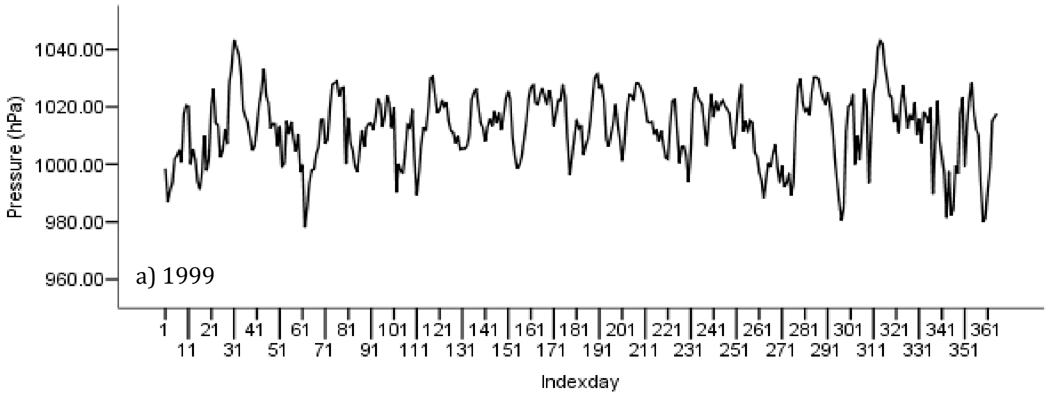
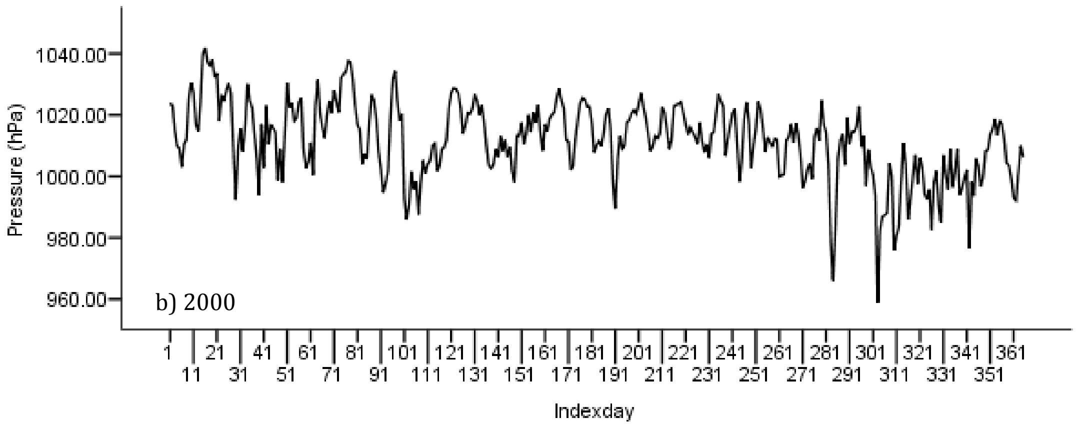
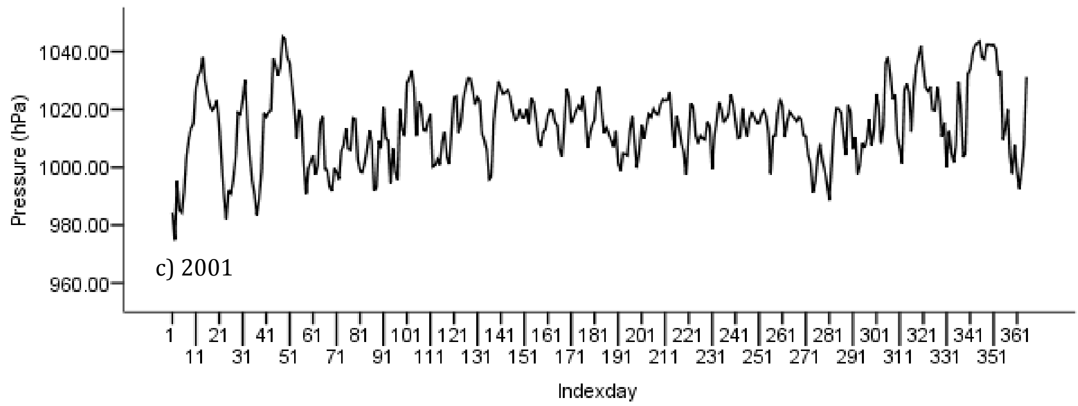
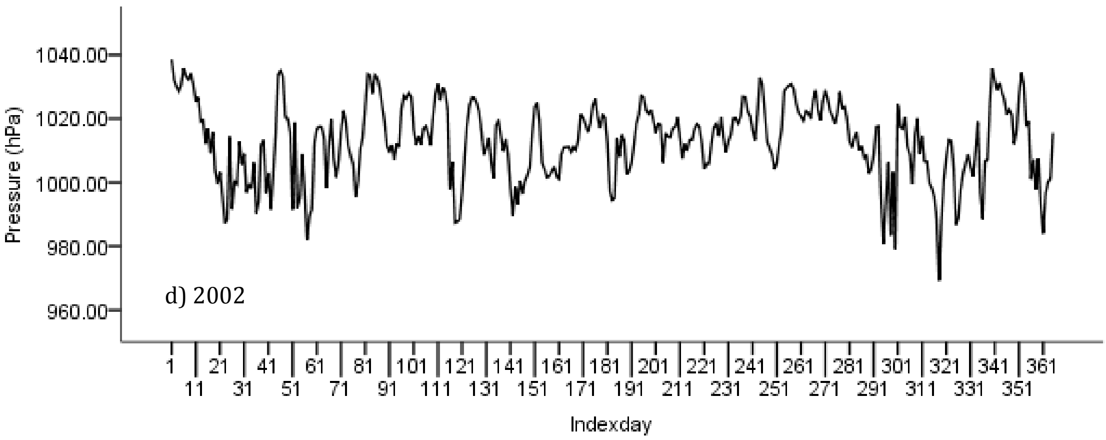


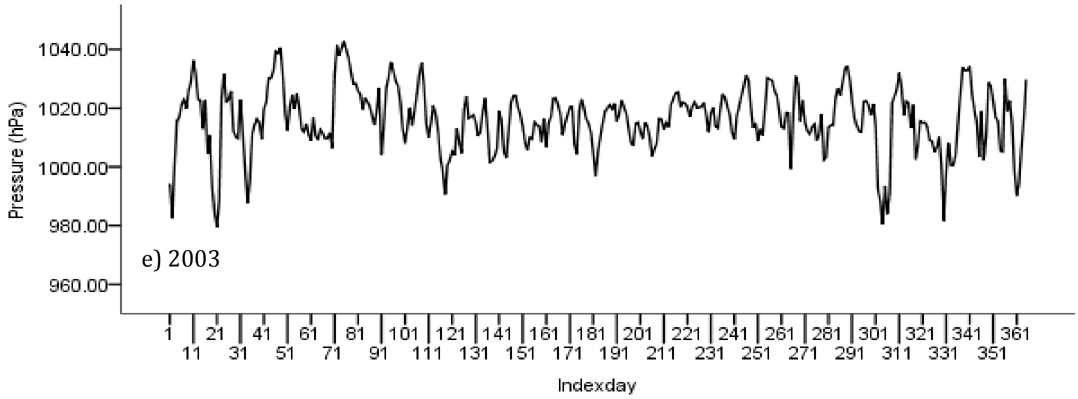
Figure C2. 53: England Rainfall Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


1040.00
1020.00
1000.00
980.00
960.00
Pressure (hPa)
a) 1999
1 21 41 61 81 101 121 141 161 181 201 221 241 261 281 301 321 341 361
11 31 51 71 91 111 131 151 171 191 211 231 251 271 291 311 331 351
Indexday


1040.00
1020.00
1000.00
980.00
960.00
Pressure (hPa)
b) 2000
1 21 41 61 81 101 121 141 161 181 201 221 241 261 281 301 321 341 361
11 31 51 71 91 111 131 151 171 191 211 231 251 271 291 311 331 351
Indexday


1040.00
1020.00
1000.00
980.00
960.00
Pressure (hPa)
c) 2001
1 21 41 61 81 101 121 141 161 181 201 221 241 261 281 301 321 341 361
11 31 51 71 91 111 131 151 171 191 211 231 251 271 291 311 331 351
Indexday


1040.00
1020.00
1000.00
980.00
960.00
Pressure (hPa)
d) 2002
1 21 41 61 81 101 121 141 161 181 201 221 241 261 281 301 321 341 361
11 31 51 71 91 111 131 151 171 191 211 231 251 271 291 311 331 351
Indexday



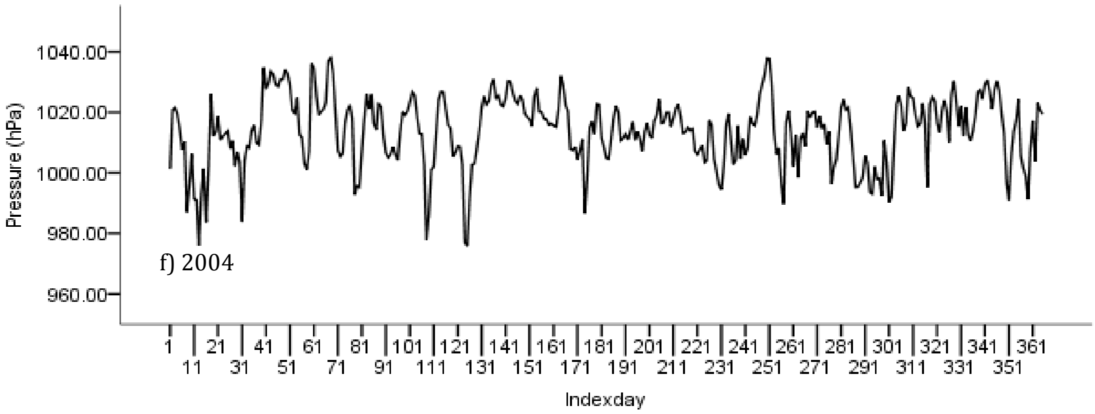
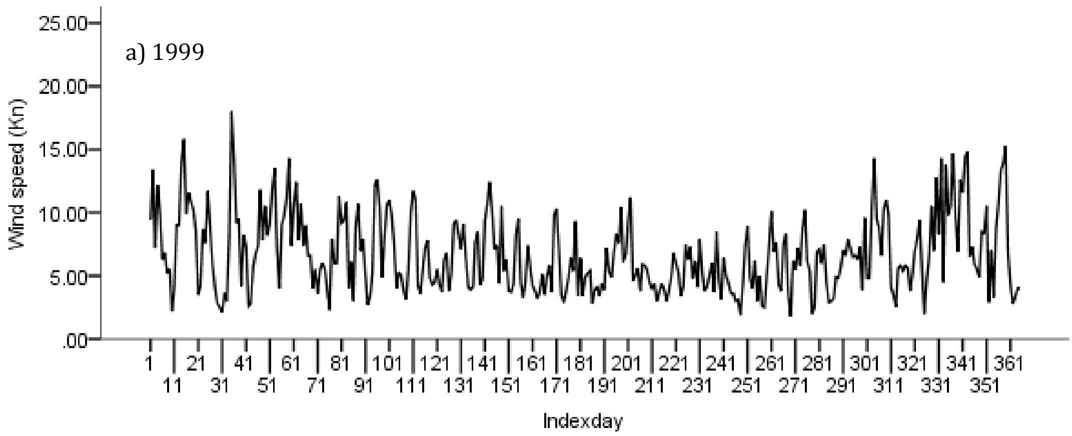
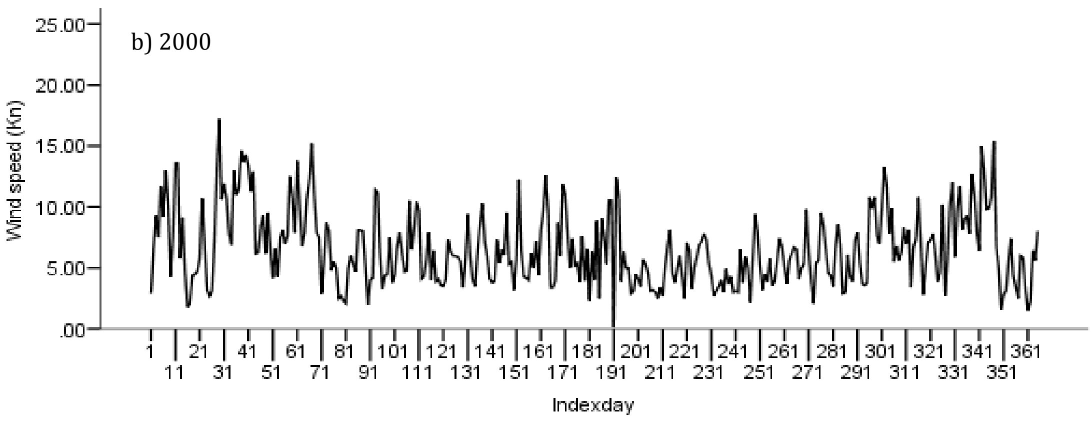


Figure C2. 54: England Pressure Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.





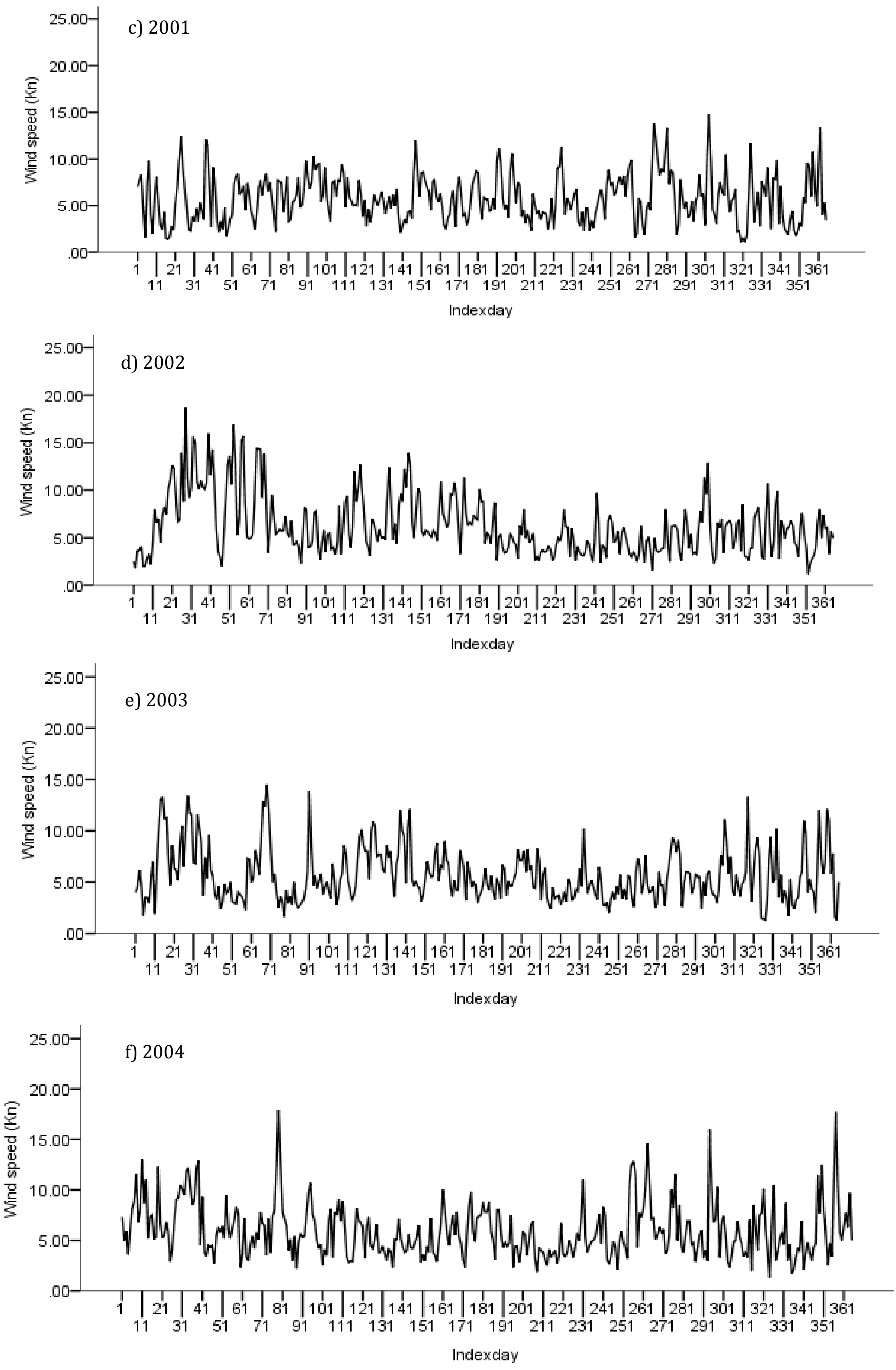
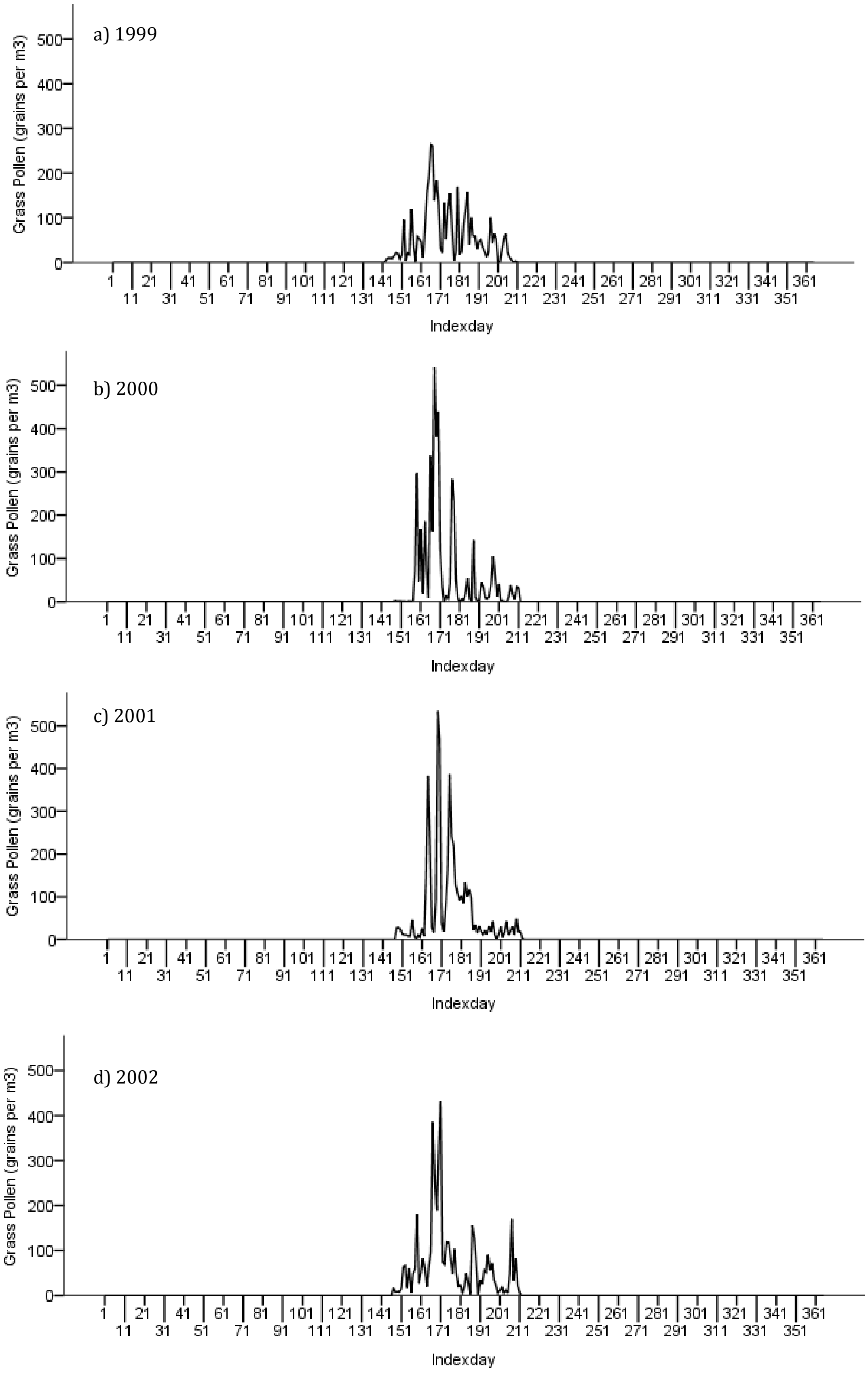


Figure C2. 55: England Wind Speed Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.



a) 1999
b) 2000
c) 2001
d) 2002
Grass Pollen (grains per m3)
0
100
200
300
400
500
1
11
21
31
41
51
61
71
81
91
101
111
121
131
141
151
161
171
181
191
201
211
221
231
241
251
261
271
281
291
301
311
321
331
341
351
361
Indexday

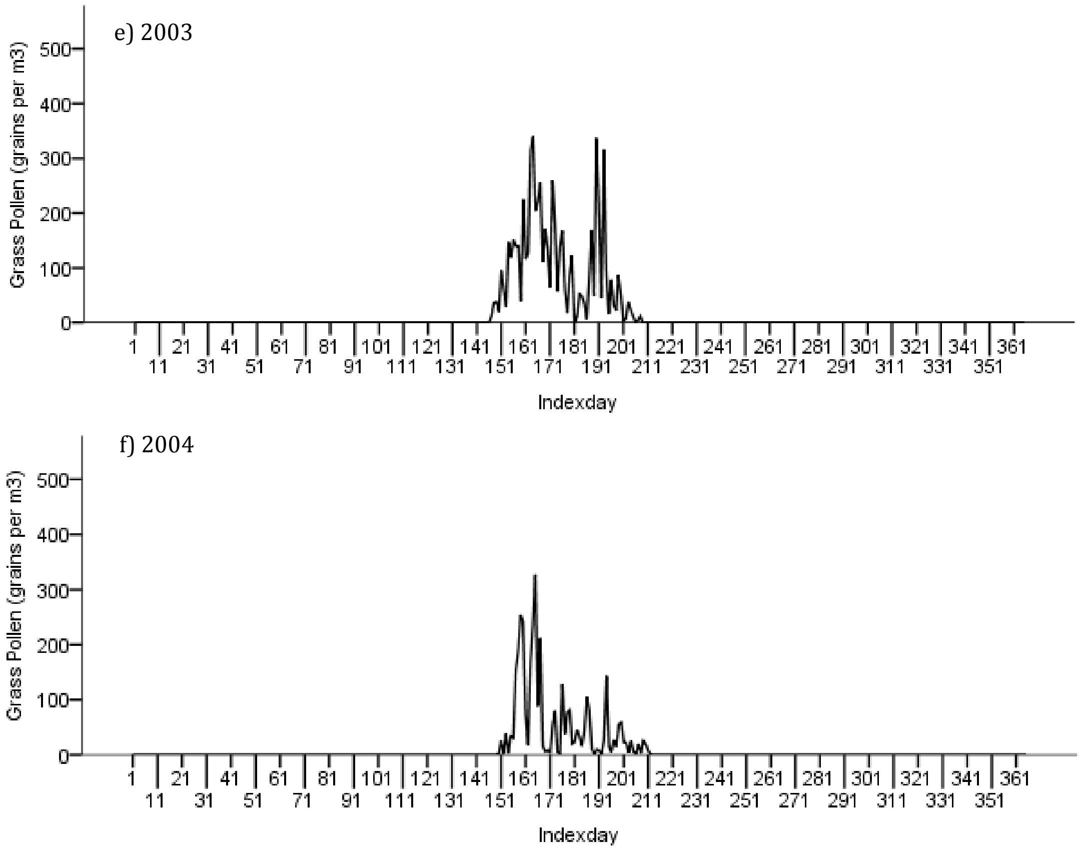


Figure C2. 56: England Grass Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.

C2.2.1. England Summary of All Daily Environmental Measures

Table C. 15 Summary statistics for England environmental measures (n=2190 days).

Exposure			Mean	Median	SD	Minimum	Maximum
Outdoor air pollutants	Min'	NO	3.14	1	6.09	0	120
		NO_2	13.73	10	10.55	0	65
		NOD	19.69	14	18.72	0	241
		SO_2	3.8	3	1.98	0	16
		PM_{10}	10.45	9	7.64	0	64
		O_3	13.53	8	13.9	0	82
		CO	0.19	0.2	0.11	0	0.9
	Mean	NO	28.85	21	29.03	0.43	291
		NO_2	35.53	34	15.03	6	101.42
		NOD	79.35	66	56.61	9	530
		SO_2	8.73	7	5.7	2	76
		PM_{10}	24.78	22	11.78	4	110
		O_3	36.2	36	17.62	2	96.95
		CO	0.43	0.4	0.24	0.04	2.4
	Max'	NO	85.02	63.5	82.17	3	808
		NO_2	61.6	61	22.15	10	195
		NOD	185.96	154	140.51	13	1383
		SO_2	20.62	13	22.33	1.66	221
		PM_{10}	45.22	39	24.6	9	272
		O_3	61.04	62	22.33	2	187.09
		CO	0.84	0.7	0.6	0.02	7.1
Weather	Min'	Temperature	7.03	7.3	4.87	-6	19.9
	Max'	Temperature	13.9	13.7	6	-1.7	31.4
		Sunshine	5.12	4.3	3.84	0.71	16.6
		Rain	3.39	1.2	5.18	0.18	78
		Pressure	1013.58	1014.4	12	958.8	1045.11
		Wind speed	6.16	5.6	2.88	0.13	18.7
Pollen		Grass	12.57	0	47.46	0	542

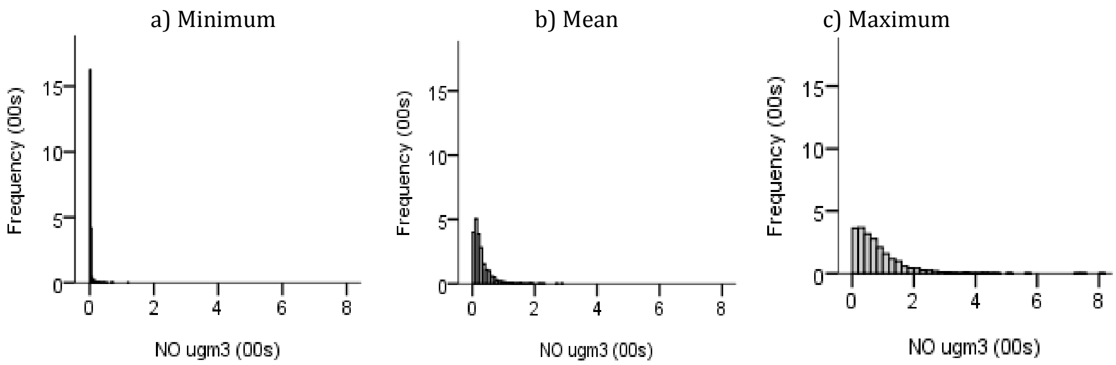


Figure C2. 57: England NO - distribution of the daily a) minimum, b) mean and c) maximum measures.

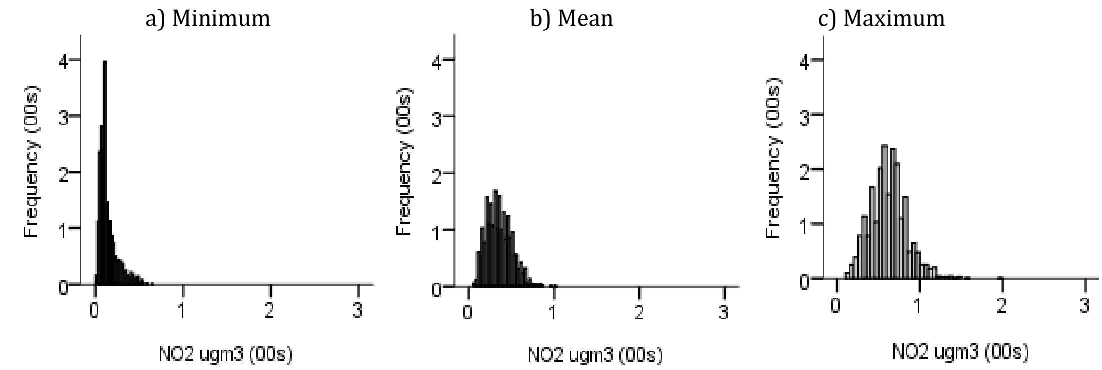


Figure C2. 58: England NO_2 - distribution of the daily a) minimum, b) mean and c) maximum measures.

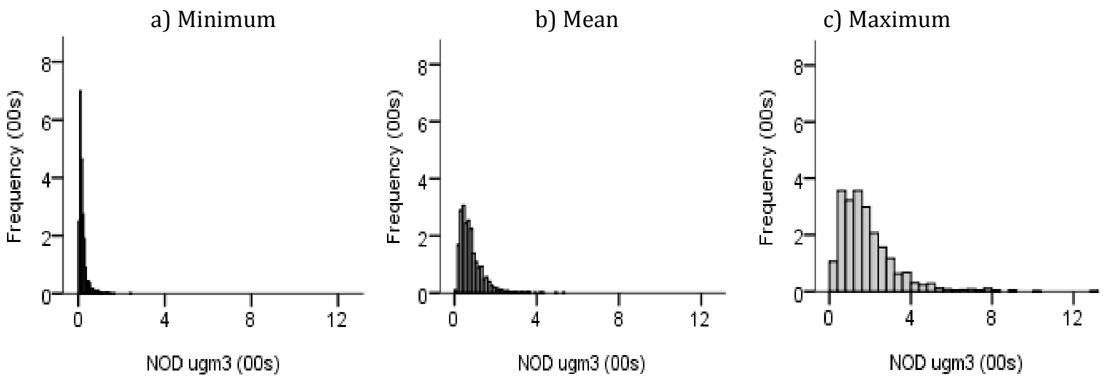


Figure C2. 59: England NOD - distribution of the daily a) minimum, b) mean and c) maximum measures.

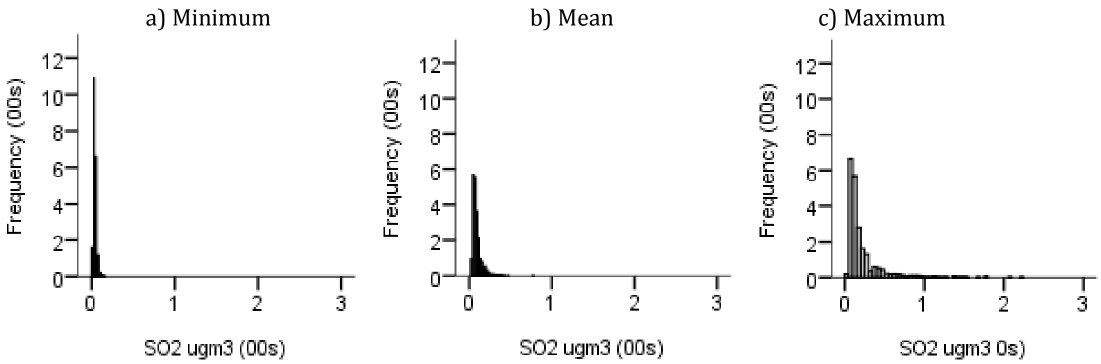


Figure C2. 60: England SO_2 - distribution of the daily a) minimum, b) mean and c) maximum measures.

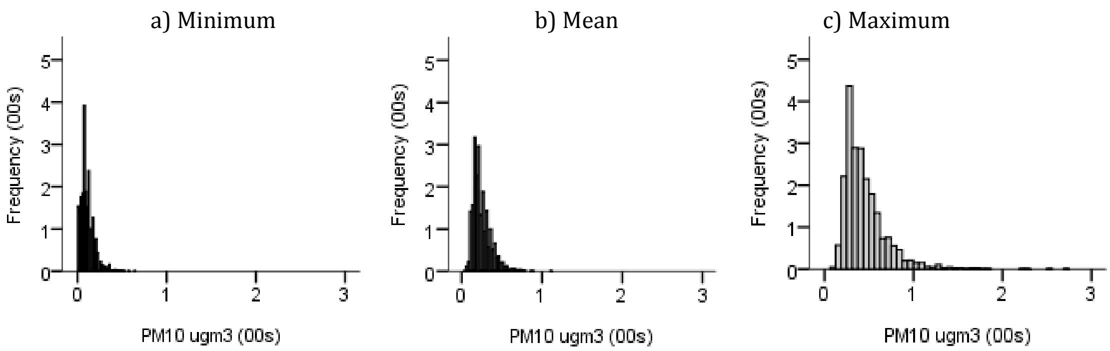


Figure C2. 61: England PM_{10} - distribution of the daily a) minimum, b) mean and c) maximum measures.

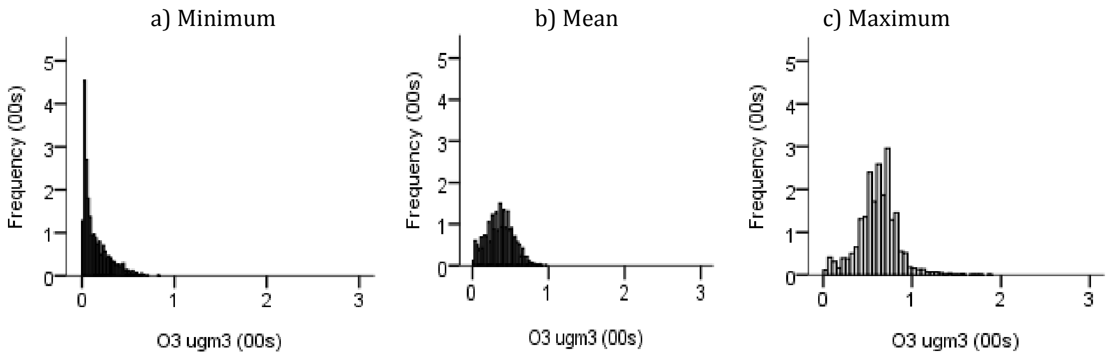


Figure C2. 62: England O_3 - distribution of the daily a) minimum, b) mean and c) maximum measures.

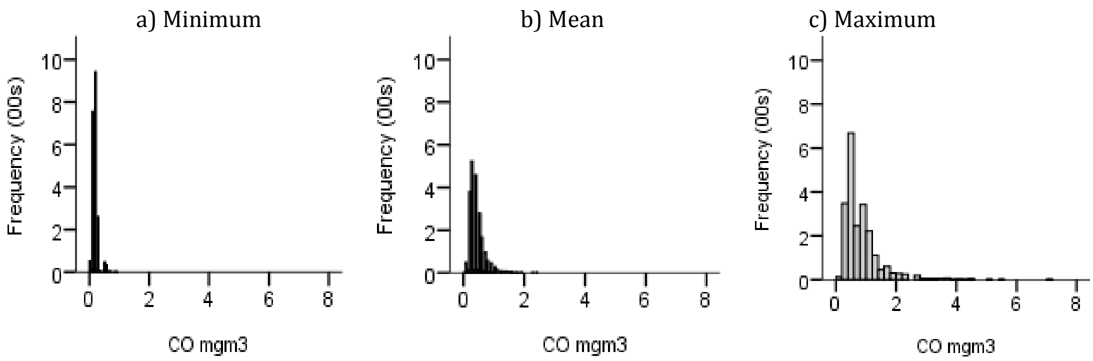


Figure C2. 63: England CO - distribution of the daily a) minimum, b) mean and c) maximum measures.

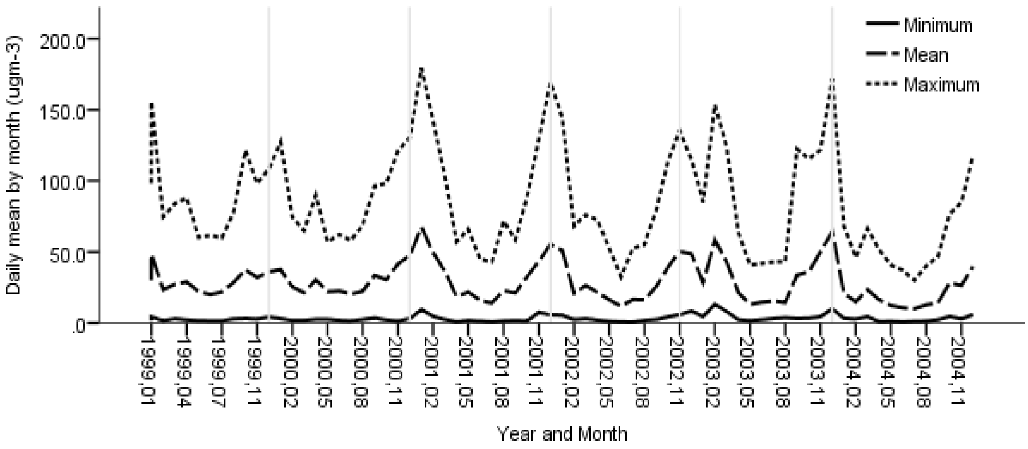


Figure C2. 64: England NO - plot of the daily mean aggregated by month.

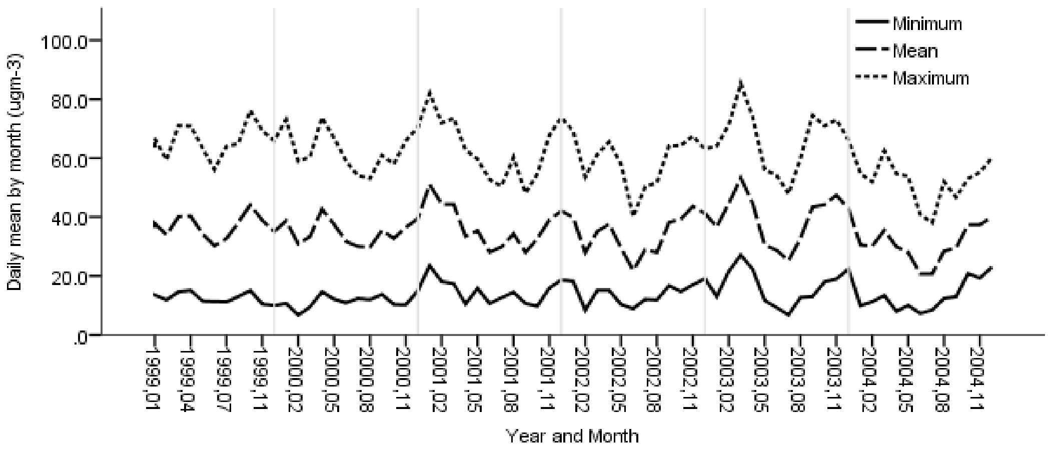


Figure C2. 65: - England NO_2 - plot of the daily mean aggregated by month.

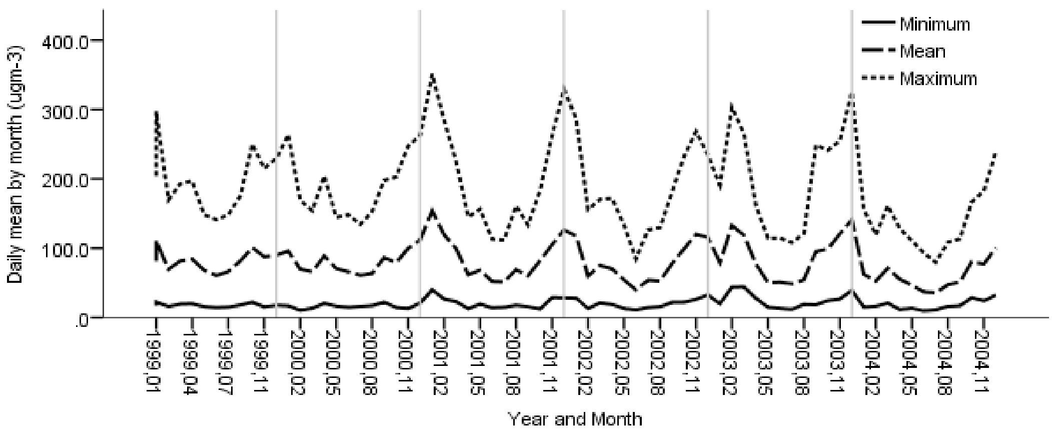


Figure C2. 66: England NOD - plot of the daily mean aggregated by month.

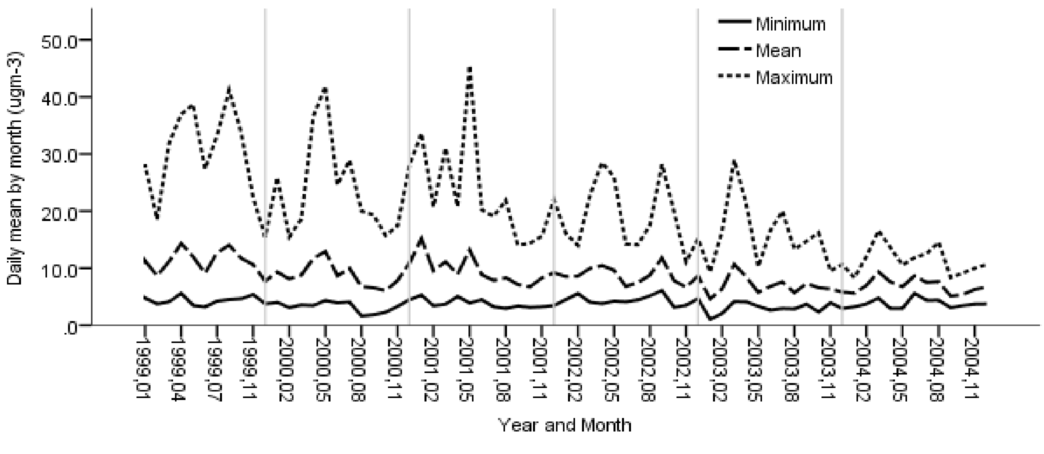


Figure C2. 67: England SO_2 - plot of the daily mean aggregated by month.

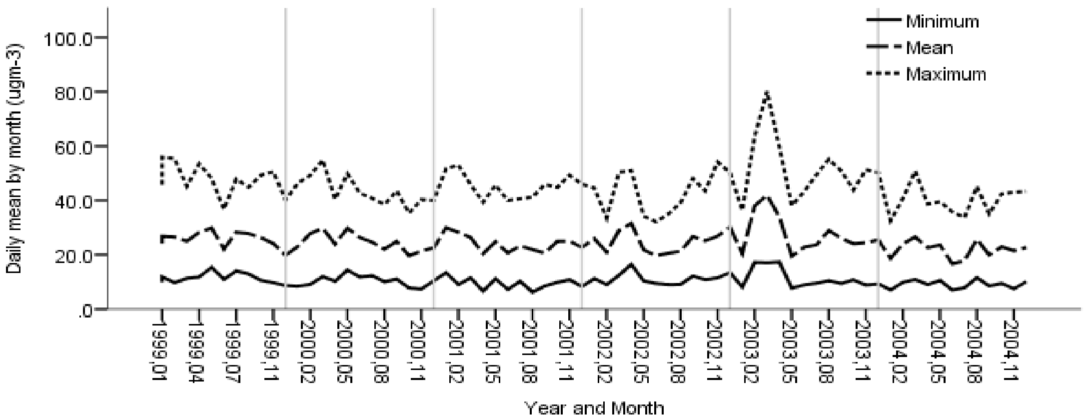


Figure C2. 68: England PM_{10} - plot of the daily mean aggregated by month.

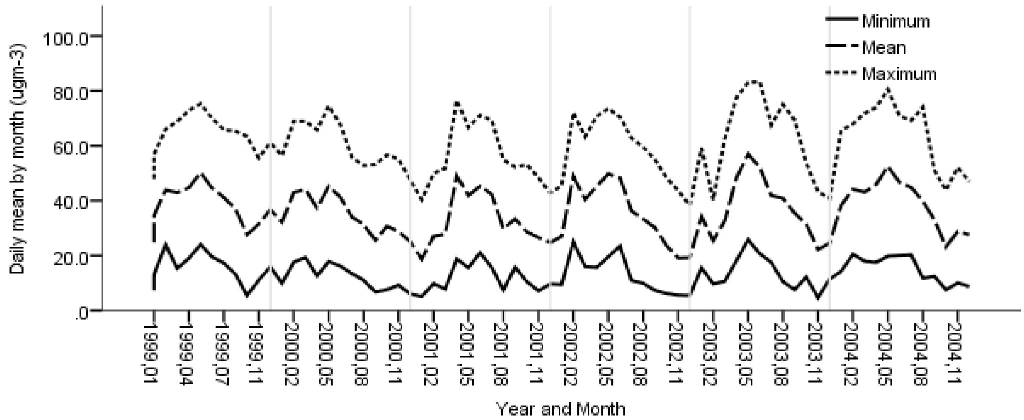


Figure C2. 69: England O_3 - plot of the daily mean aggregated by month.

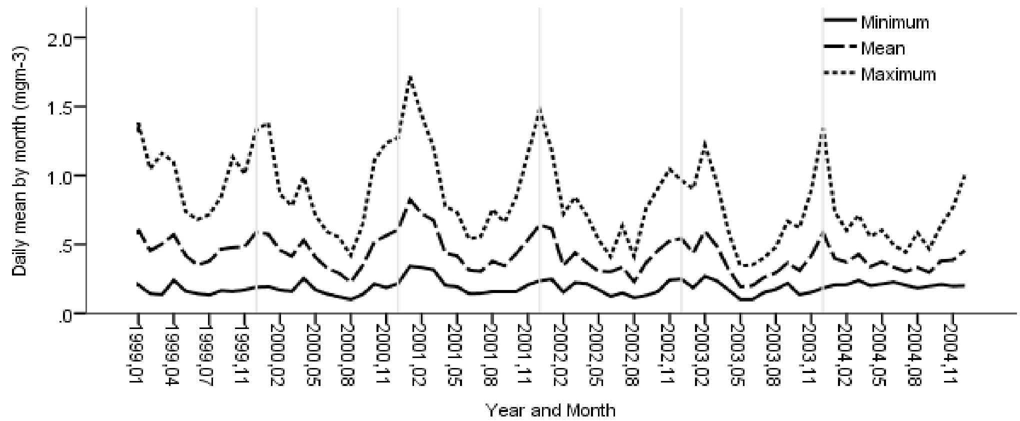


Figure C2. 70: England CO - plot of the daily mean aggregated by month.

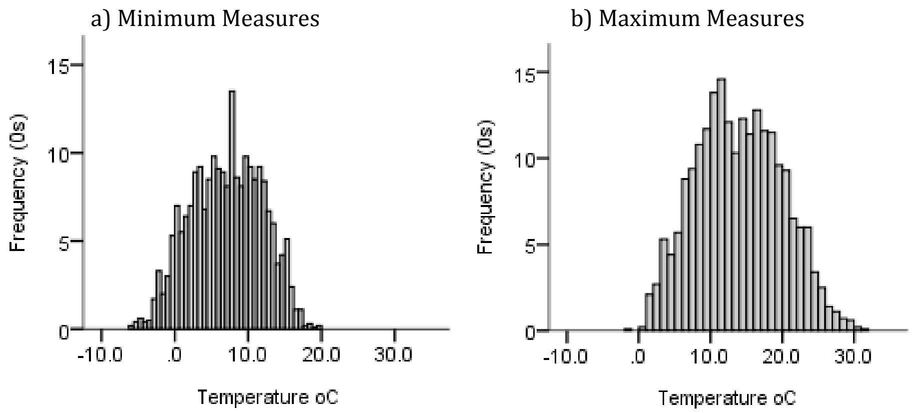


Figure C2. 71: England Temperature - distribution of the a) minimum and b) maximum daily measures.

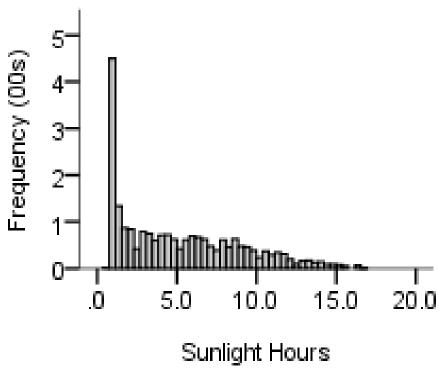


Figure C2. 72: England Sun - distribution of the daily measures.

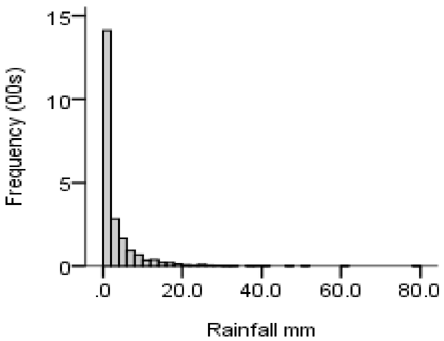


Figure C2. 73: England Rainfall - distribution of the daily measures.

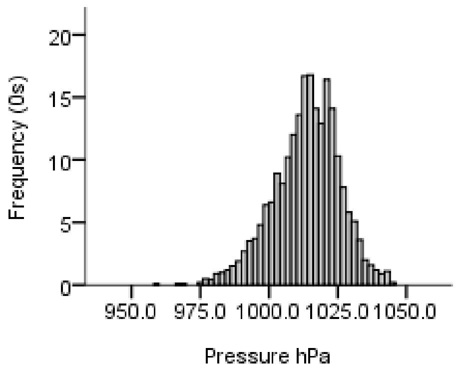


Figure C2. 74: England Pressure - distribution of the daily measures.

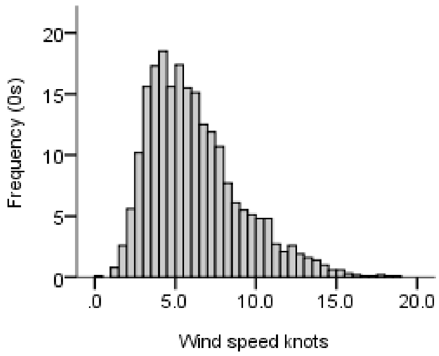


Figure C2. 75: England Wind speed mean - distribution of the daily measures.

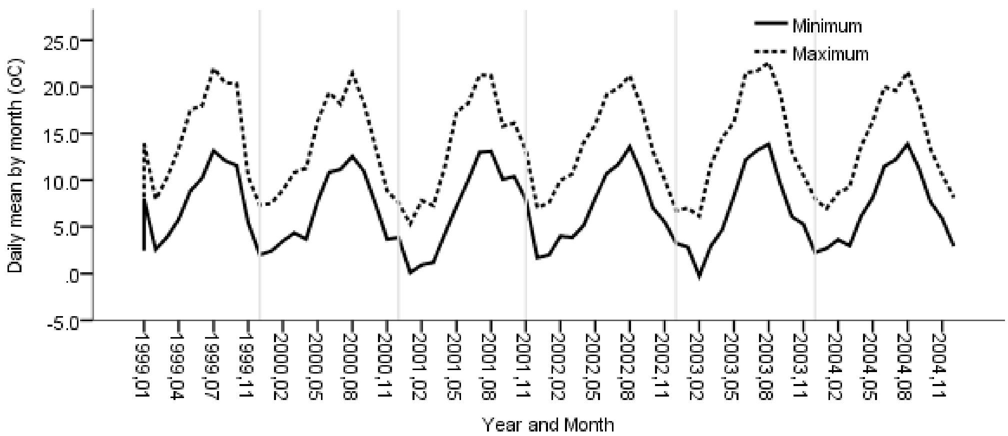


Figure C2. 76: England Temperature minimum and maximum measures - plot of the daily mean aggregated by month.

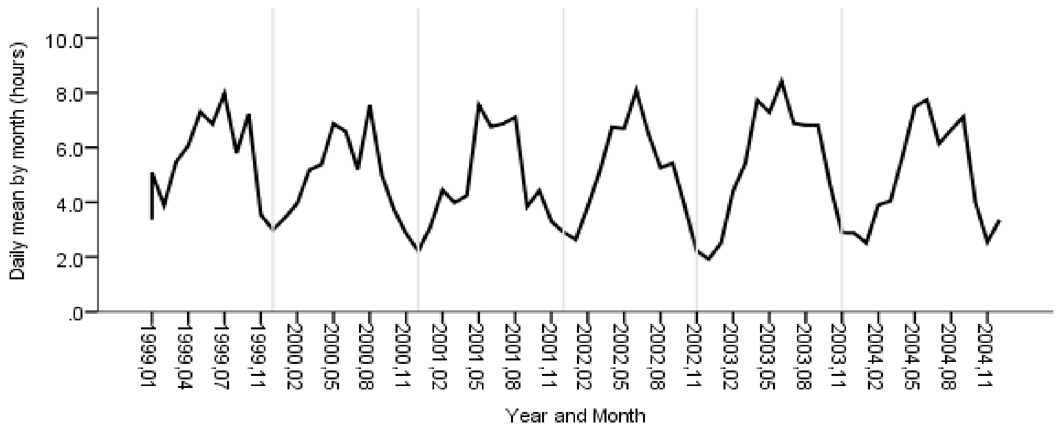


Figure C2. 77: England Sun - plot of the daily mean aggregated by month.

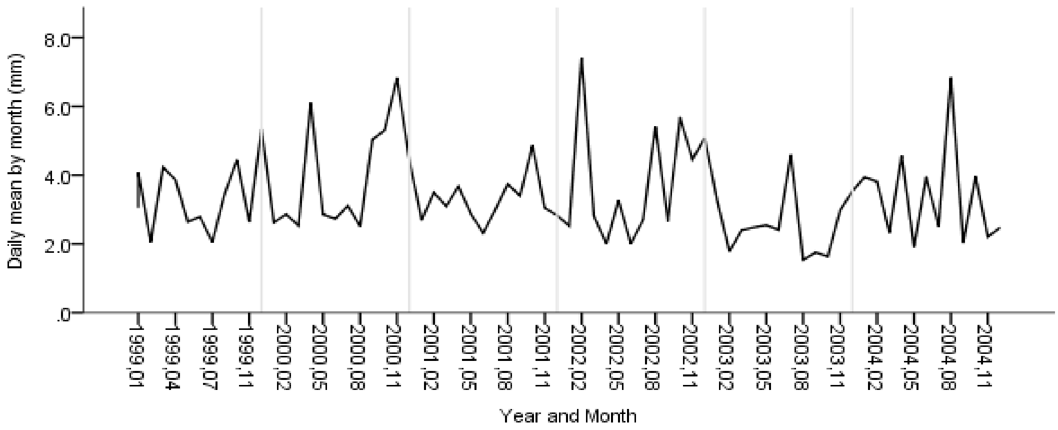


Figure C2. 78: England Rainfall - plot of the daily mean aggregated by month.

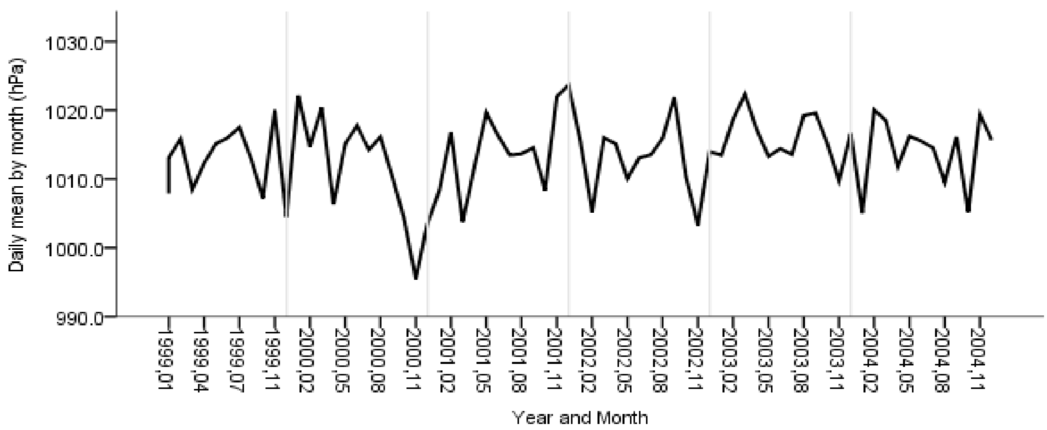


Figure C2. 79: England Pressure - plot of the daily mean aggregated by month.

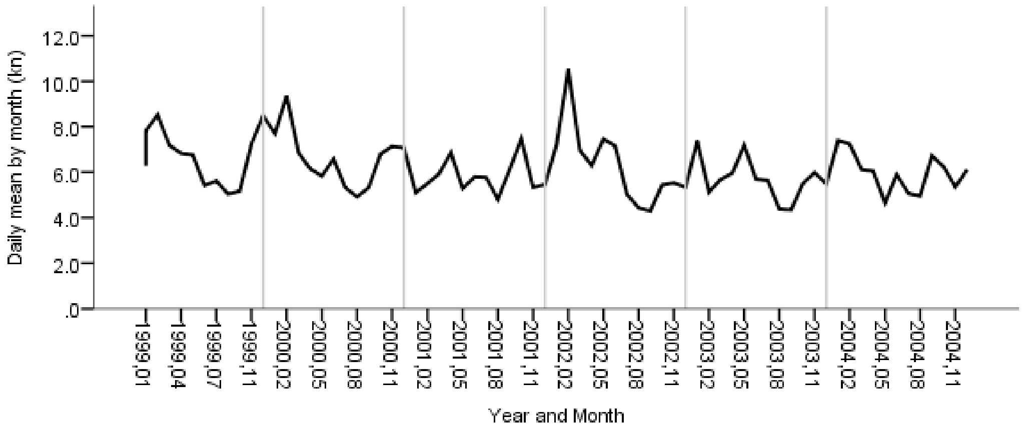


Figure C2. 80: England Wind speed mean - plot of the daily mean aggregated by month.

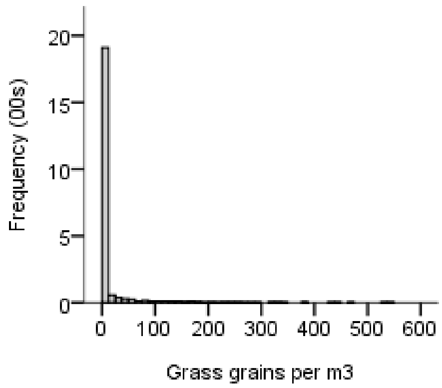


Figure C2. 81: England Grass pollen - distribution of the daily measures.

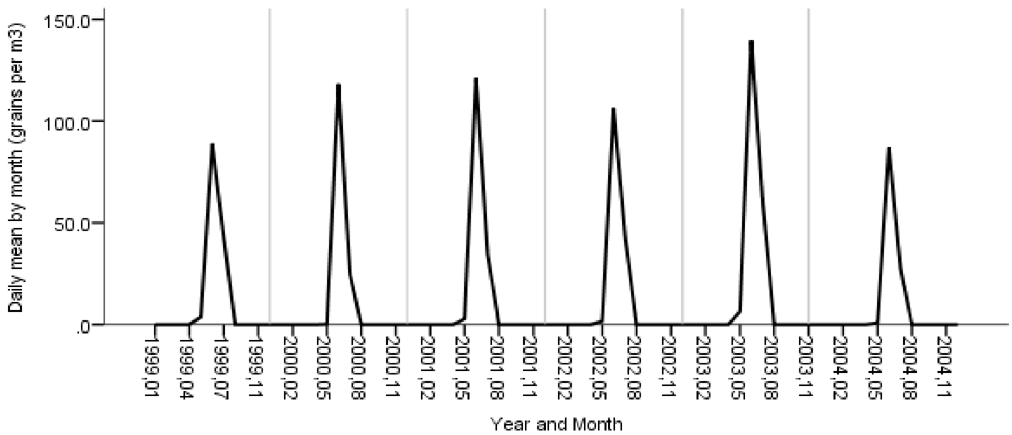
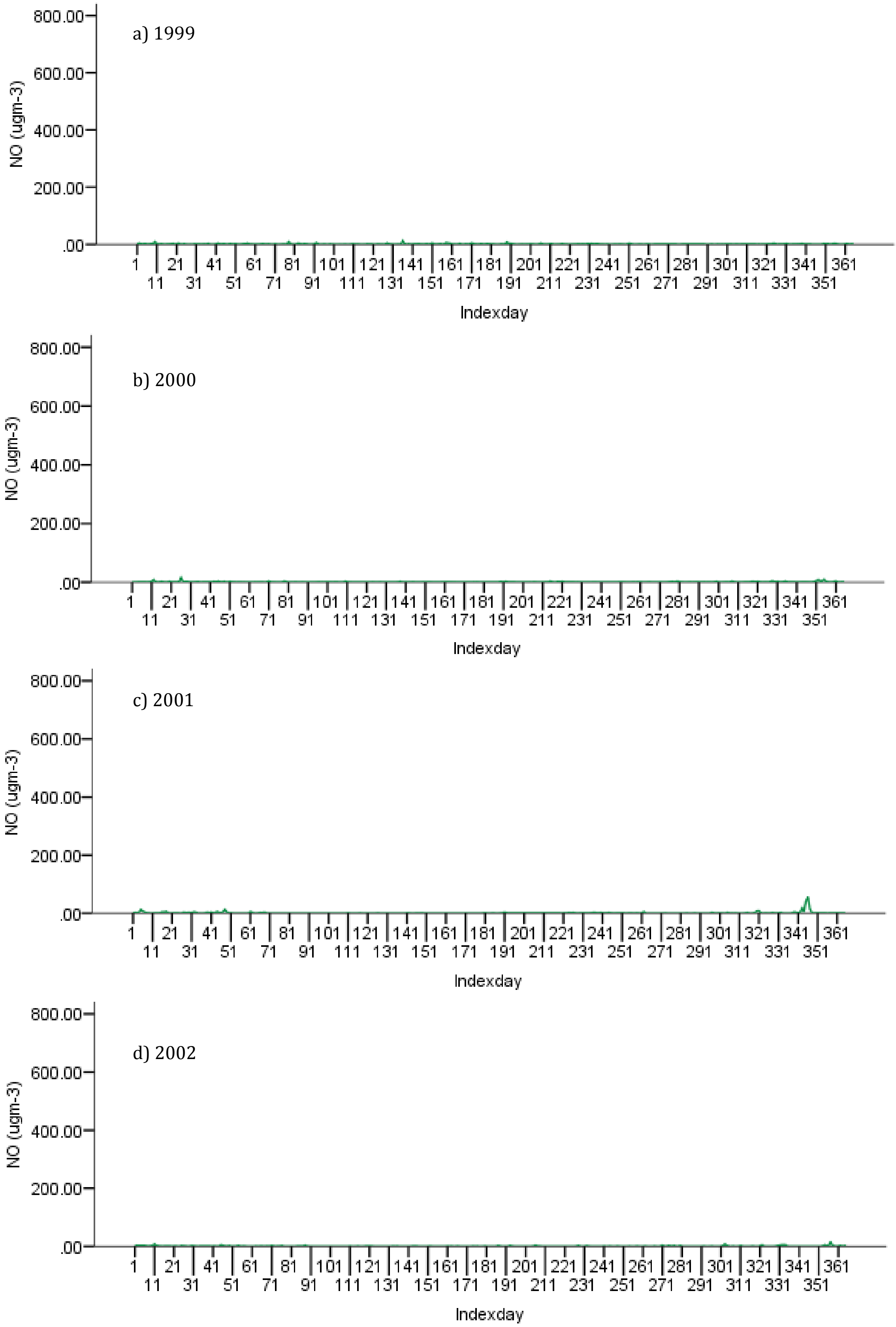
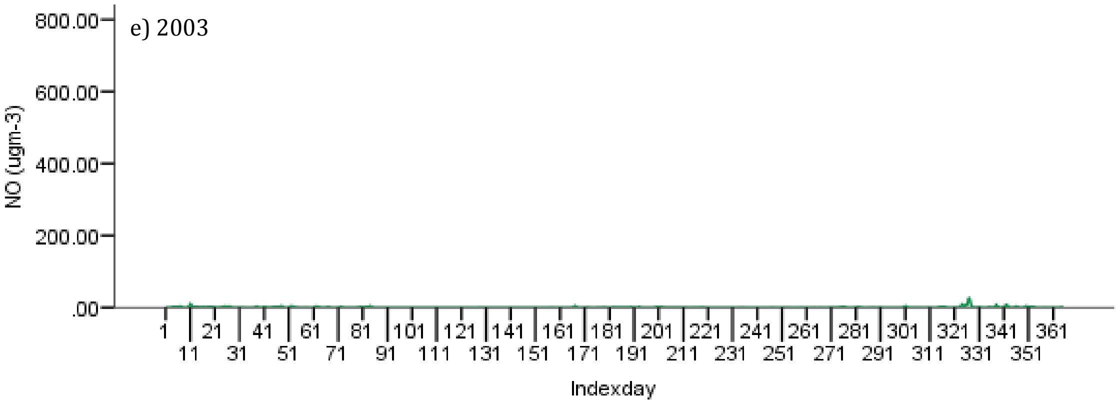


Figure C2. 82: England Grass pollen - plot of the daily means measures aggregated by month.

C2.3. Scotland Plots by Year


a) 1999
b) 2000
c) 2001
d) 2002
NO (ugm-3)
800.00
600.00
400.00
200.00
.00
1 21 41 61 81 101 121 141 161 181 201 221 241 261 281 301 321 341 361
11 31 51 71 91 111 131 151 171 191 211 231 251 271 291 311 331 351
Indexday



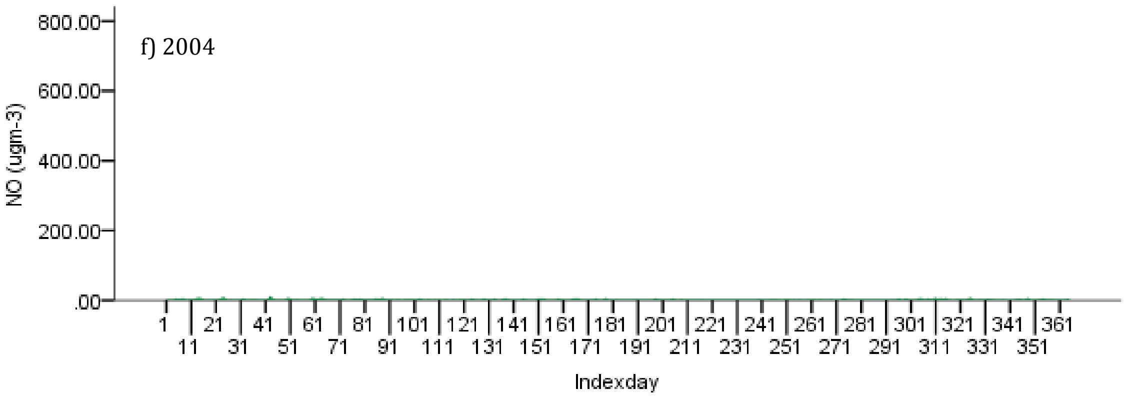
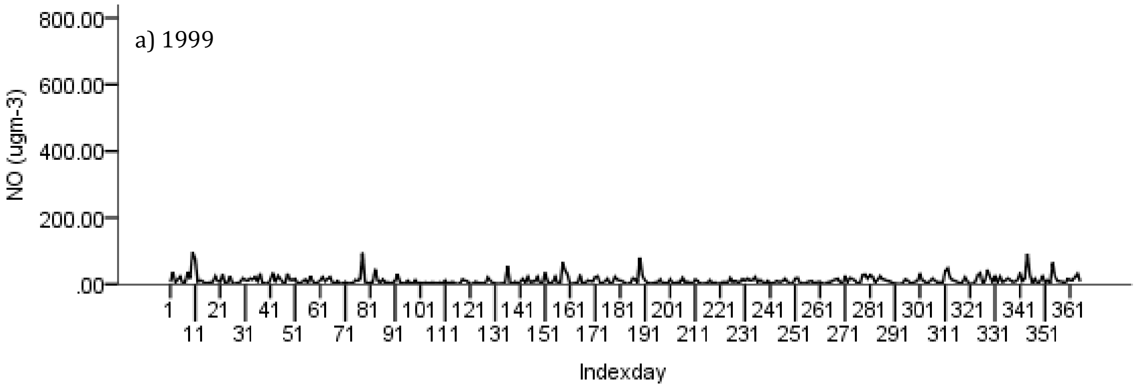
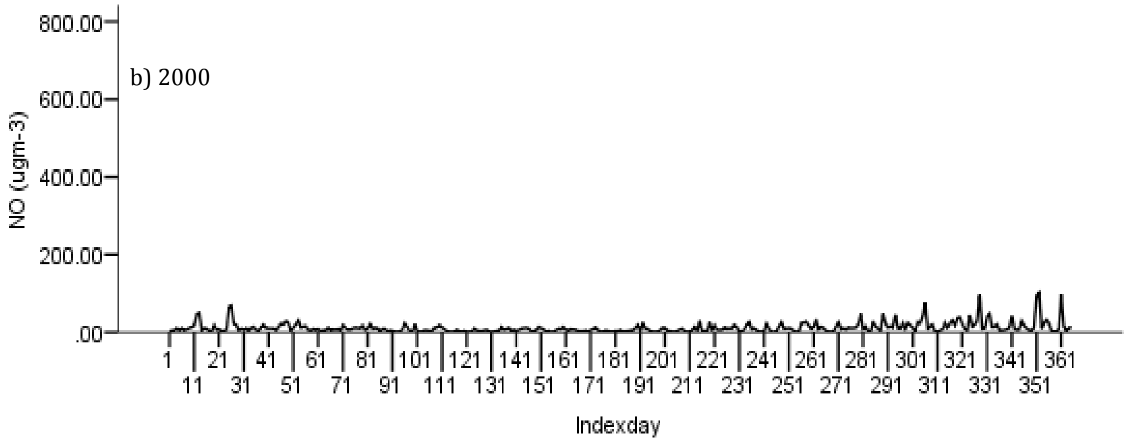


Figure C2. 83: Scotland NO Minimum Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.





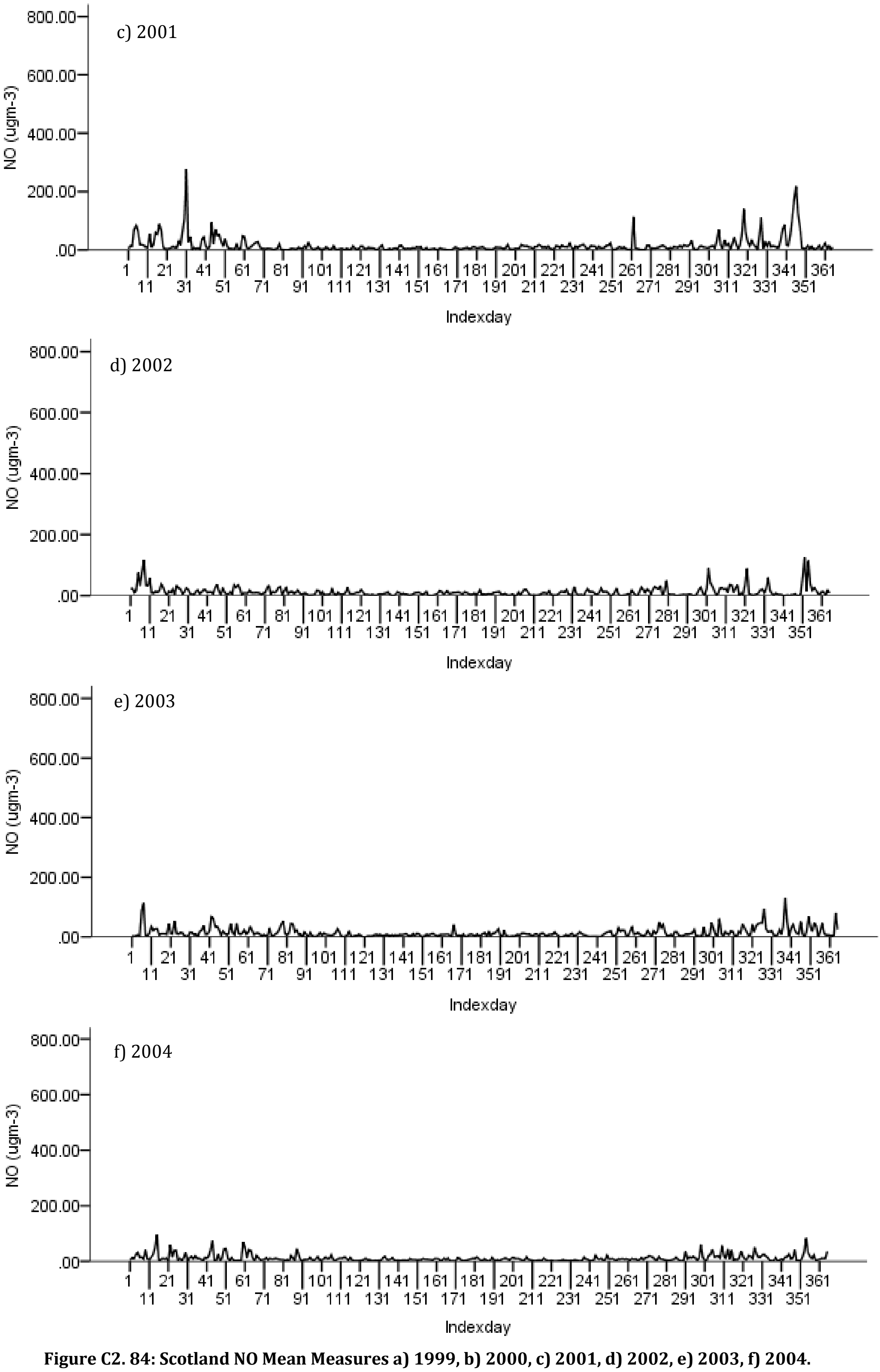
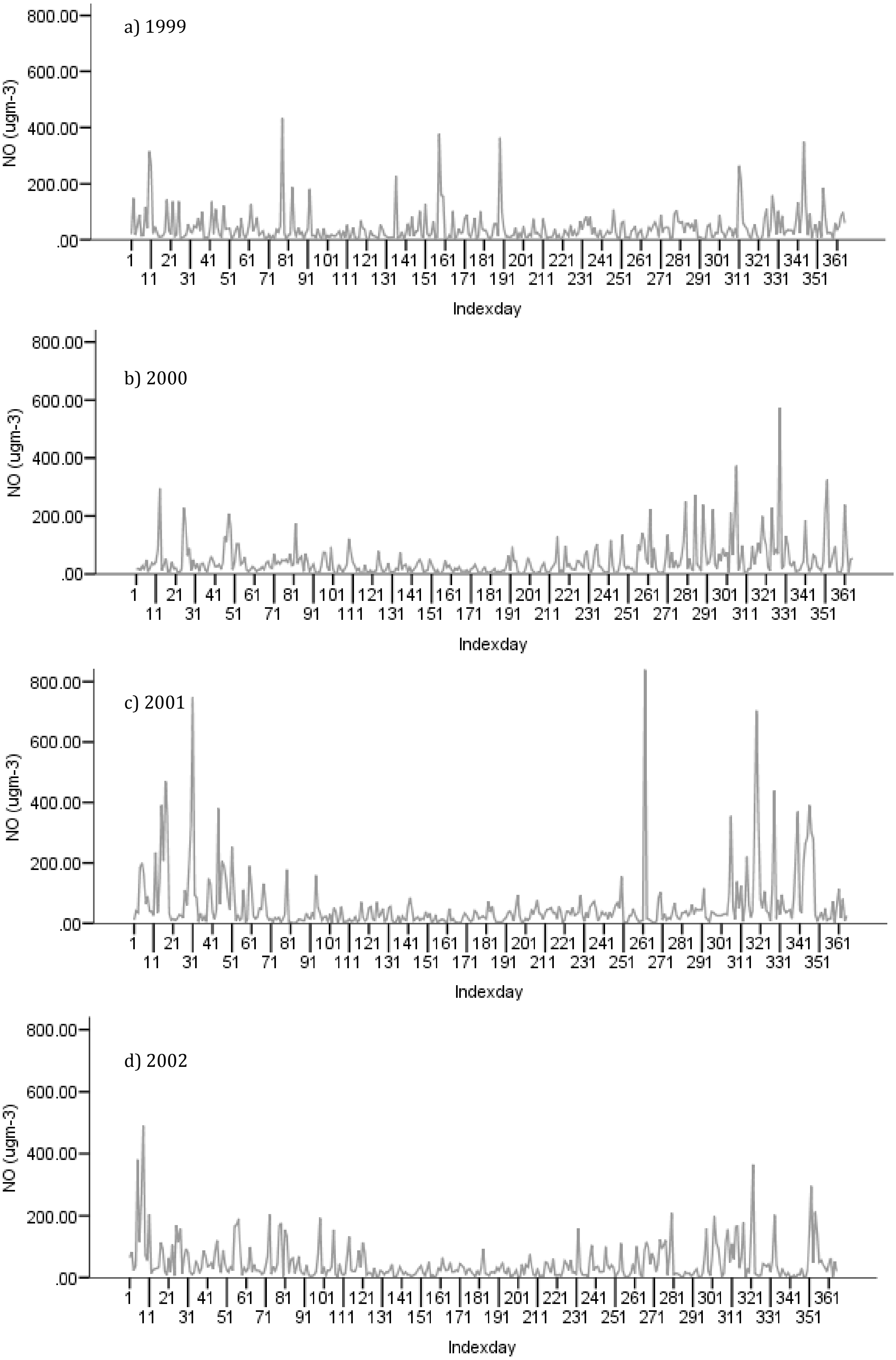


Figure C2. 84: Scotland NO Mean Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


a) 1999
b) 2000
c) 2001
d) 2002
NO (ugm-3)
800.00
600.00
400.00
200.00
.00
Indexday
1
11
21
31
41
51
61
71
81
91
101
111
121
131
141
151
161
171
181
191
201
211
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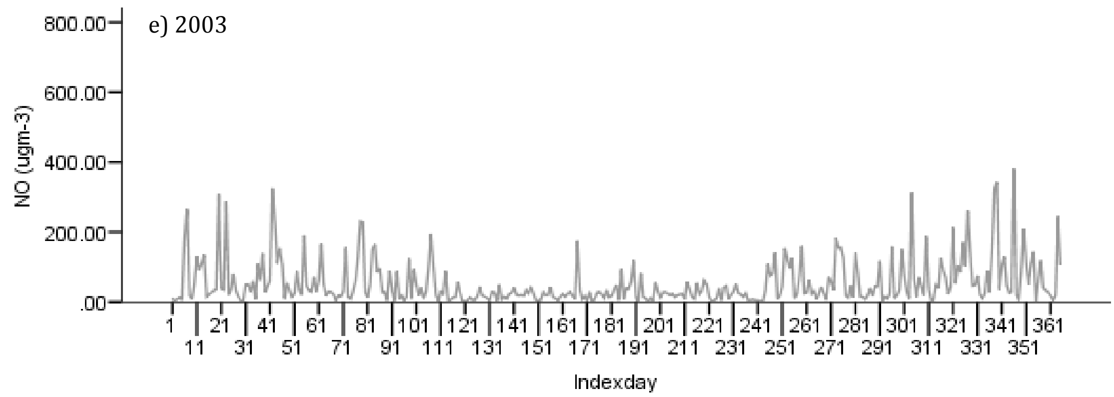
321
331
341
351
361



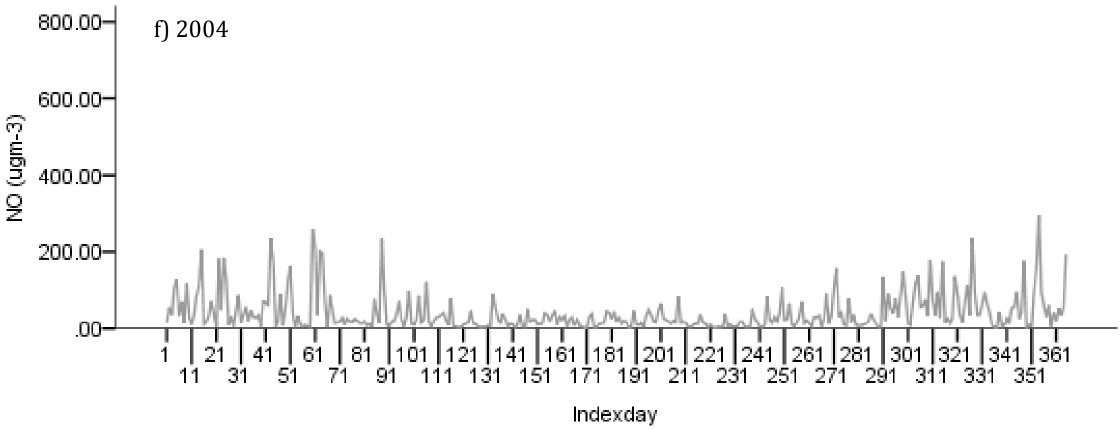
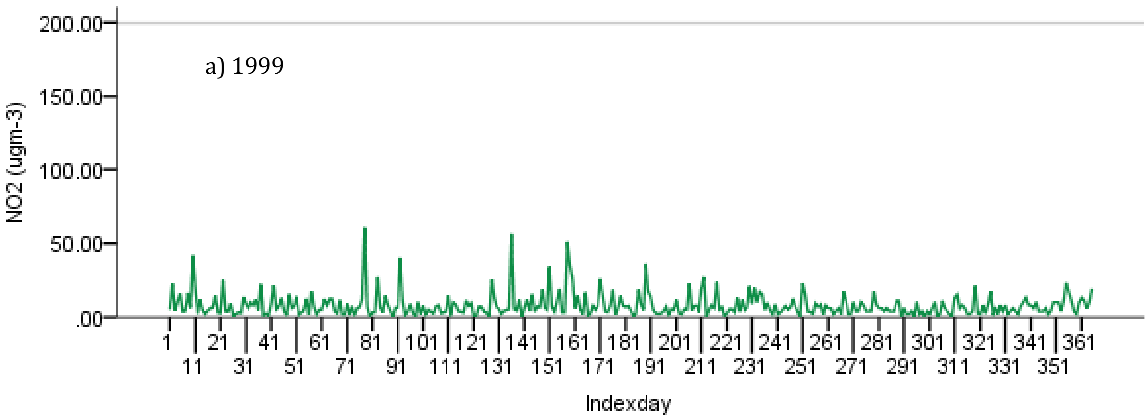
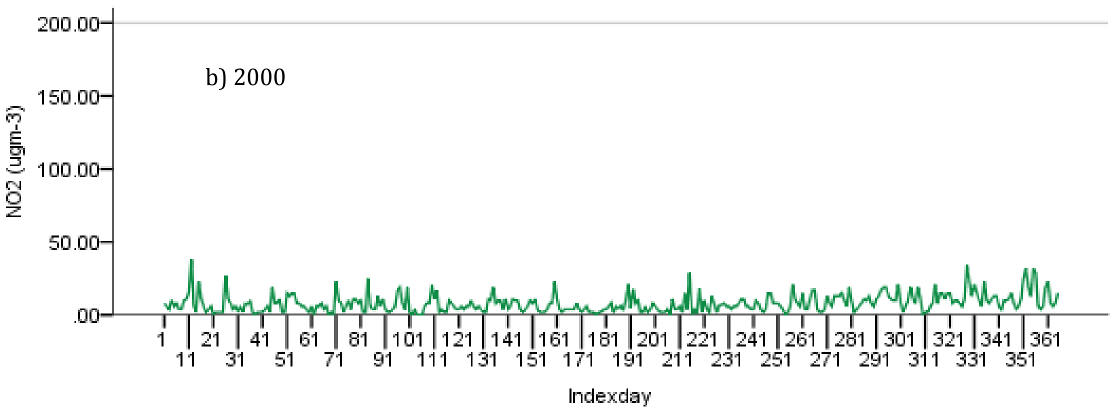


Figure C2. 85: Scotland NO Maximum Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.





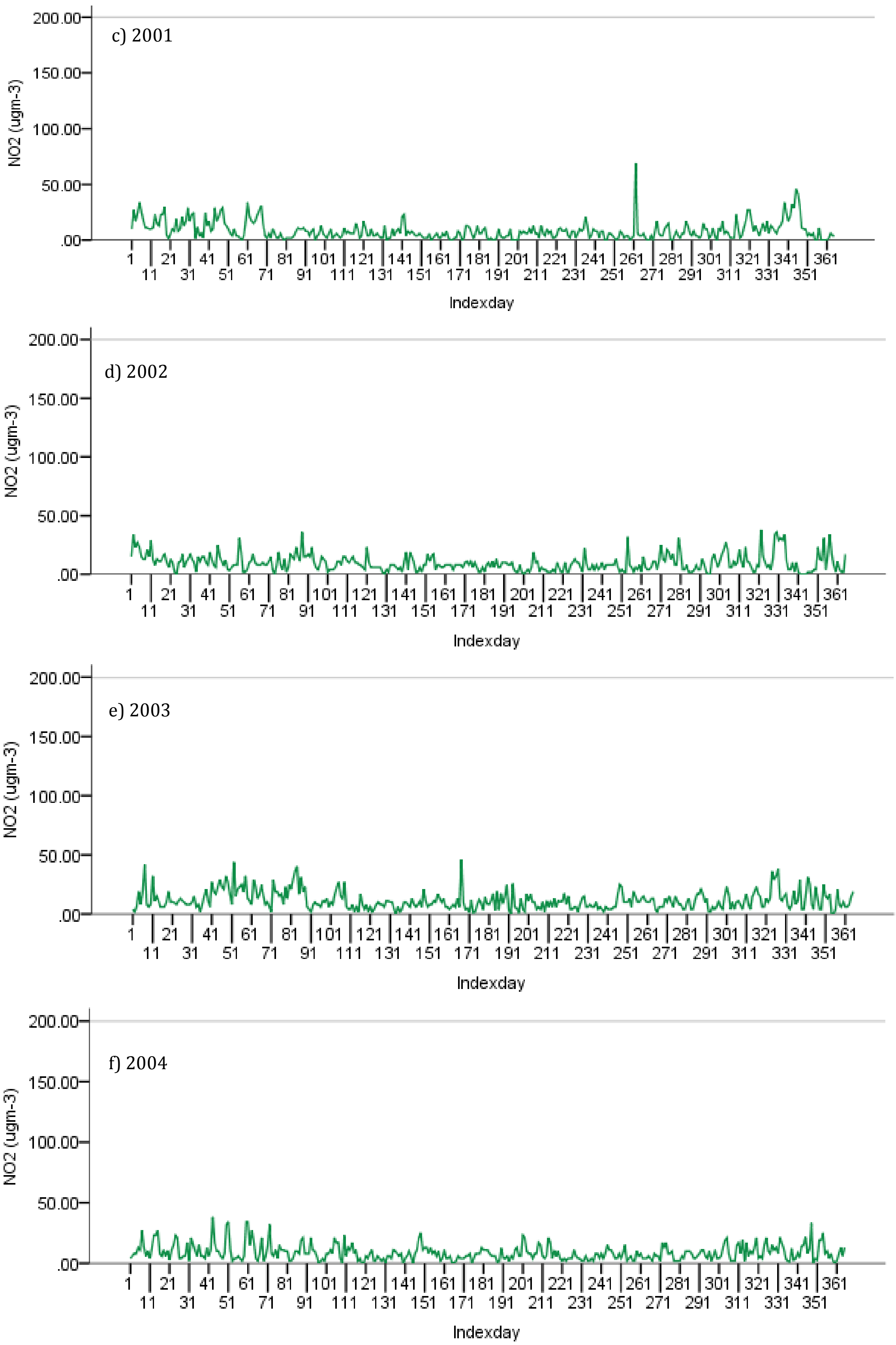
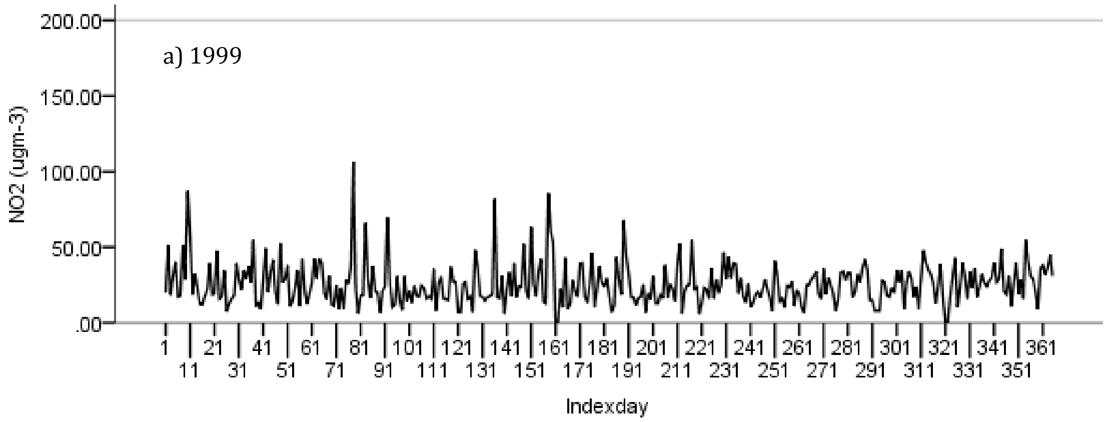
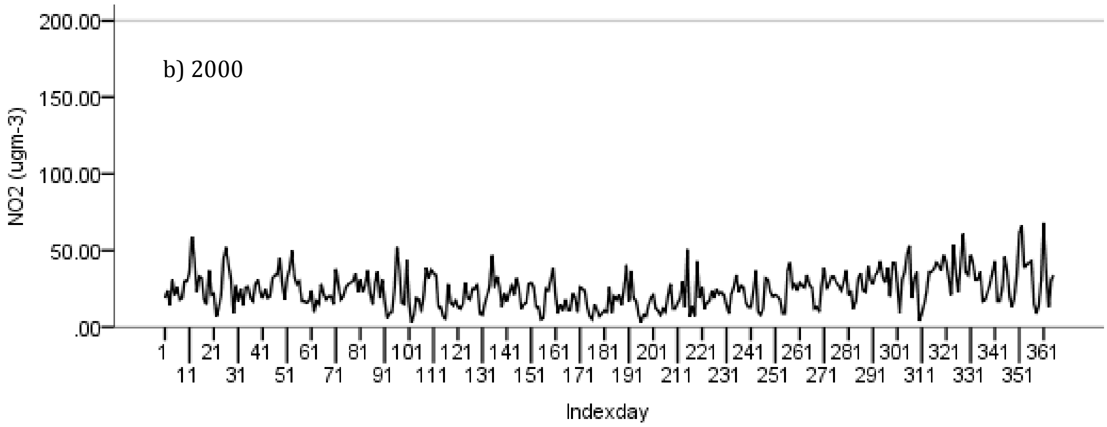
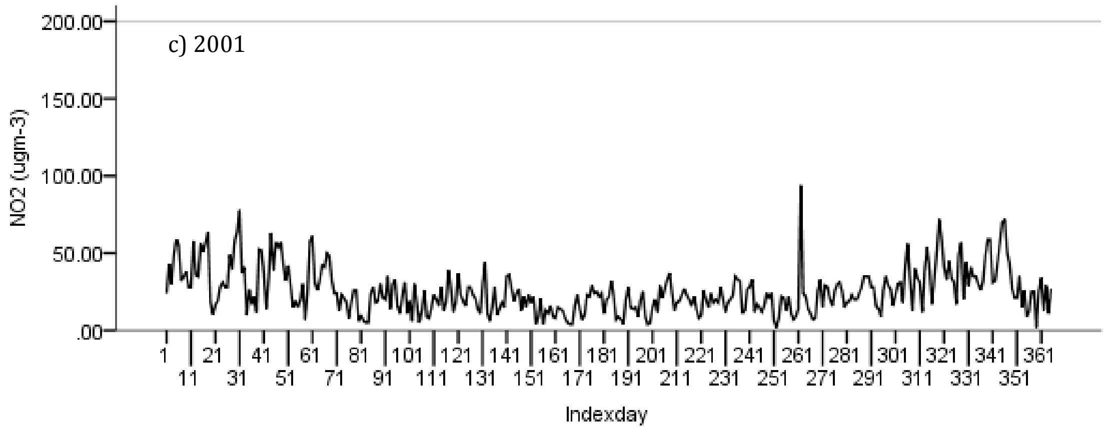
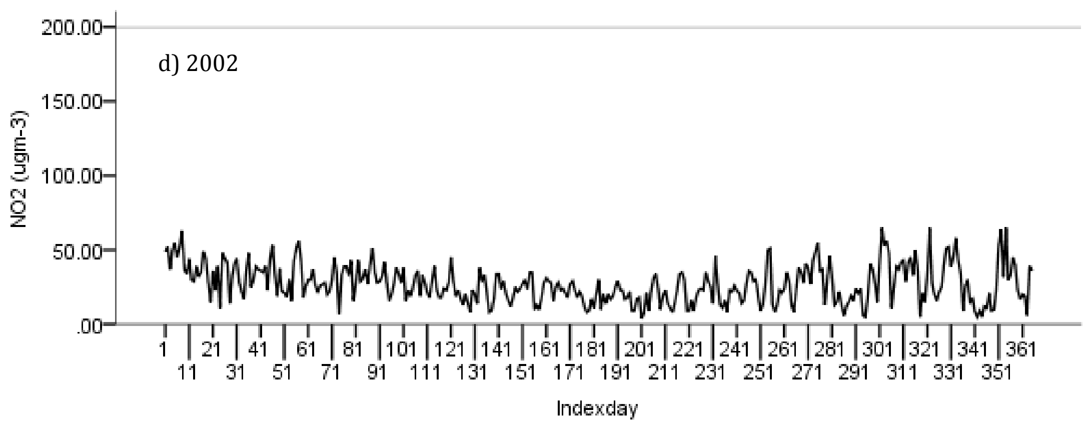


Figure C2. 86: Scotland NO_2 Minimum Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


a) 1999
NO2 (ugm-3)
200.00
150.00
100.00
50.00
.00
1 21 41 61 81 101 121 141 161 181 201 221 241 261 281 301 321 341 361
11 31 51 71 91 111 131 151 171 191 211 231 251 271 291 311 331 351
Indexday


b) 2000
NO2 (ugm-3)
200.00
150.00
100.00
50.00
.00
1 21 41 61 81 101 121 141 161 181 201 221 241 261 281 301 321 341 361
11 31 51 71 91 111 131 151 171 191 211 231 251 271 291 311 331 351
Indexday


c) 2001
NO2 (ugm-3)
200.00
150.00
100.00
50.00
.00
1 21 41 61 81 101 121 141 161 181 201 221 241 261 281 301 321 341 361
11 31 51 71 91 111 131 151 171 191 211 231 251 271 291 311 331 351
Indexday


d) 2002
NO2 (ugm-3)
200.00
150.00
100.00
50.00
.00
1 21 41 61 81 101 121 141 161 181 201 221 241 261 281 301 321 341 361
11 31 51 71 91 111 131 151 171 191 211 231 251 271 291 311 331 351
Indexday

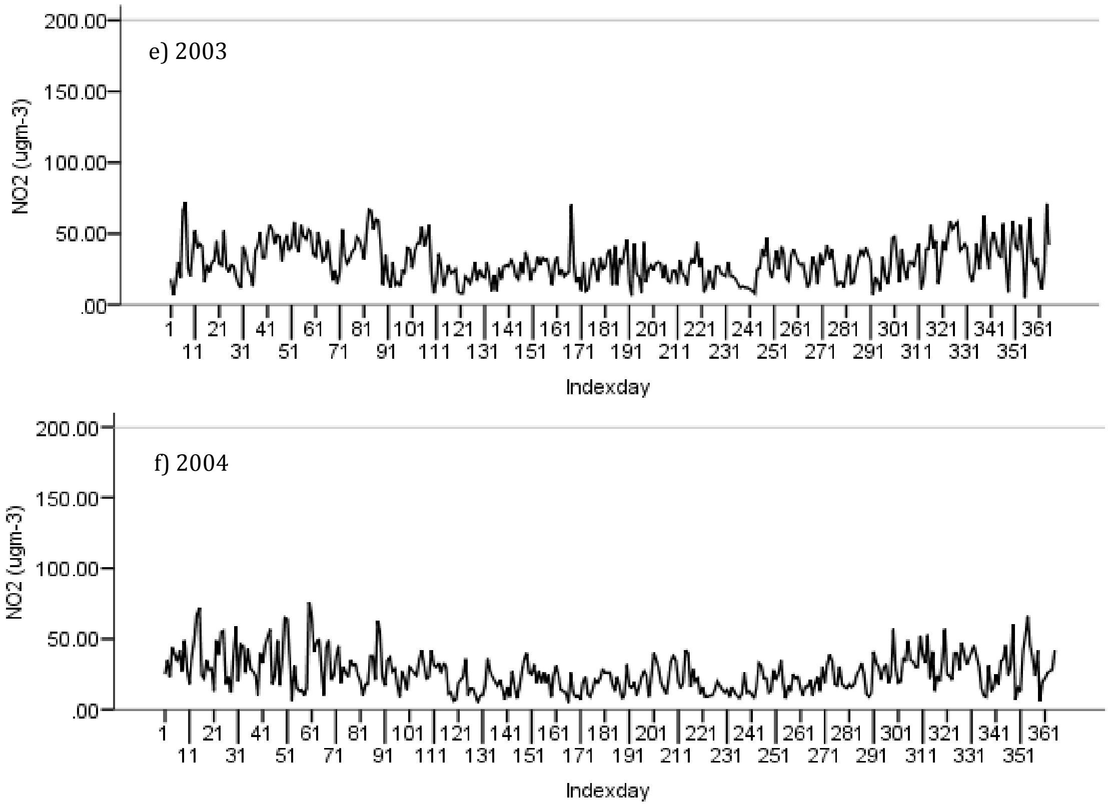
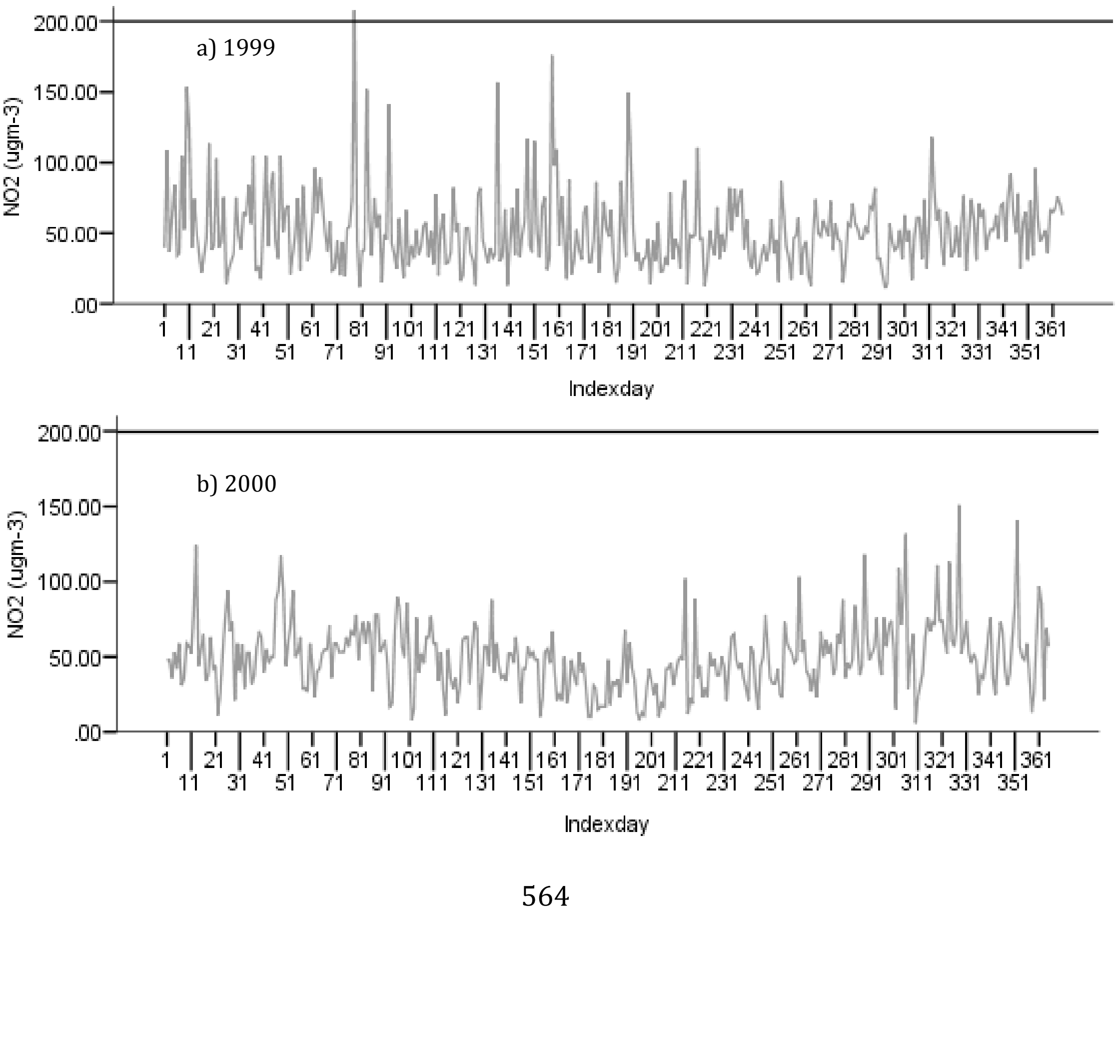
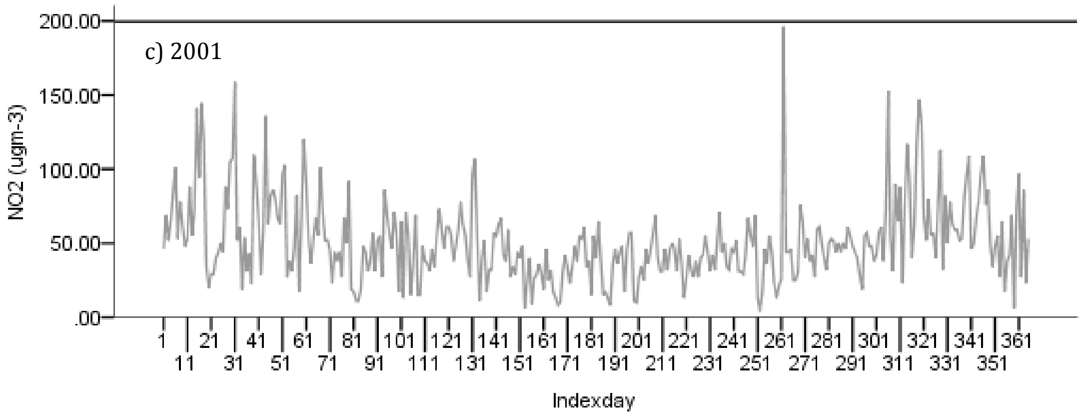
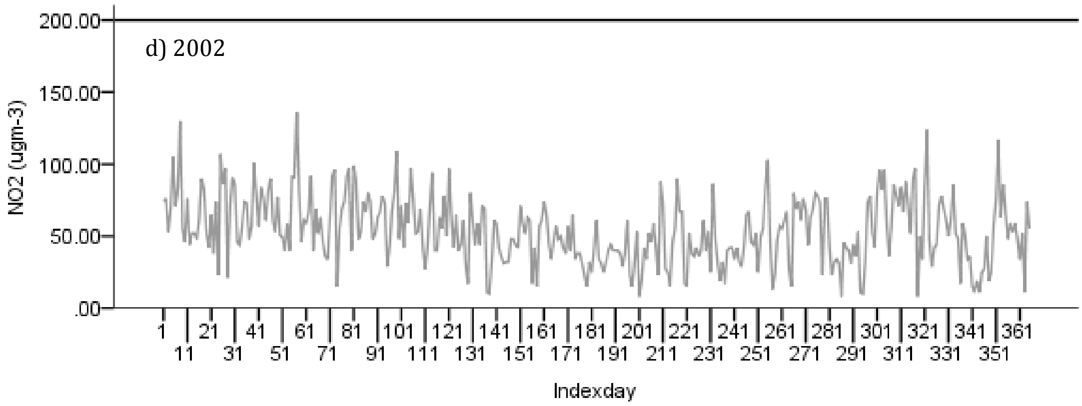
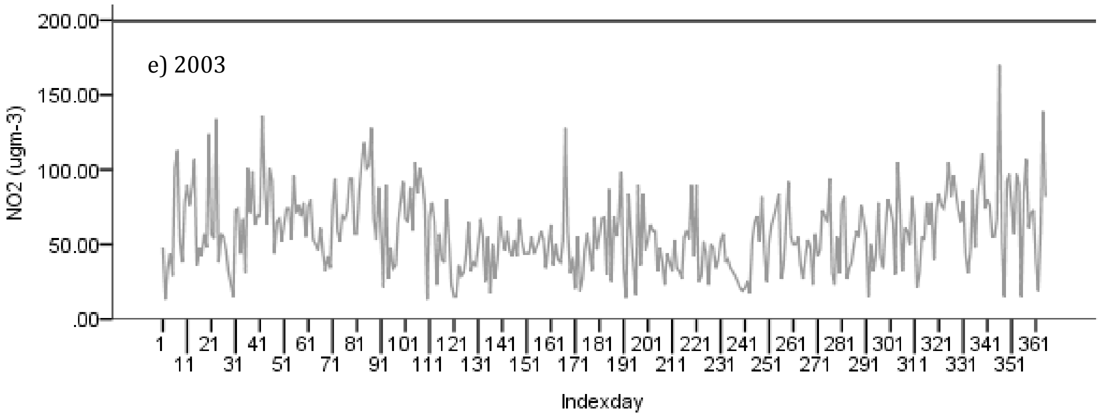


Figure C2. 87: Scotland NO_2 Mean Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.









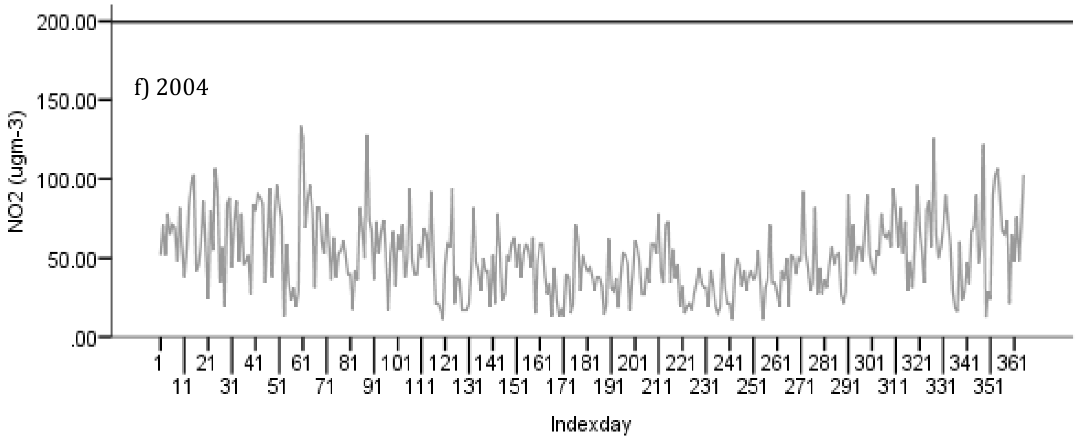
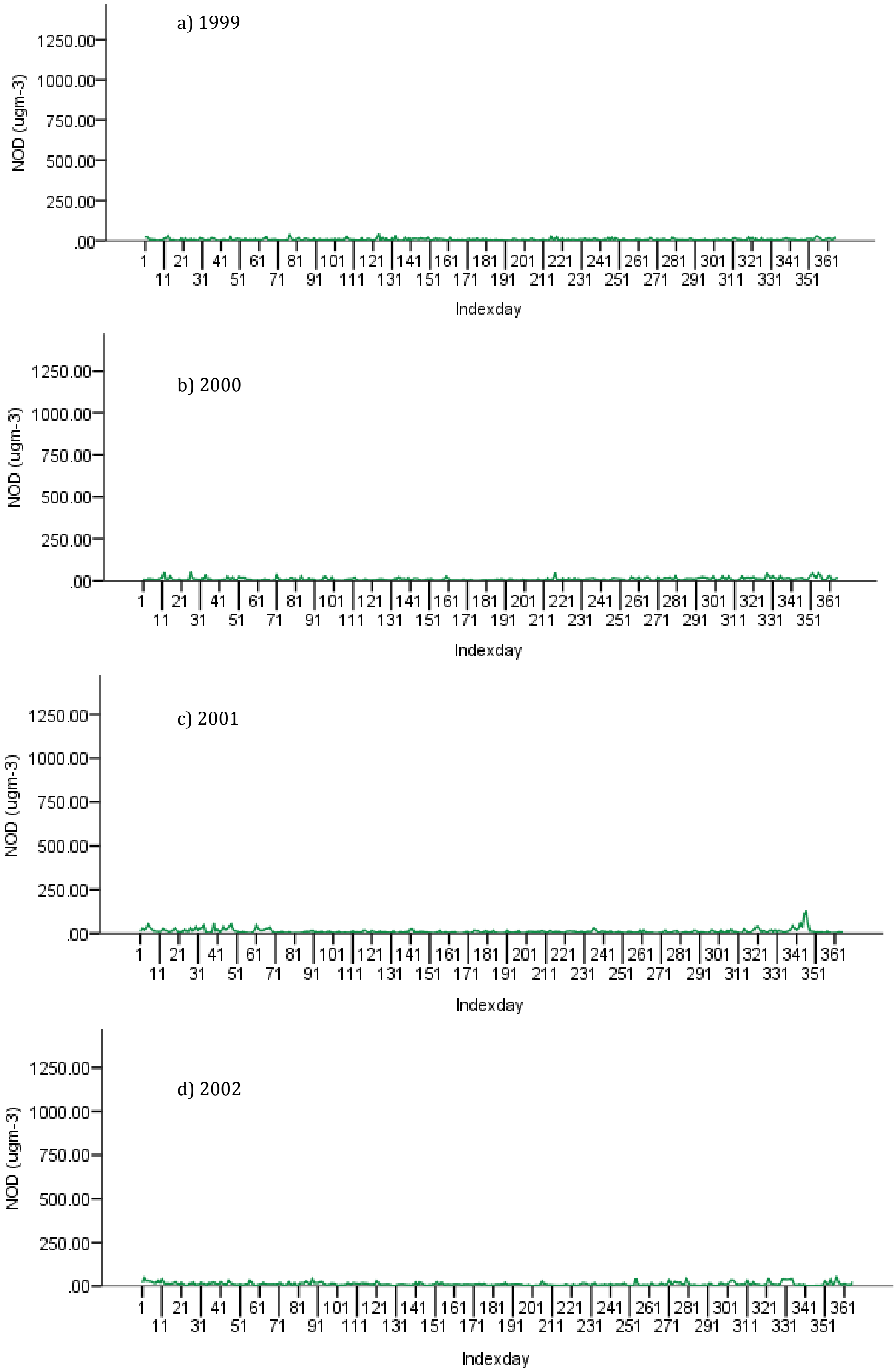
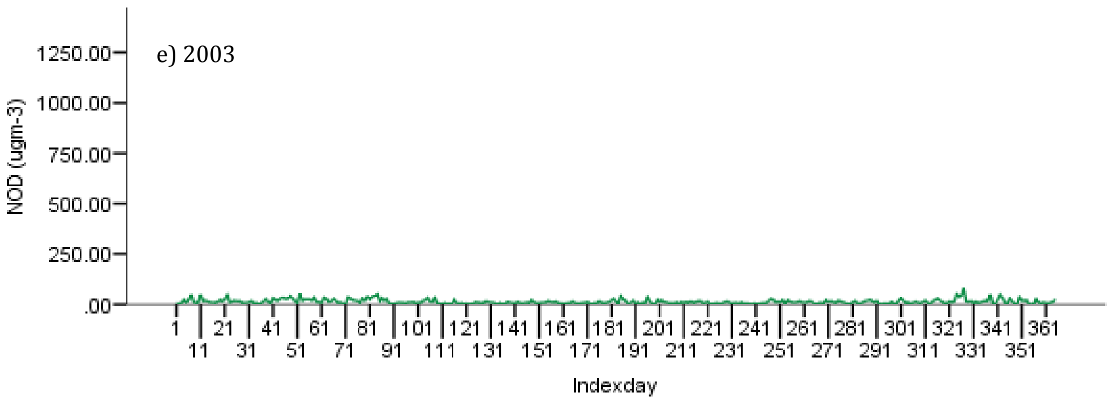


Figure C2. 88: Scotland NO_2 Maximum Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


a) 1999
b) 2000
c) 2001
d) 2002
NOD (ugm-3)
1250.00
1000.00
750.00
500.00
250.00
.00
Indexday



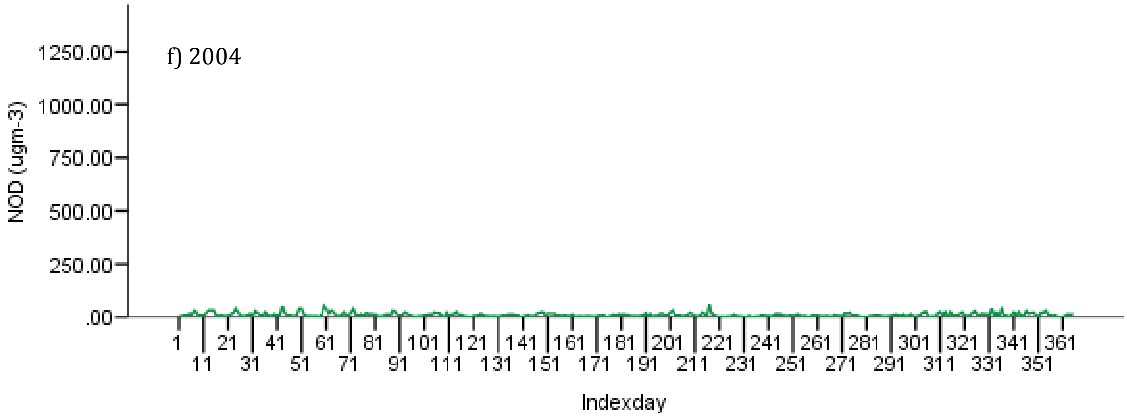
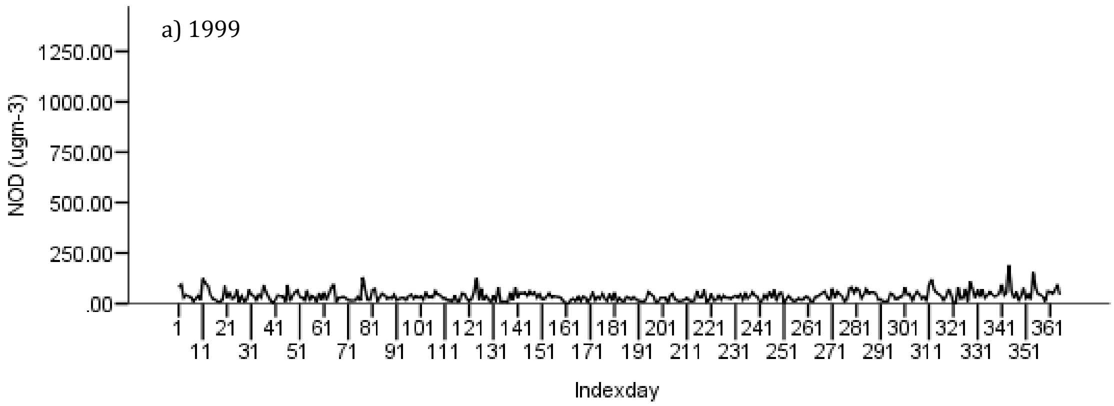
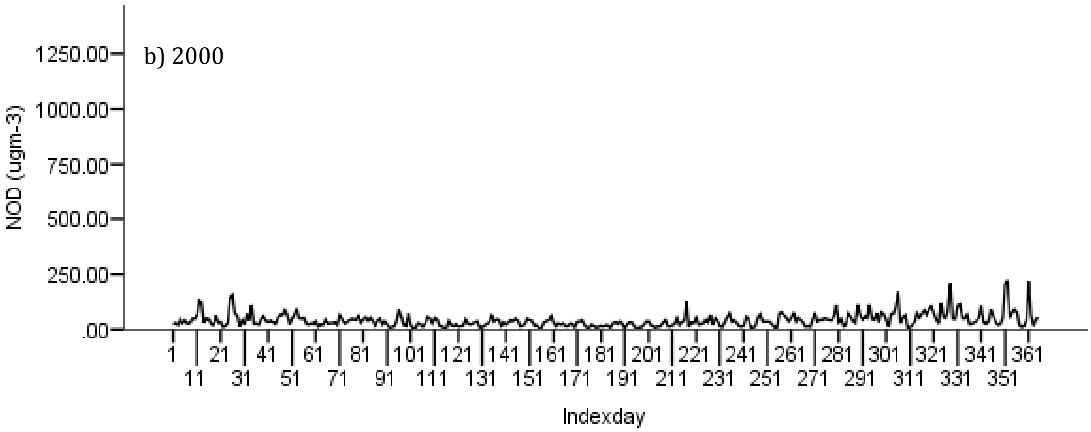


Figure C2. 89: Scotland NOD Minimum Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.





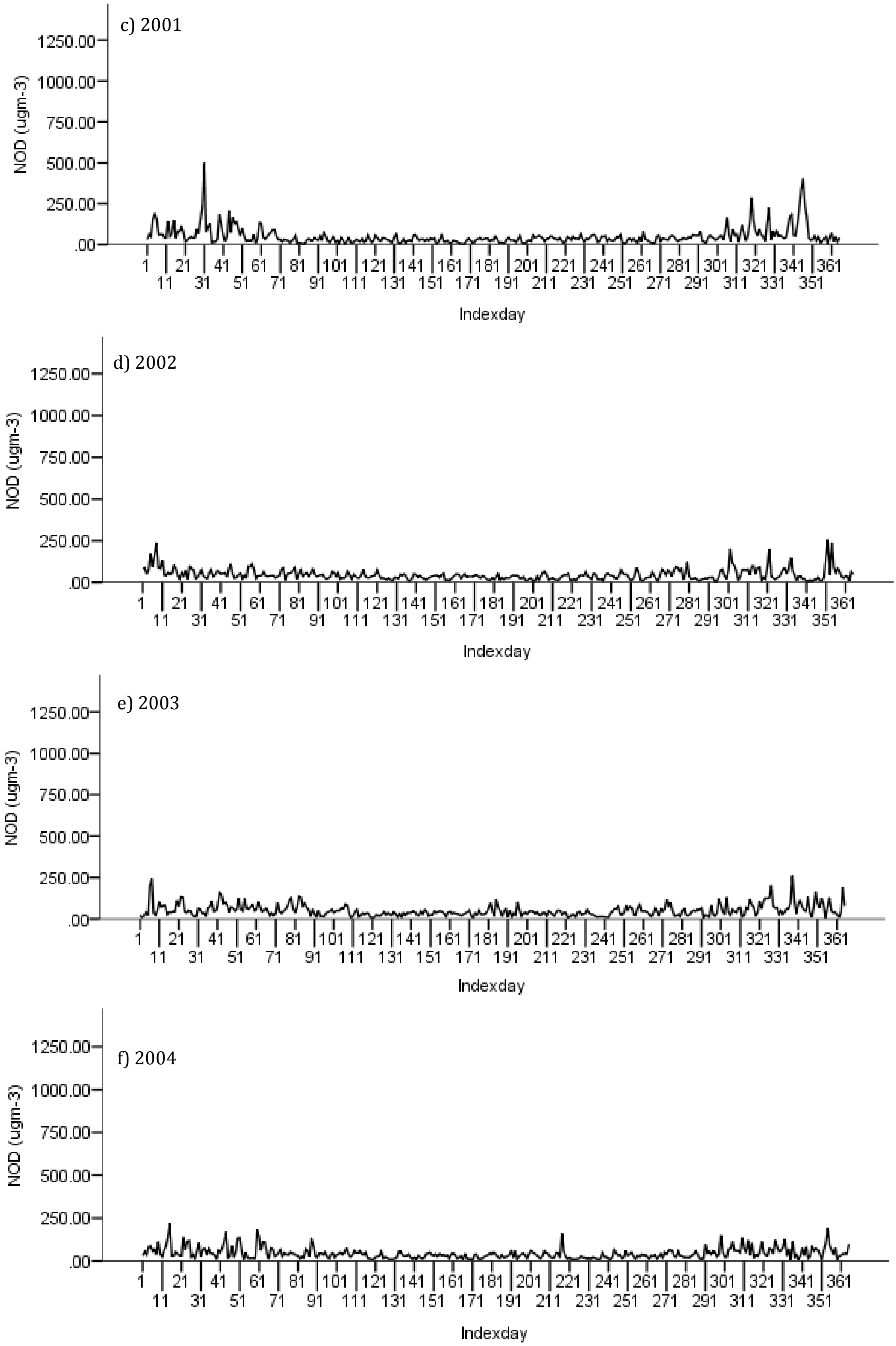
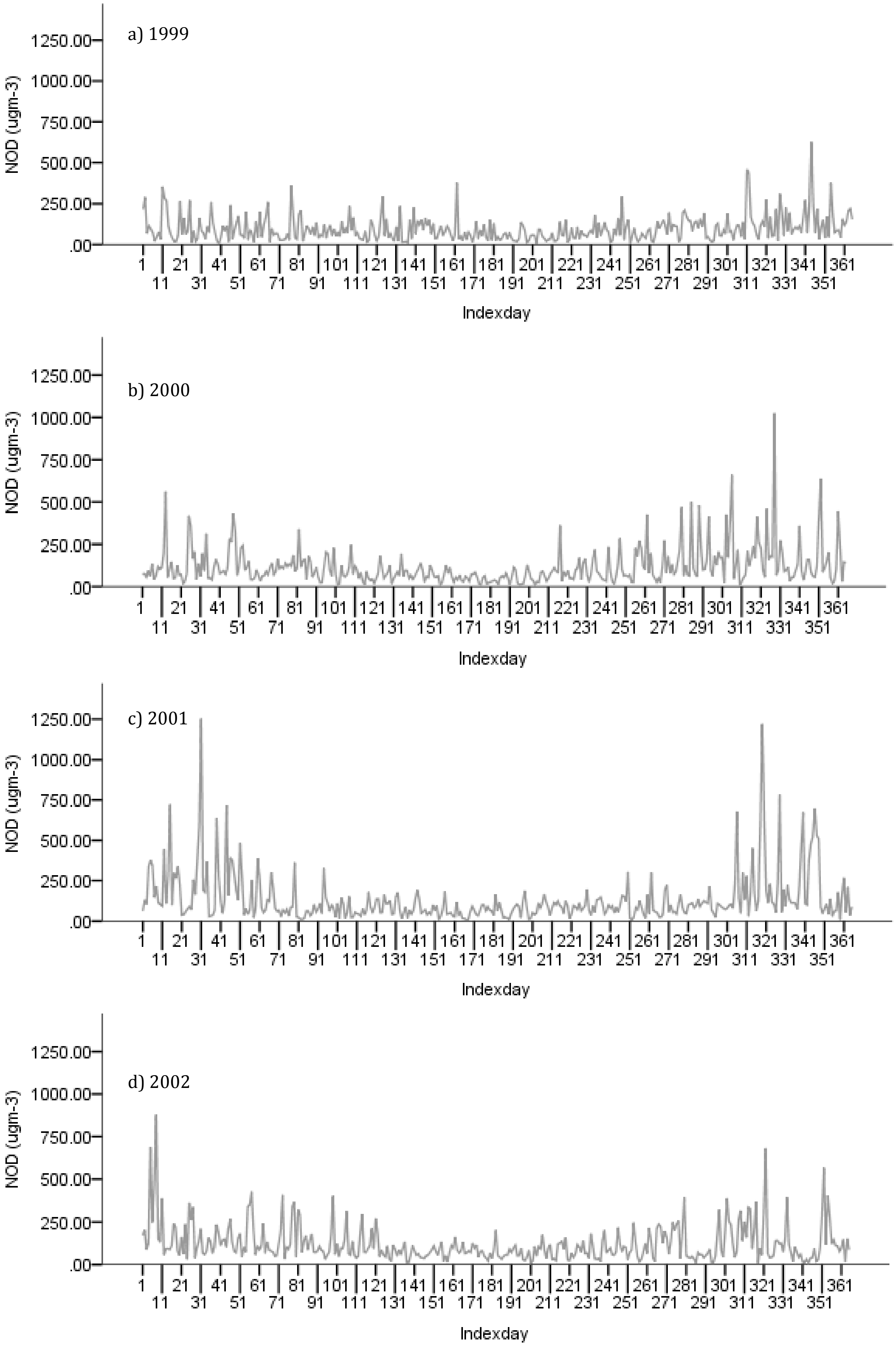


Figure C2. 90: Scotland NOD Mean Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


a) 1999
b) 2000
c) 2001
d) 2002
NOD (ugm-3)
.00
250.00
500.00
750.00
1000.00
1250.00
Indexday
1 11 21 31 41 51 61 71 81 91 101 111 121 131 141 151 161 171 181 191 201 211 221 231 241 251 261 271 281 291 301 311 321 331 341 351 361

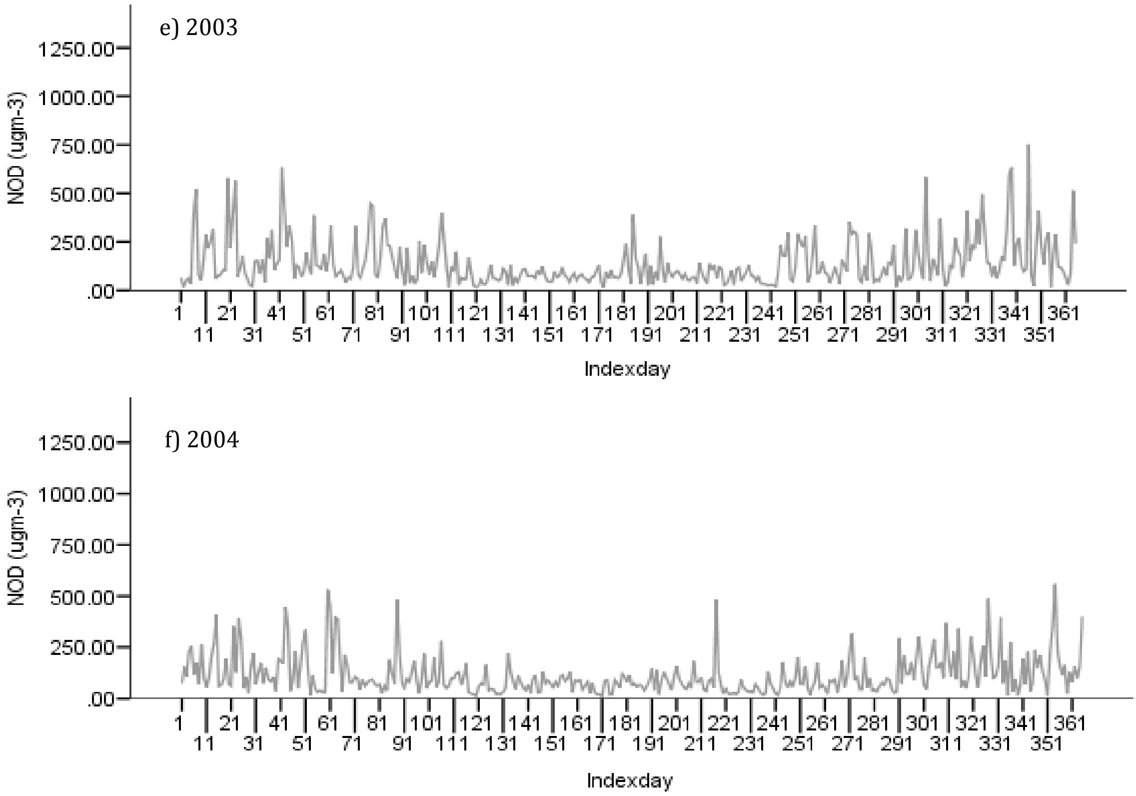
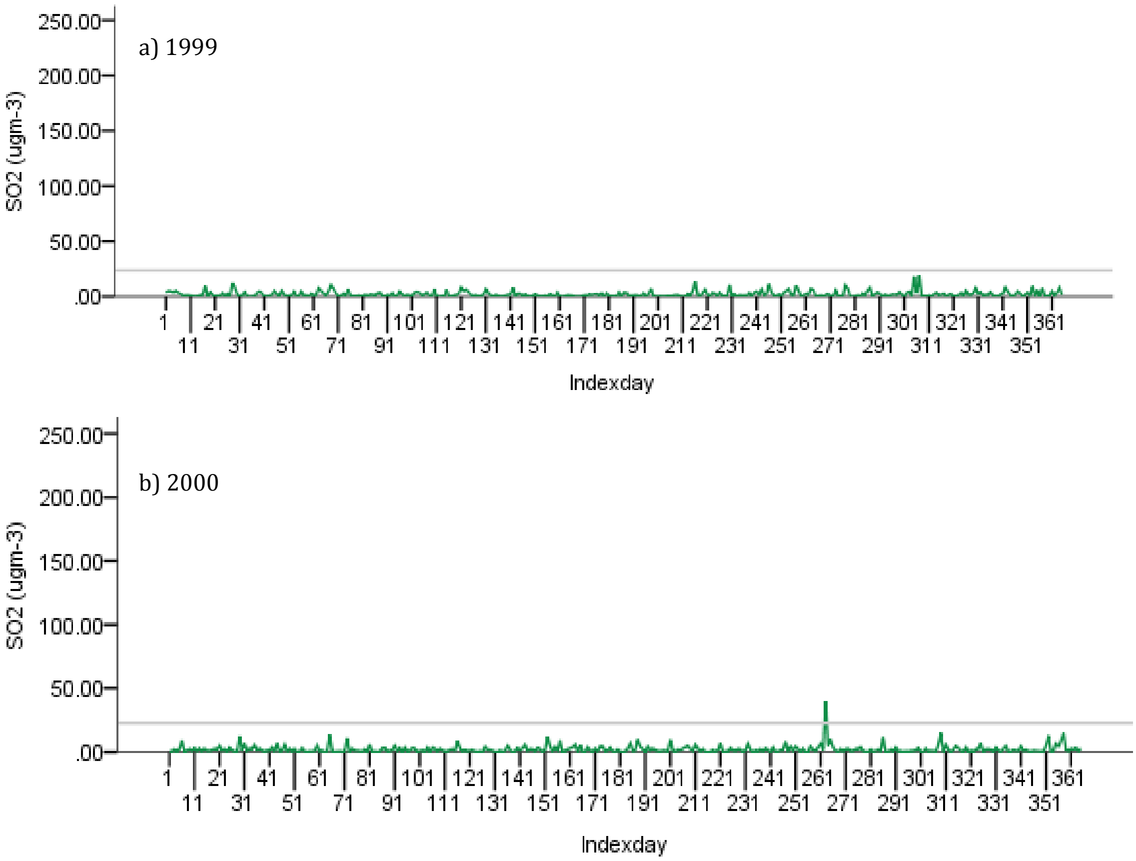


Figure C2. 91: Scotland NOD Maximum Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.



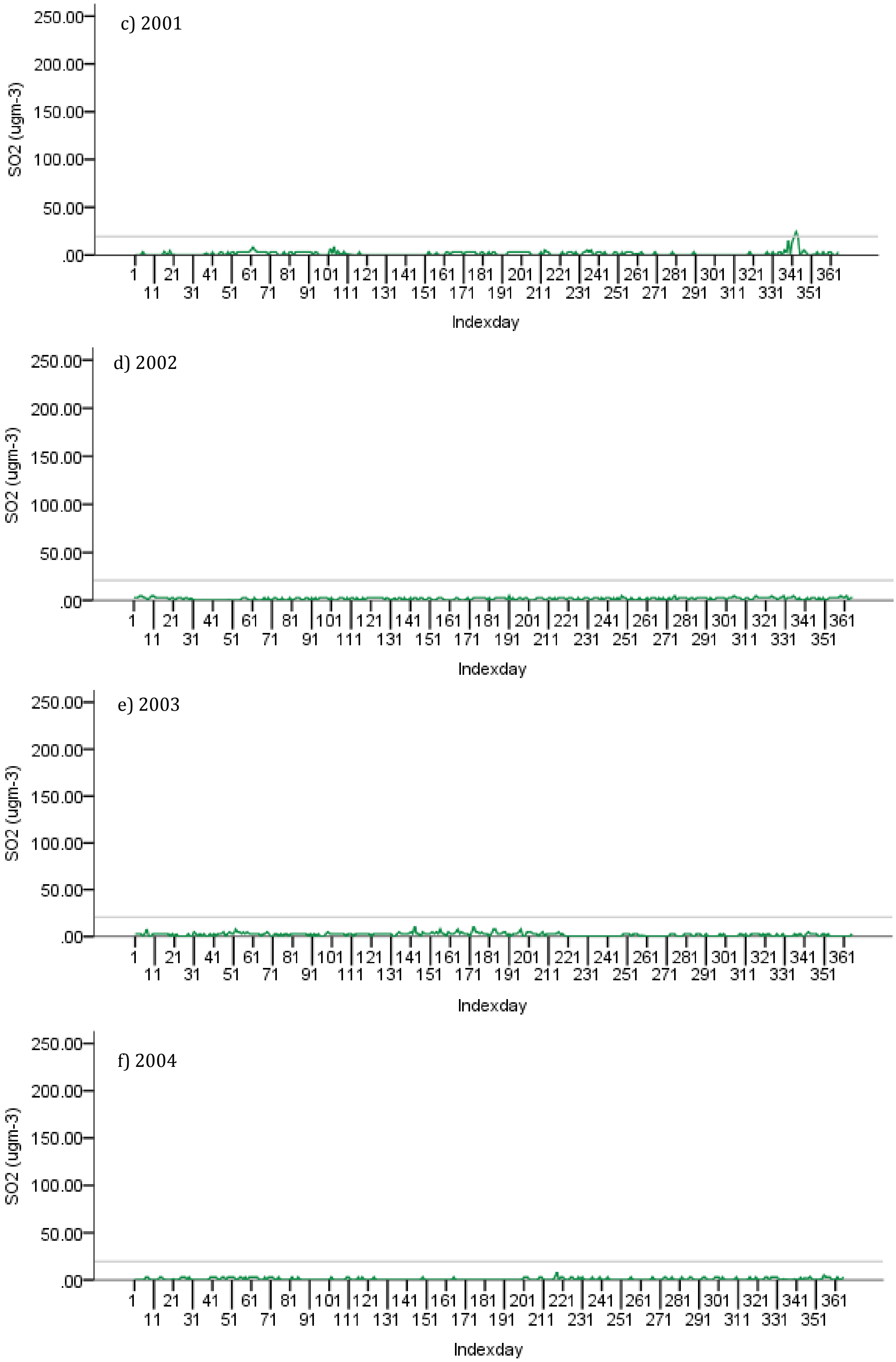
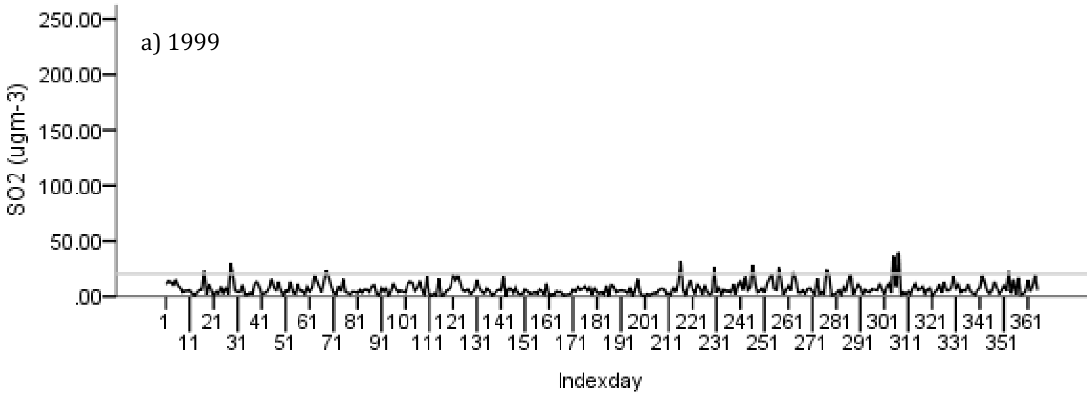
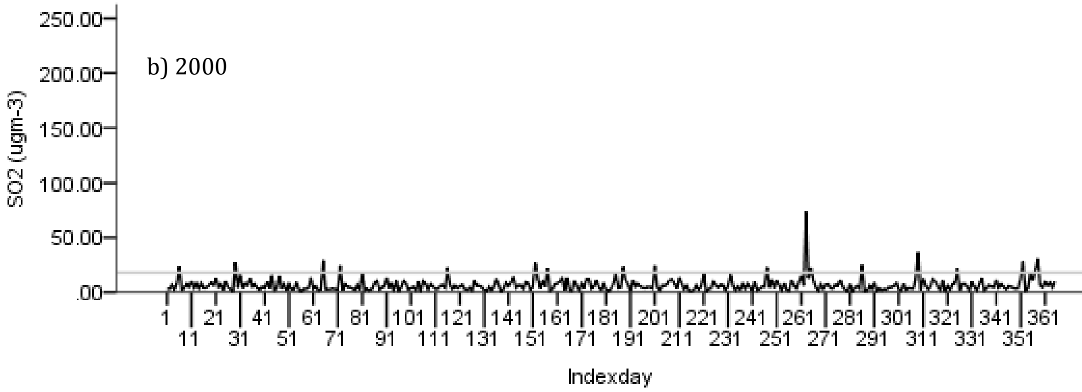
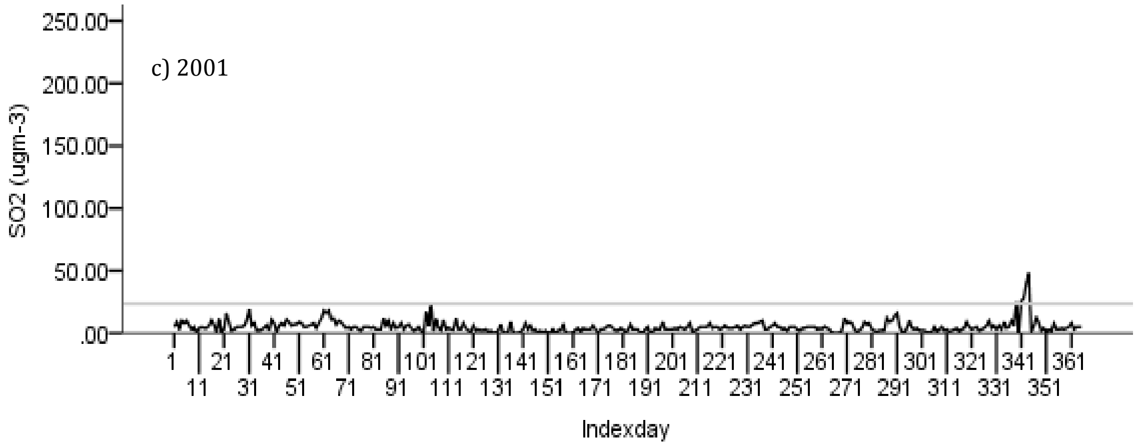
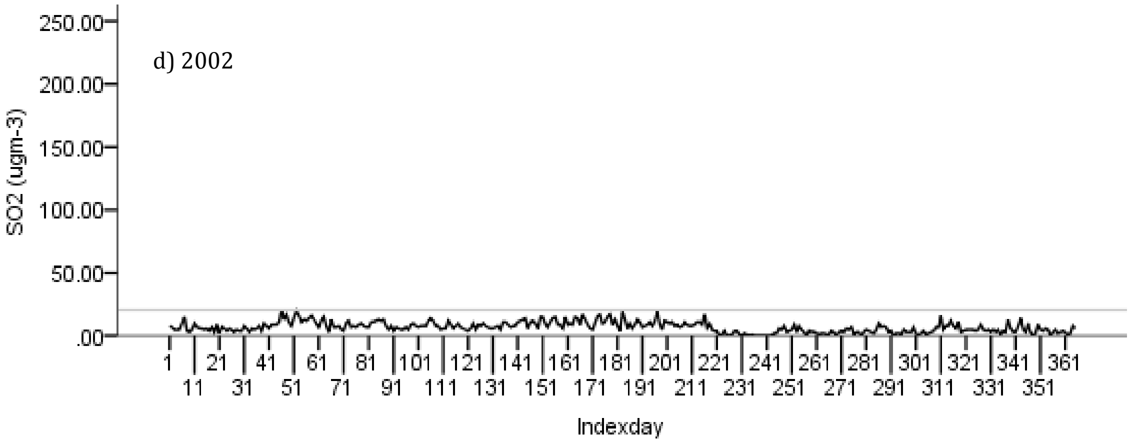


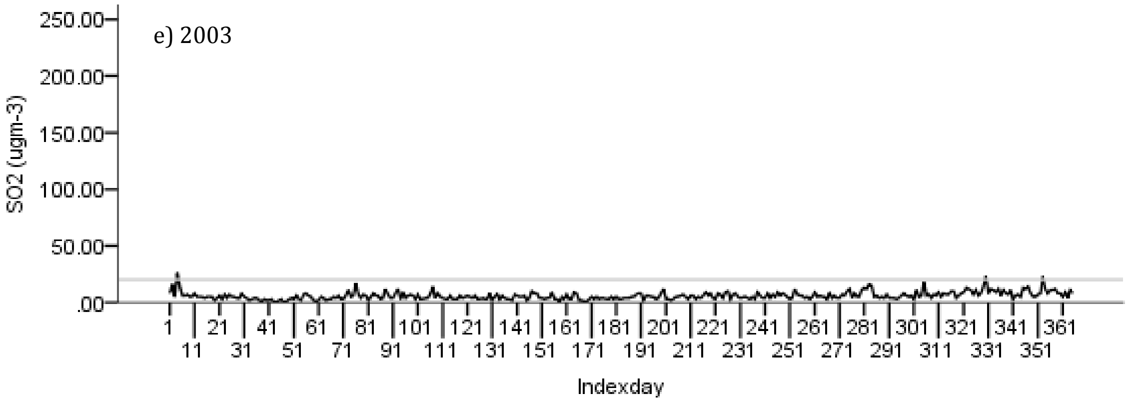
Figure C2. 92: Scotland SO_2 Minimum Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


a) 1999
SO2 (ugm-3)
Indexday


b) 2000
SO2 (ugm-3)
Indexday


c) 2001
SO2 (ugm-3)
Indexday


d) 2002
SO2 (ugm-3)
Indexday



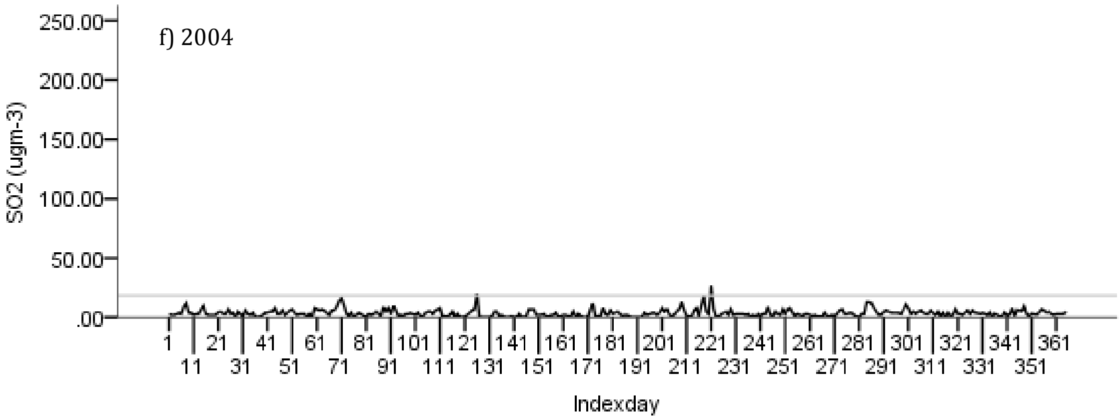
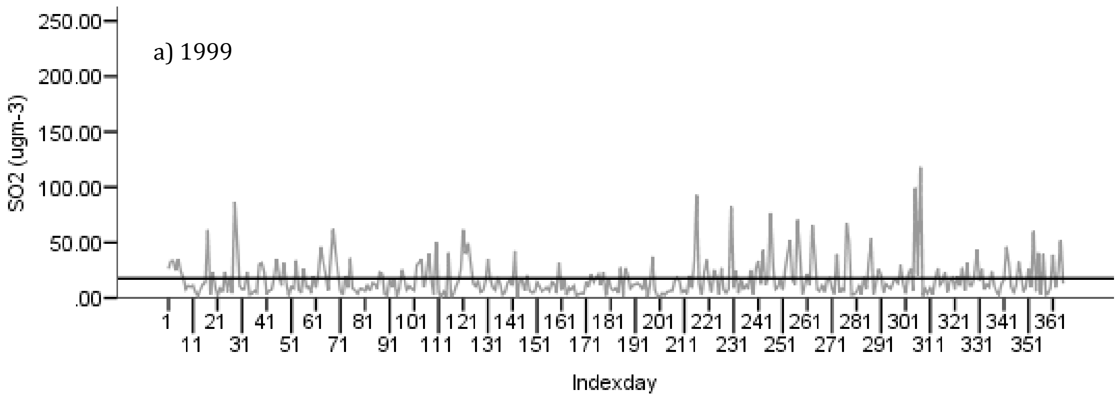
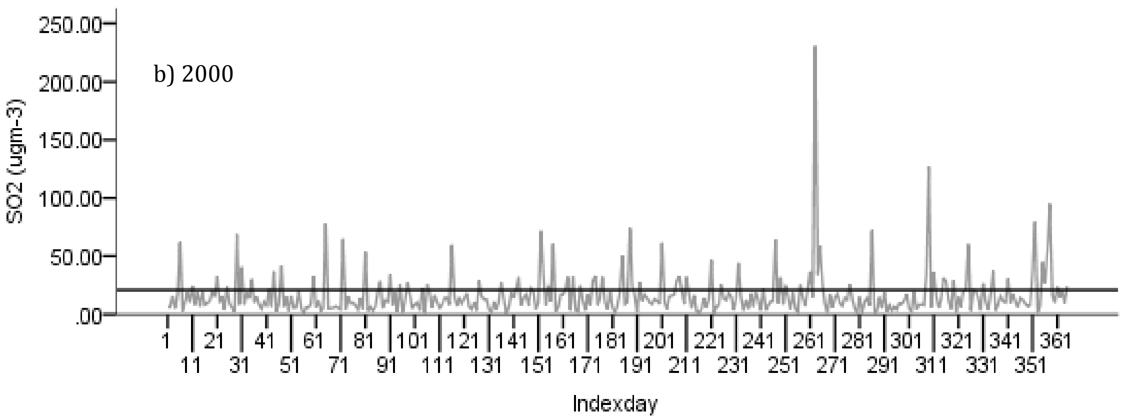


Figure C2. 93: Scotland SO_2 Mean Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.





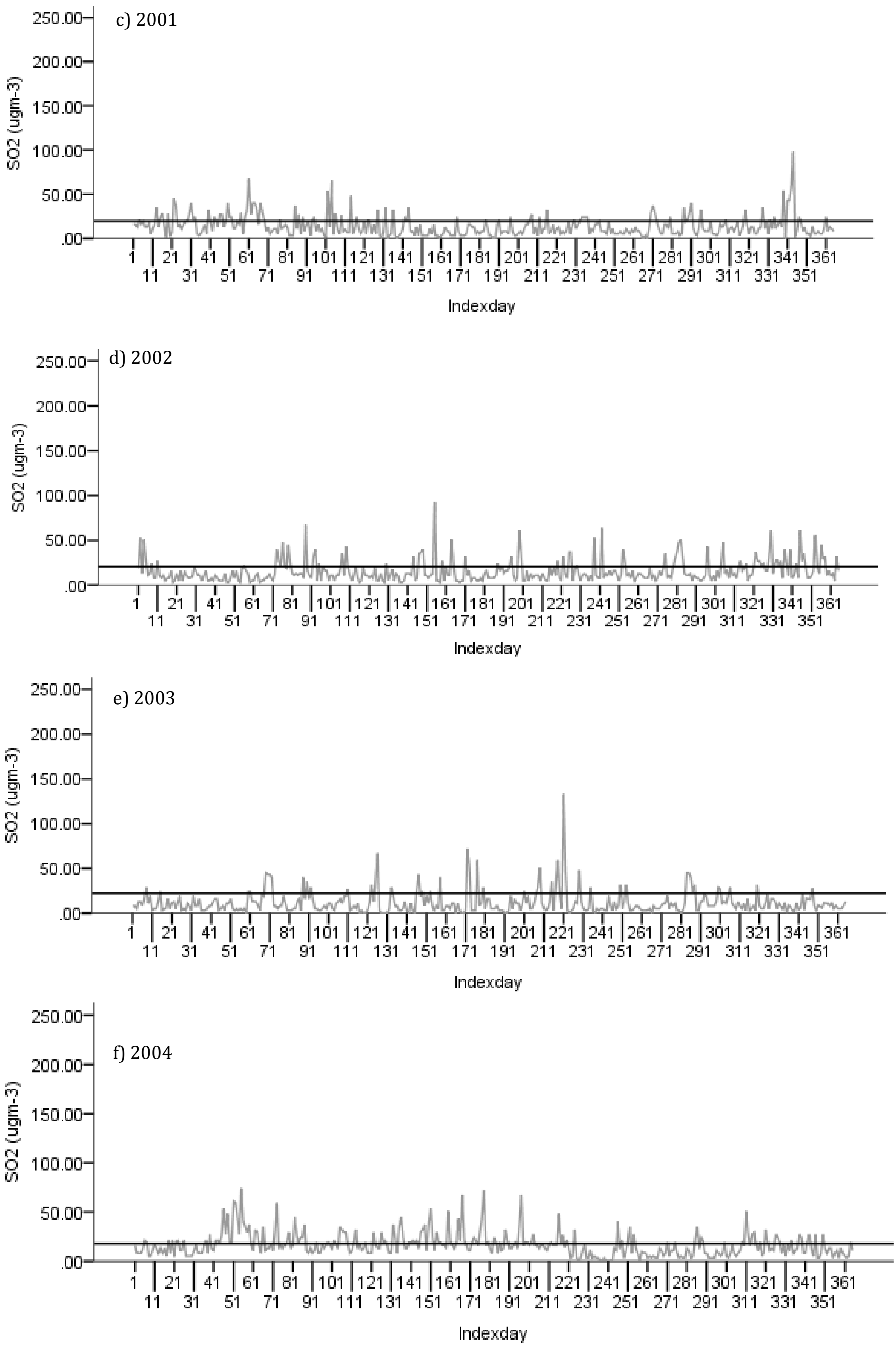
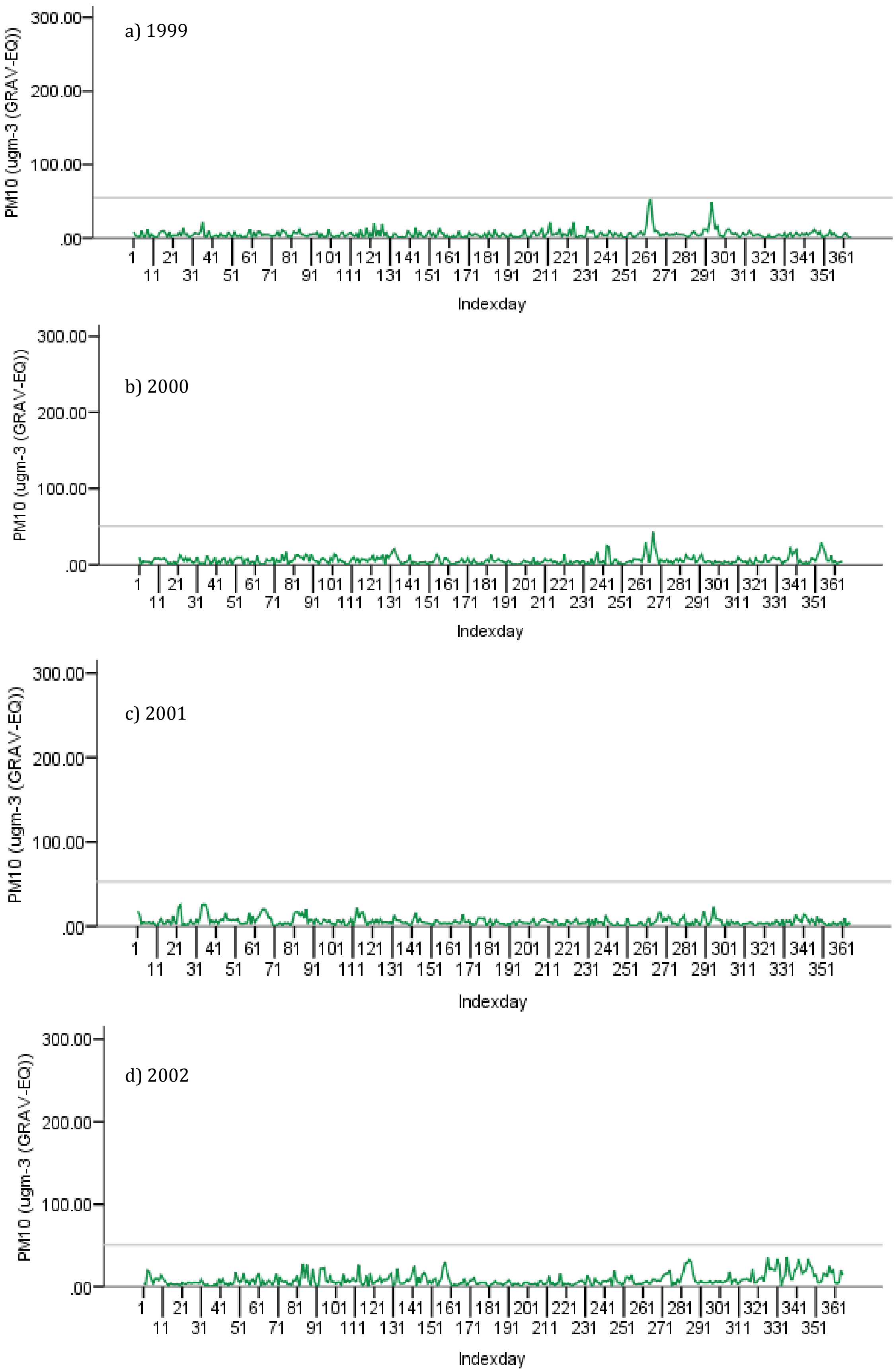
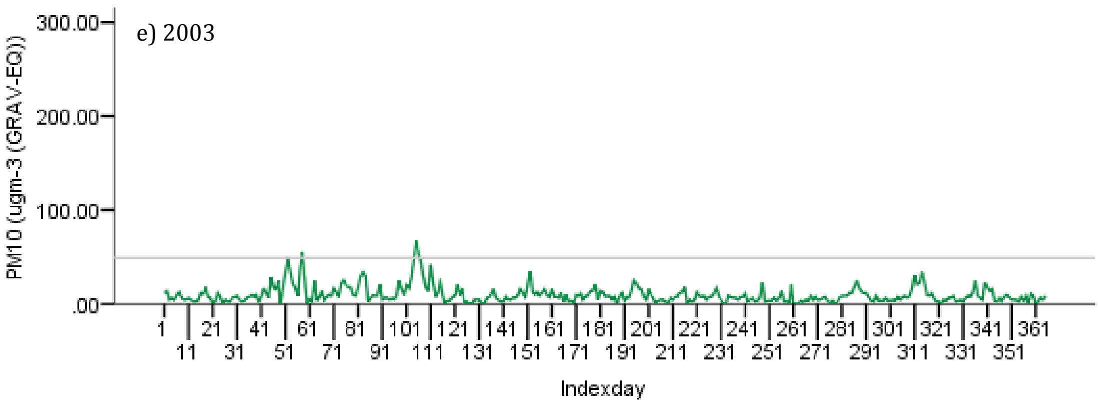


Figure C2. 94: Scotland SO_2 Maximum Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.



a) 1999
b) 2000
c) 2001
d) 2002
PM10 (ugm-3 (GRAV-EQ))
300.00
200.00
100.00
.00
Indexday



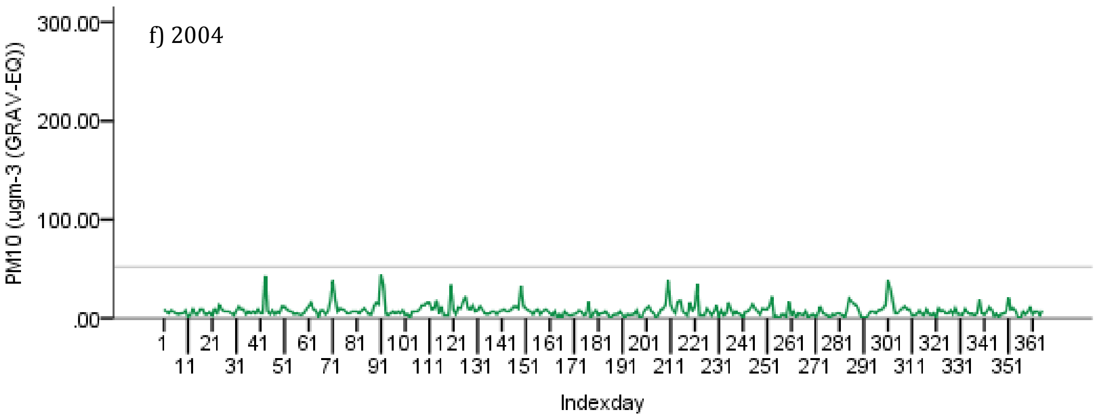
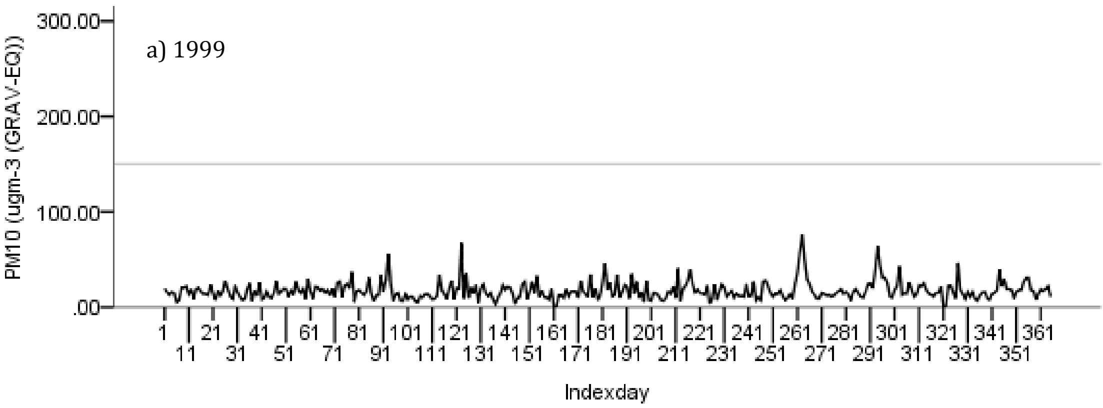
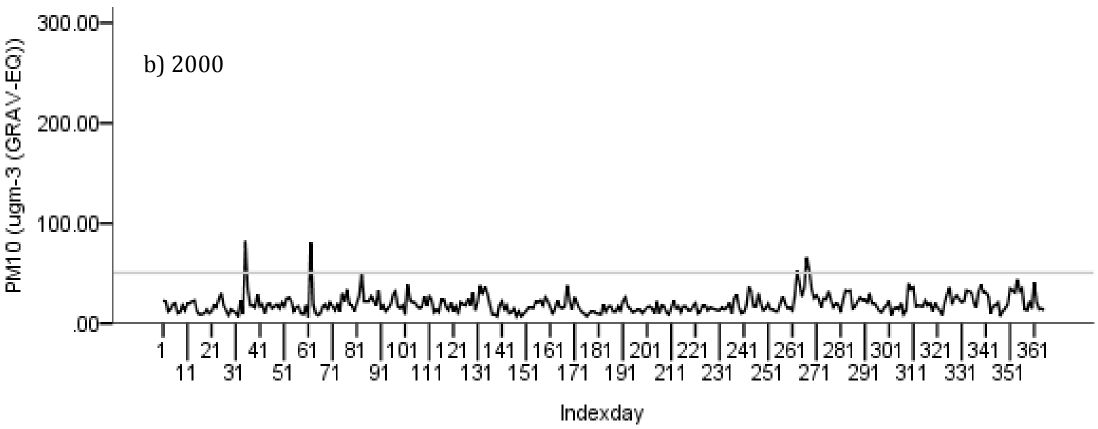


Figure C2. 95: Scotland PM_{10} Minimum Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.





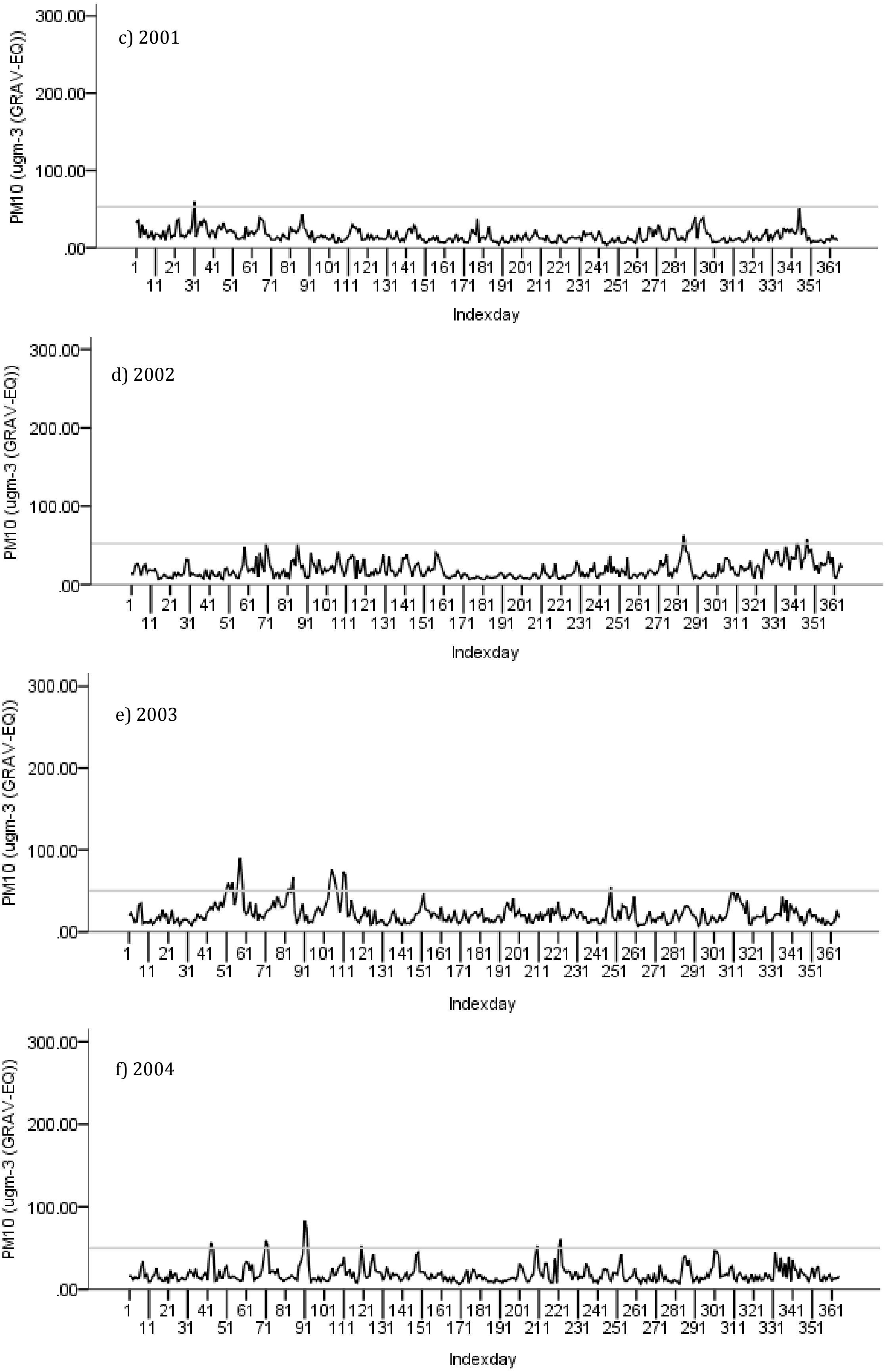
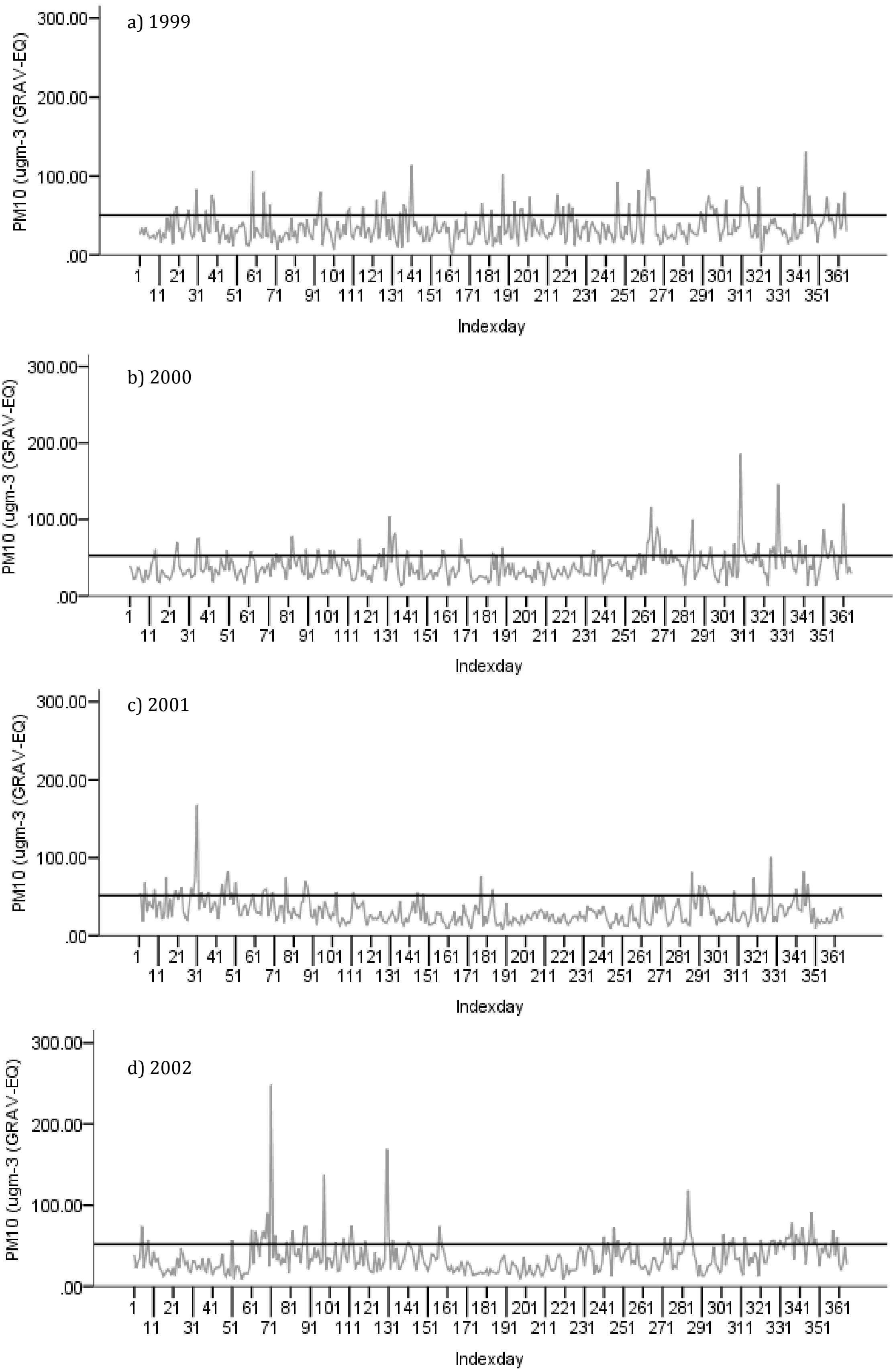


Figure C2. 96: Scotland PM_{10} Mean Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.



a) 1999
b) 2000
c) 2001
d) 2002
PM10 (ugm-3 (GRAV-EQ)
300.00
200.00
100.00
.00
Indexday

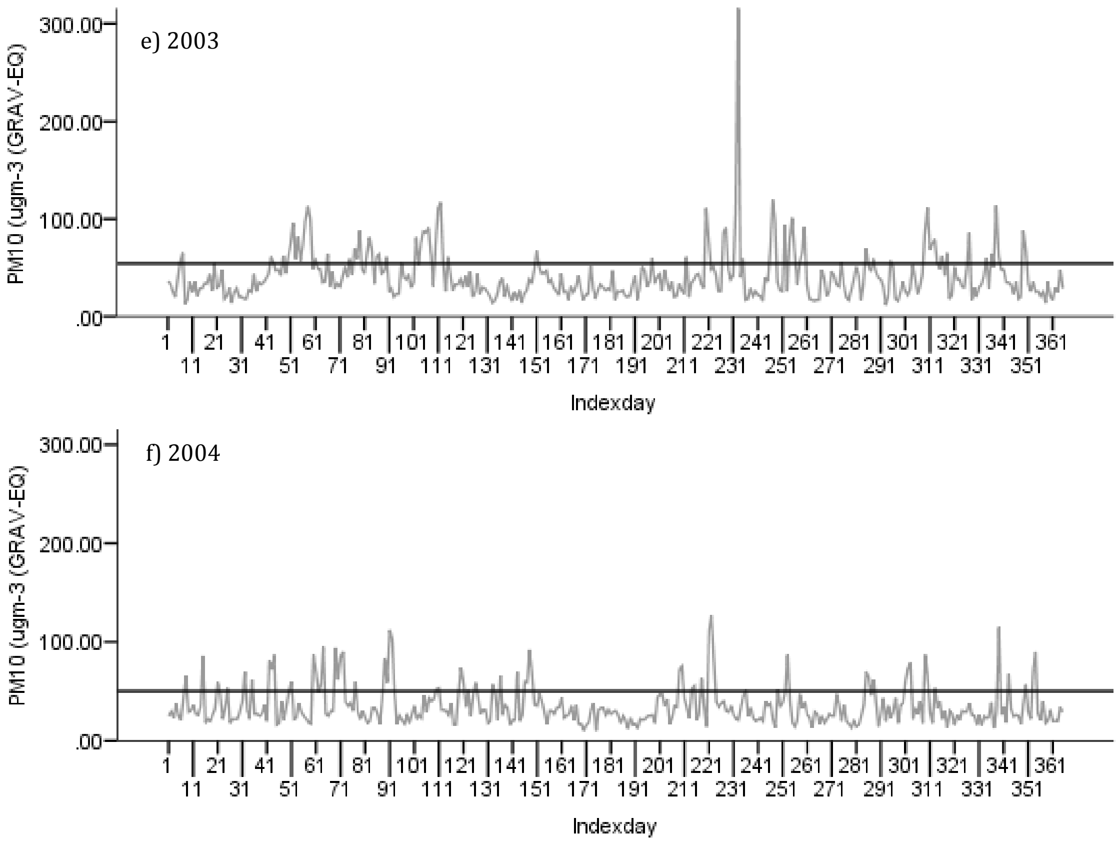
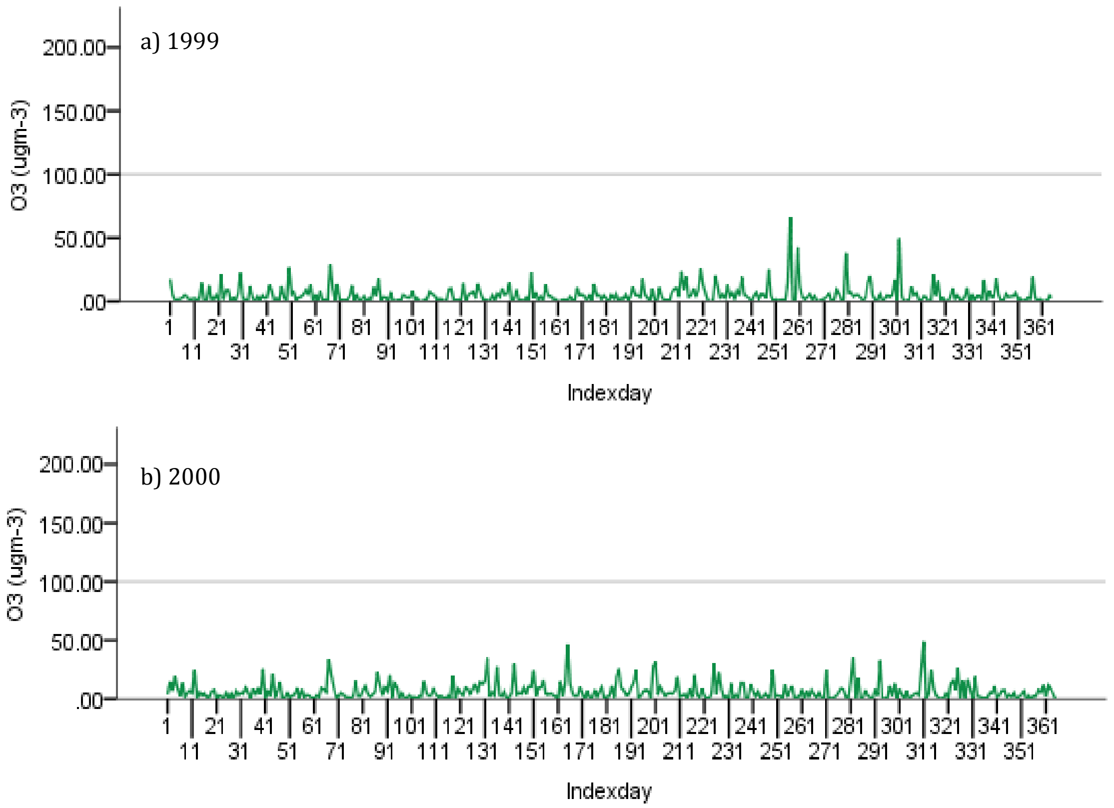


Figure C2. 97: Scotland PM_{10} Maximum Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.



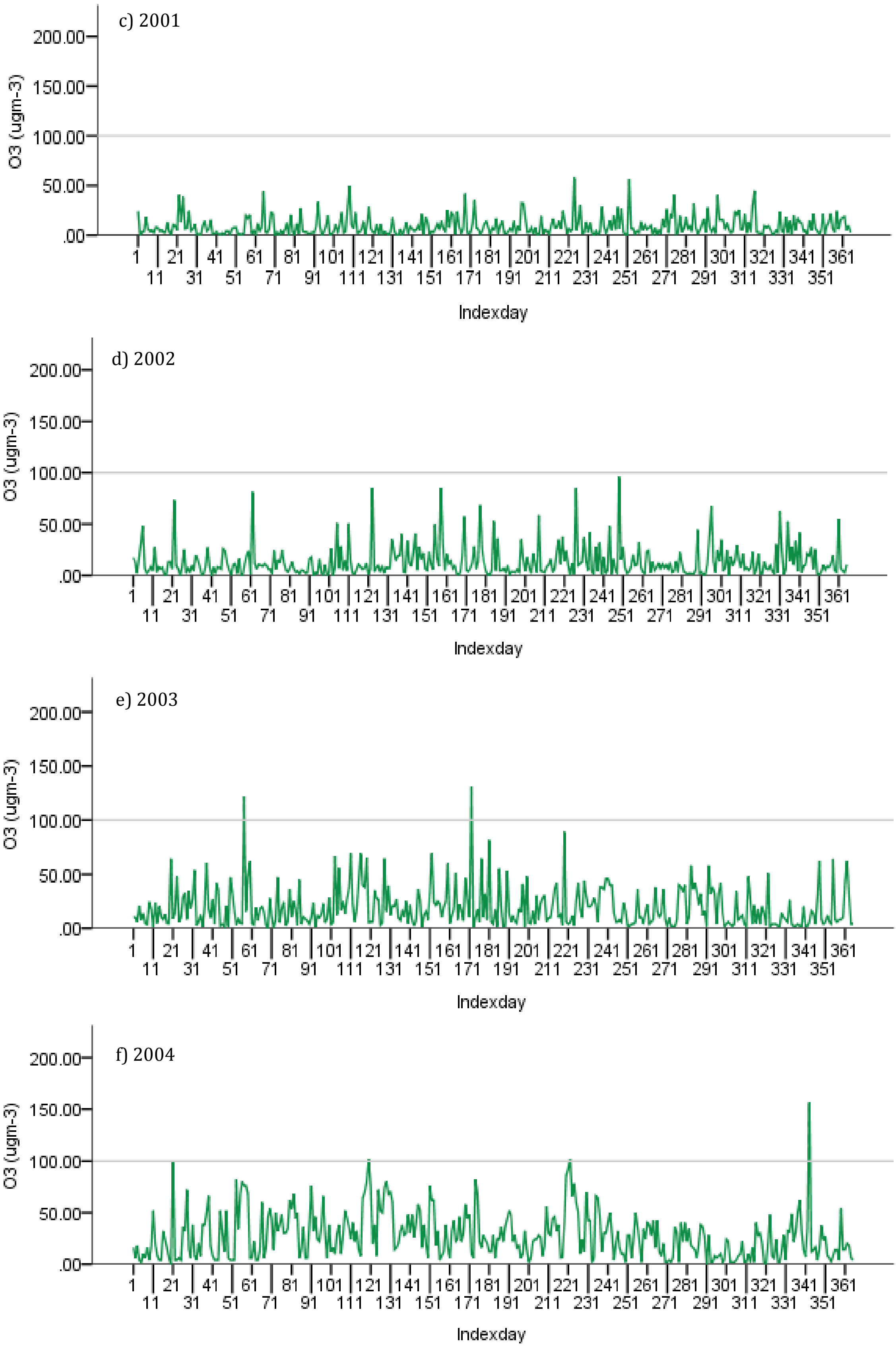
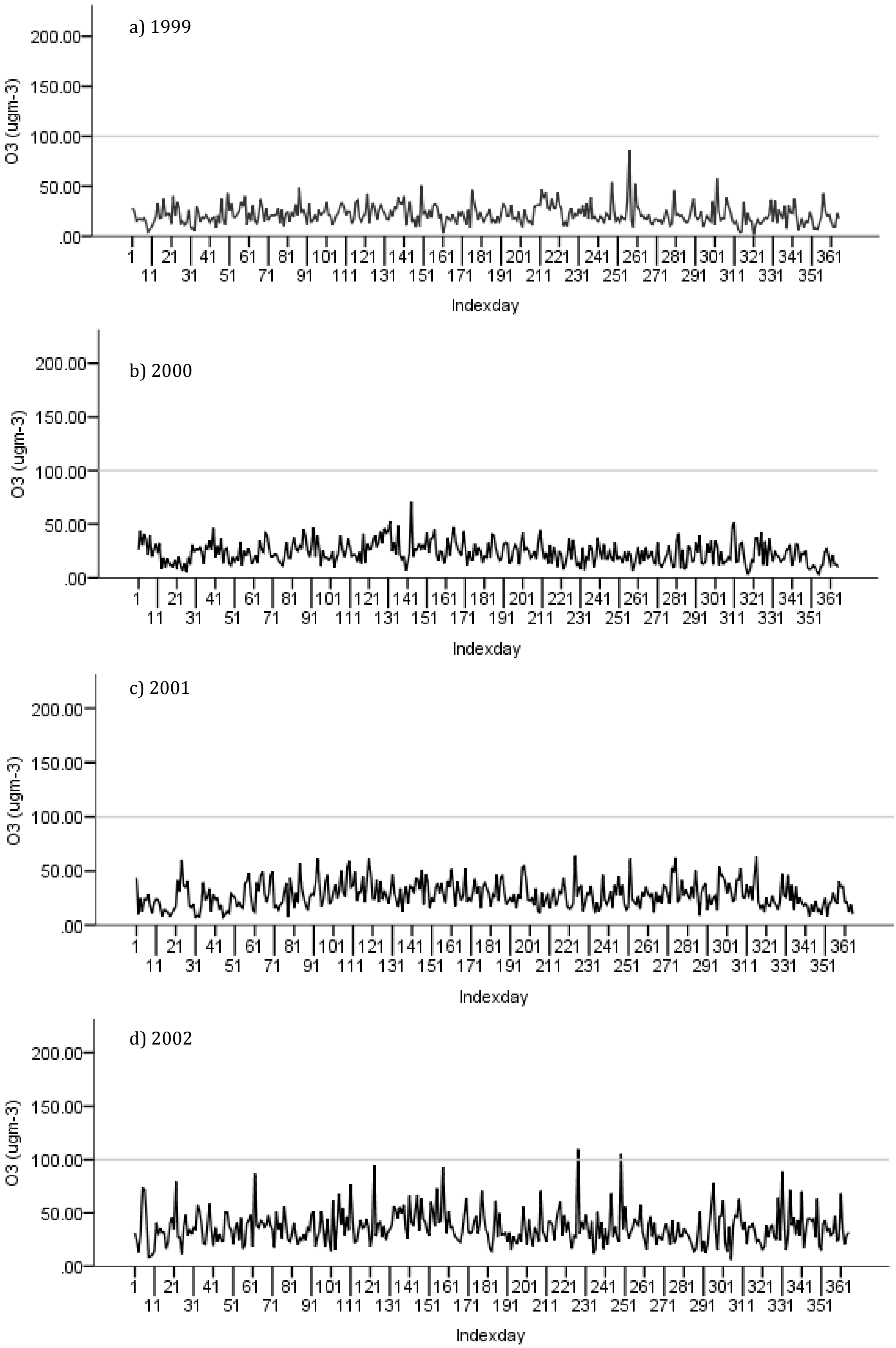


Figure C2.98: Scotland O_3 Minimum Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


a) 1999
b) 2000
c) 2001
d) 2002
O3 (ugm-3)
200.00
150.00
100.00
50.00
.00
1 21 41 61 81 101 121 141 161 181 201 221 241 261 281 301 321 341 361
11 31 51 71 91 111 131 151 171 191 211 231 251 271 291 311 331 351
Indexday

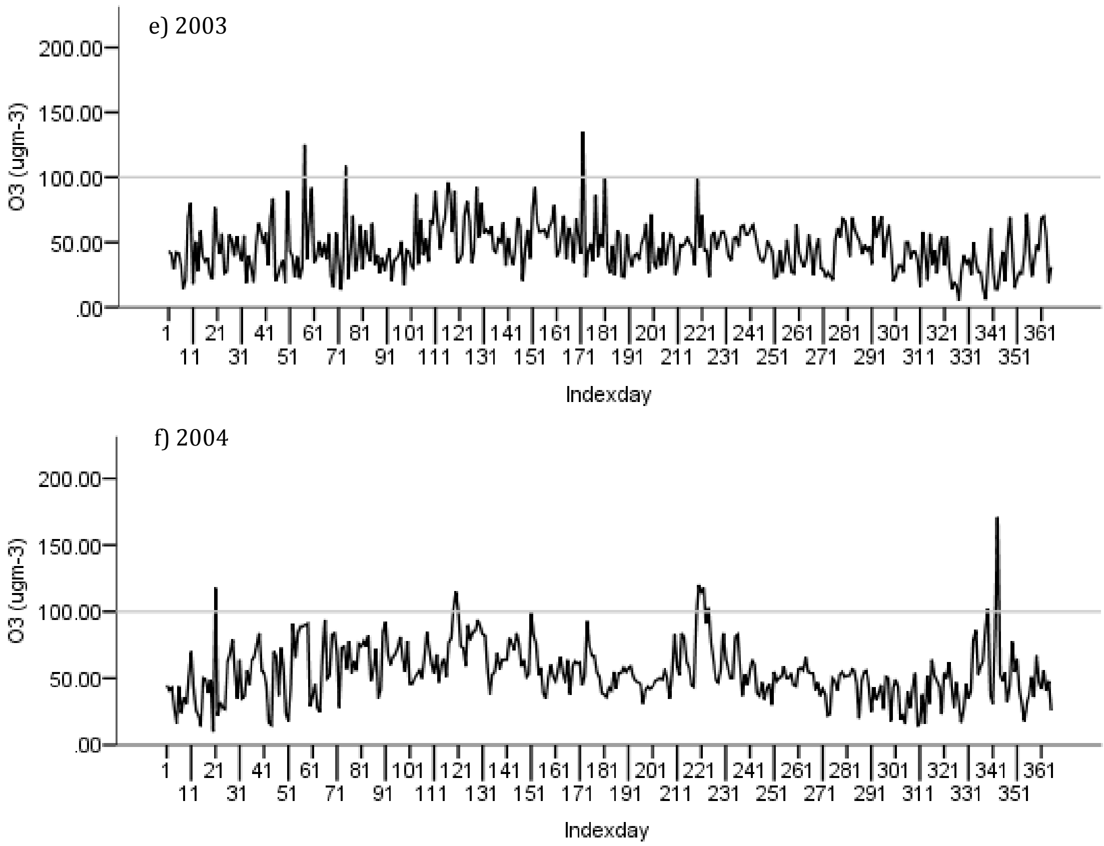
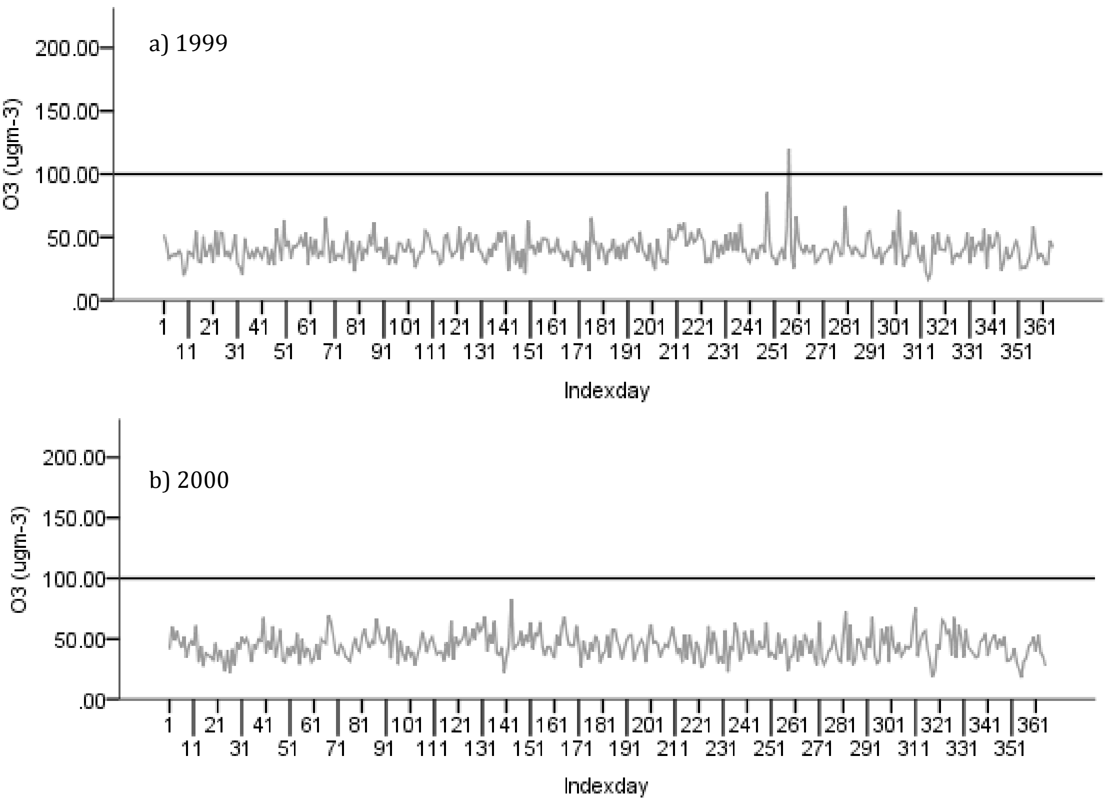


Figure C2. 99: Scotland O_3 Mean Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.



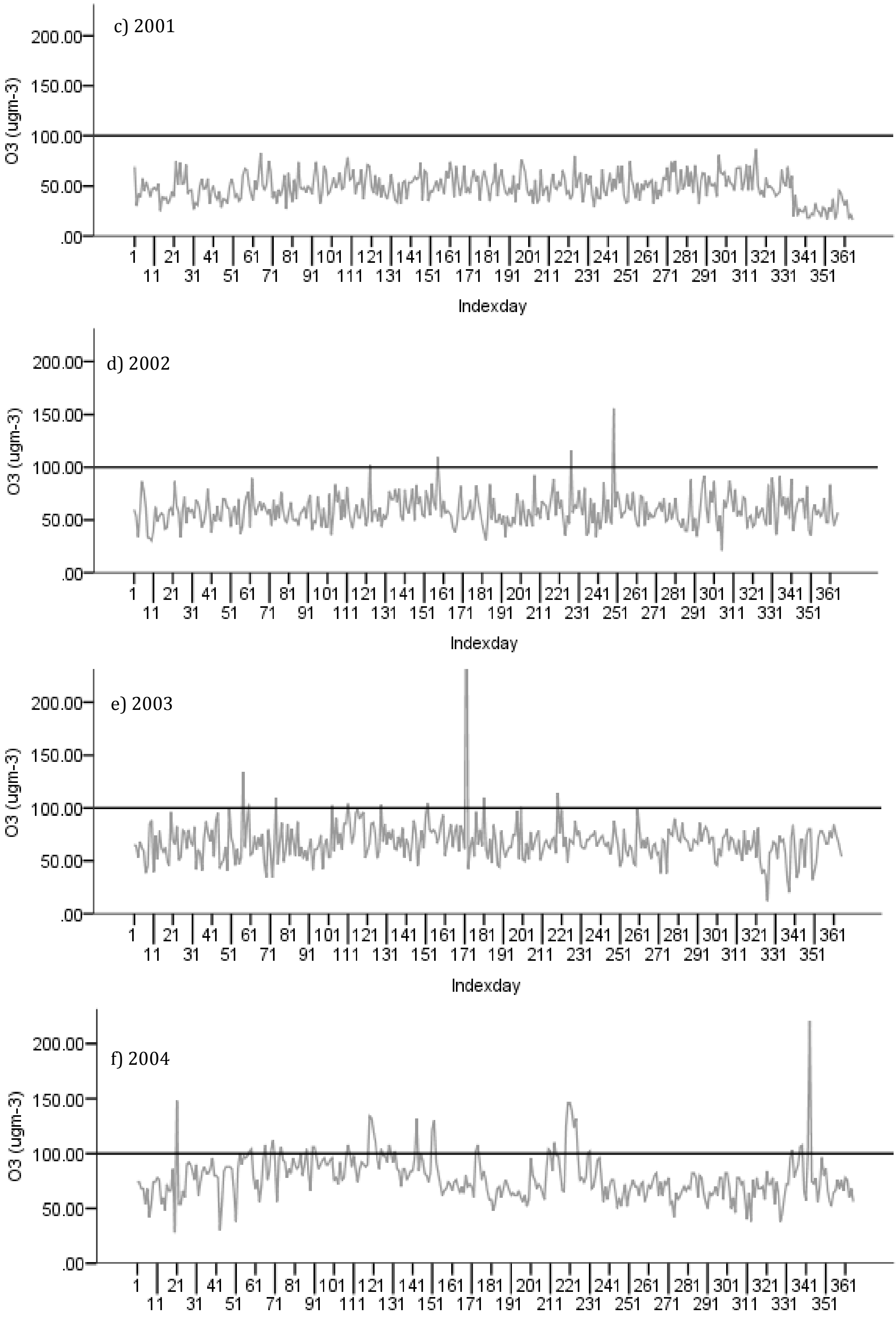
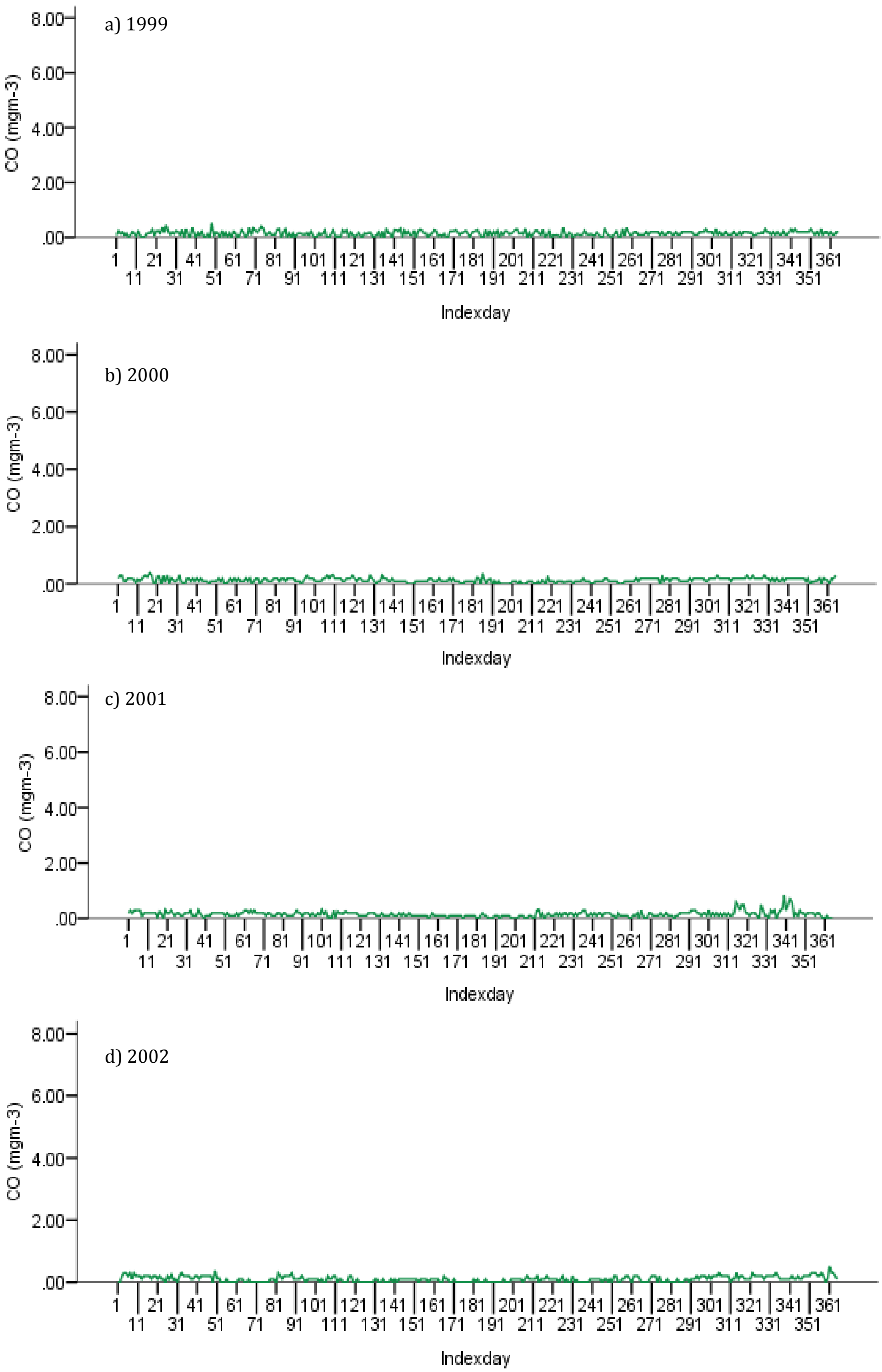
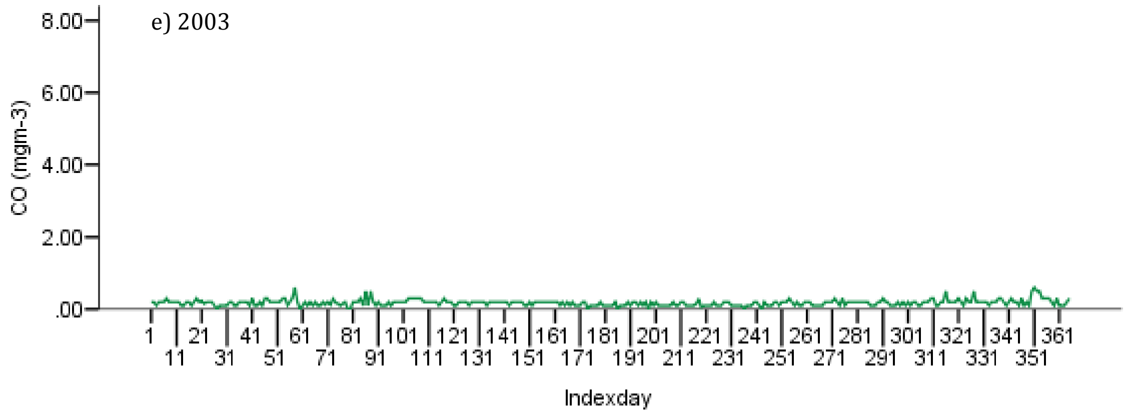


Figure C2. 100: Scotland O_3 Maximum Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


a) 1999
CO (mgm-3)
8.00
6.00
4.00
2.00
.00
1 21 41 61 81 101 121 141 161 181 201 221 241 261 281 301 321 341 361
11 31 51 71 91 111 131 151 171 191 211 231 251 271 291 311 331 351
Indexday
b) 2000
CO (mgm-3)
8.00
6.00
4.00
2.00
.00
1 21 41 61 81 101 121 141 161 181 201 221 241 261 281 301 321 341 361
11 31 51 71 91 111 131 151 171 191 211 231 251 271 291 311 331 351
Indexday
c) 2001
CO (mgm-3)
8.00
6.00
4.00
2.00
.00
1 21 41 61 81 101 121 141 161 181 201 221 241 261 281 301 321 341 361
11 31 51 71 91 111 131 151 171 191 211 231 251 271 291 311 331 351
Indexday
d) 2002
CO (mgm-3)
8.00
6.00
4.00
2.00
.00
1 21 41 61 81 101 121 141 161 181 201 221 241 261 281 301 321 341 361
11 31 51 71 91 111 131 151 171 191 211 231 251 271 291 311 331 351
Indexday



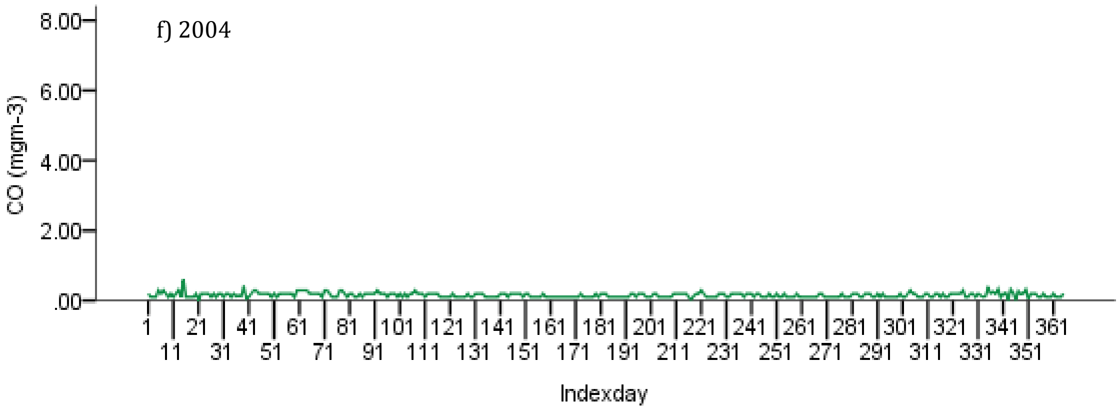
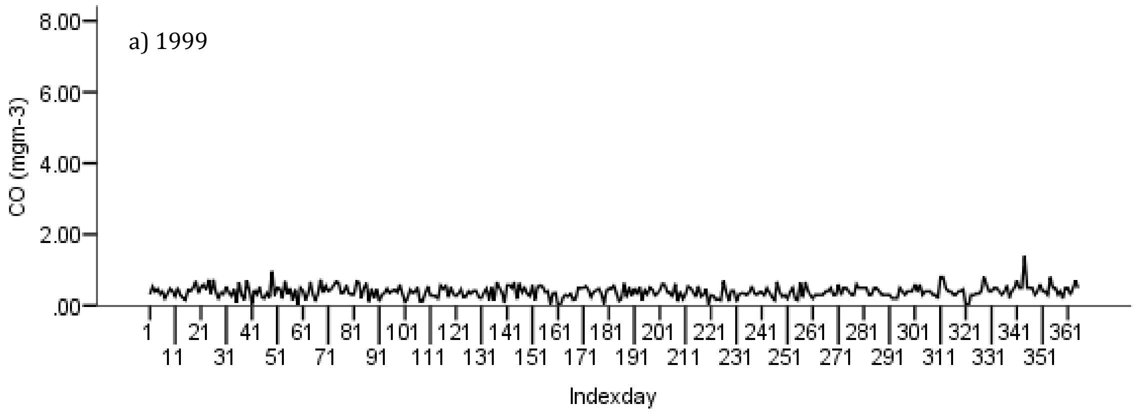
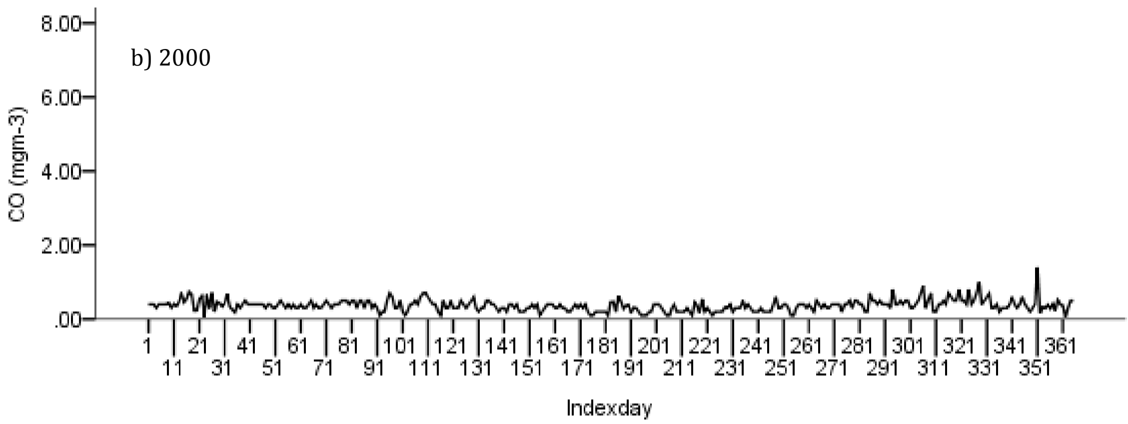


Figure C2. 101: Scotland CO Minimum Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.





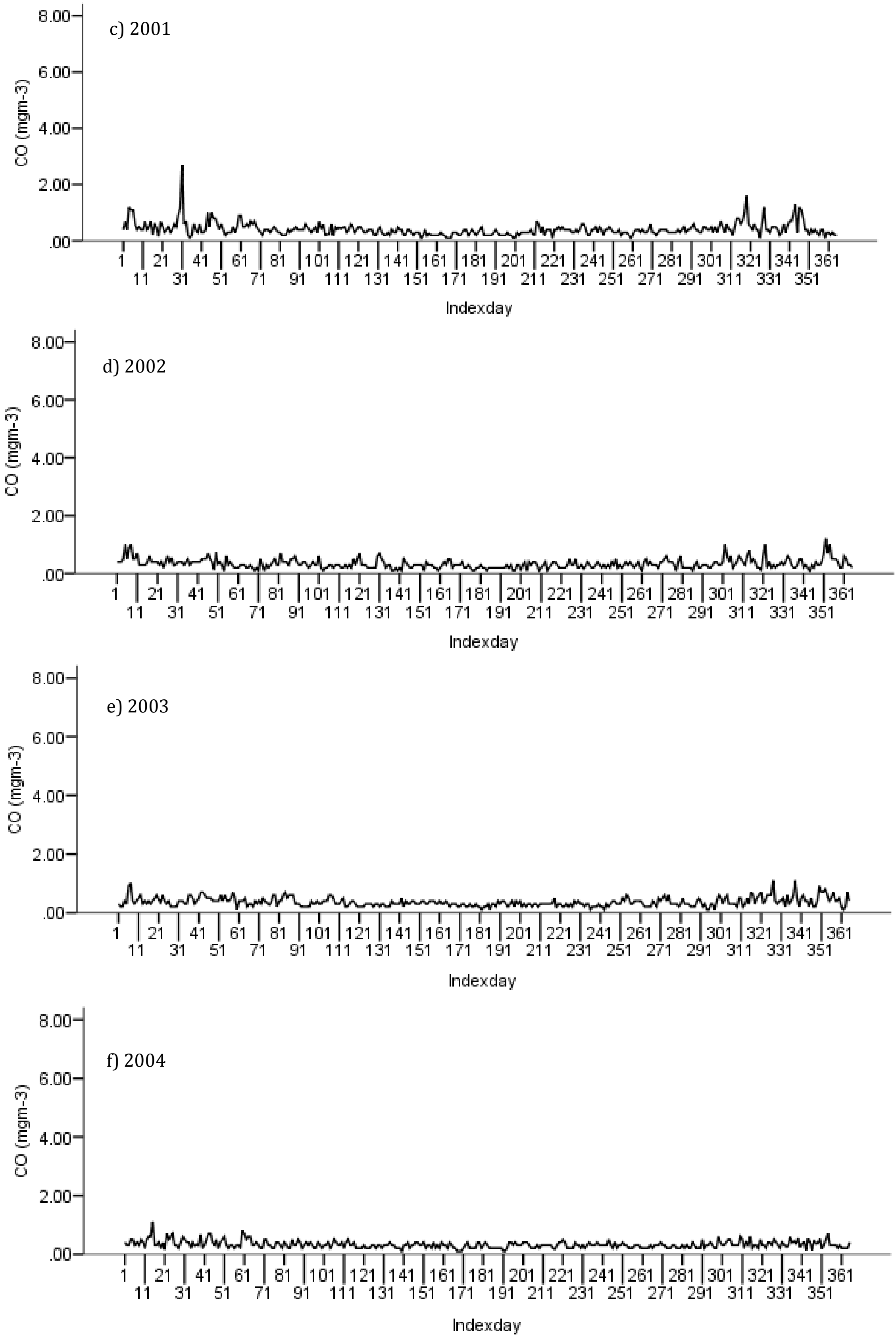
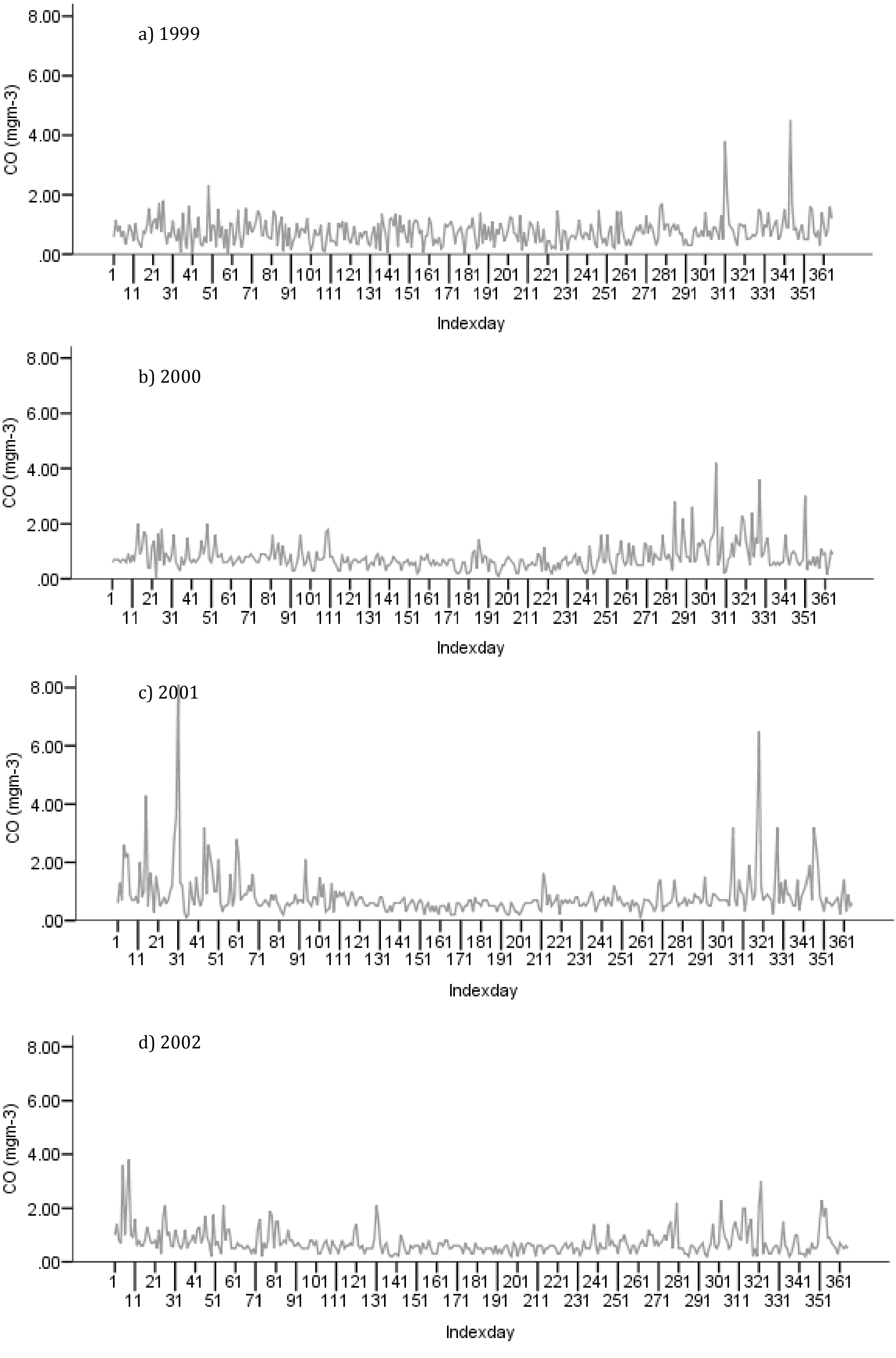


Figure C2. 102: Scotland CO Mean Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


a) 1999
CO (mgm-3)
Indexday
b) 2000
CO (mgm-3)
Indexday
c) 2001
CO (mgm-3)
Indexday
d) 2002
CO (mgm-3)
Indexday

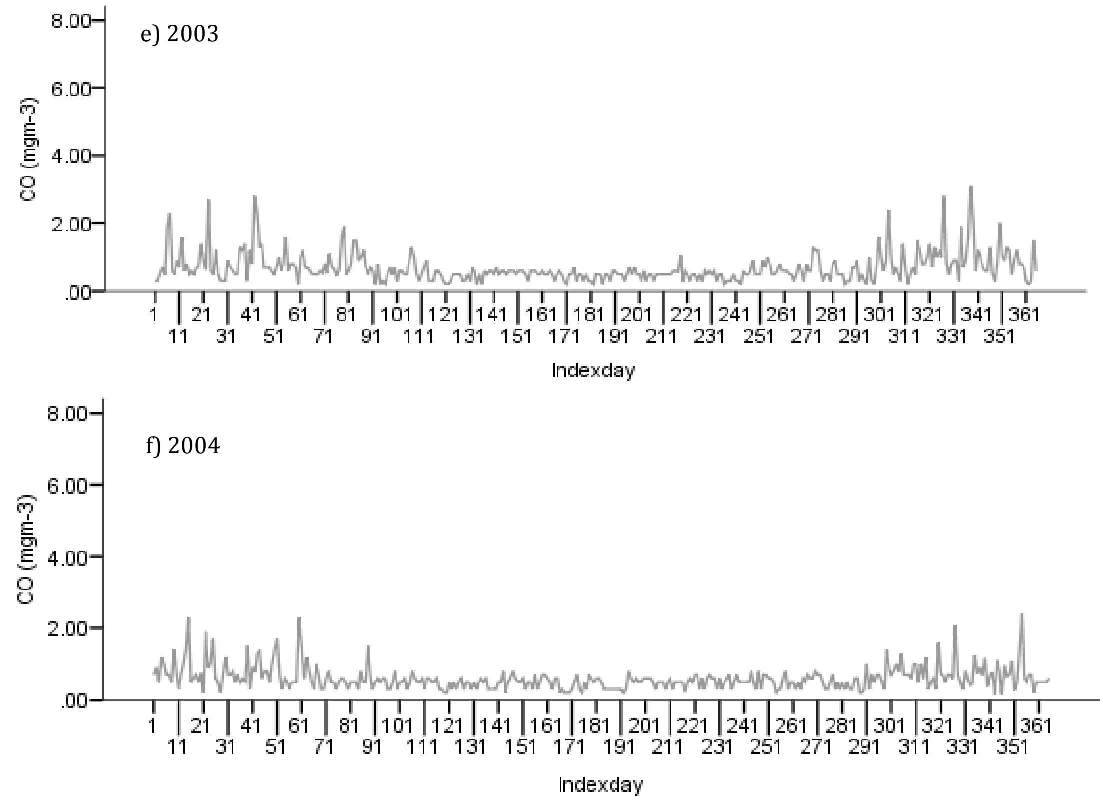
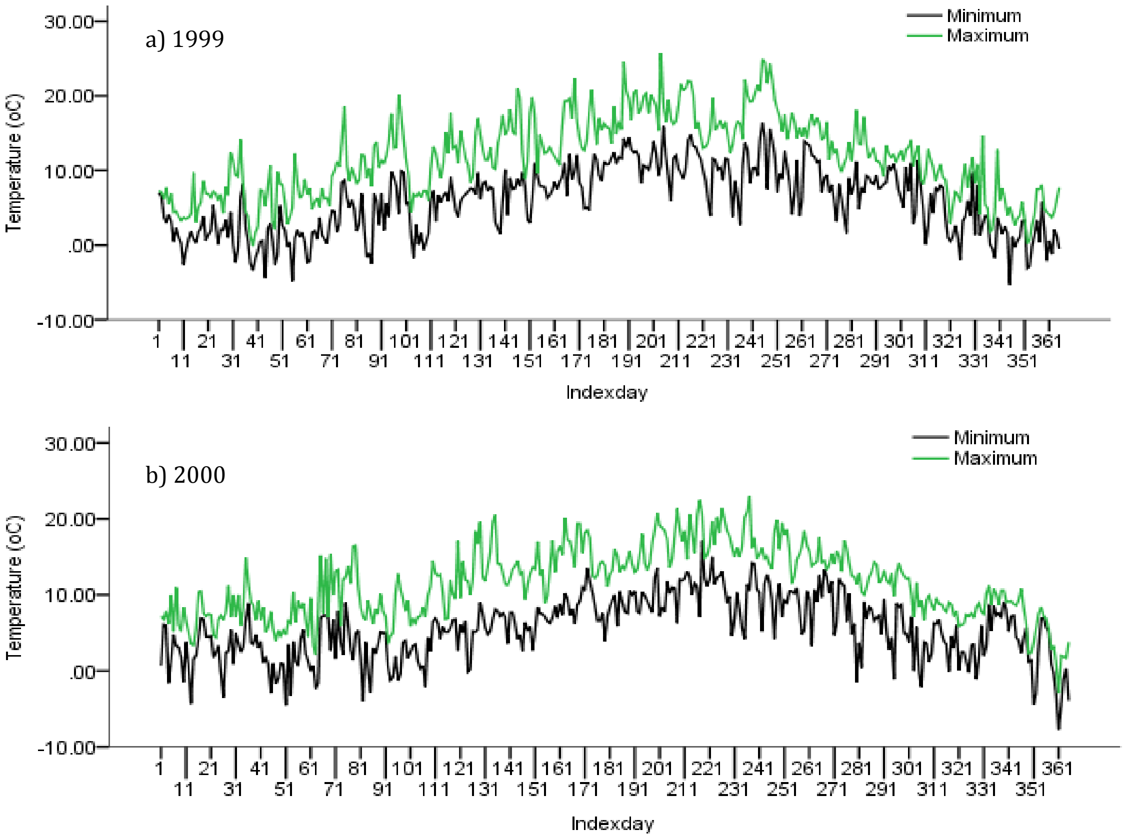


Figure C2. 103: Scotland CO Maximum Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.



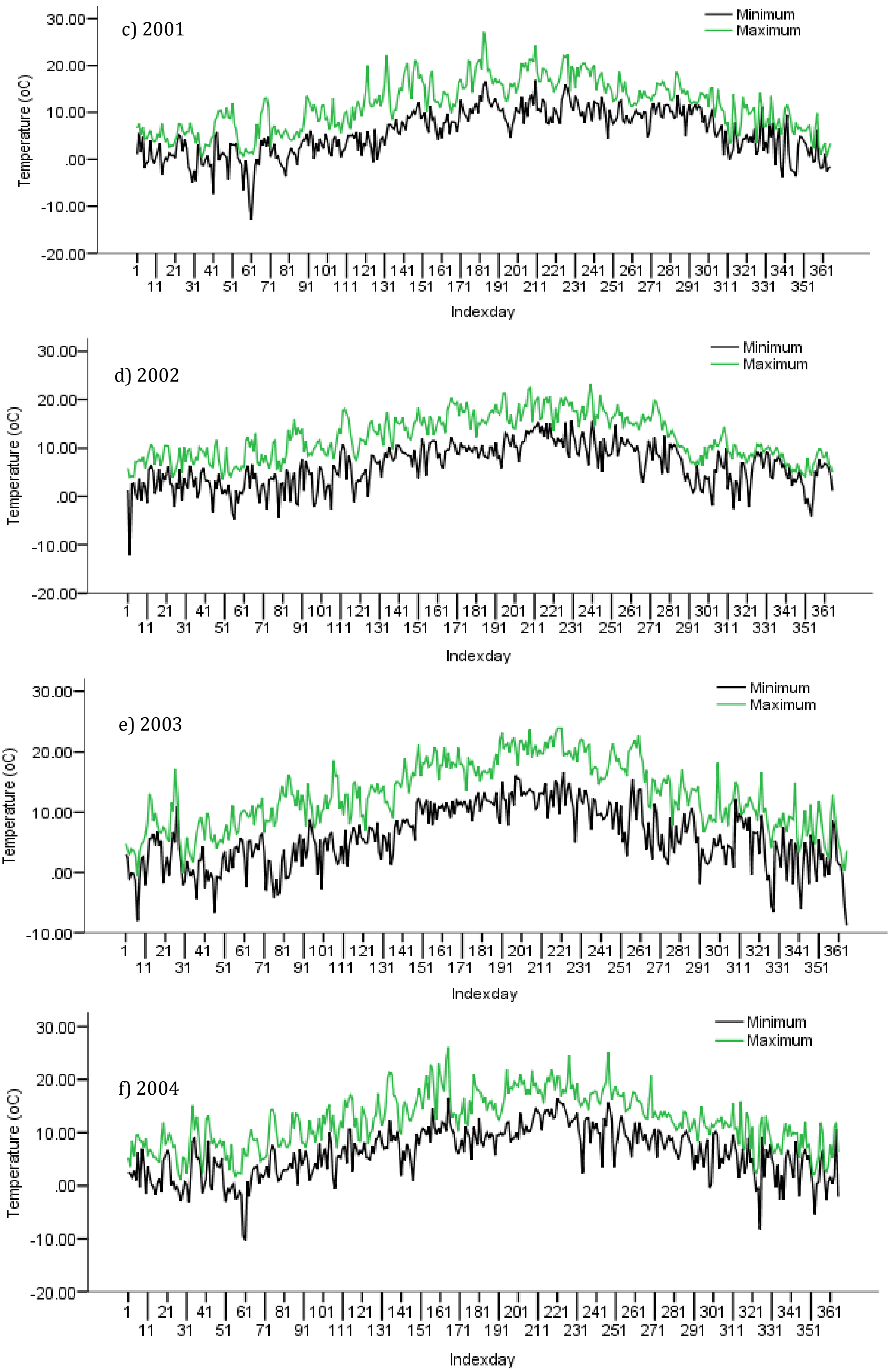
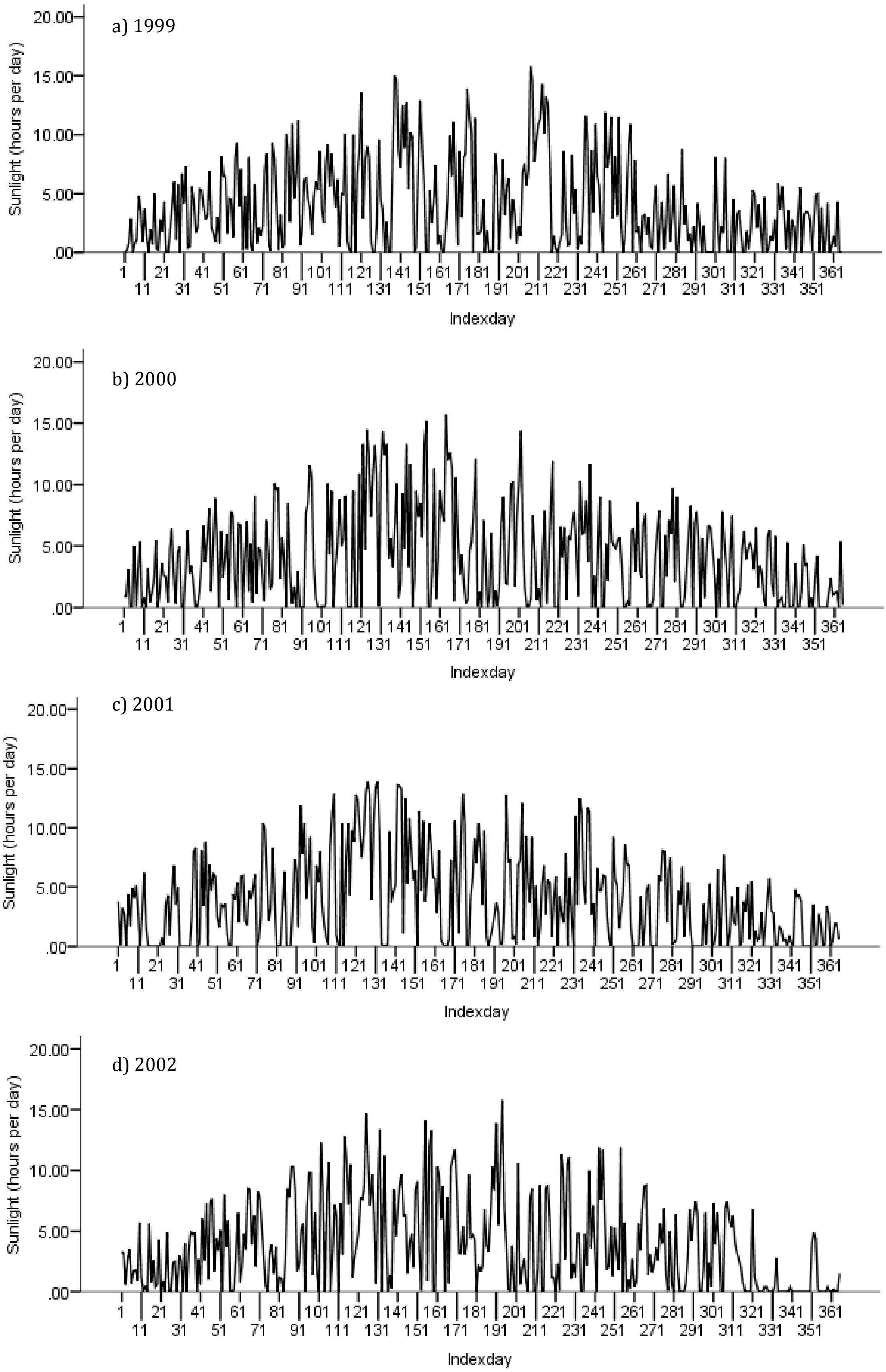
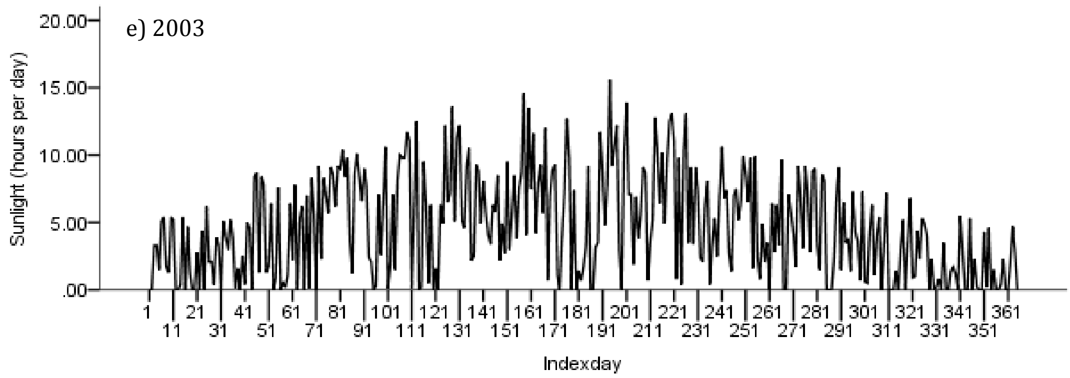


Figure C2. 104: Scotland Temperature Minimum and Maximum Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


a) 1999
b) 2000
c) 2001
d) 2002
Sunlight (hours per day)
20.00
15.00
10.00
5.00
.00
Indexday
1 11 21 31 41 51 61 71 81 91 101 111 121 131 141 151 161 171 181 191 201 211 221 231 241 251 261 271 281 291 301 311 321 331 341 351 361



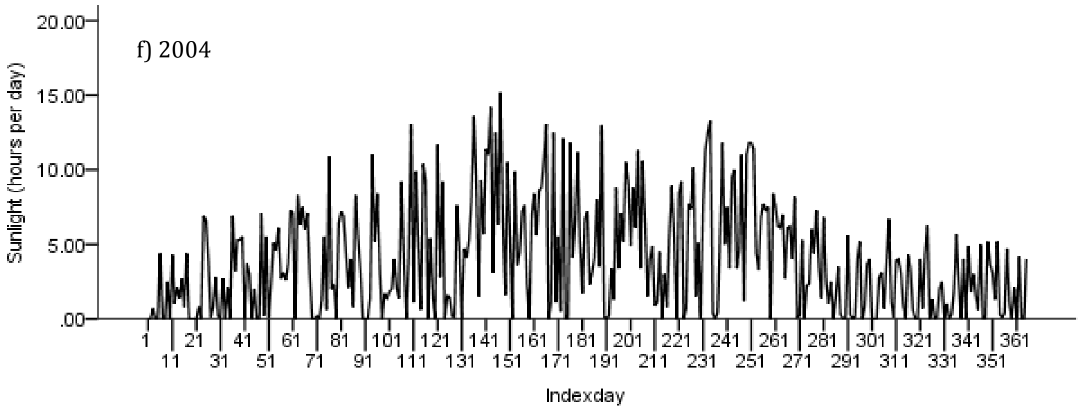
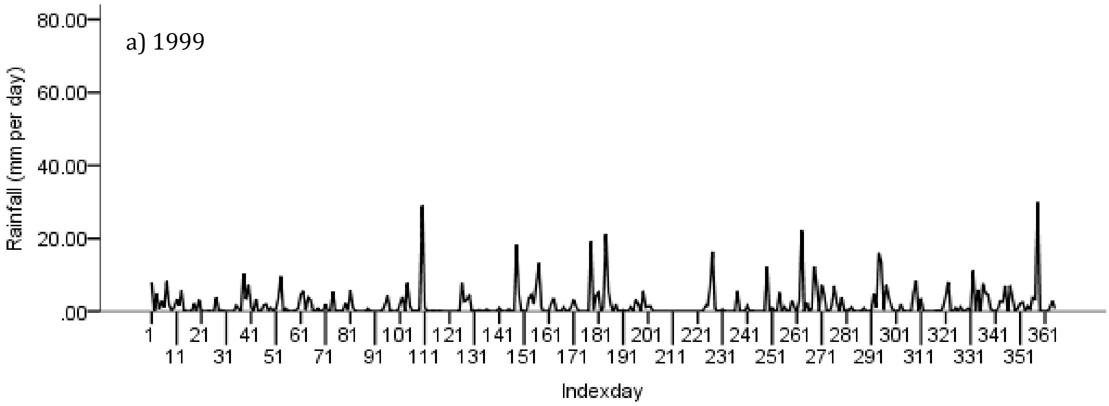
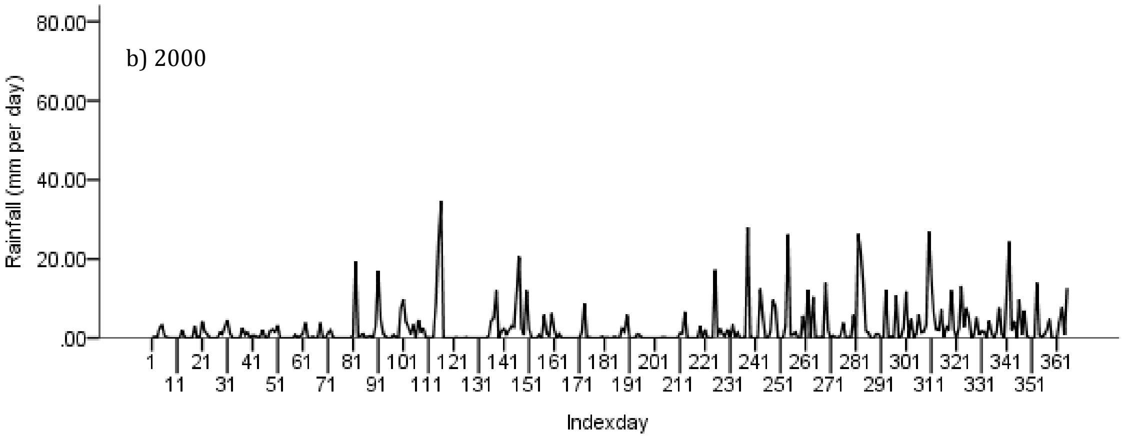


Figure C2. 105: Scotland Sun Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004





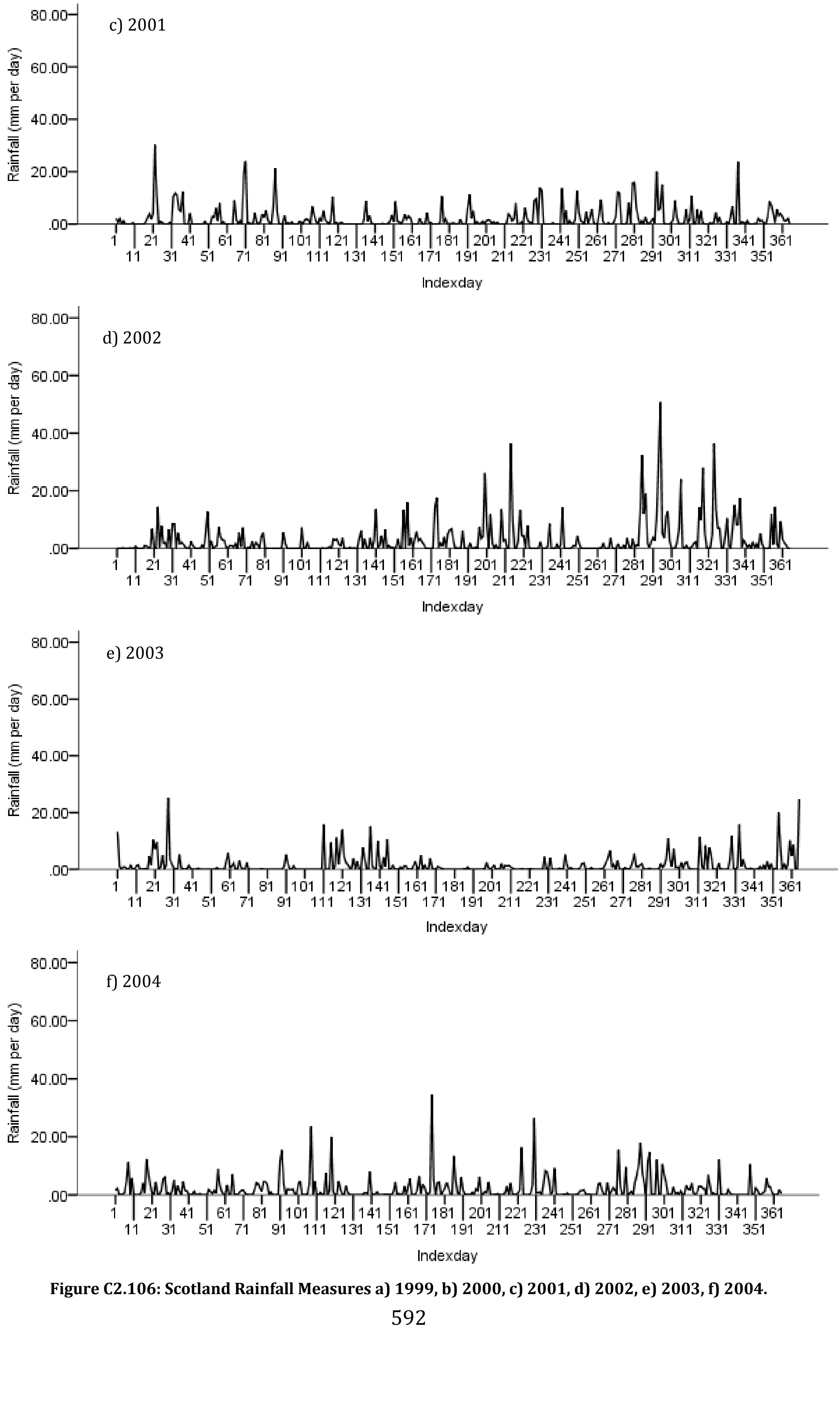
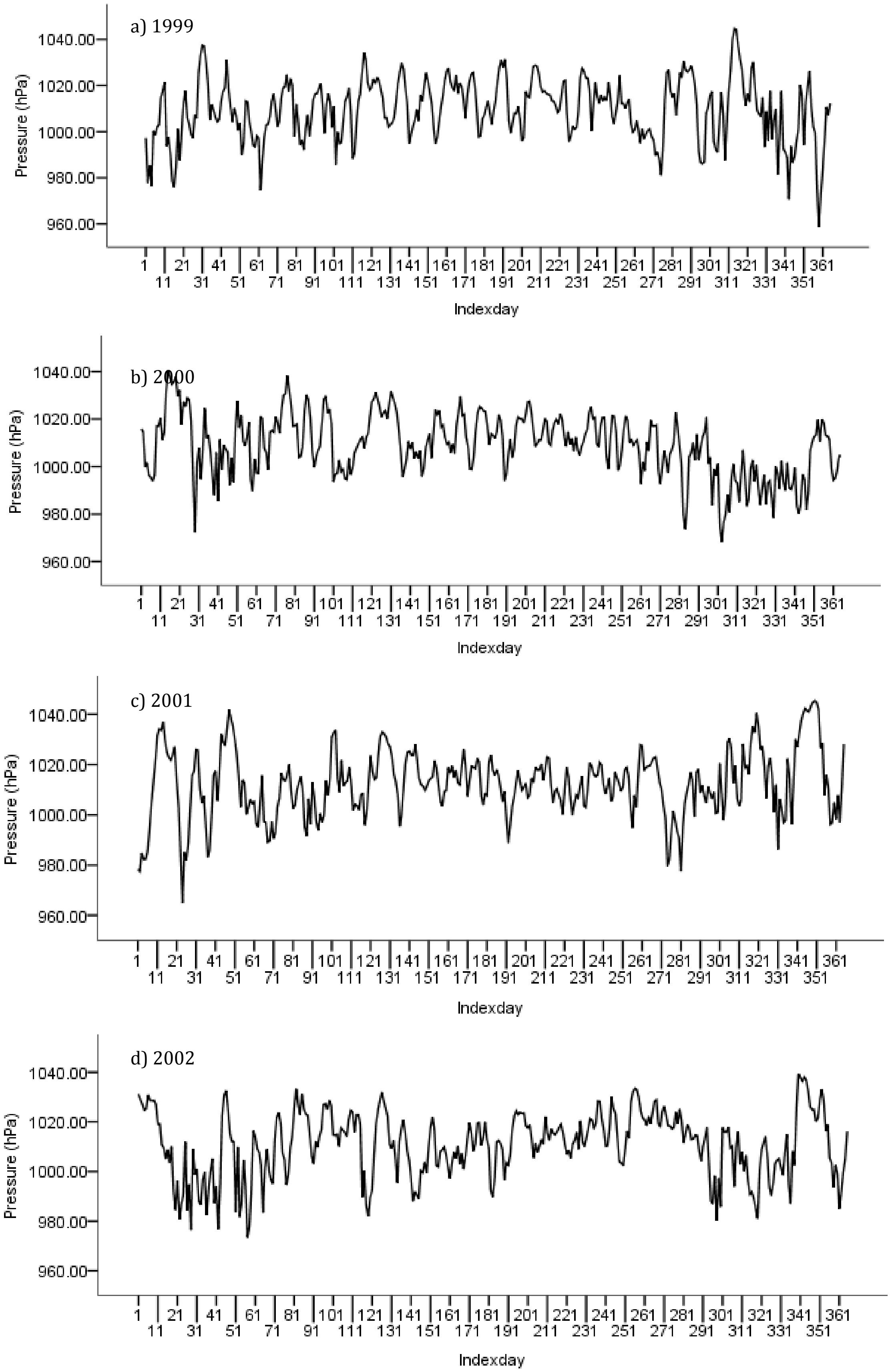


Figure C2.106: Scotland Rainfall Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


a) 1999
b) 2000
c) 2001
d) 2002
Pressure (hPa)
1040.00
1020.00
1000.00
980.00
960.00
1 21 41 61 81 101 121 141 161 181 201 221 241 261 281 301 321 341 361
11 31 51 71 91 111 131 151 171 191 211 231 251 271 291 311 331 351
Indexday

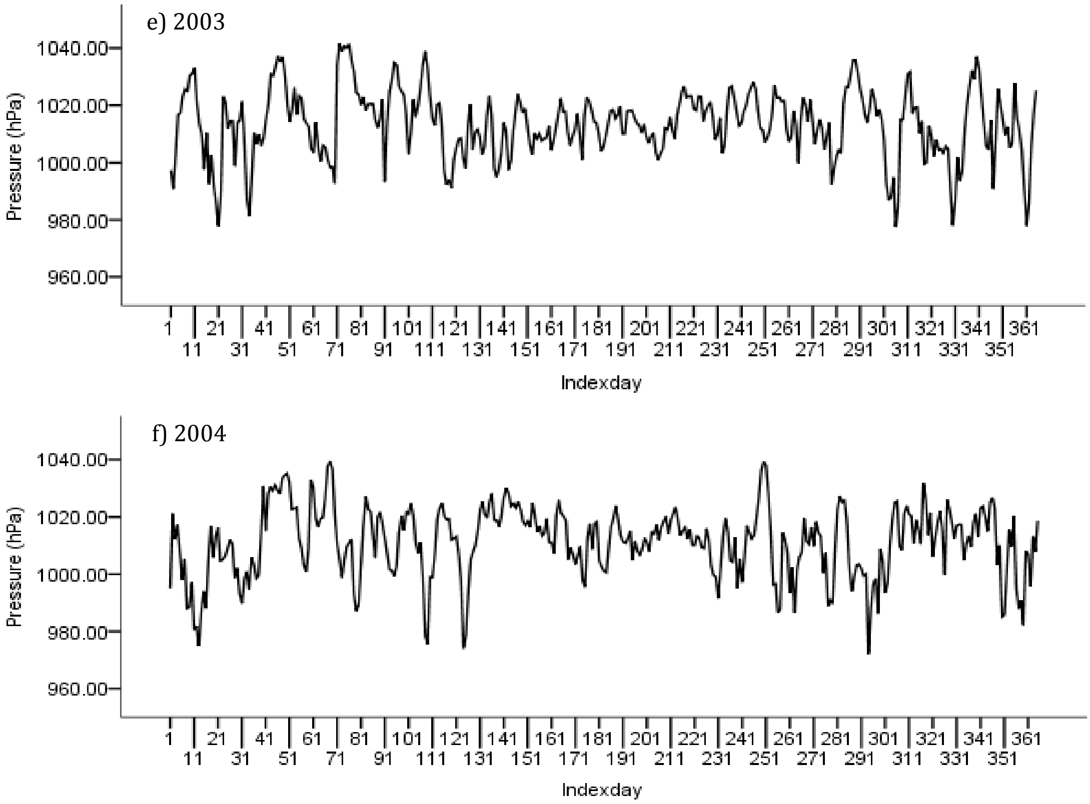
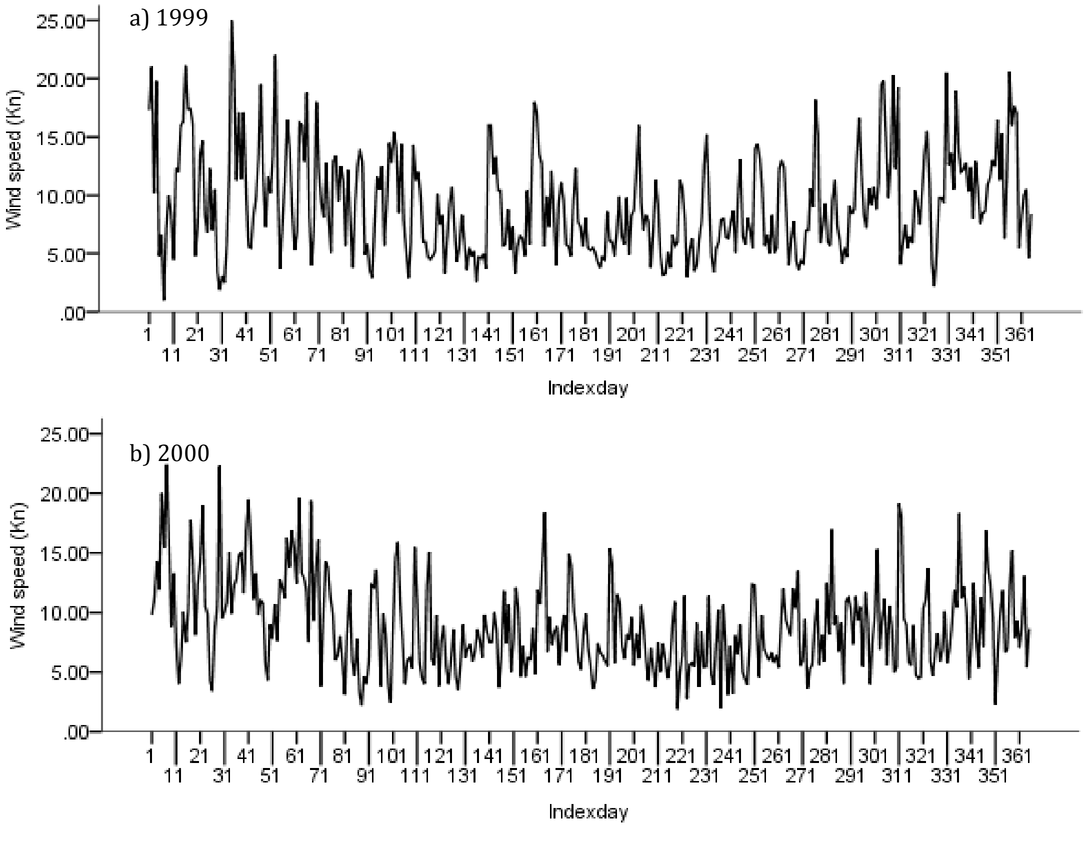


Figure C2. 107: Scotland Pressure Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.



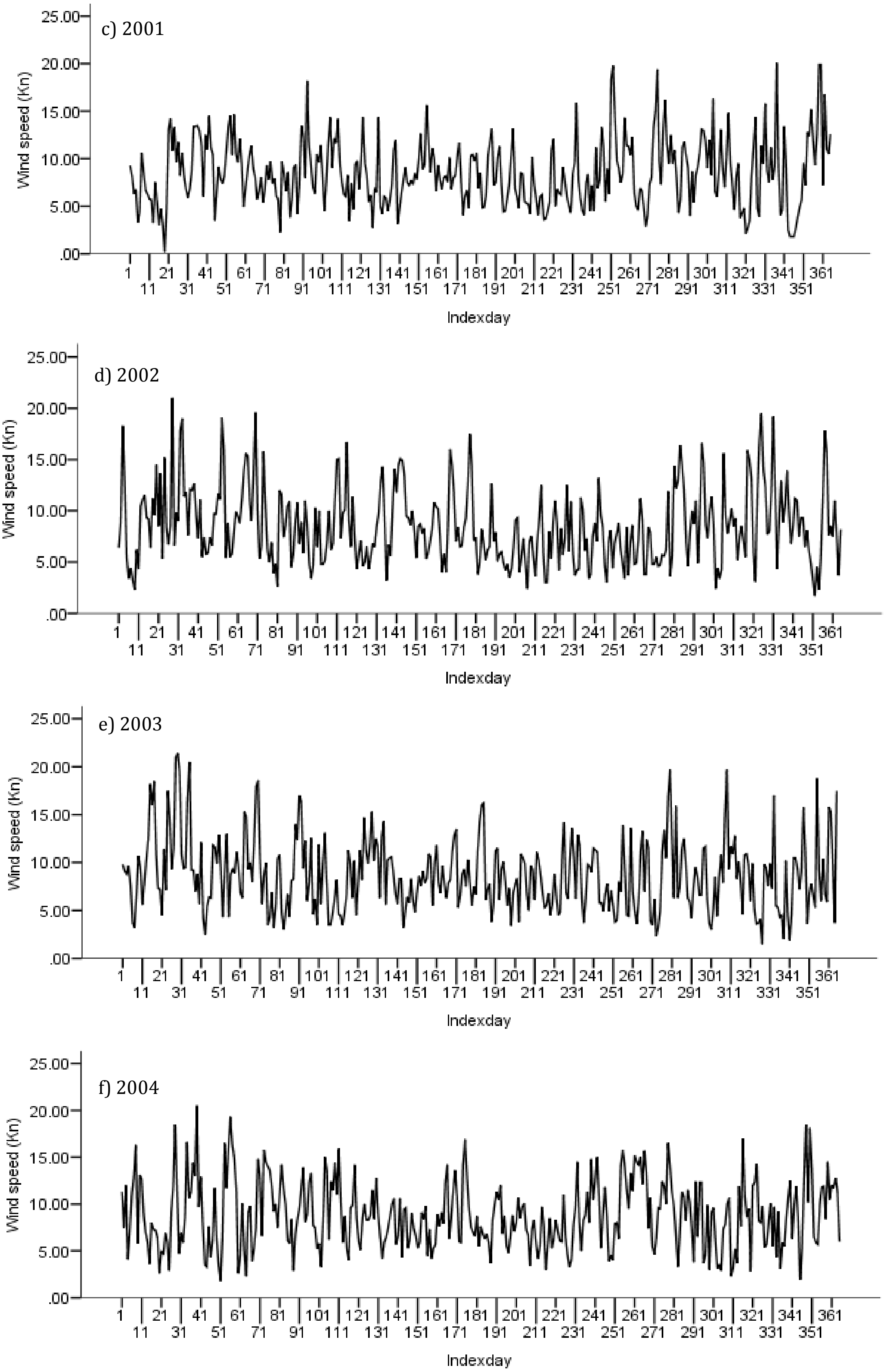
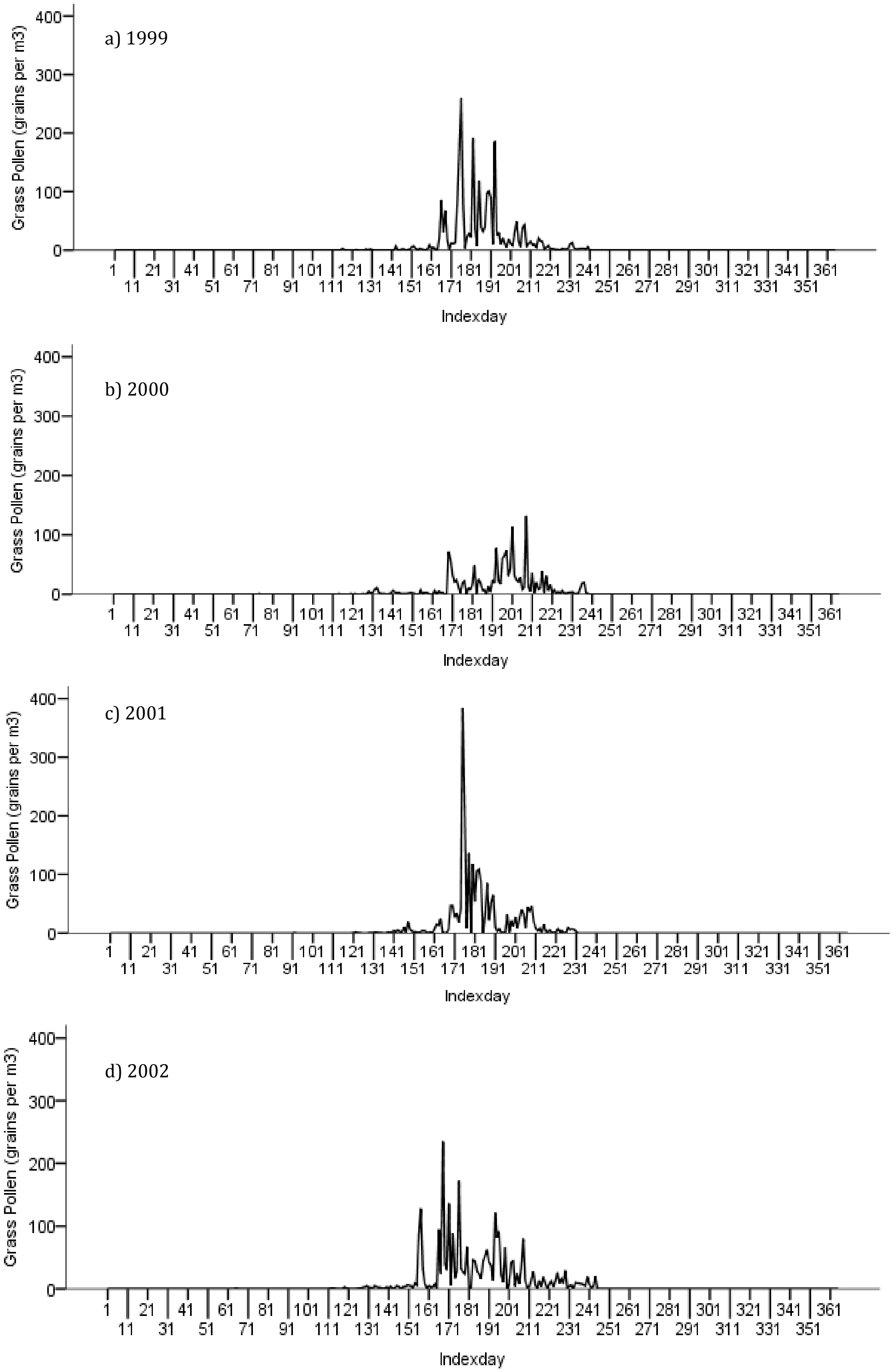
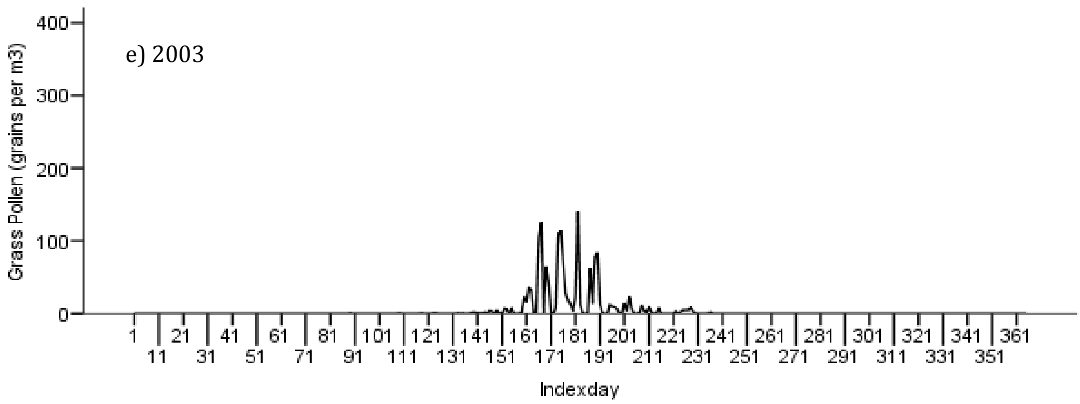


Figure C2. 108: Scotland Wind speed Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.


a) 1999
b) 2000
c) 2001
d) 2002
Grass Pollen (grains per m3)
Indexday
0
100
200
300
400
1 21 41 61 81 101 121 141 161 181 201 221 241 261 281 301 321 341 361
11 31 51 71 91 111 131 151 171 191 211 231 251 271 291 311 331 351



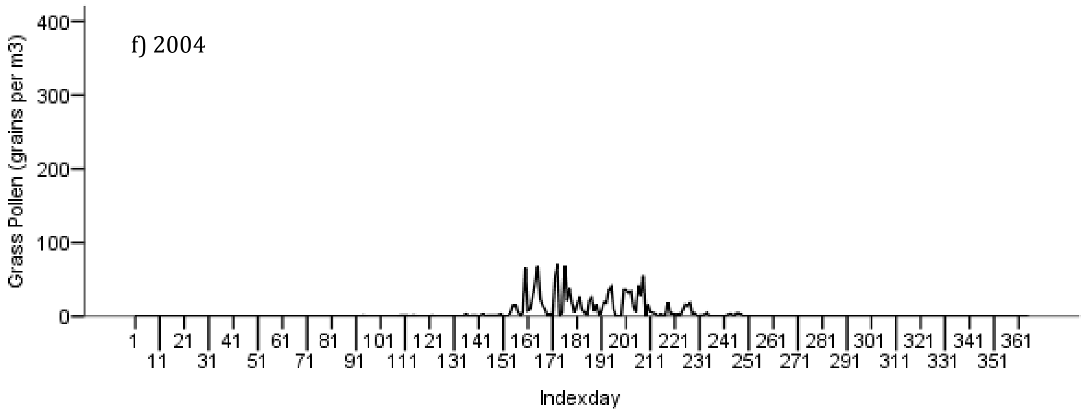
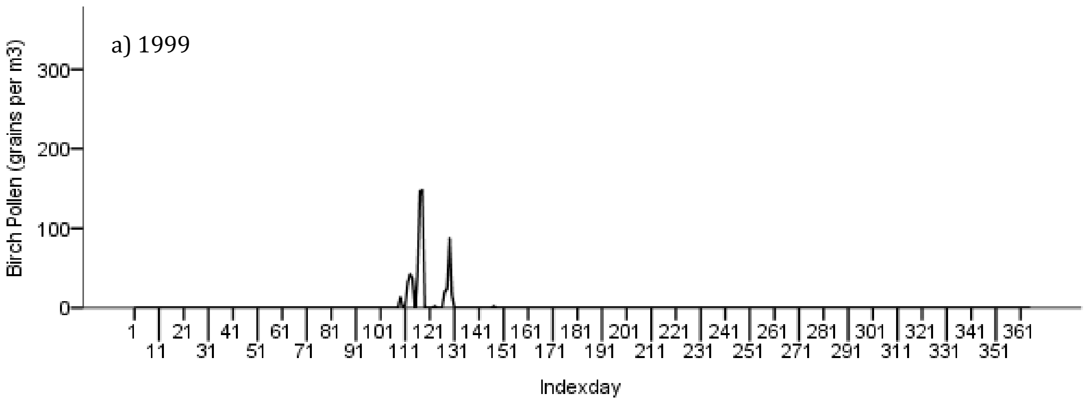
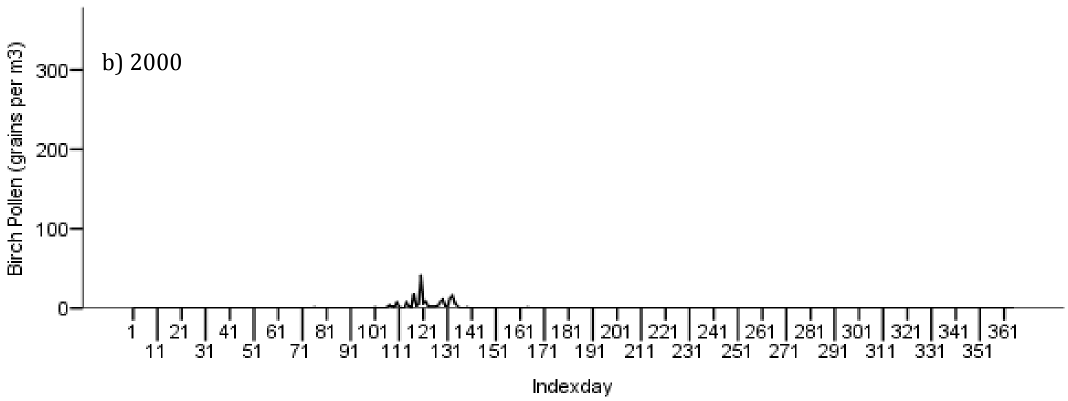


Figure C2. 109: Scotland Grass Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004





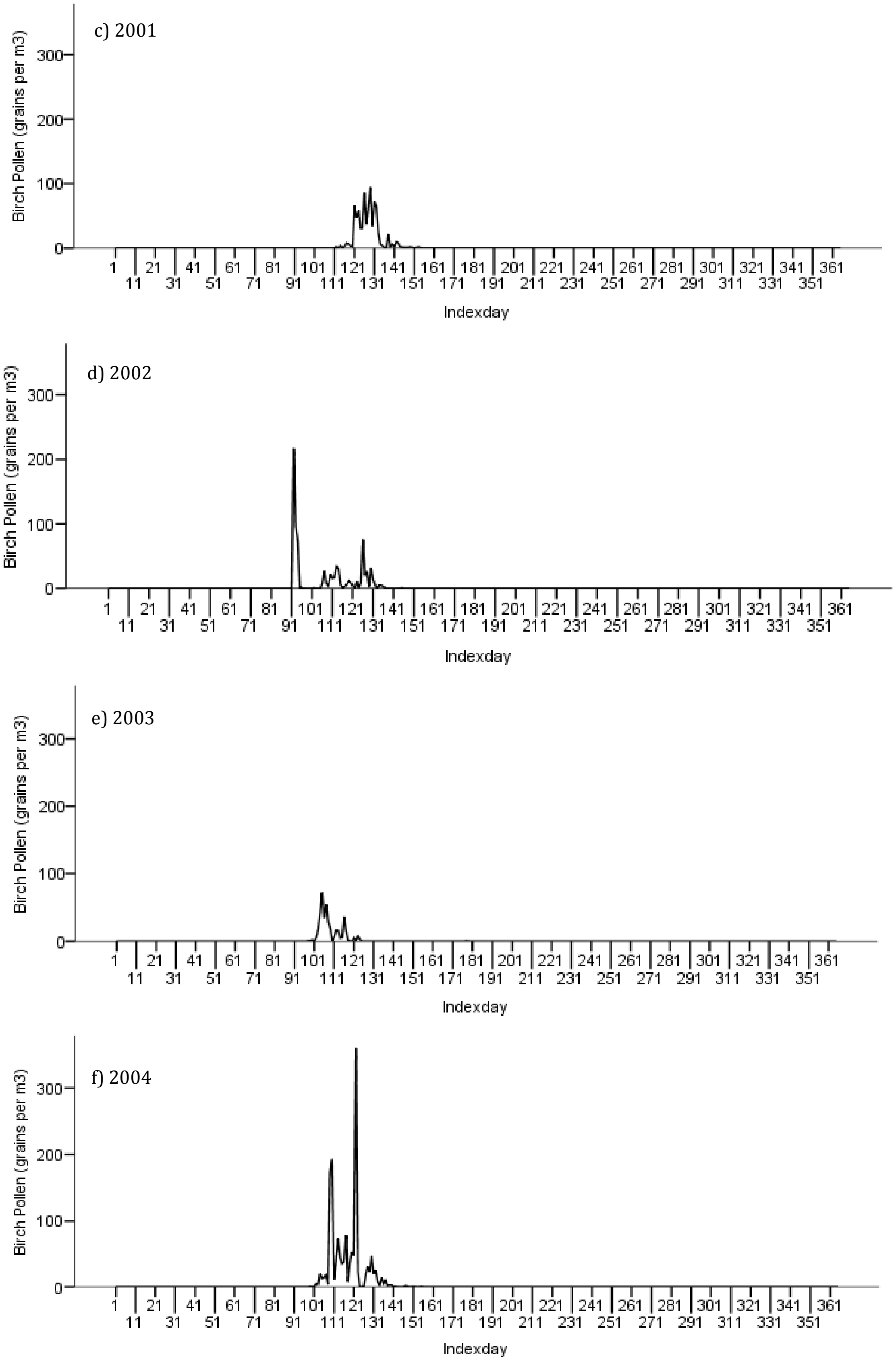
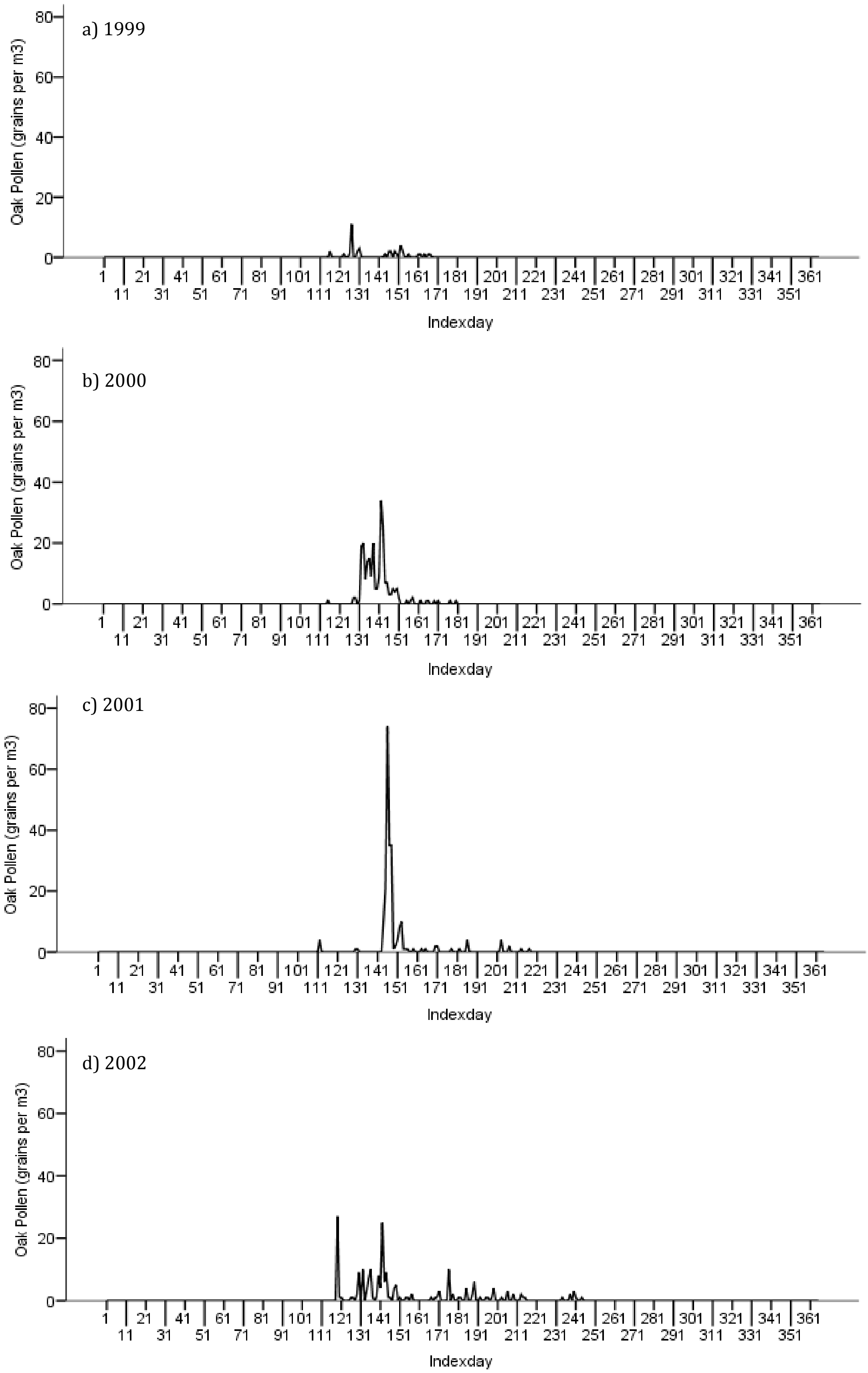


Figure C2. 110: Scotland Birch Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004


a) 1999
b) 2000
c) 2001
d) 2002
Oak Pollen (grains per m3)
0
20
40
60
80
Indexday
1 21 41 61 81 101 121 141 161 181 201 221 241 261 281 301 321 341 361
11 31 51 71 91 111 131 151 171 191 211 231 251 271 291 311 331 351

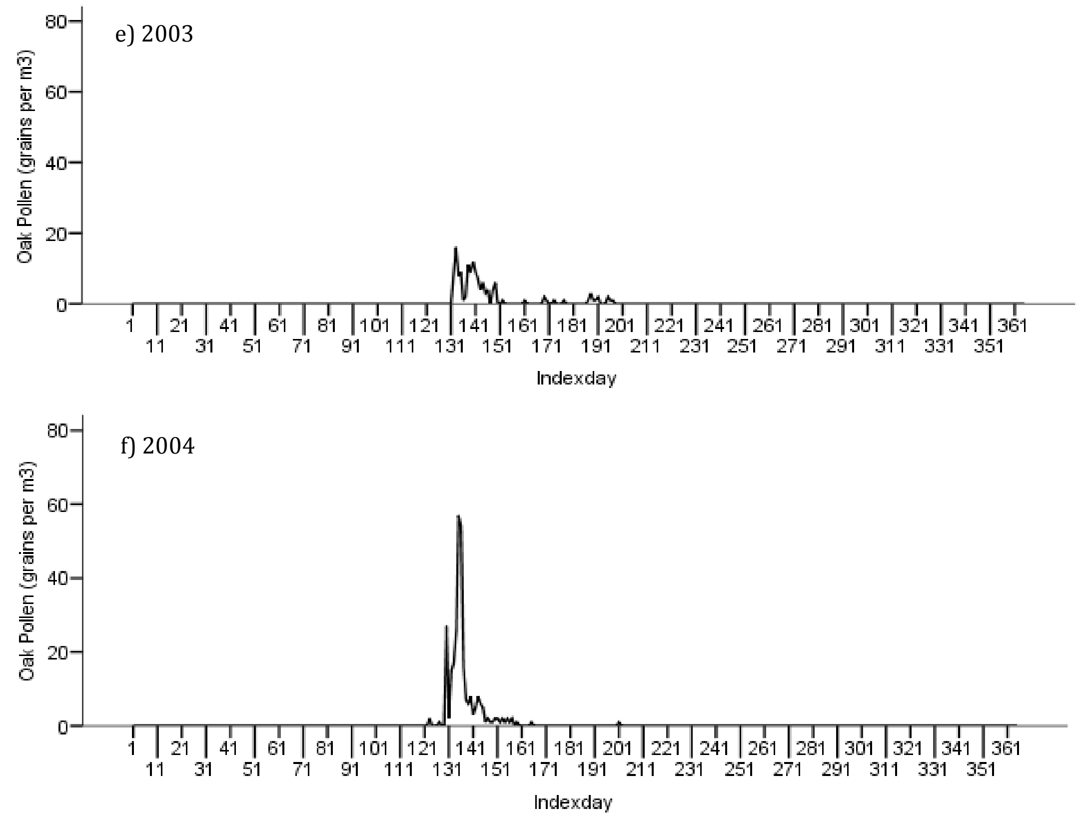
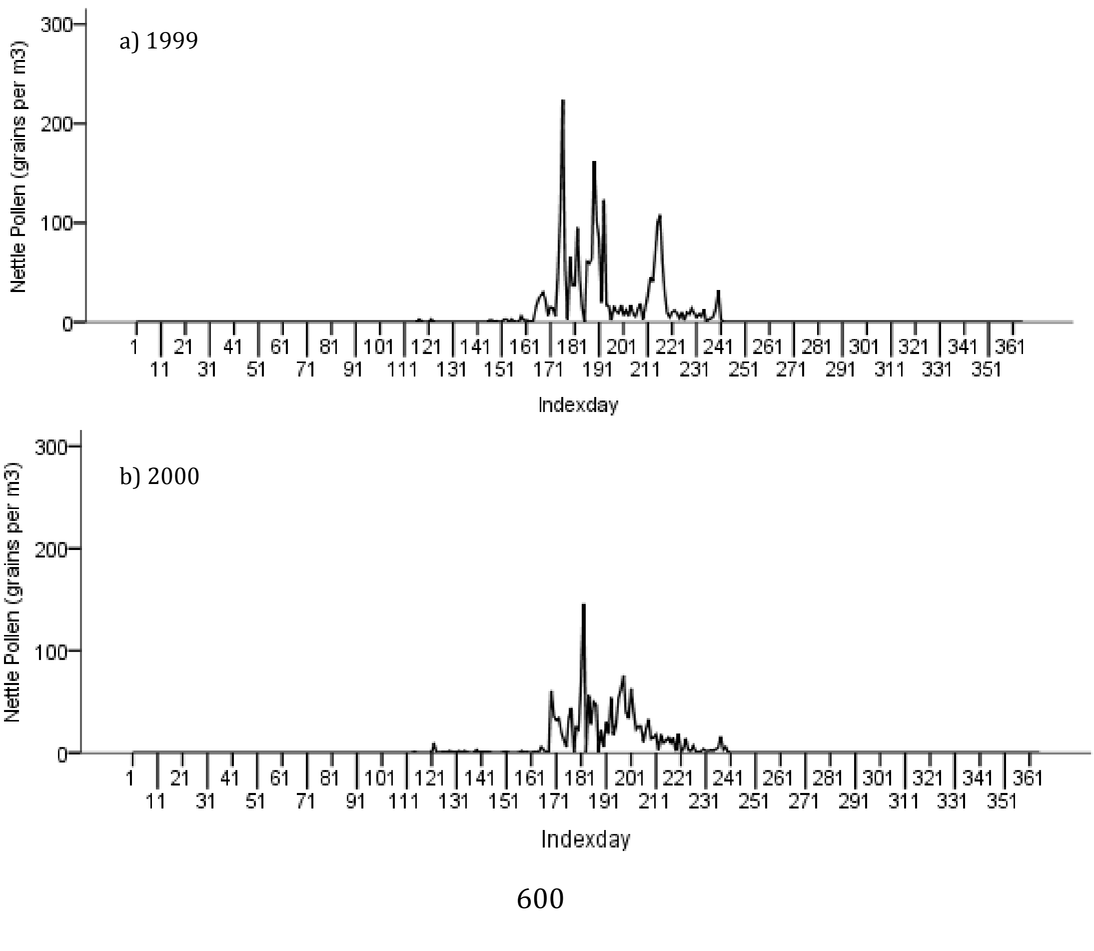


Figure C2. 111: Scotland Oak Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.



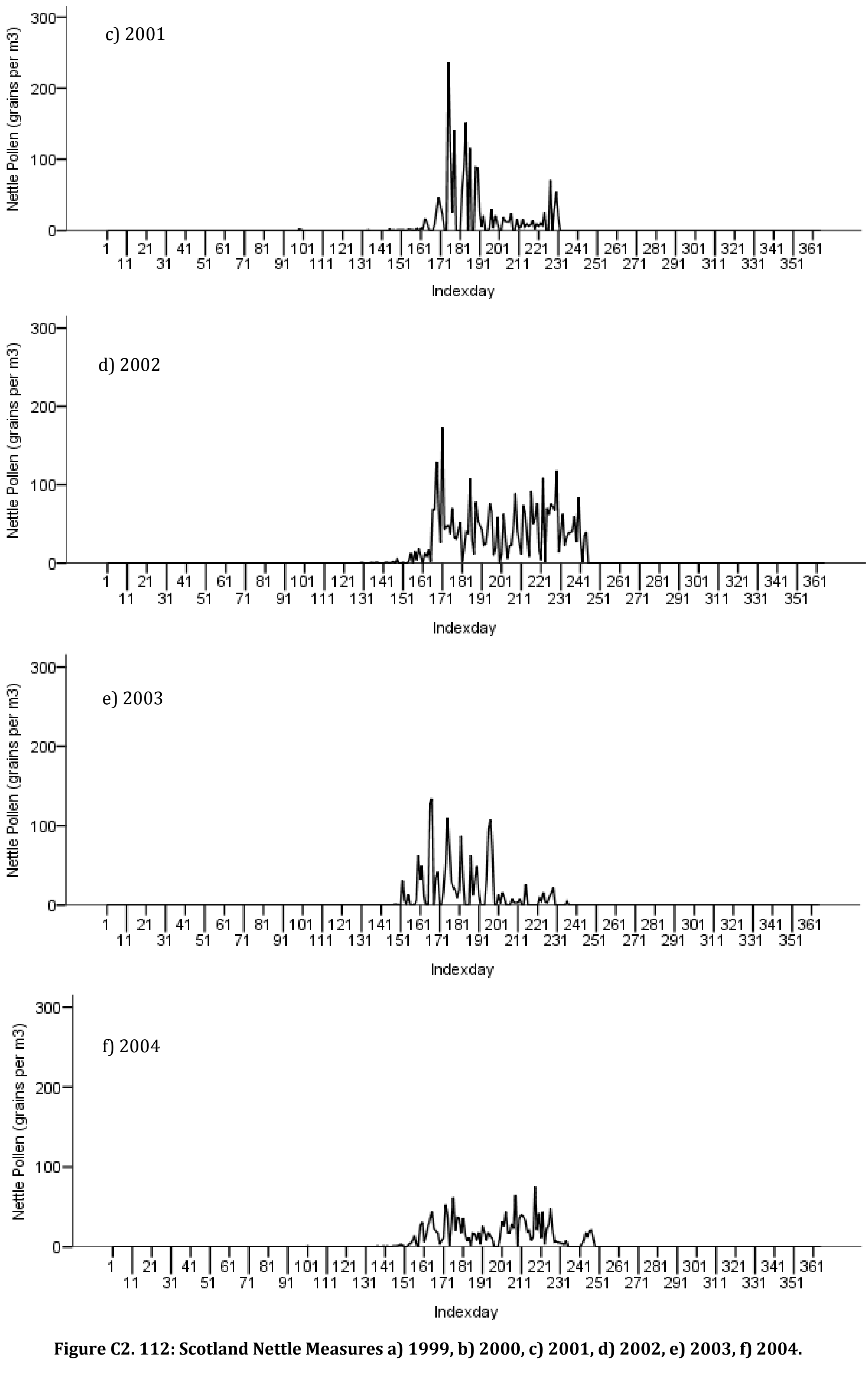


Figure C2. 112: Scotland Nettle Measures a) 1999, b) 2000, c) 2001, d) 2002, e) 2003, f) 2004.

C2.3.1 Scotland Summary of All Daily Environmental Measures

Figure C2.113: Summary statistics for Scotland environmental measures (n=2190).

	Exposure (measure)		Mean	Median	SD	Minimum	Maximum
Outdoor air pollutants	Min'	NO	0.94	0.015	2.2	0	56
		NO_2	9.15	8	7.59	0	69.18
		NOD	10.99	8	9.82	0	128
		SO_2	1.75	0.95	2.39	0	39.89
		PM_{10}	7.29	5	47.45	0	68
		O_3	13.64	6.89	16.85	0	156.78
		CO	0.15	0.11	0.09	0	0.7
	Mean	NO	13	8	17.73	0	277
		NO_2	26.48	24.87	13.55	1.93	106.51
		NOD	45.35	37	37.25	2.3	501
		SO_2	5.91	5	5.05	0	73.52
		PM_{10}	18.79	16	111.16	0	90
		O_3	35.05	30.87	19.48	1.357	170.86
		CO	0.37	0.3	0.18	0.01	2.7
	Max'	NO	48.27	26	67.57	0	839.02
		NO_2	10.99	8	9.82	0	128
		NOD	1.75	0.95	2.39	0	39.89
		SO_2	7.29	5	47.45	0	68
		PM_{10}	13.64	6.89	16.85	0	156.78
		O_3	0.15	0.11	0.09	0	0.7
		CO	0.73	0.6	0.51	0	8.1
Weather	Min'	Temperature	5.87	6	21.62	-12.9	17.1
	Max'	Temperature	12.01	11.9	26.59	-2.9	27.1
		Sun	4.08	3.4	3.76	15.8	0
		Rain	2.21	0.2	4.55	0	50.8
		Pressure	1013.58	1014.4	11	958.8	1045.5
		Wind speed	8.79	8.3	3.85	0.2	25
Pollen		Grass	5.45	0	20.77	0	384
		Birch	1.98	0	13.78	0	360
		Oak	0.52	0	3.32	0	74
		Nettle	6.04	0	19.09	0	237

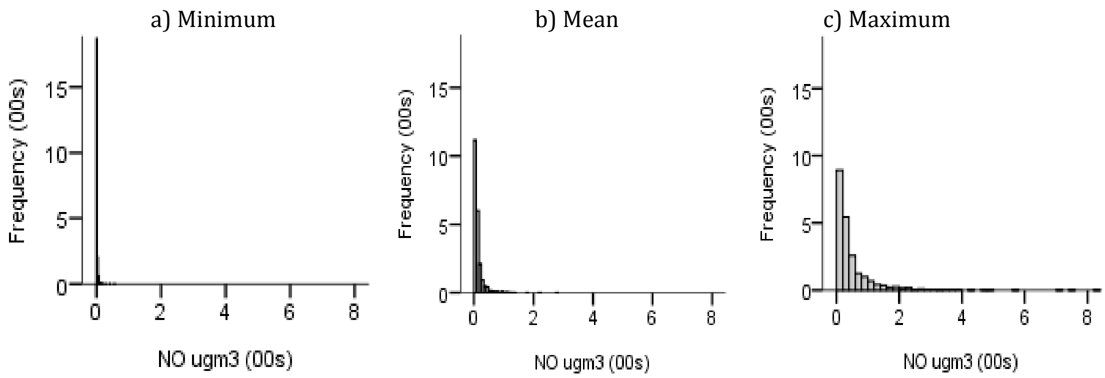


Figure C2. 114: Scotland NO – distribution of the daily a) minimum, b) mean and c) maximum measures.

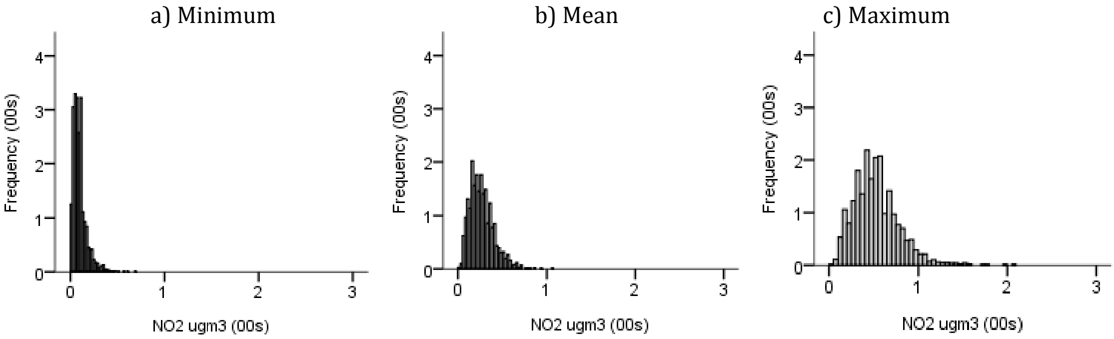


Figure C2. 115: Scotland NO_2 – distribution of the daily a) minimum, b) mean and c) maximum measures.

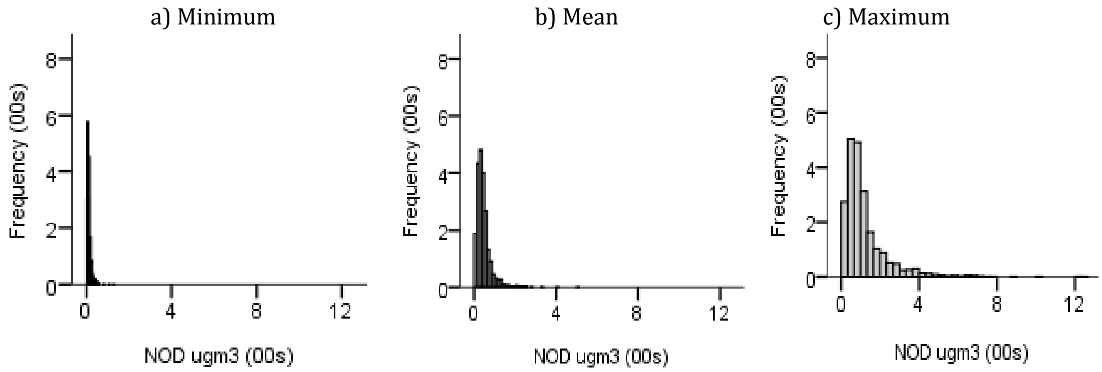


Figure C2. 116: Scotland NOD – distribution of the daily a) minimum, b) mean and c) maximum measures.

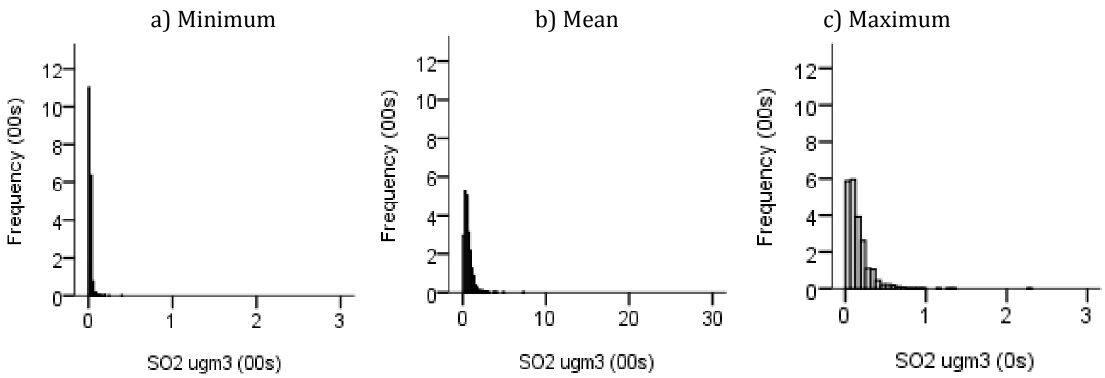


Figure C2. 117: Scotland SO_2 – distribution of the daily a) minimum, b) mean and c) maximum measures.

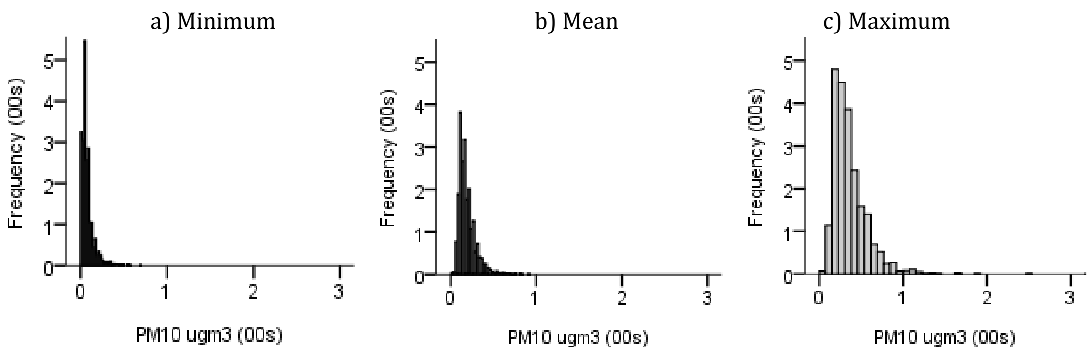


Figure C2. 118: Scotland PM_{10} – distribution of the daily a) minimum, b) mean and c) maximum measures.

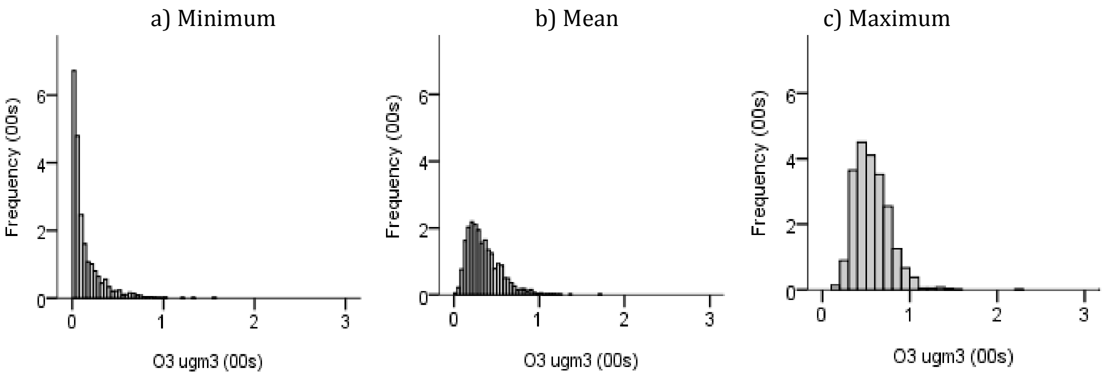


Figure C2. 119: Scotland O_3 – distribution of the daily a) minimum, b) mean and c) maximum measures.

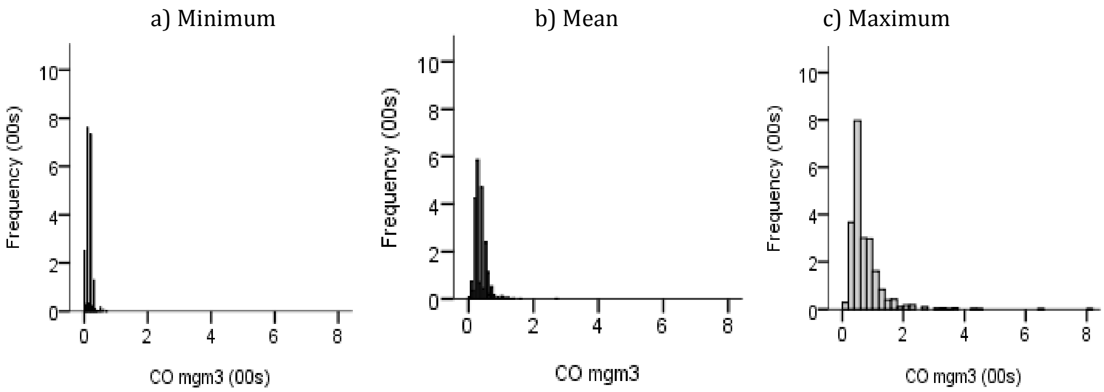


Figure C2. 120: Scotland CO – distribution of the daily a) minimum, b) mean and c) maximum measures.

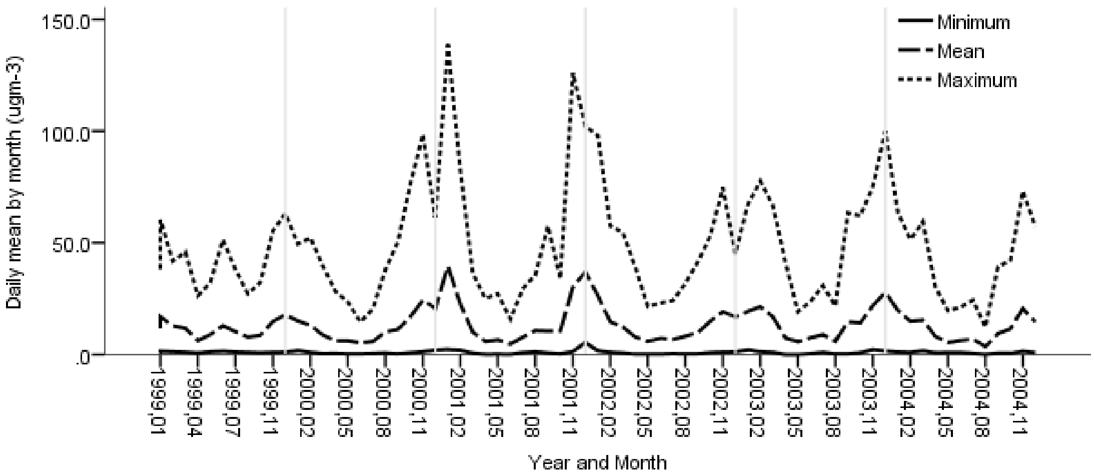


Figure C2. 121: Scotland NO – plot of the daily mean aggregated by month.

Figure C2. 122: Scotland NO_2 – plot of the daily mean aggregated by month.

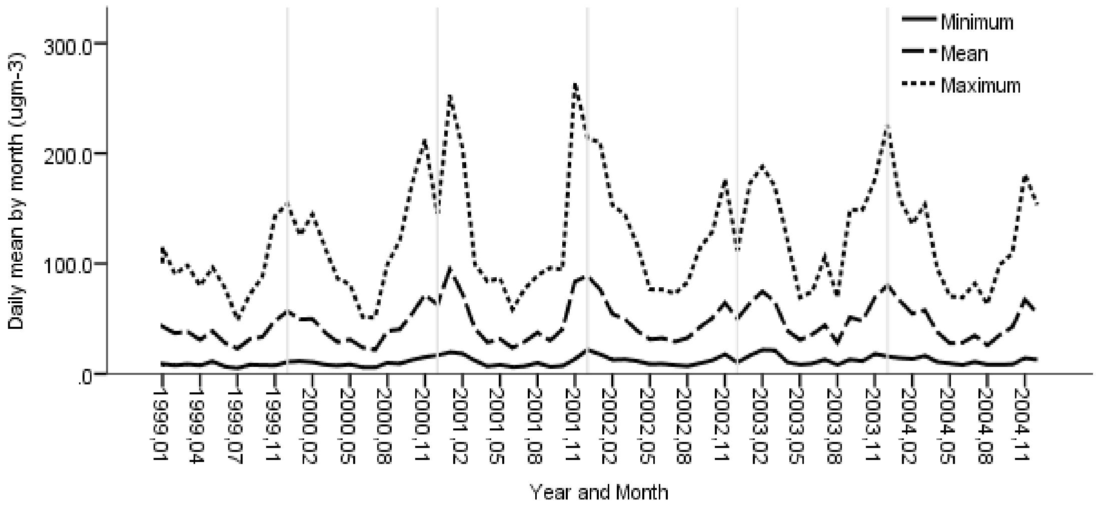


Figure C2. 123: Scotland NOD – plot of the daily mean aggregated by month.

Figure C2. 124: Scotland SO_2 – plot of the daily mean aggregated by month.

Figure C2. 125: Scotland PM_{10} – plot of the daily mean aggregated by month.

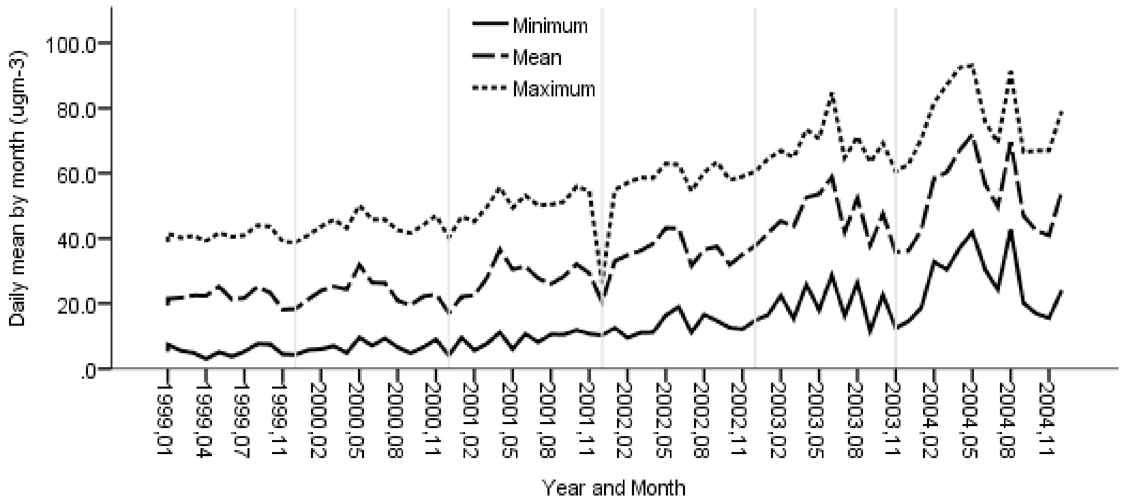


Figure C2. 126: Scotland O_3 – plot of the daily mean aggregated by month.

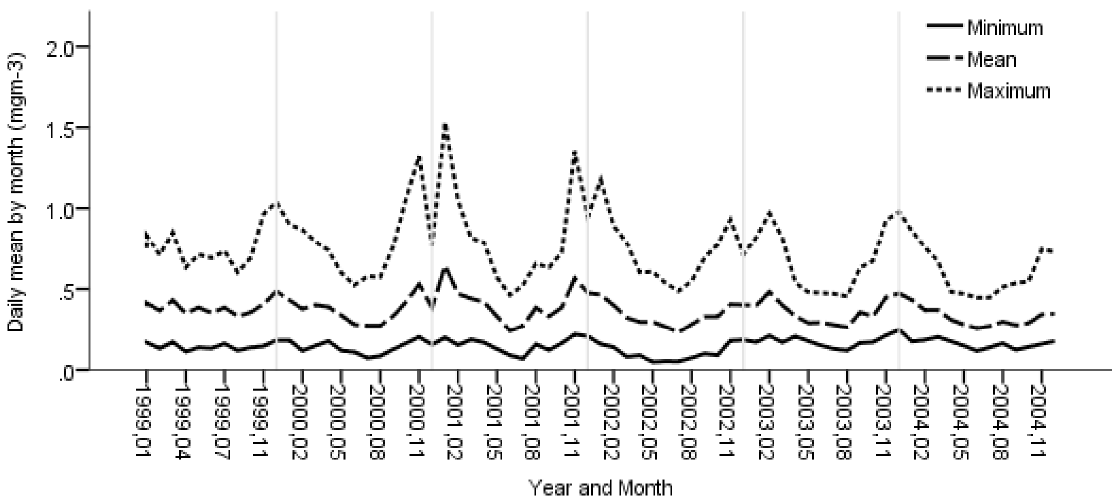


Figure C2. 127: Scotland CO – plot of the daily mean aggregated by month.

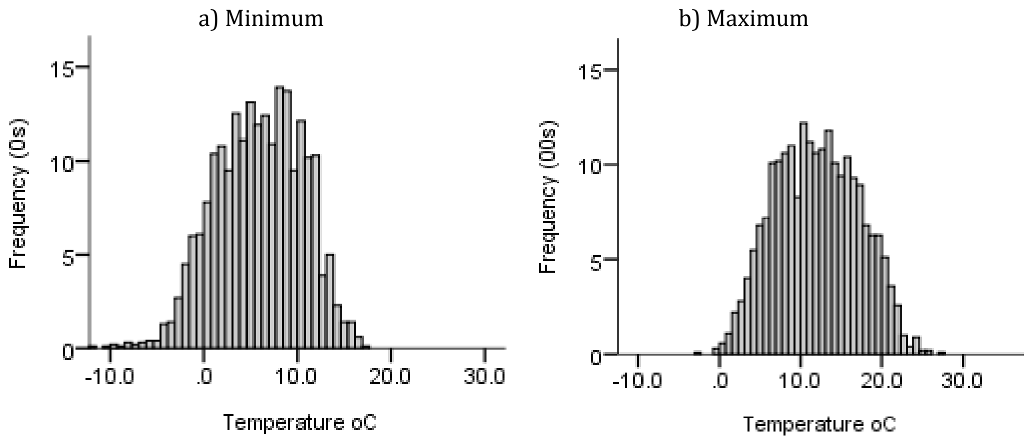


Figure C2. 128: Scotland Temperature distribution of the a) minimum and b) maximum daily measures.

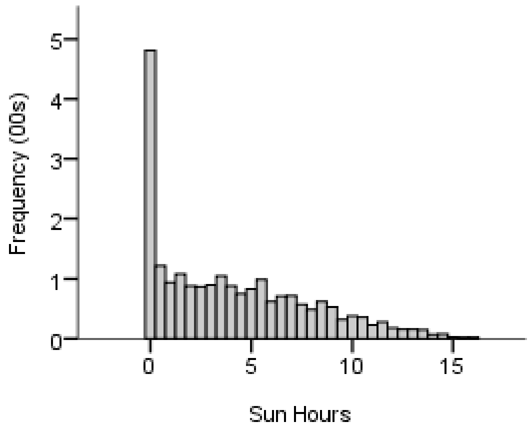


Figure C2. 129: Scotland Sun distribution of the daily measures.

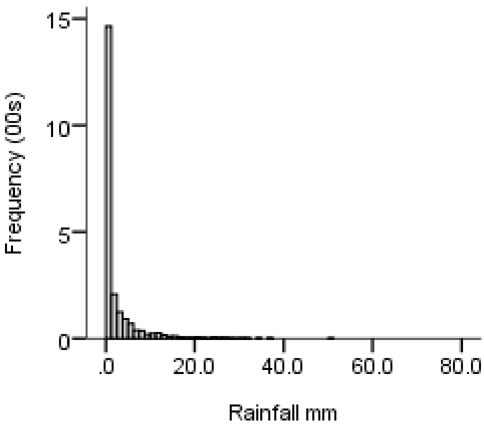


Figure C2. 130: Scotland Rainfall distribution of the daily measures.

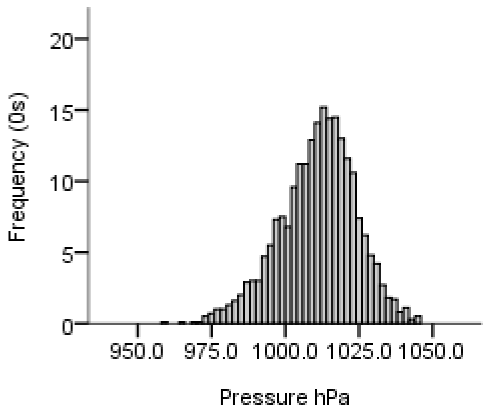


Figure C2. 131: Scotland Pressure distribution of the daily measures.

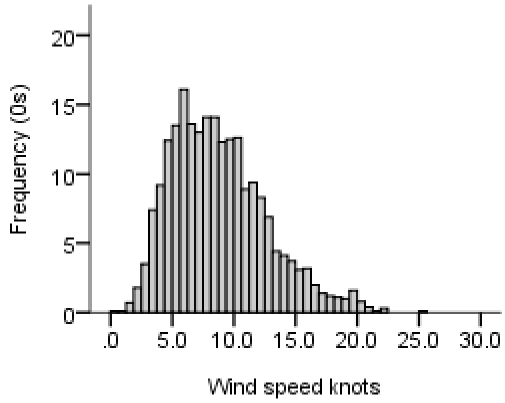


Figure C2. 132: Scotland Wind speed distribution of the daily measures.

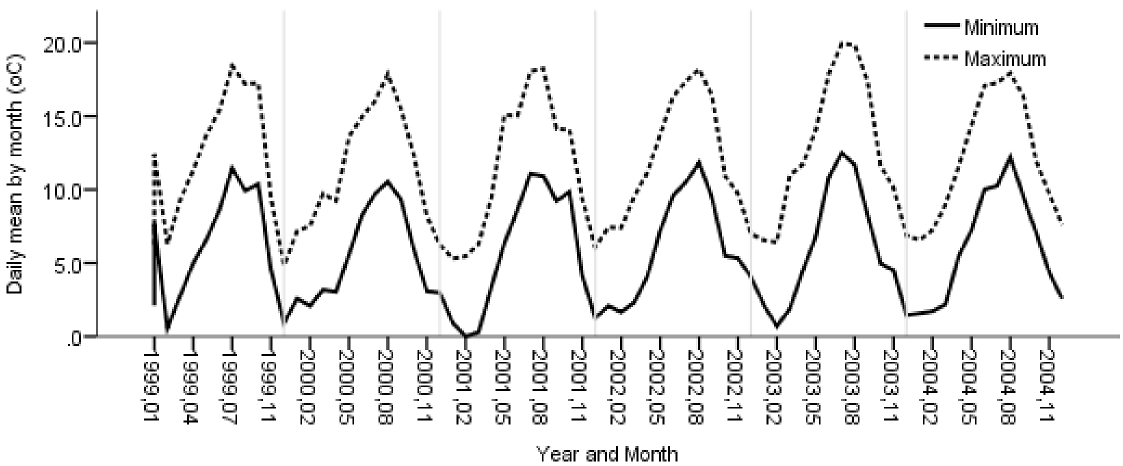


Figure C2. 133: Scotland Temperature – plot of the daily mean aggregated by month.

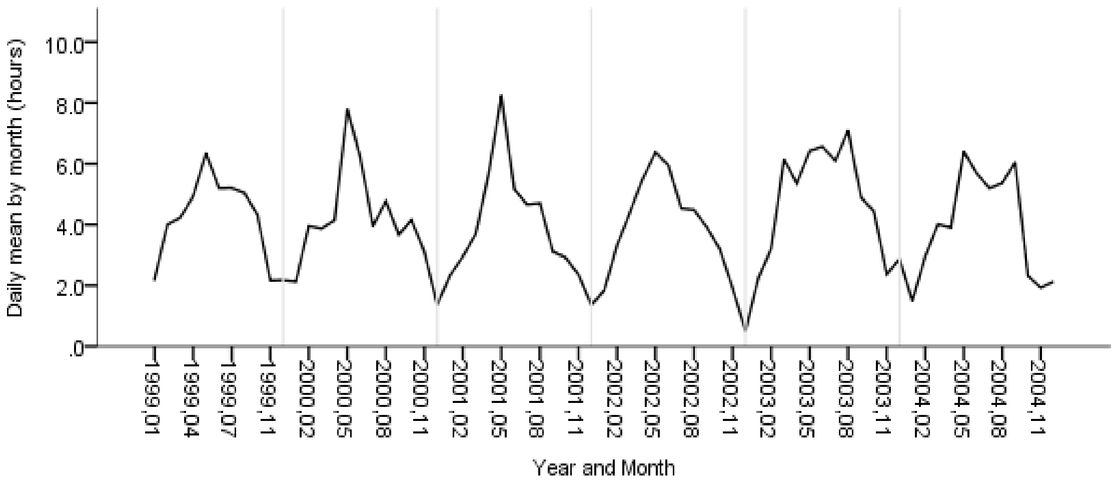


Figure C2. 134: Scotland Sun – plot of the daily mean aggregated by month.

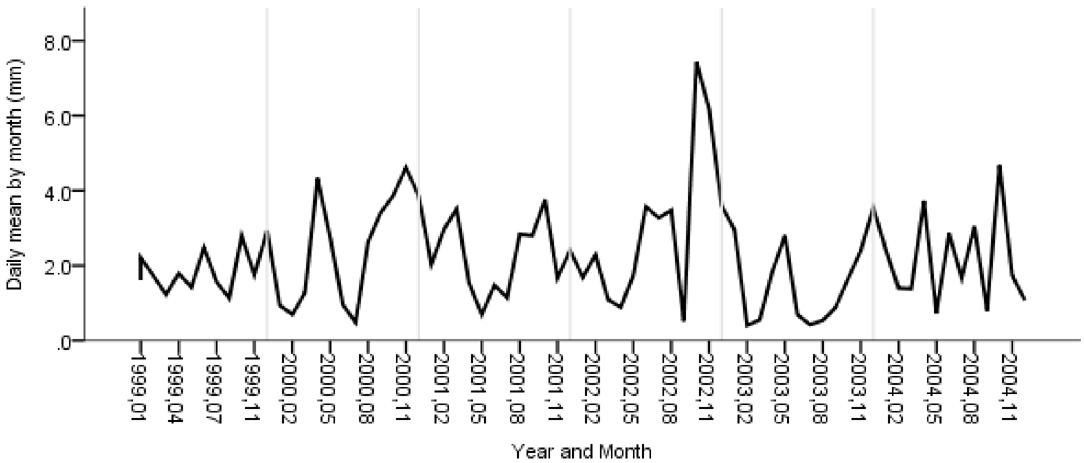


Figure C2. 135: Scotland Rainfall – plot of the daily mean aggregated by month.

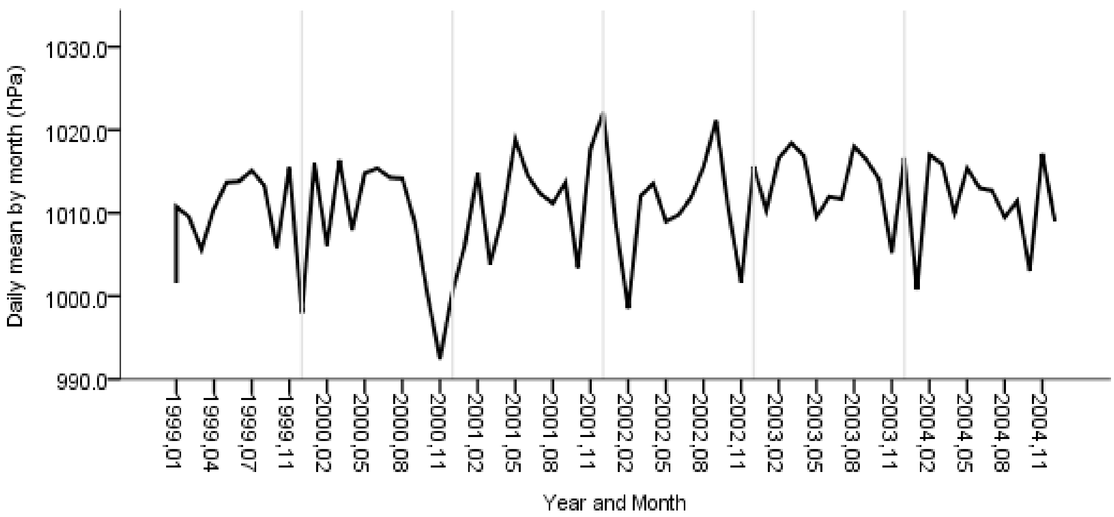


Figure C2. 136: Scotland Pressure – plot of the daily mean aggregated by month.

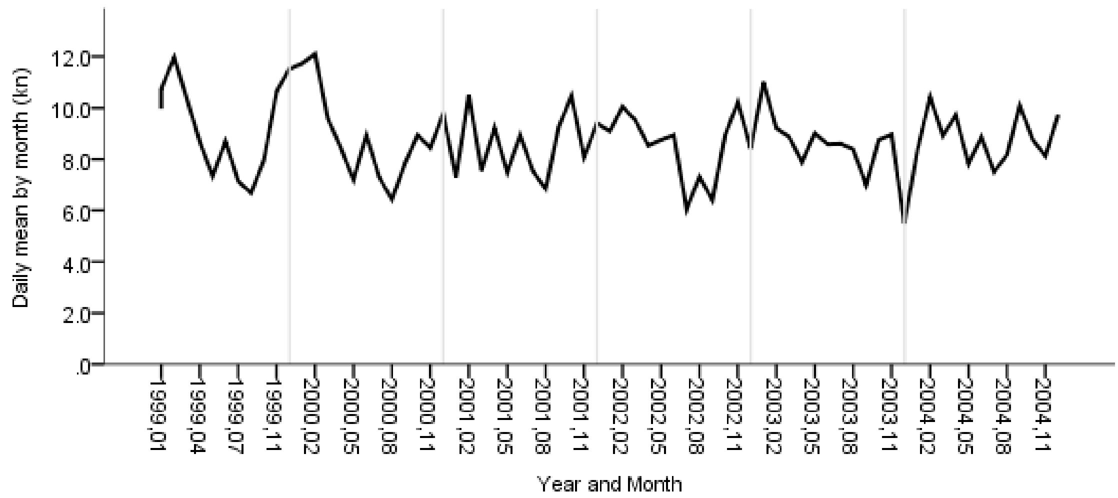


Figure C2. 137: Scotland Wind speed – plot of the daily mean aggregated by month.

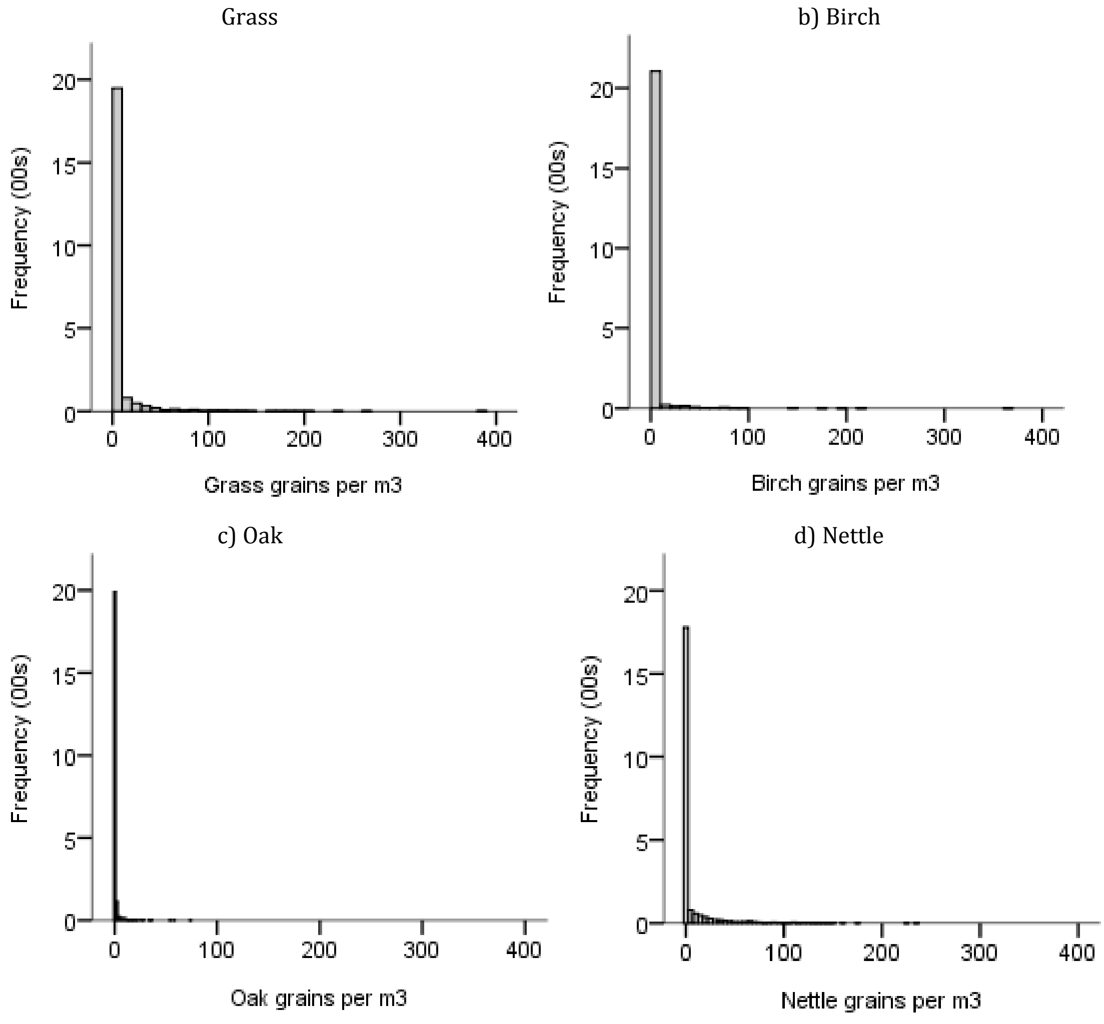


Figure C2. 138: Scotland Pollen distribution of the daily measures, a) Grass, b) Birch, c) Oak, d) Netttle.

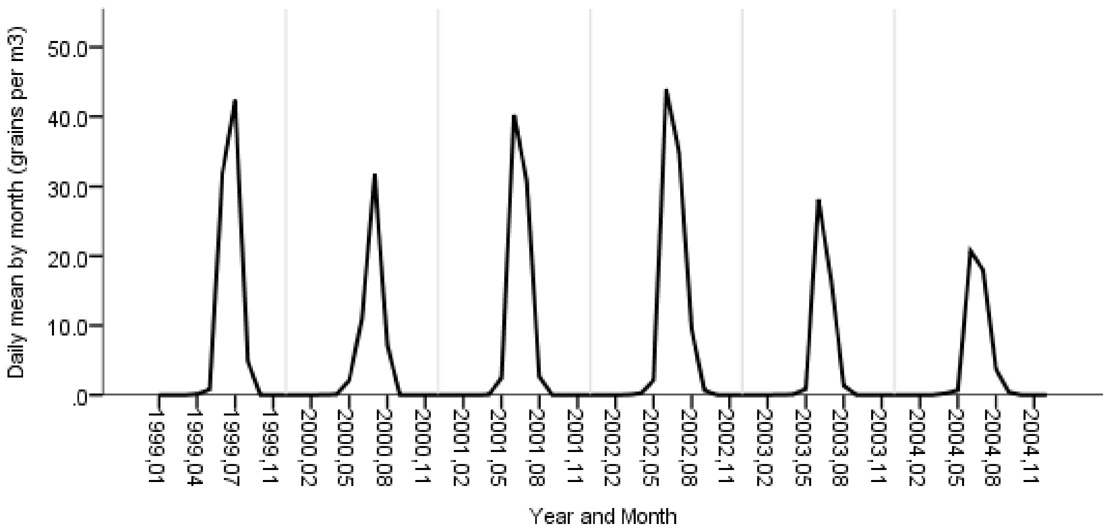


Figure C2. 139: Scotland Grass Pollen – plot of the daily mean aggregated by month.

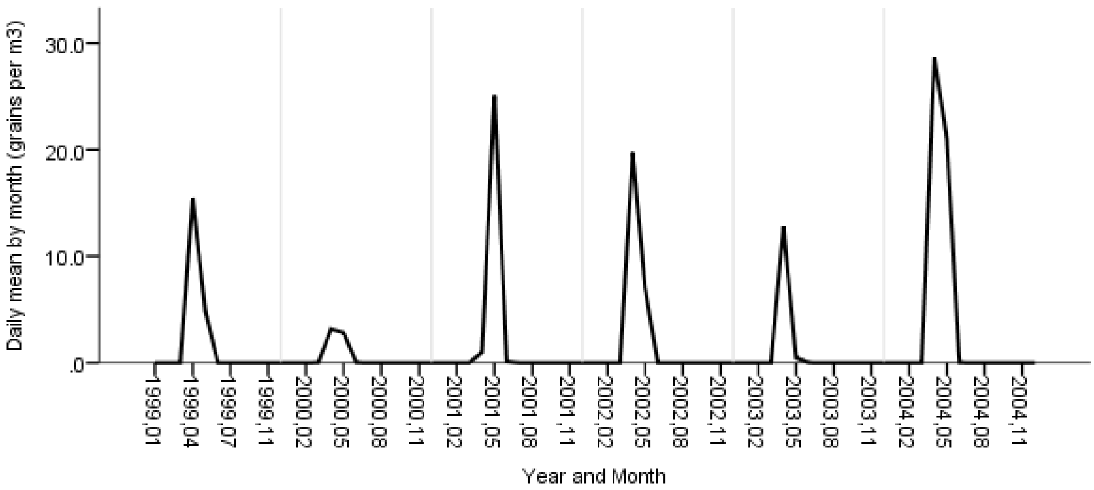


Figure C2. 140: Scotland Birch Pollen – plot of the daily mean aggregated by month.

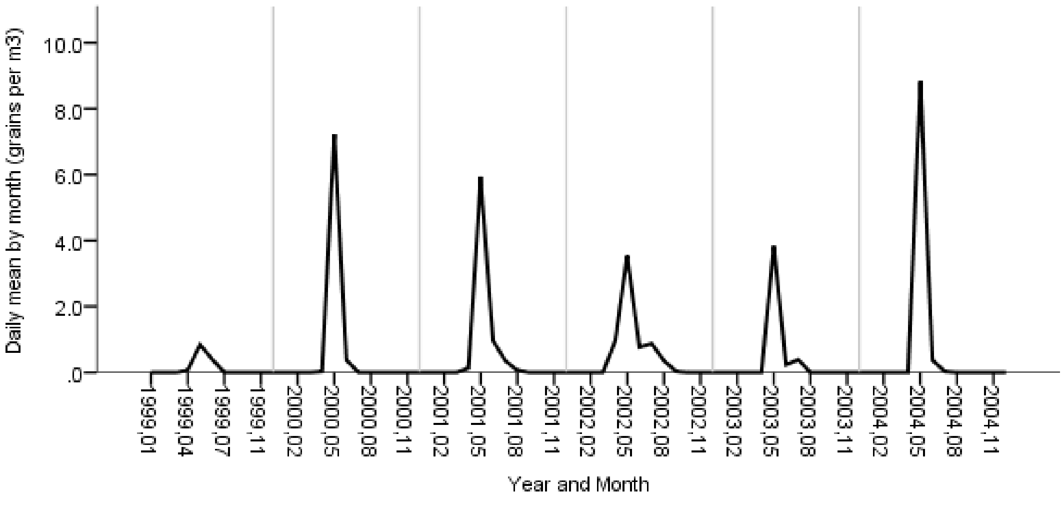


Figure C2. 141: Scotland Oak Pollen – plot of the daily mean aggregated by month.

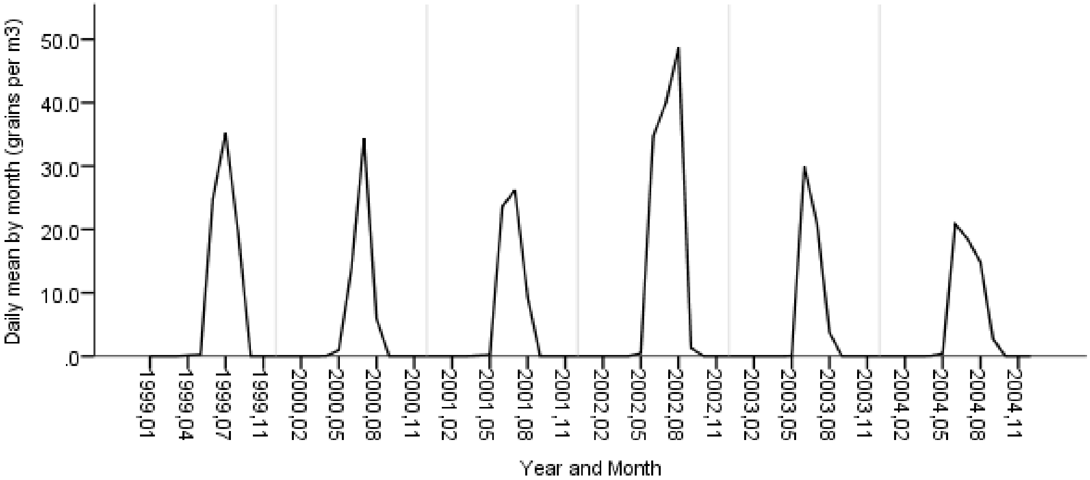


Figure C2. 142: Scotland Nettle Pollen – plot of the daily mean aggregated by month.

C2.4. Descriptives for the Spatial Pollutant Measures

Table C. 16: Air quality score equivalent measures (μgm^3 unless otherwise stated).

Exposure	Score	Measure Equivalent	Additional Information
NO_2	5	40-50[a]	Equivalent to annual mean
PM_{10}	8	35-40[a]	Equivalent to annual mean
Benzene	6	4.07-4.88[a]	Equivalent to annual mean
SO_2	4	199.5-266[b]	Equivalent to fifteen minute mean
O_3	2	5-10	Score was equivalent to the number of days where 8 hour means surpassed 100 μgm^3

Table C. 17: Mean air quality scores descriptive statistics.

Mean measures	N	Missing	Mean	Median	SD	Min'	Max'	% MSOAs with measures above AQS
NO_2 Roadside	62	9	4.86	4.75	0.79	3.25	7.50	48
NO_2 Background	71	0	3.08	3.00	0.52	2.00	4.25	0
PM_{10} Roadside	62	9	6.00	5.75	0.64	5.00	7.50	0
PM_{10} Background	71	0	5.04	5.00	0.47	4.00	6.25	0
Benzene Roadside	62	9	2.63	2.63	0.52	2.00	4.00	0
Benzene Background	71	0	1.94	2.00	0.41	1.00	3.00	0
SO_2 Background	71	0	1.86	1.75	0.14	1.75	2.25	0
O_3 Background	71	0	3.00	3.00	0.38	2.00	3.50	100

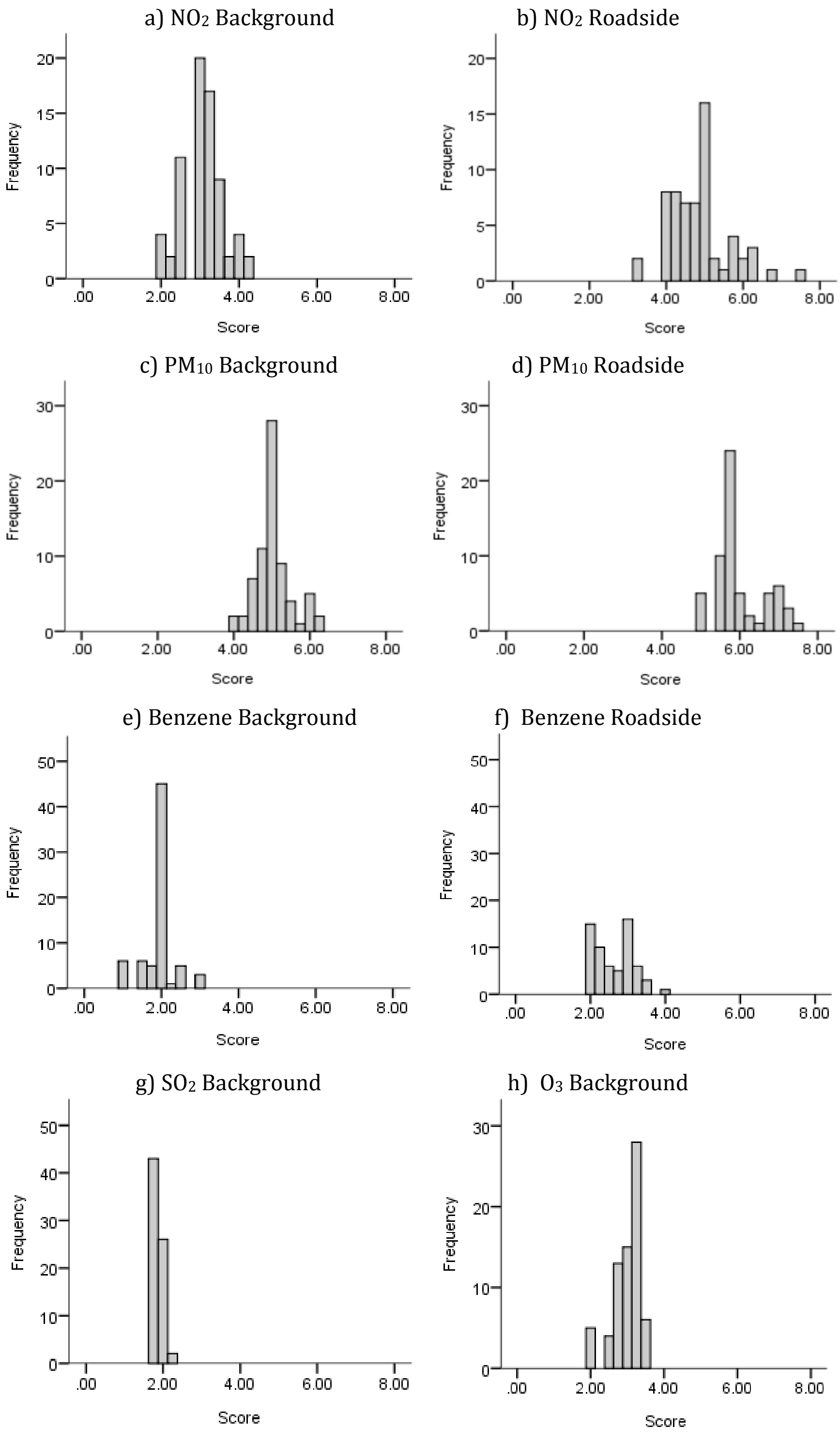


Figure C2. 143: Air quality score distributions.

Table C. 18: Mean air emissions descriptive statistics.

Measure (n=71)		Mean	Median	SD	Minimum	Maximum
Score of NO_x Emission Intensity		5.25	5	1.91	1	8
% of NO_x from	Industry	10.15	3	15.90	0	68
	Domestic and commercial	27.85	30	11.66	5	54
	Road transport	45.52	46	13.58	17	79
	Other sources	16.44	15	9.81	2	44
Score of PM_{10} Emission Intensity		5.04	5	2.04	1	8
% of PM_{10} from	Industry	14.20	8	15.54	2	66
	Domestic and commercial	12.28	7	11.55	1	49
	Road transport	39.30	40	14.30	8	73
	Other sources	34.21	34	11.59	9	62
Score of SO_2 Emission Intensity		5.39	5	1.99	1	8
% of SO_2 from	Industry	24.51	10	29.99	0	99
	Domestic and commercial	33.56	31	29.54	0	87
	Road transport	7.18	5	6.55	0	34
	Other sources	34.87	25	30.54	0	94
Score of Benzene Emission Intensity		5.62	6	1.79	1	8
% of Benzene from	Industry	18.65	16	13.54	4	75
	Domestic and commercial	19.73	11	17.19	2	65
	Road transport	36.00	38	11.35	7	52
	Other sources	25.62	25	8.92	7	51

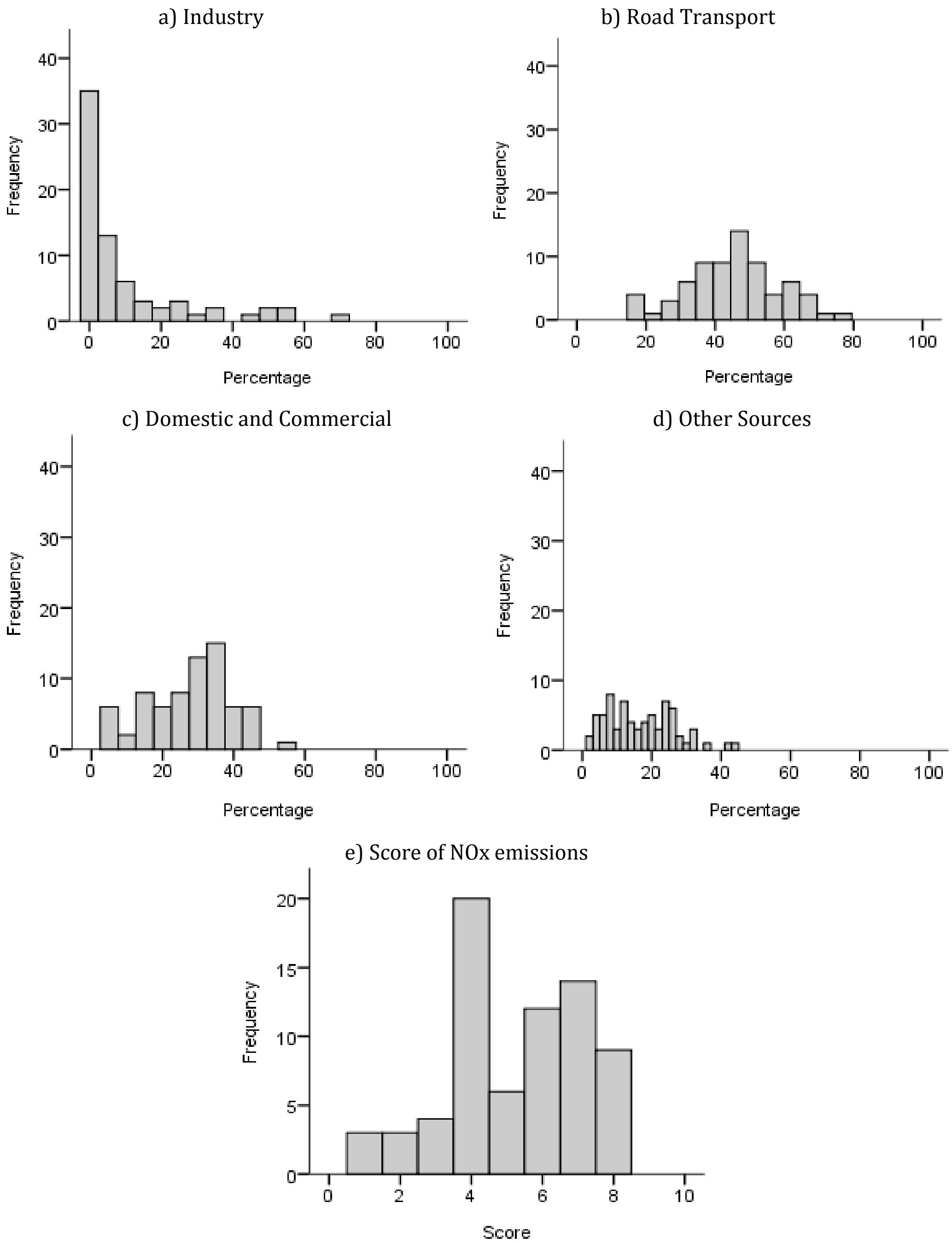


Figure C2. 144: a to d) - Distribution of the amount (measured as a % of total emissions) of NO_x emissions produced from a) Industry, b) Road Transport, c) Domestic and Commercial and d) Other Sources; e) Distribution of the Score of NO_x emissions.

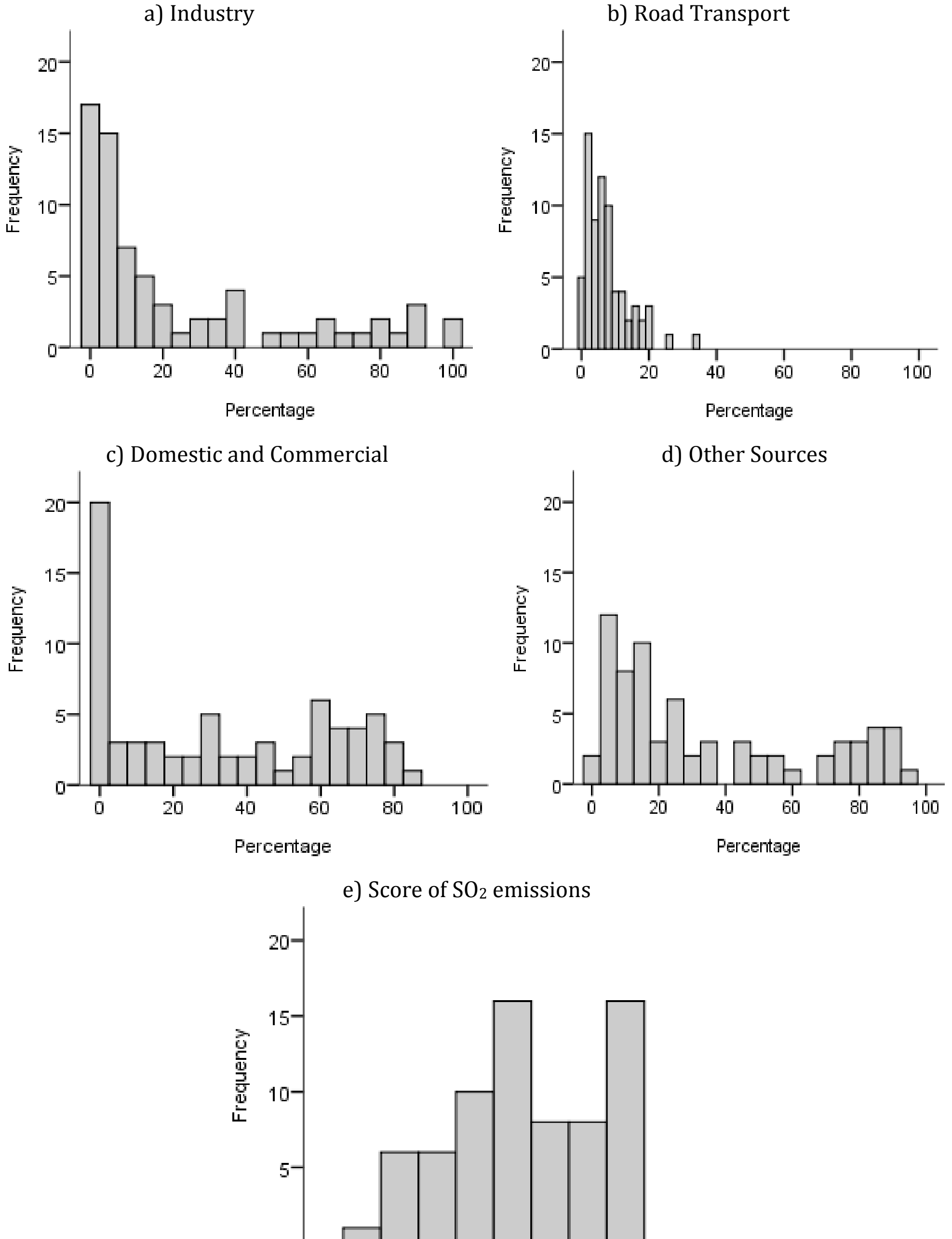


Figure C2. 145: a to d) - Distribution of the amount (measured as a % of total emissions) of SO_2 emissions produced from a) Industry, b) Road Transport, c) Domestic and Commercial and d) Other Sources; e) Distribution of the Score of SO_2 emissions.

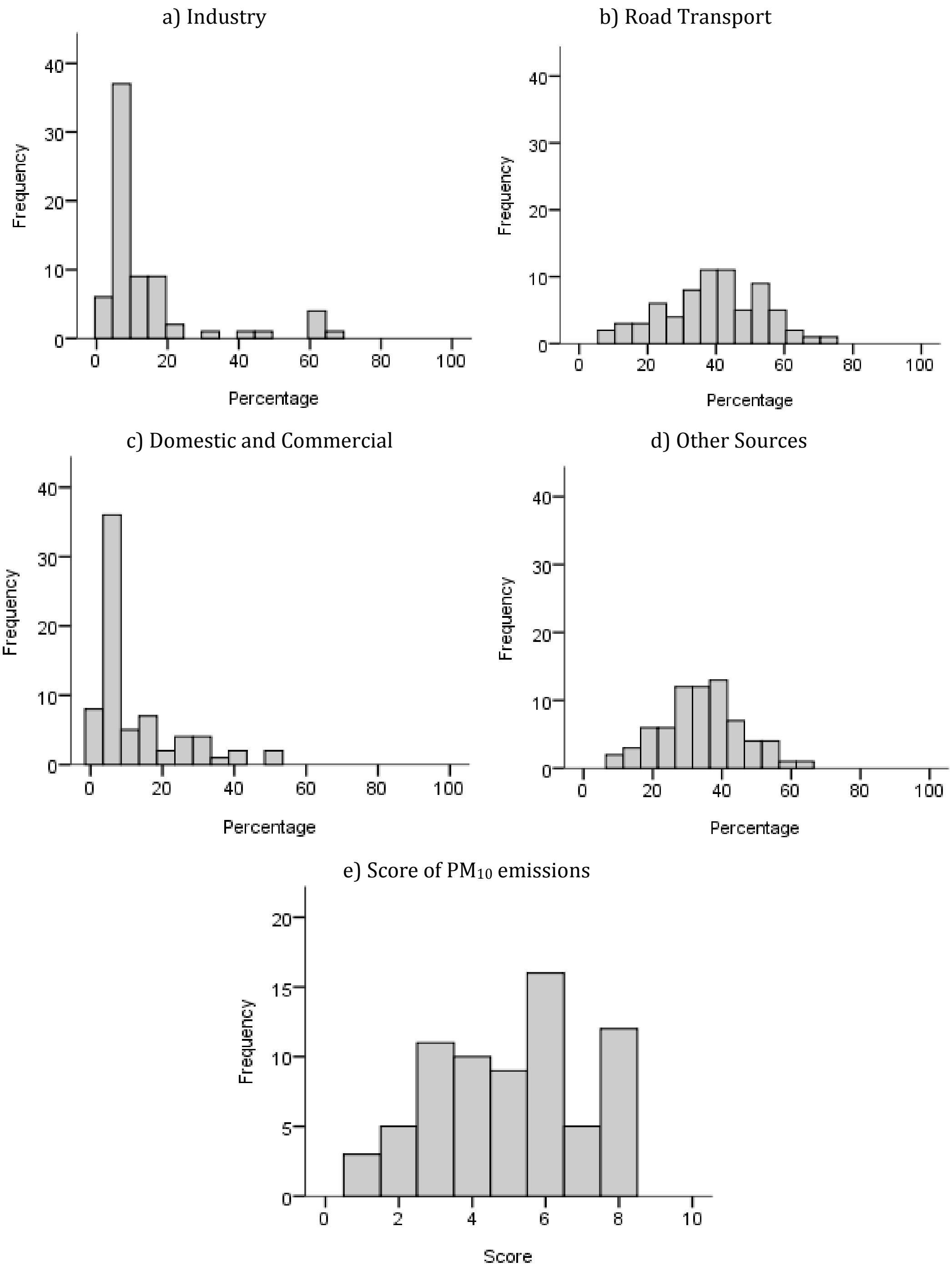


Figure C2. 146: a to d) - Distribution of the amount (measured as a % of total emissions) of PM_{10} emissions produced from a) Industry, b) Road Transport, c) Domestic and Commercial and d) Other Sources; e) Distribution of the Score of PM_{10} emissions.

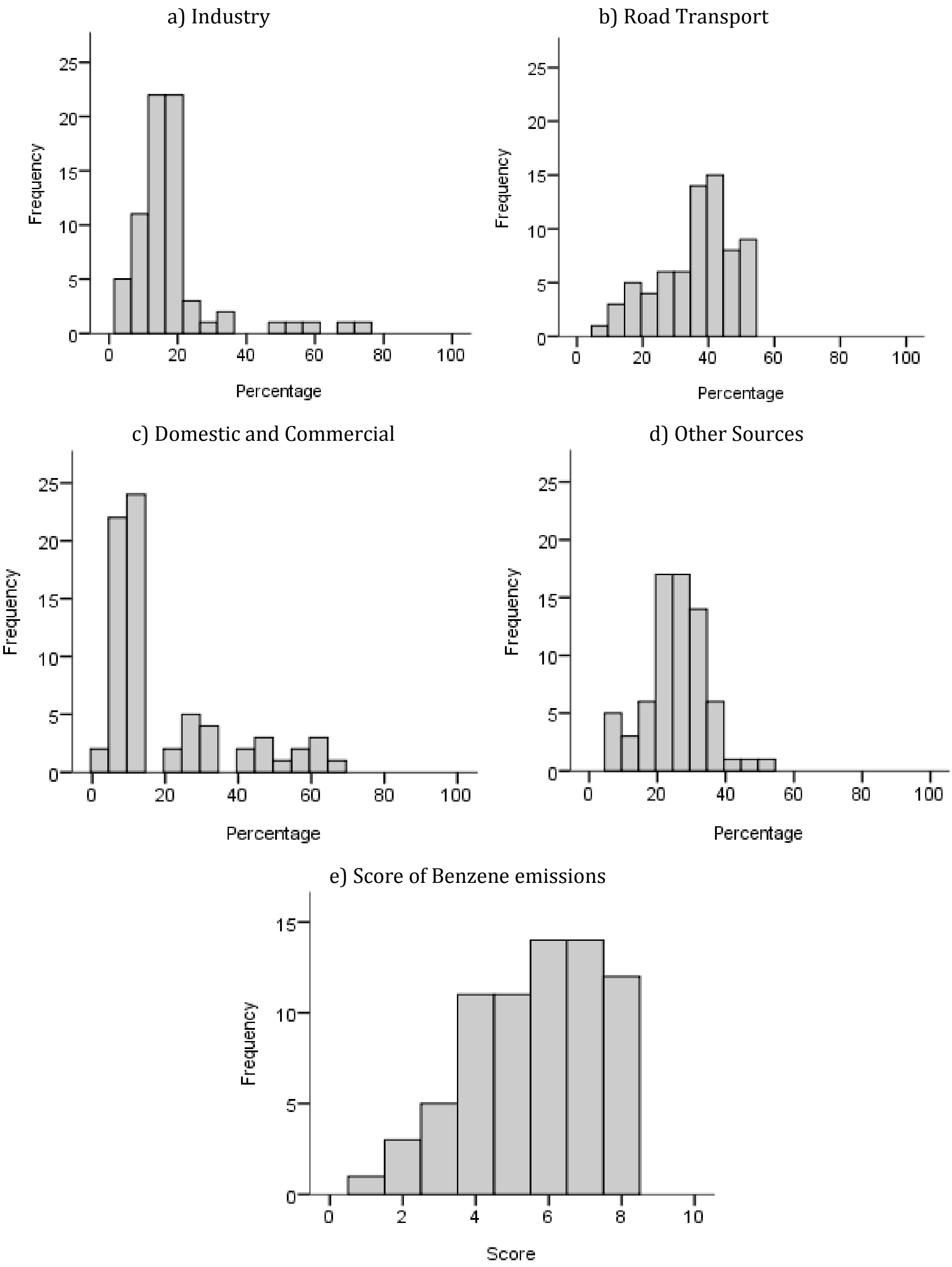
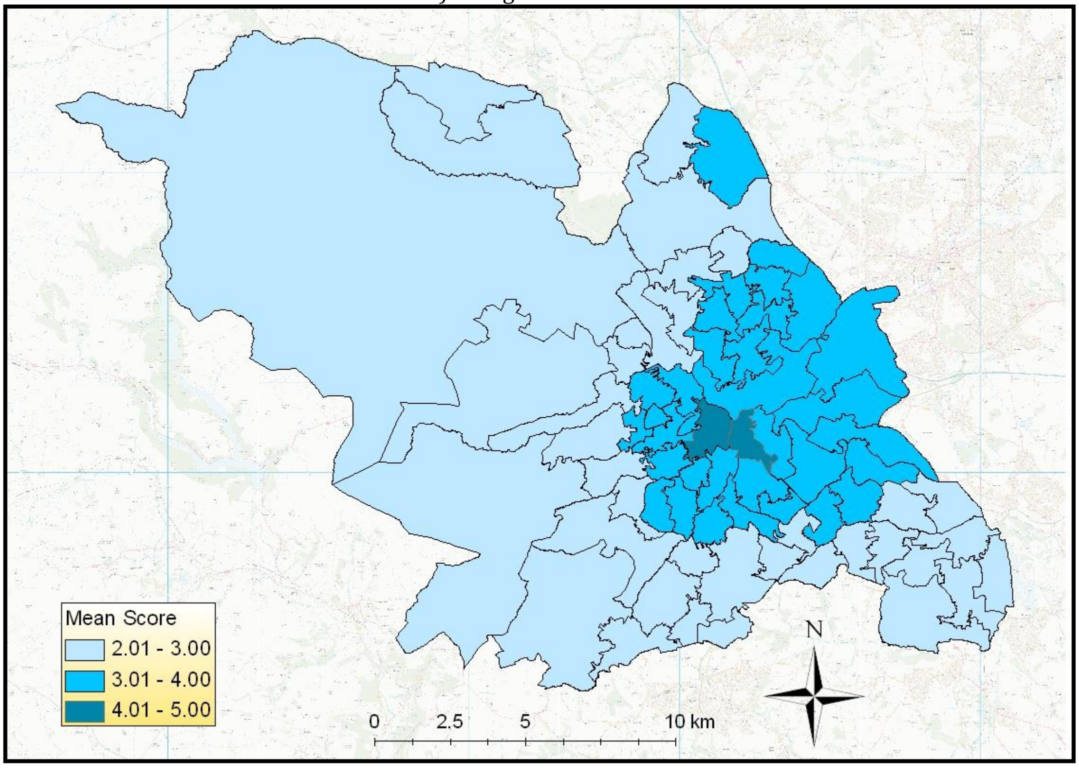


Figure C2. 147: a to d) - Distribution of the amount (measured as a % of total emissions) of Benzene emissions produced from a) Industry, b) Road Transport, c) Domestic and Commercial and d) Other Sources; e) Distribution of the Score of Benzene emissions.

a) Background scores



b) Roadside Scores

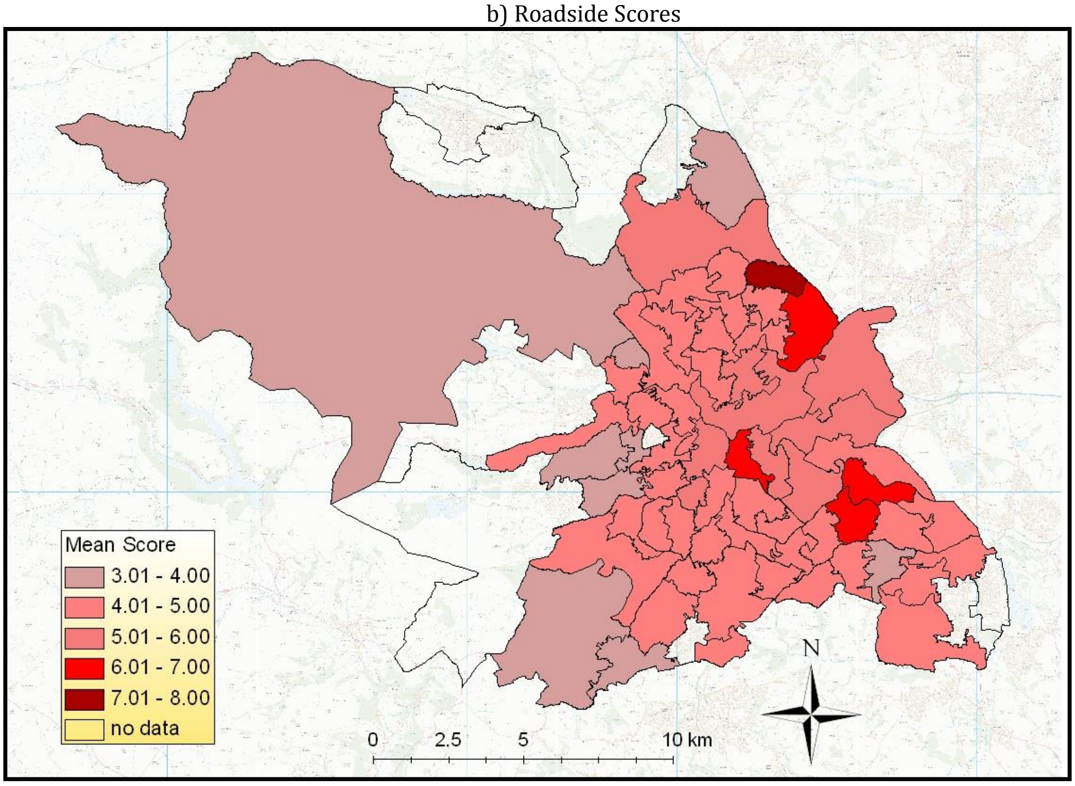
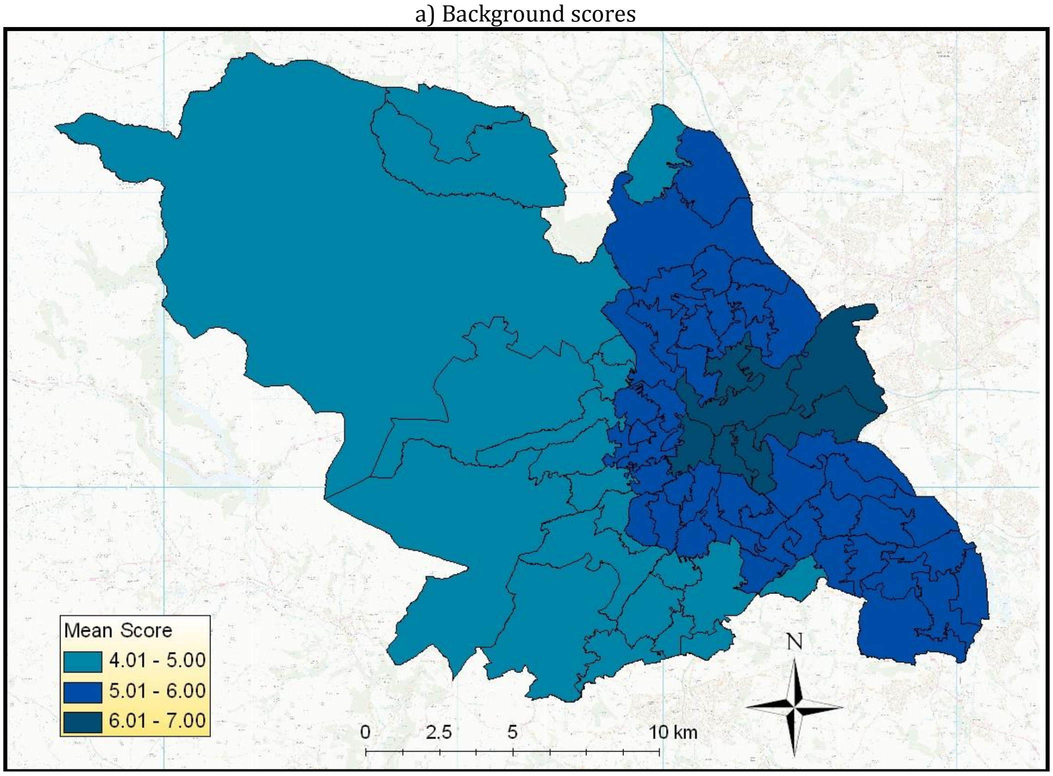


Figure C2. 148: Map of NO_2 Air Quality Scores for a) Background and b) Roadside sources.

a) Background scores



b) Roadside Scores

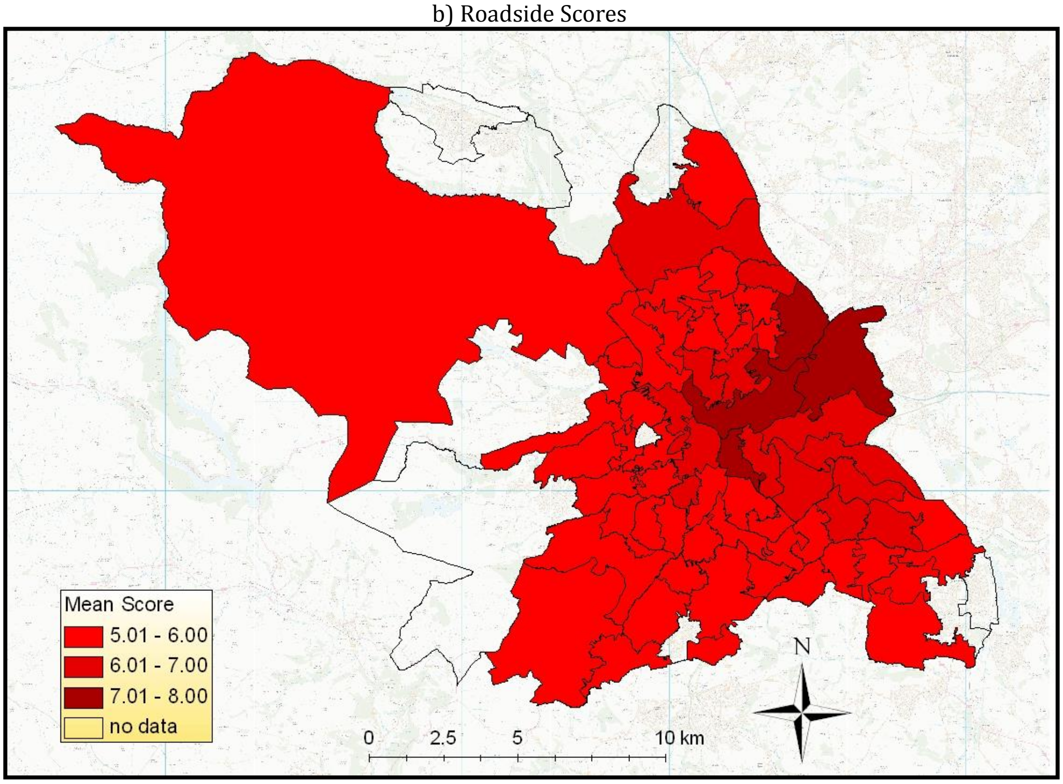
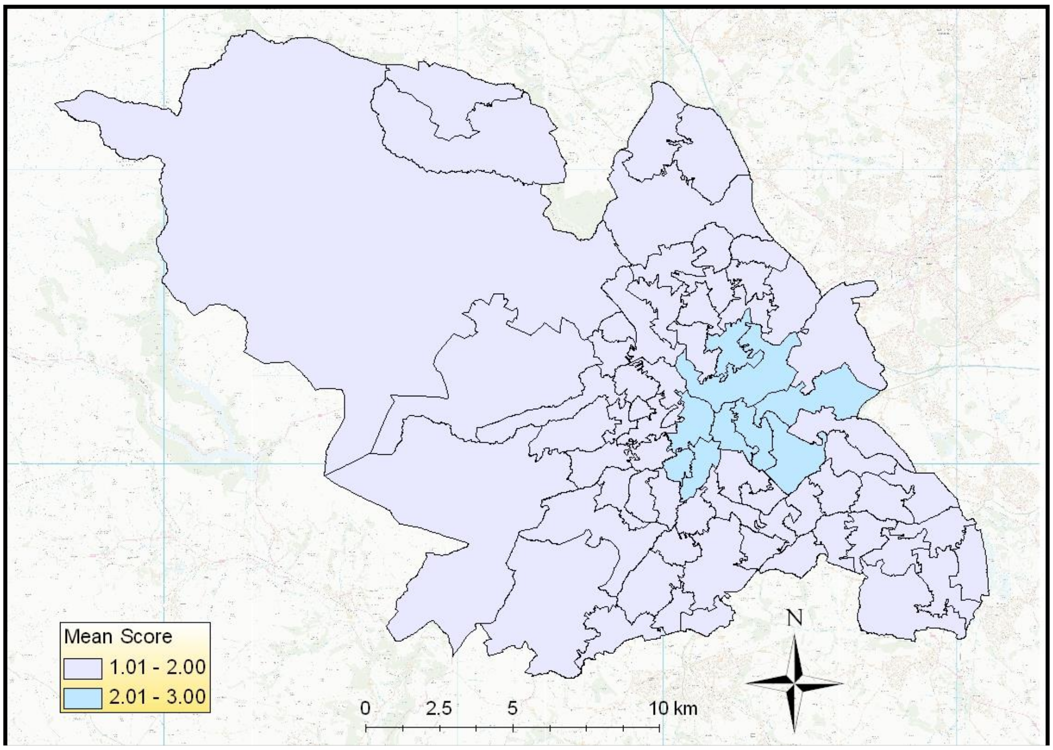


Figure C2. 149: Map of PM_{10} Air Quality Scores for a) Background and b) Roadside sources.

a) Background scores



b) Roadside Scores

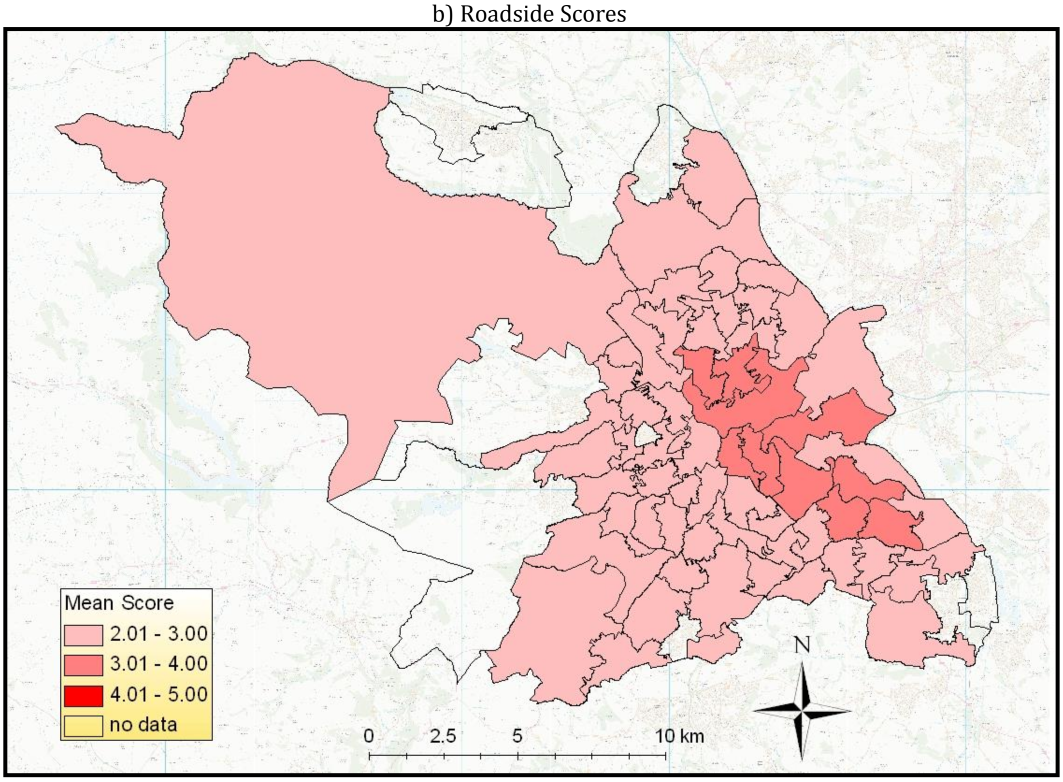


Figure C2. 150: Map of Benzene Air Quality Scores for a) Background and b) Roadside sources.

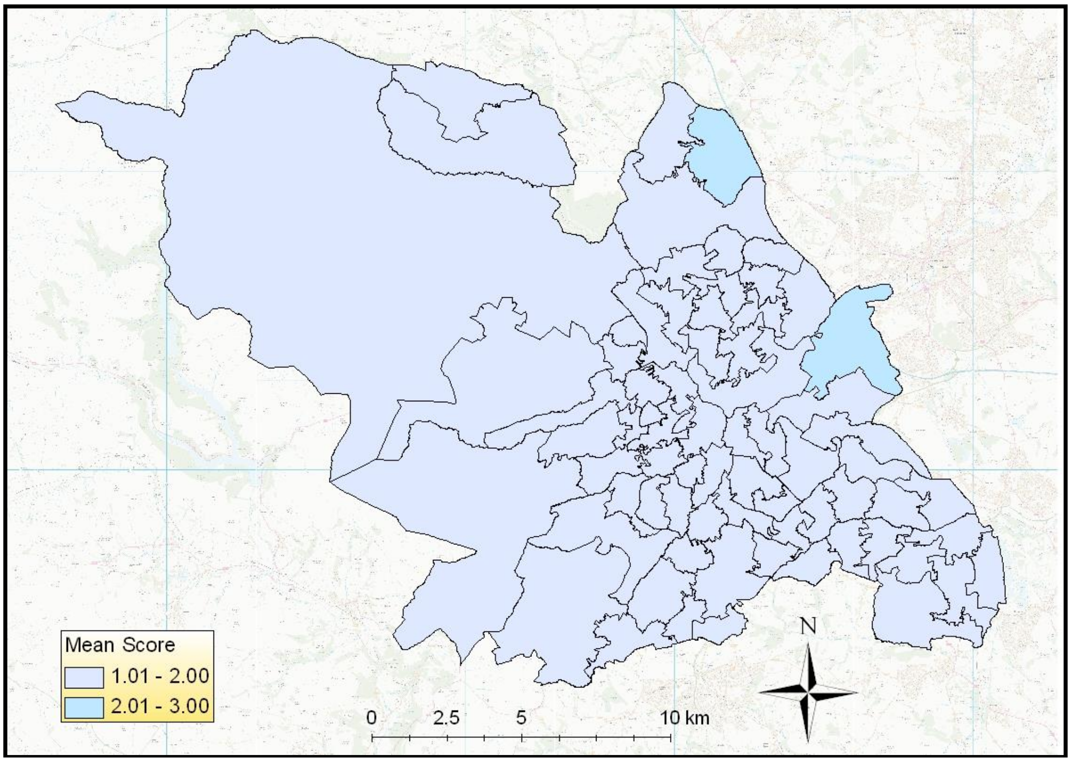
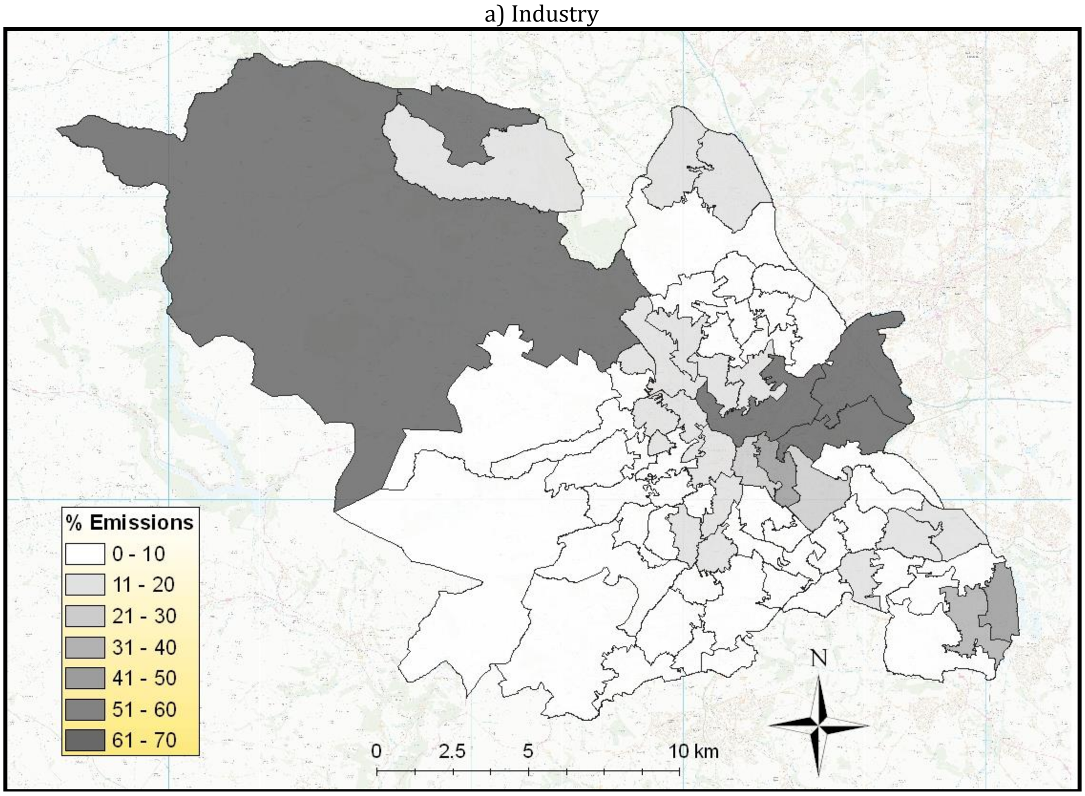
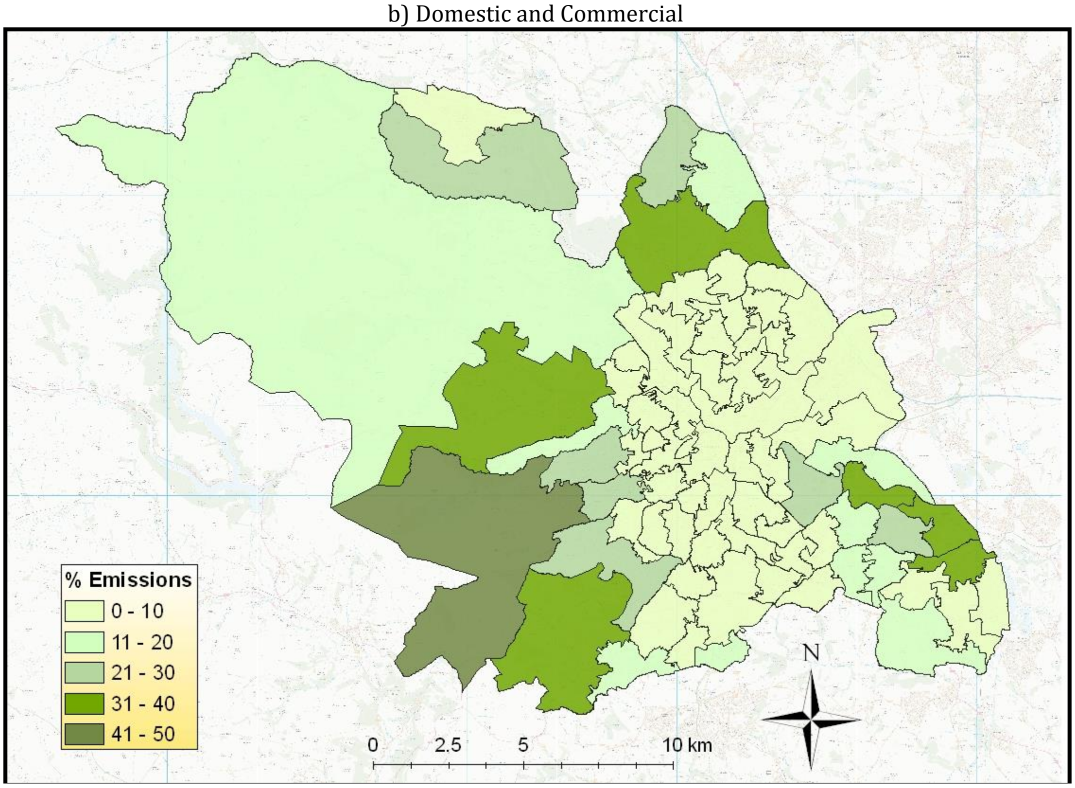


Figure C2. 151: Map of SO_2 Air Quality Scores for Background sources.

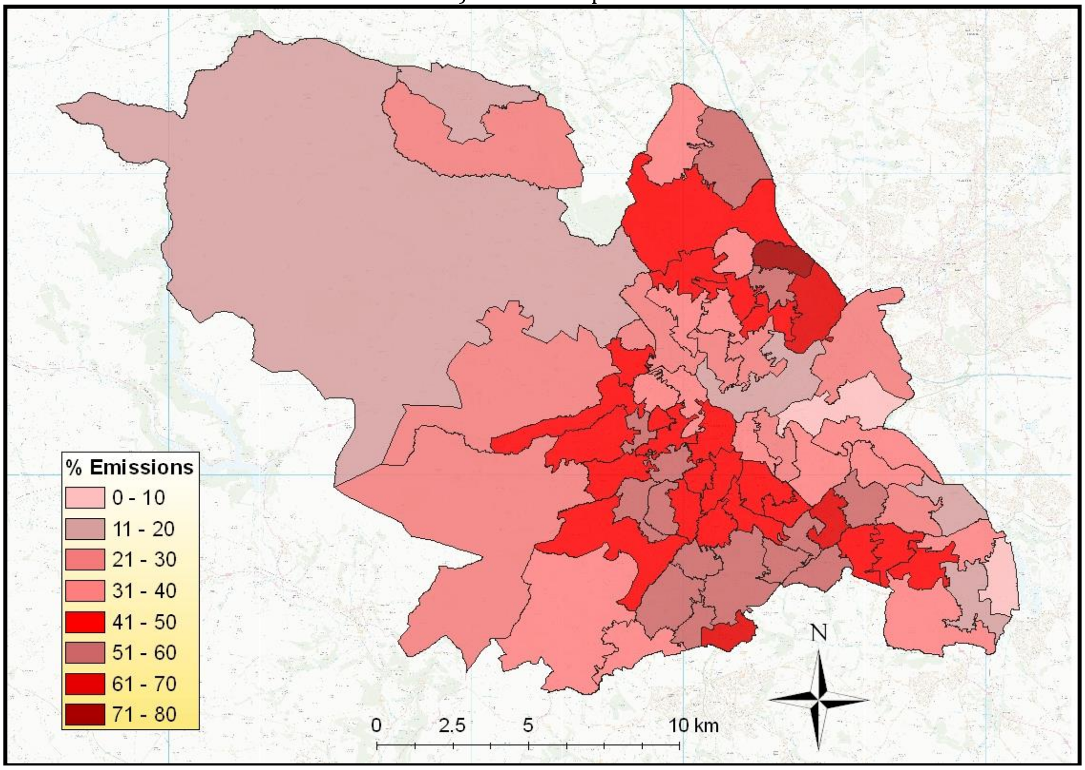
a) Industry



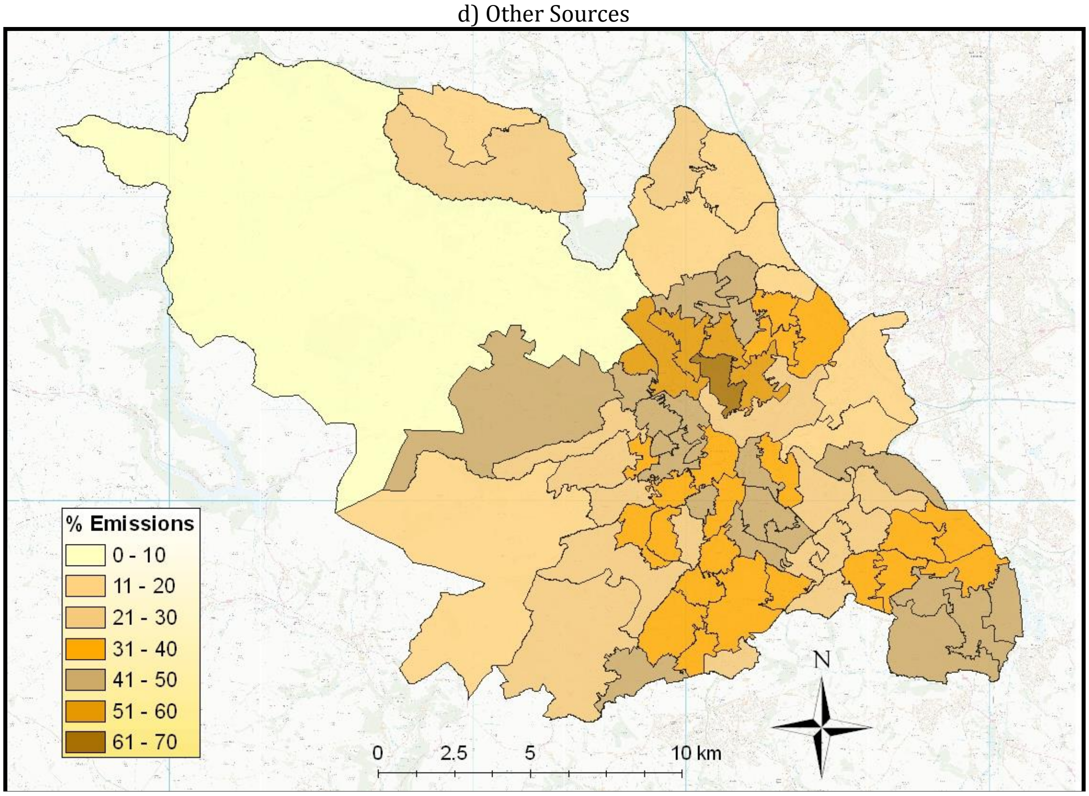
b) Domestic and Commercial



c) Road Transport



d) Other Sources



e) Score of Emission Intensity

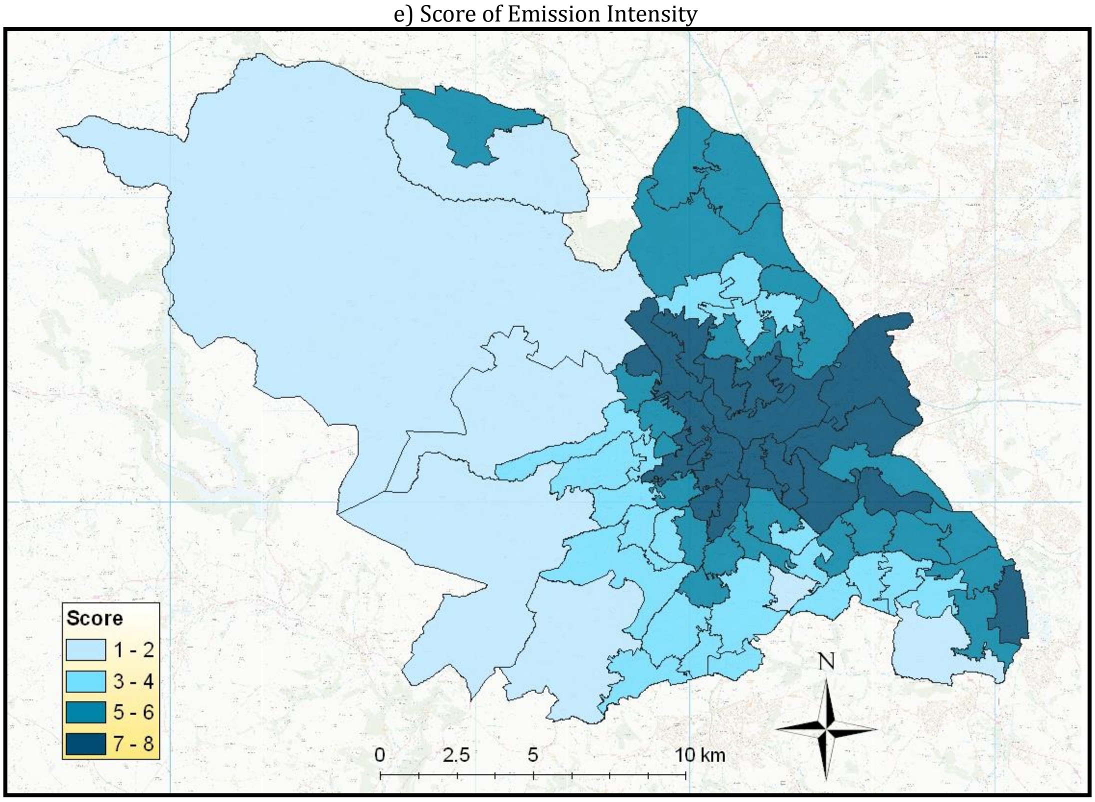
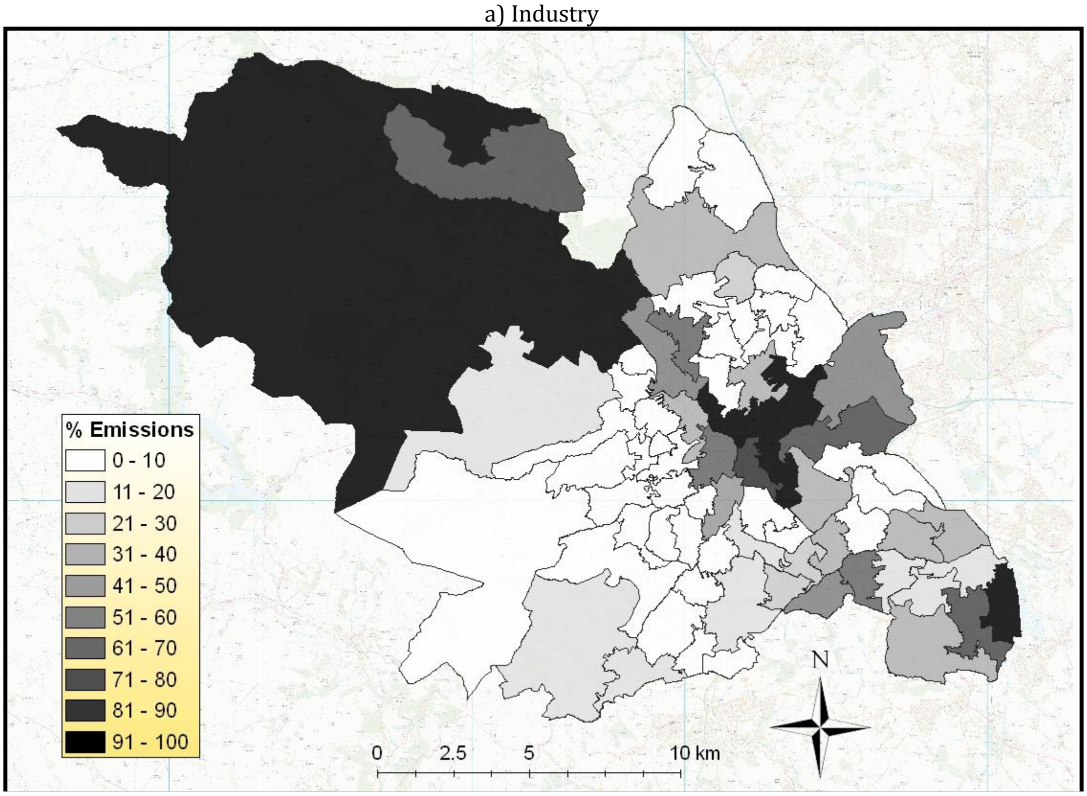
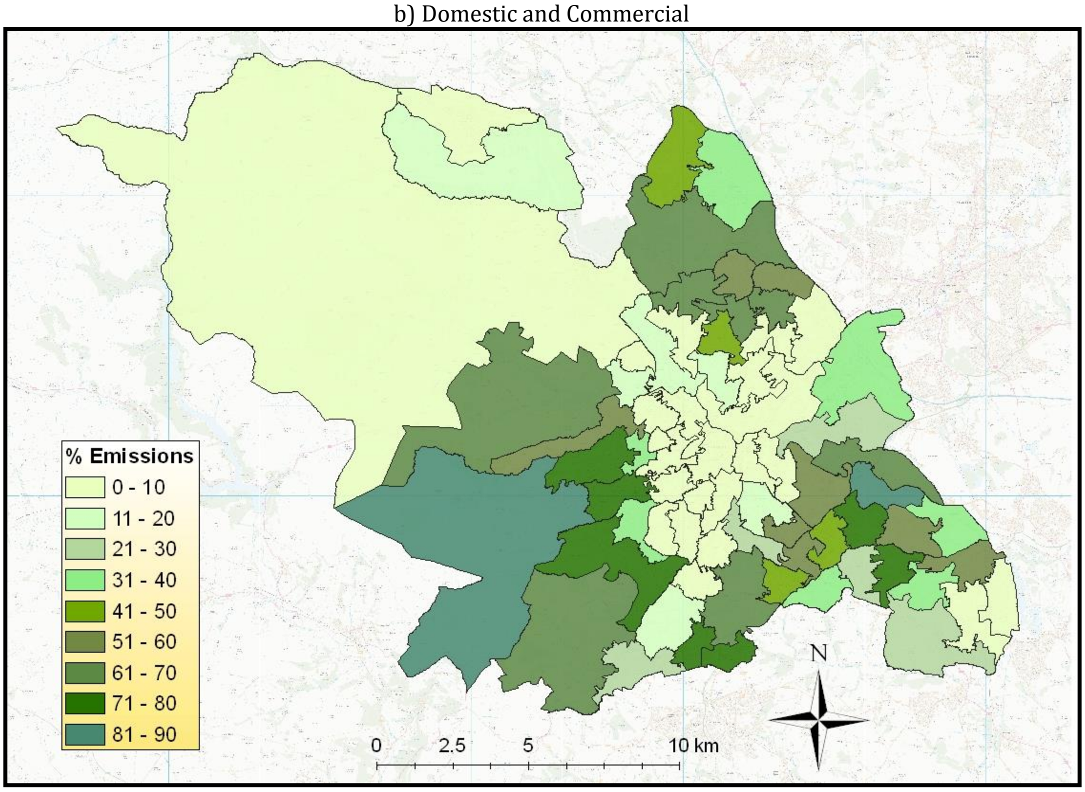


Figure C2. 152: Map of PM_{10} emission percentage from a) Industry, b) Domestic and Commercial, c) Road Transport, d) Other Sources and e) the score of overall emission intensity.

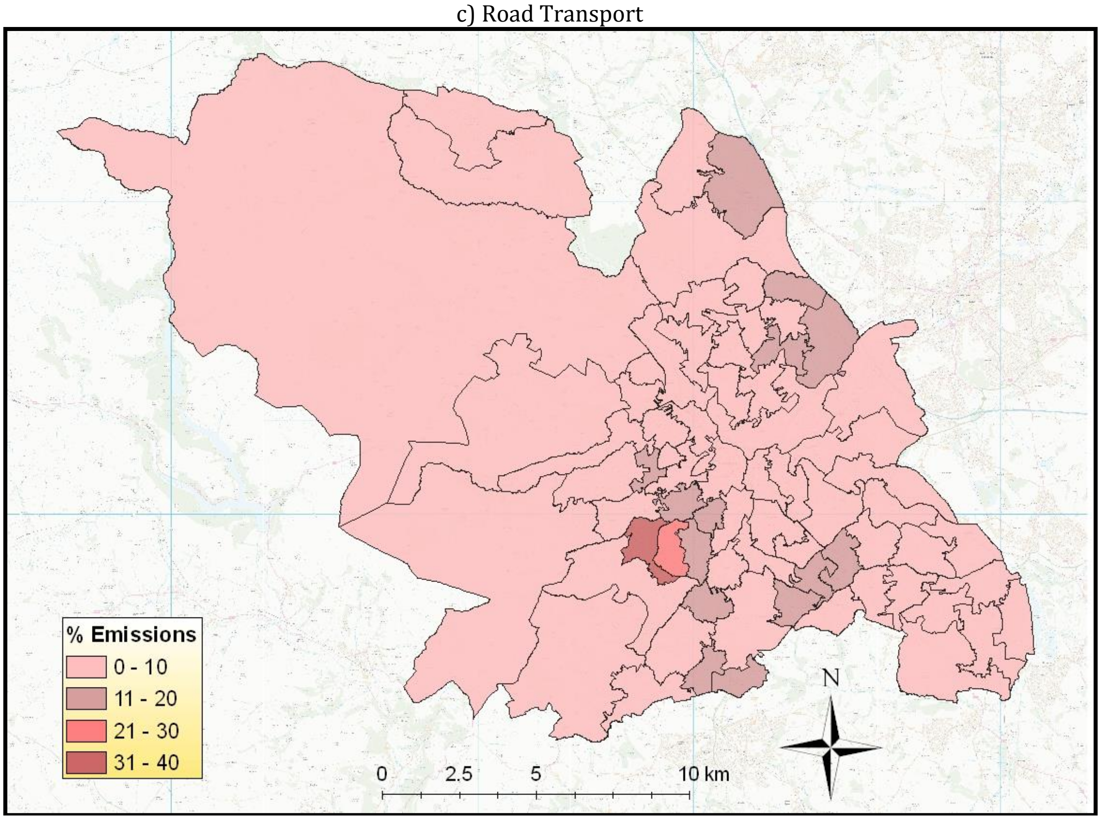
a) Industry



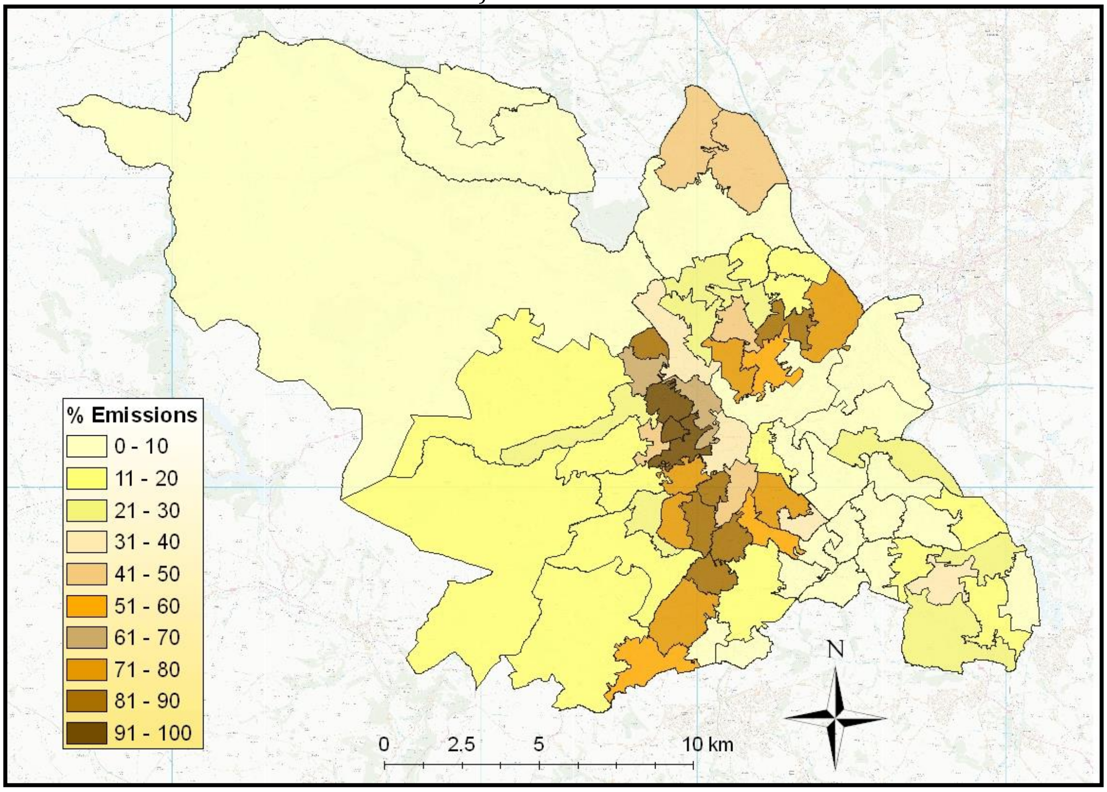
b) Domestic and Commercial



c) Road Transport



d) Other Sources



e) Score of Emission Intensity

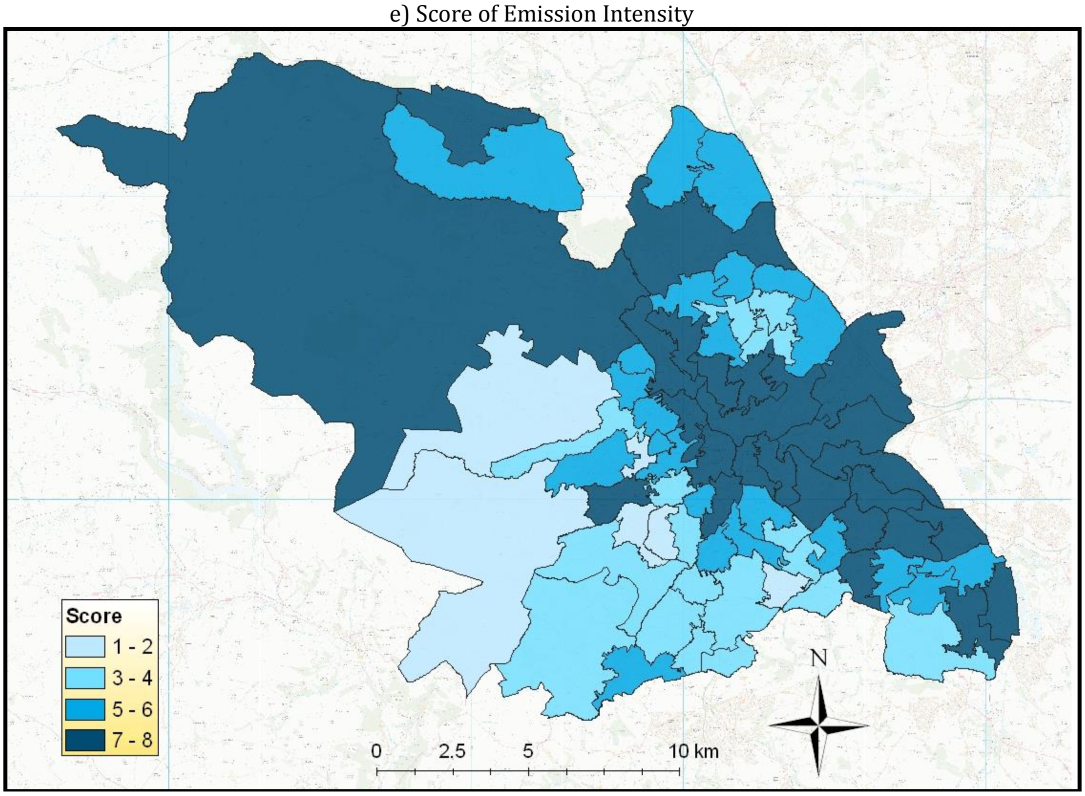
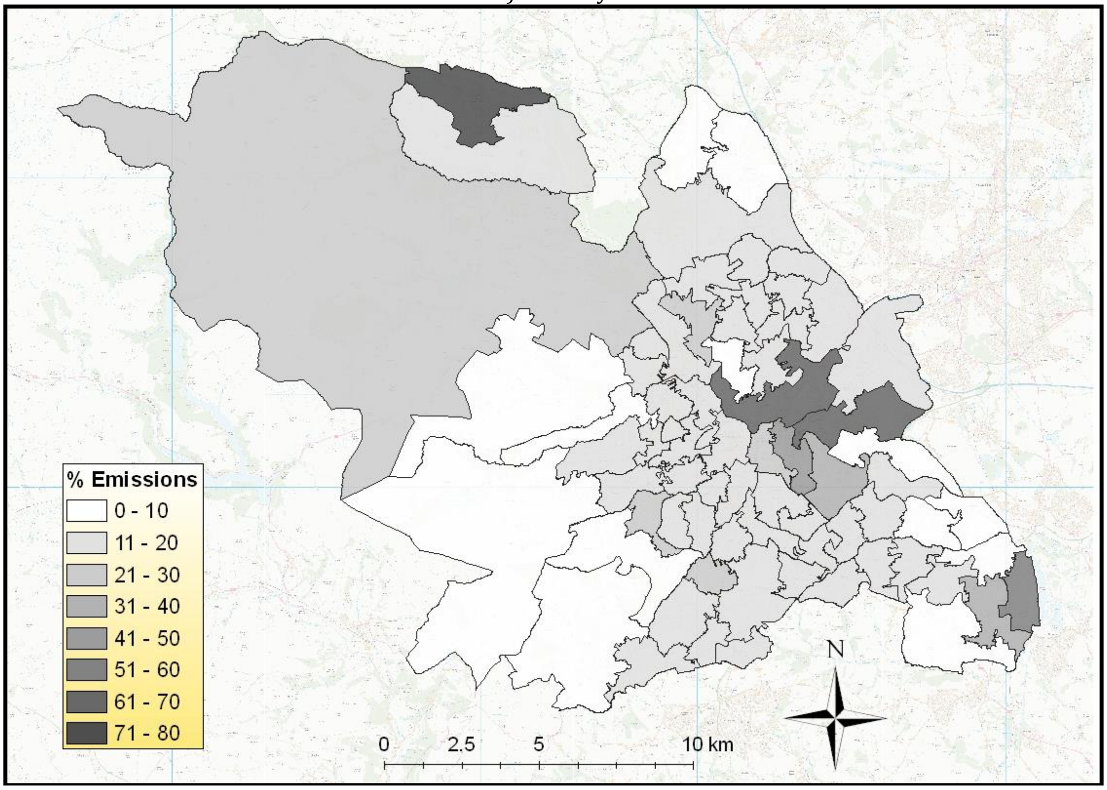
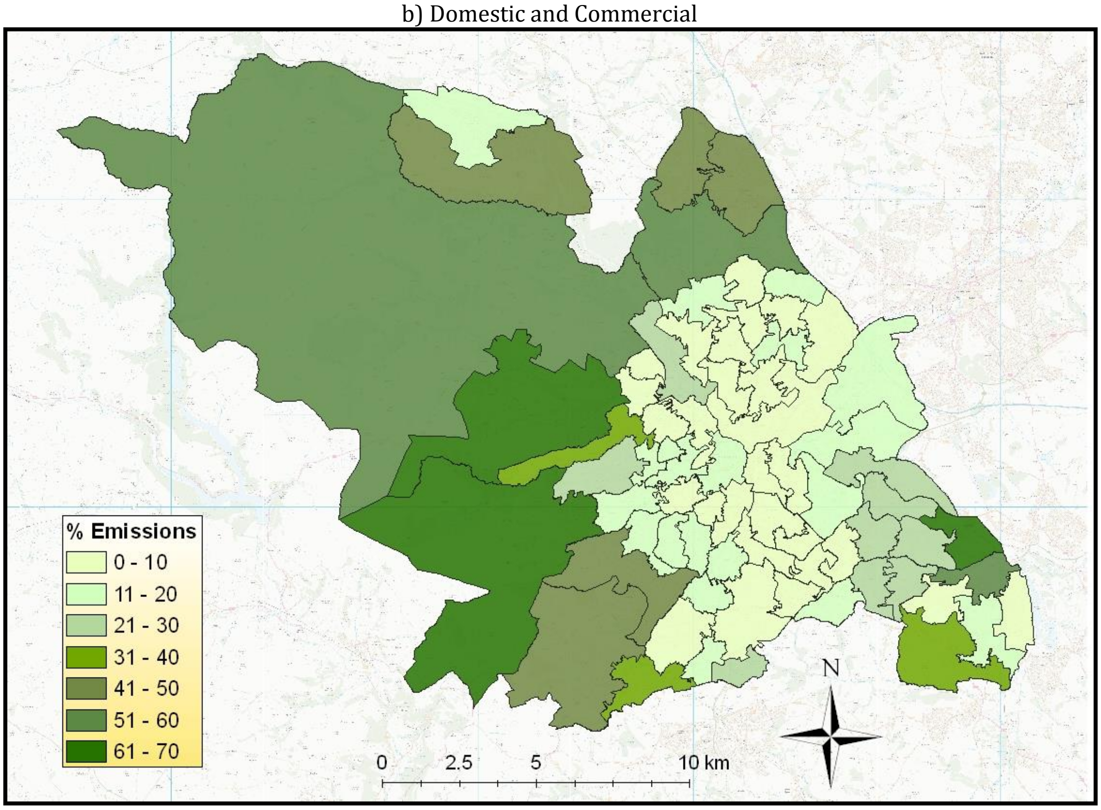


Figure C2. 153: Map of SO_2 emission percentage from a) Industry, b) Domestic and Commercial, c) Road Transport, d) Other Sources and e) the score of overall emission intensity.

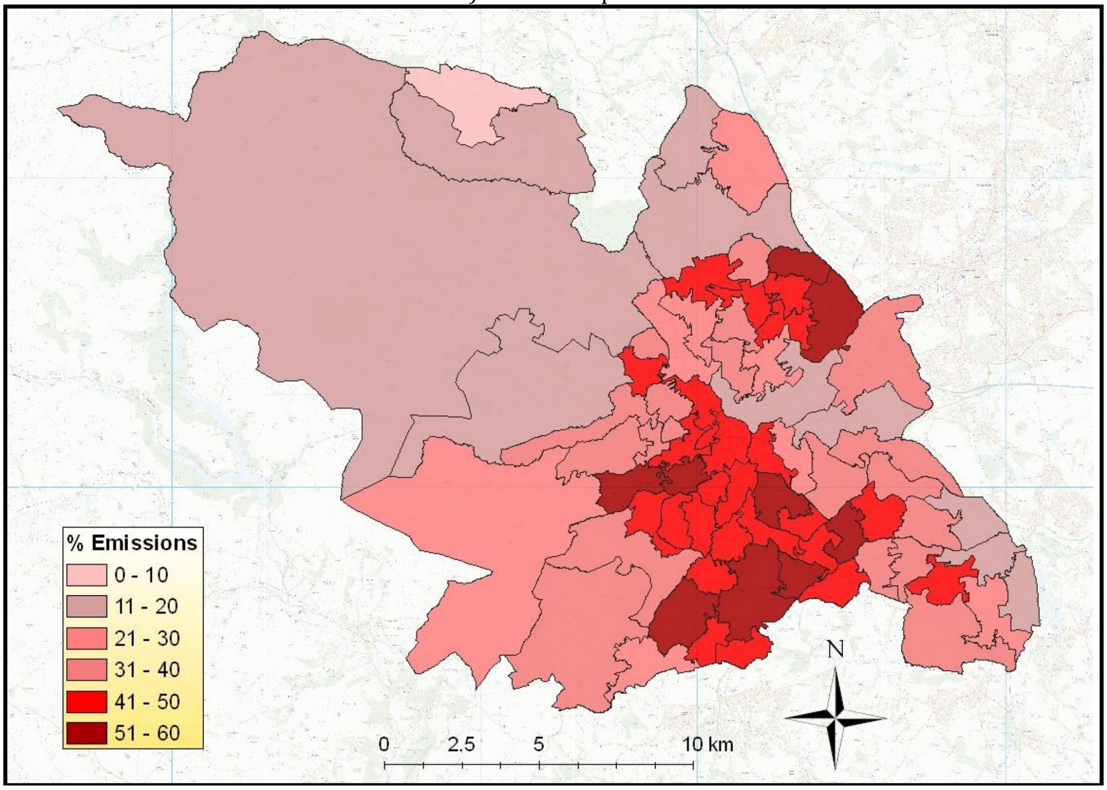
a) Industry



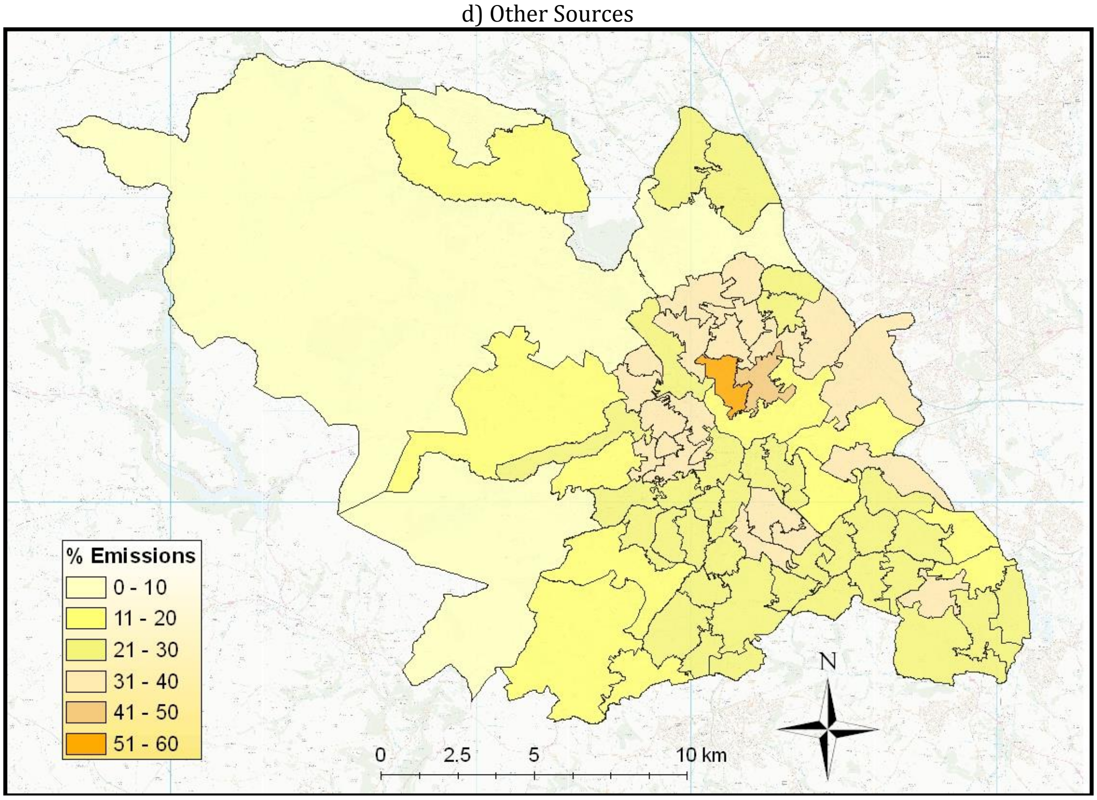
b) Domestic and Commercial



c) Road Transport



d) Other Sources



e) Score of Emission Intensity

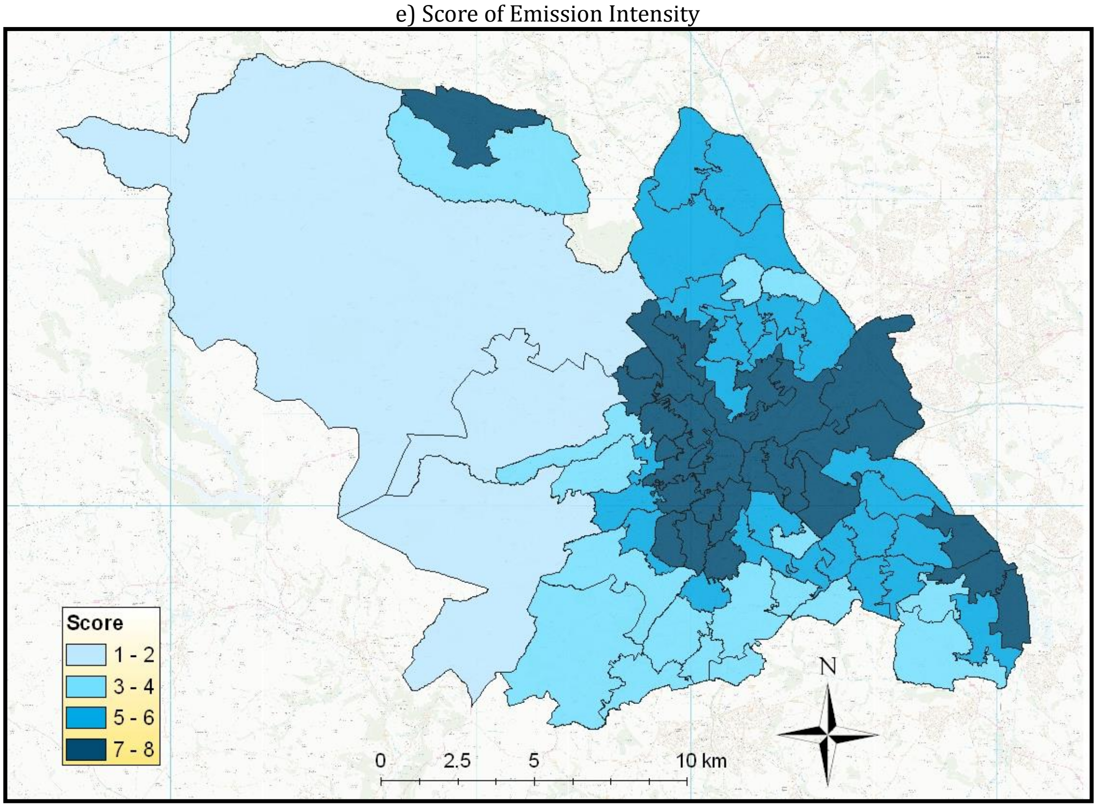


Figure C2. 154: Map of Benzene emission percentage from a) Industry, b) Domestic and Commercial, c) Road Transport, d) Other Sources and e) the score of overall emission intensity.

Appendix D

Seasonal Patterns: Results for the Remaining Datasets.

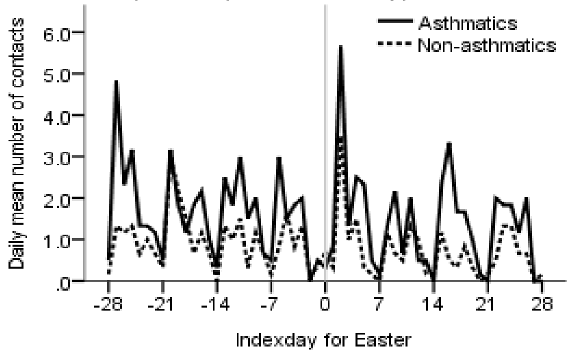
D1. Sub-Period Investigation

D1.1. England and Wales Sub-Periods

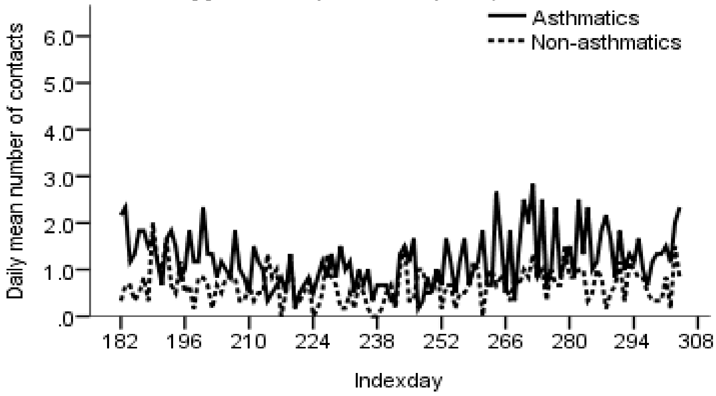
Table D. 1: England and Wales daily mean counts – sub-period descriptive statistics.

Medical contact	Statistics	Easter Asthmatics	Easter Non-asthmatics	Summer Asthmatics	Summer Non-asthmatics	Christmas Asthmatics	Christmas Non-asthmatics	All Year Asthmatics	All Year Non-asthmatics
	N	57	57	123	123	57	57	365	365
Acute Visits	**Mean**	1.53	0.84	1.20	0.66	2	1.06	1.60	0.87
	Median	1.50	0.67	1.17	0.67	2	1.17	1.50	0.83
	SD	1.17	0.69	0.59	0.38	0.87	0.48	0.78	0.47
	Min'	0	0	0.17	0	0.33	0	0.17	0
	Max'	5.67	3.50	2.83	2.00	4.33	2.50	4.83	2.50
Casualty Counts	**Mean**	5.68	3.92	6.08	3.99	5.08	3.23	5.78	3.80
	Median	6.17	4.00	6.00	3.83	4.83	3.17	5.83	3.67
	SD	2.29	1.62	1.58	1.08	1.66	0.91	1.45	1.09
	Min'	1.50	0.67	2.67	1.67	0.50	0.83	0.50	0.83
	Max'	10.67	7.83	11.17	7.00	7.83	5.17	11.17	7.00
Emergency Consultations	**Mean**	5.45	3.35	5.04	2.70	6.89	3.61	5.85	3.25
	Median	6.17	3.83	4.83	2.67	6.83	3.33	5.83	3.17
	SD	3.56	2.14	1.49	0.86	2.67	1.46	1.97	1.13
	Min'	0	0	2.00	0.83	0	0	0	0
	Max'	14.33	7.83	9.33	5.33	12.33	6.17	12.33	6.33
Emergency Counts	**Mean**	21.80	12.82	19.80	11.09	24.30	13.29	21.96	12.36
	Median	22.00	13.17	19.33	11.00	24.17	13.33	22.00	12.33
	SD	6.04	3.87	3.75	2.02	4.22	2.33	3.89	2.26
	Min'	11.83	6.50	11.67	6.83	11.00	5.83	11.00	5.83
	Max'	41.33	21.33	29.33	16.33	33.83	18.50	33.83	18.67
Out of Hours Counts	**Mean**	9.14	4.70	7.48	3.73	10.34	5.39	8.73	4.44
	Median	8.67	4.67	7.33	3.67	10.33	5.33	8.67	4.33
	SD	2.96	1.35	1.66	1.04	1.96	1.16	1.95	1.22
	Min'	4.17	1.67	4.17	1.50	6.50	2.50	4.17	1.50
	Max'	15.83	7.67	12.33	6.33	16.67	8.67	16.67	8.67

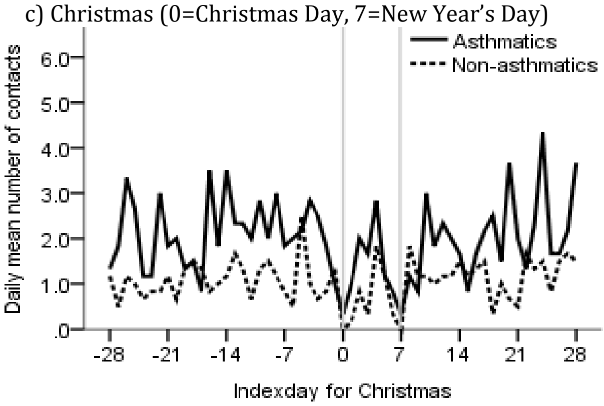
a) Easter (0=Easter Sunday)



b) Summer (Start of school summer holiday approximately indexed by 195, start of school return approximately indexed by 247)



c) Christmas (0=Christmas Day, 7=New Year's Day)



d) Average Year

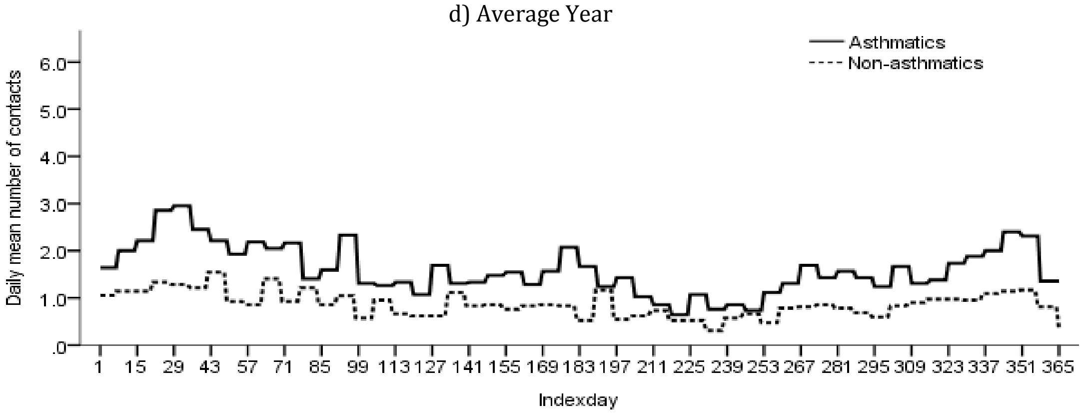
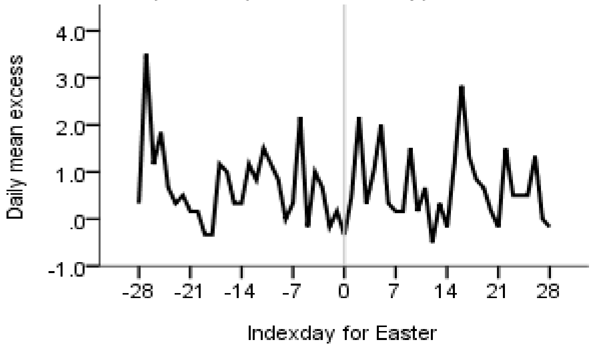
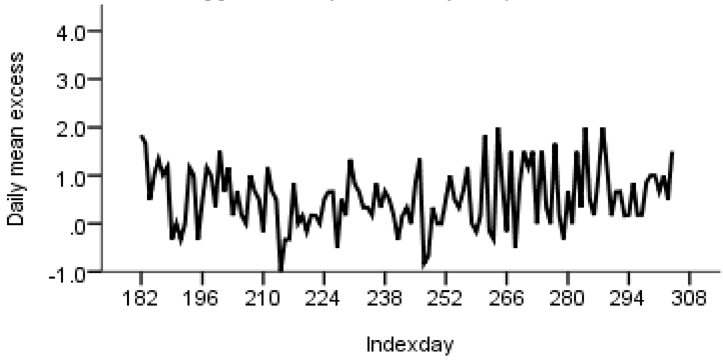


Figure D.1: England and Wales Acute Visits - plot of the aggregated daily mean number of contacts (asthmatics, non-asthmatics) a) Easter b) Summer, c) Christmas and d) Average Year (seven day average).

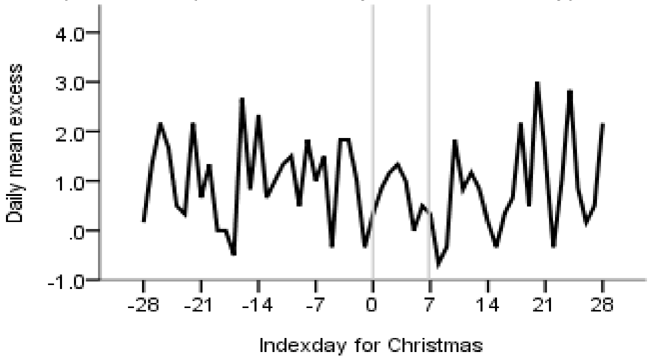
a) Easter (0=Easter Sunday)



b) Summer (Start of school summer holiday approximately indexed by 195, start of school return approximately indexed by 247)



c) Christmas (0=Christmas Day, 7=New Year's Day)



d) Average Year

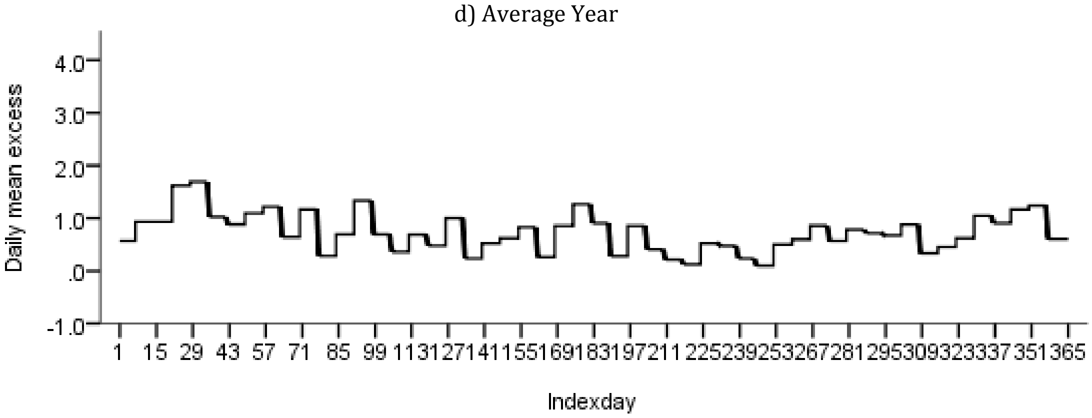
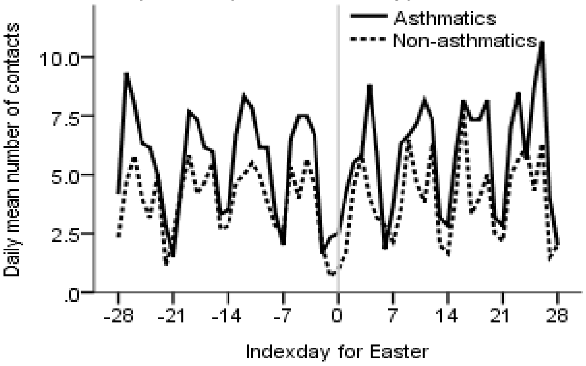
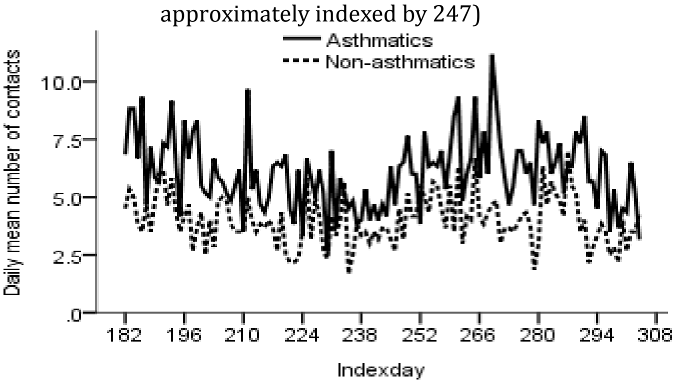


Figure D. 2: England and Wales Acute Visits - plot of the aggregated daily mean excess a) Easter b) Summer, c) Christmas and d) Average Year (seven day average).

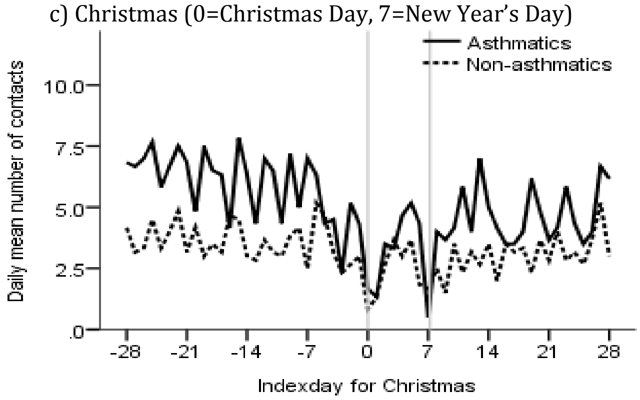
a) Easter (0=Easter Sunday)



b) Summer (Start of school summer holiday approximately indexed by 195, start of school return approximately indexed by 247)



c) Christmas (0=Christmas Day, 7=New Year's Day)



d) Average Year

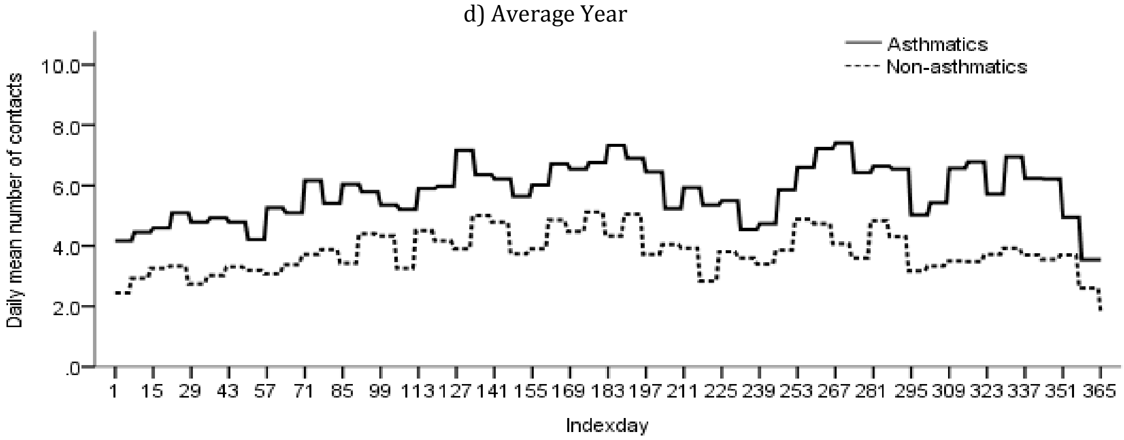


Figure D. 3: England and Wales Casualty Counts - plot of the aggregated daily mean number of contacts (asthmatics, non-asthmatics) a) Easter b) Summer, c) Christmas and d) Average Year (seven day average).

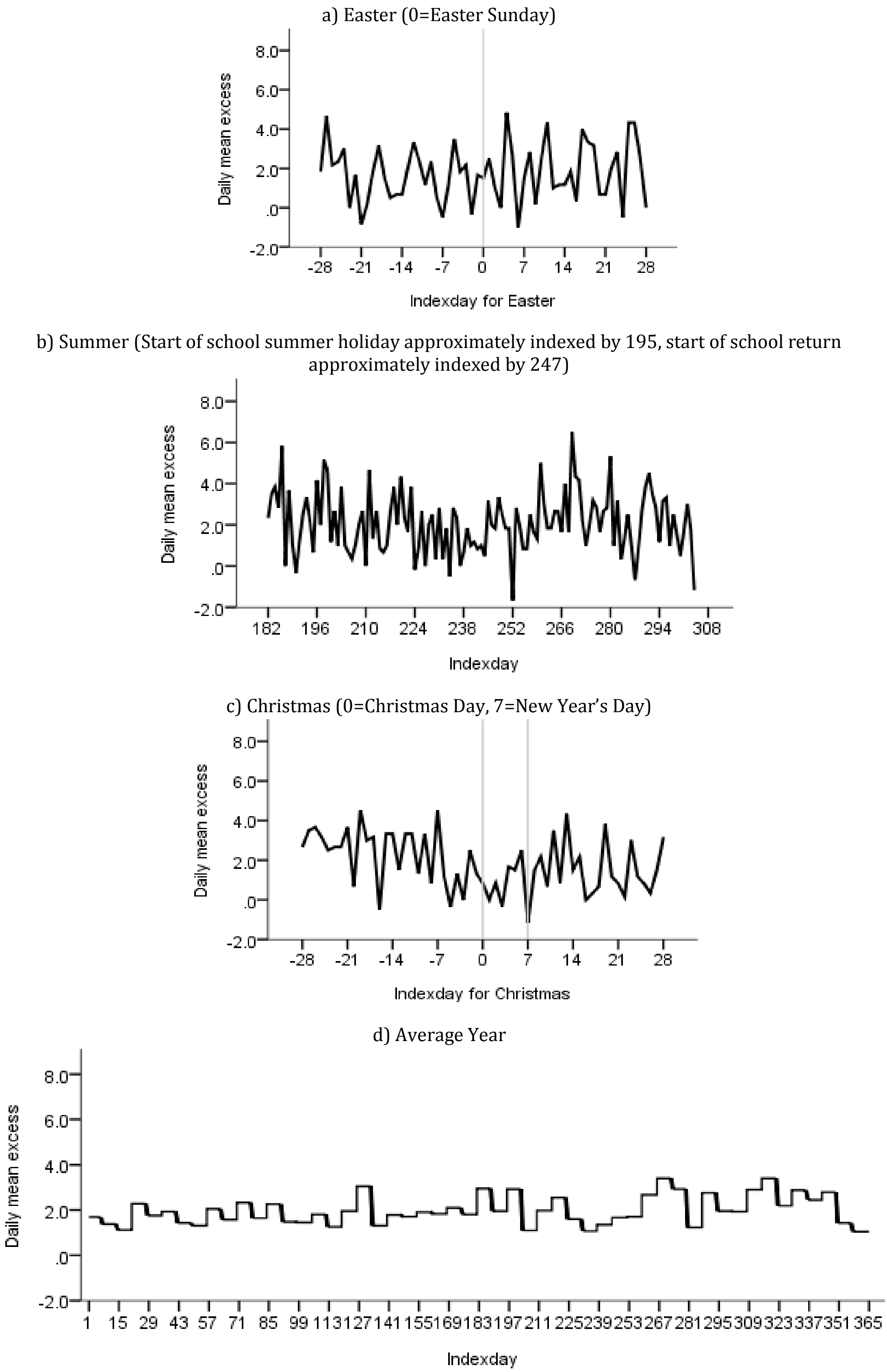
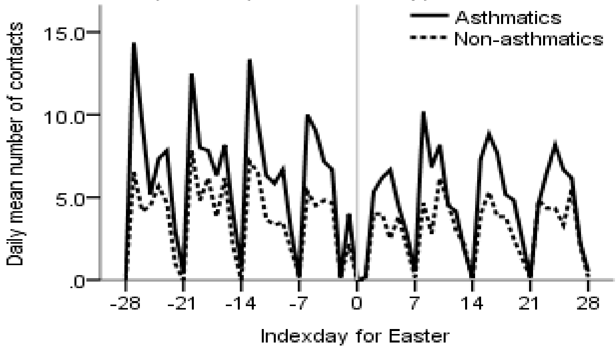
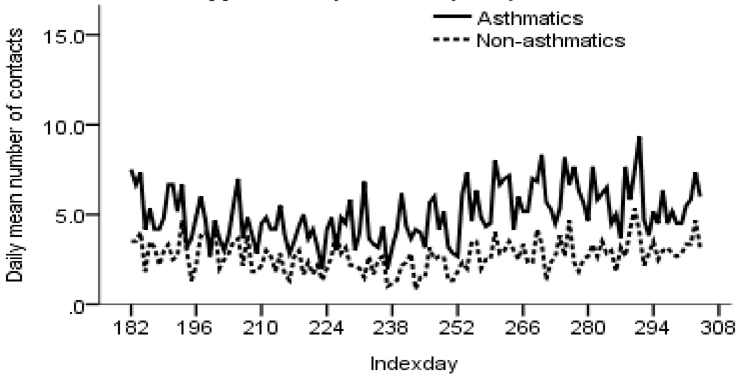


Figure D. 4: England and Wales Casualty Counts - plot of the aggregated daily mean excess a) Easter b) Summer, c) Christmas and d) Average Year (seven day average).

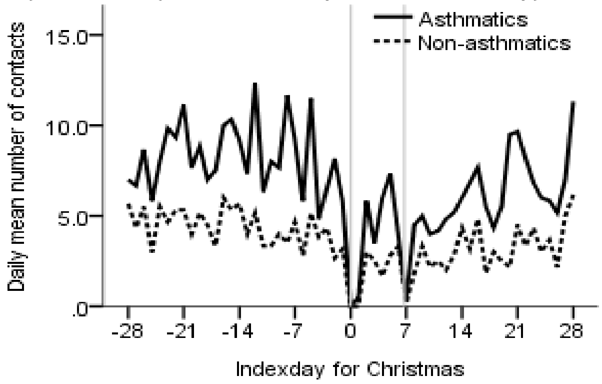
a) Easter (0=Easter Sunday)



b) Summer (Start of school summer holiday approximately indexed by 195, start of school return approximately indexed by 247)



c) Christmas (0=Christmas Day, 7=New Year's Day)



d) Average Year

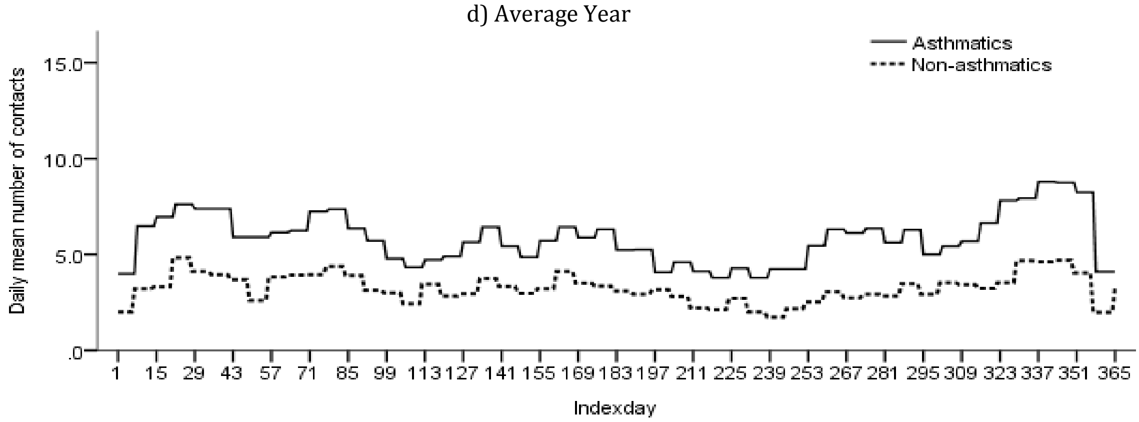
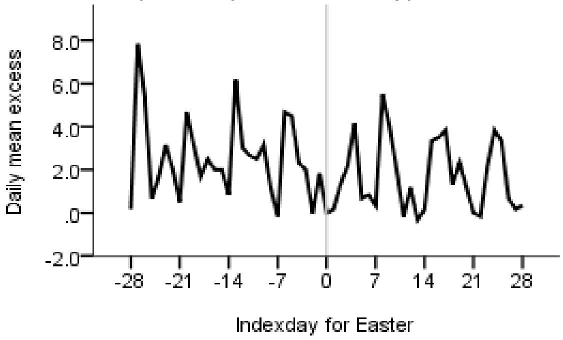
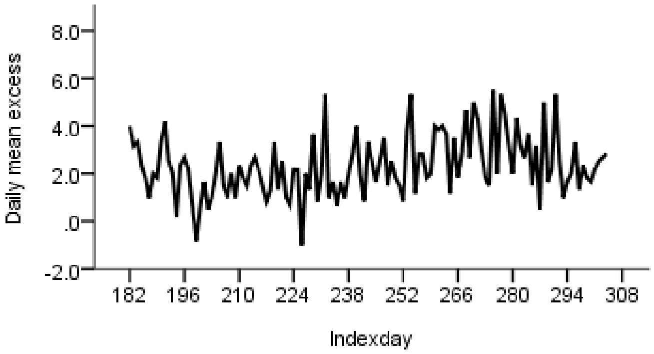


Figure D. 5: England and Wales Emergency Consultations - plot of the aggregated daily mean number of contacts (asthmatics, non-asthmatics) a) Easter b) Summer, c) Christmas and d) Average Year (seven day average).

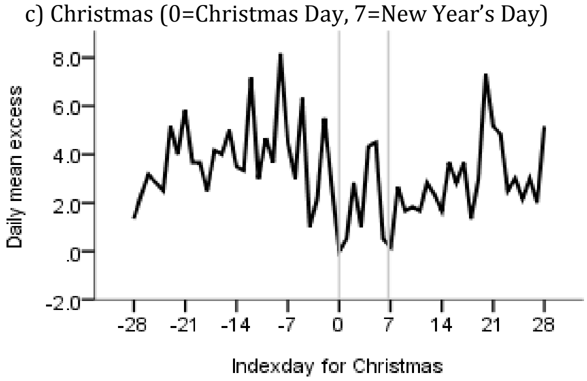
a) Easter (0=Easter Sunday)



b) Summer (Start of school summer holiday approximately indexed by 195, start of school return approximately indexed by 247)



c) Christmas (0=Christmas Day, 7=New Year's Day)



d) Average Year

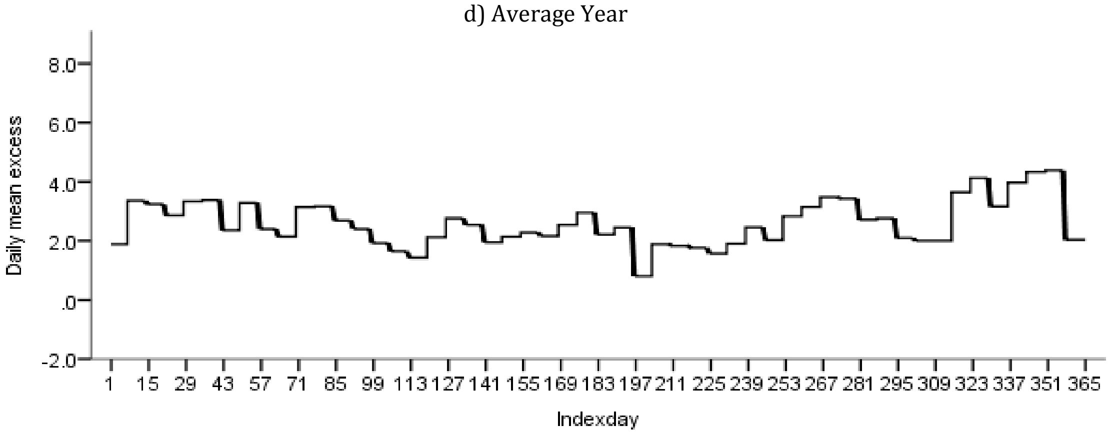
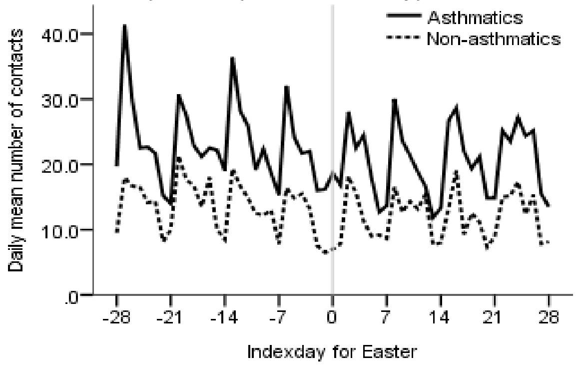
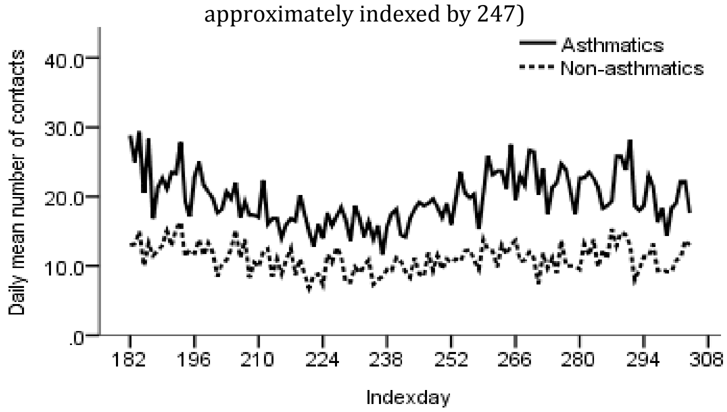


Figure D. 6: England and Wales Emergency Consultations - plot of the aggregated daily mean excess a) Easter b) Summer, c) Christmas and d) Average Year (seven day average).

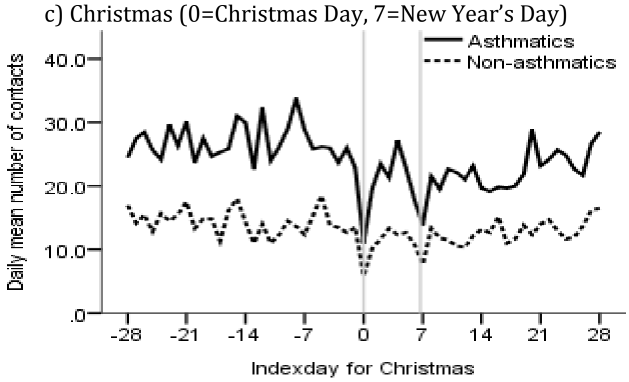
a) Easter (0=Easter Sunday)



b) Summer (Start of school summer holiday approximately indexed by 195, start of school return approximately indexed by 247)



c) Christmas (0=Christmas Day, 7=New Year's Day)



d) Average Year

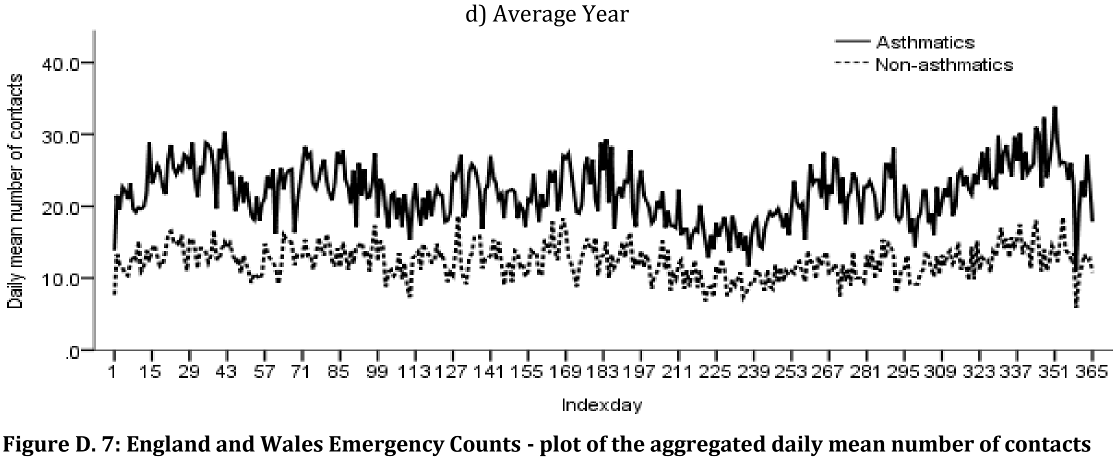
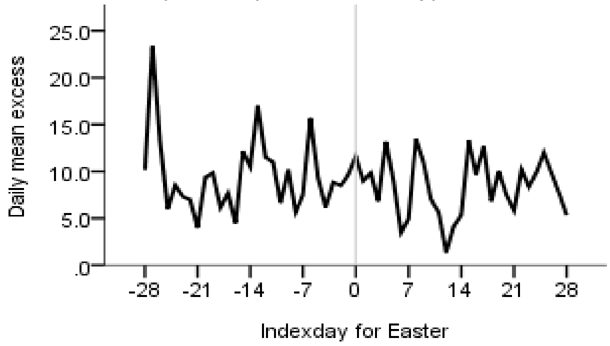
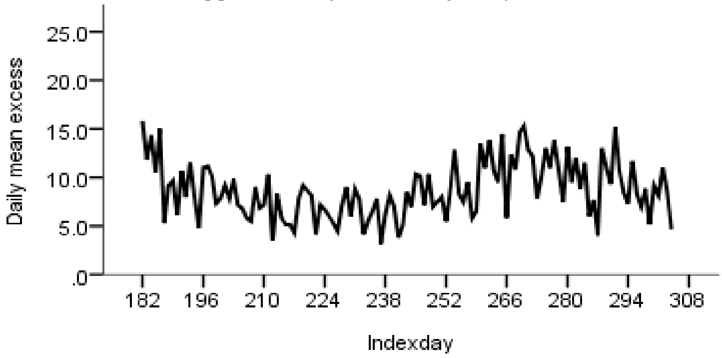


Figure D. 7: England and Wales Emergency Counts - plot of the aggregated daily mean number of contacts (asthmatics, non-asthmatics) a) Easter b) Summer, c) Christmas and d) Average Year.

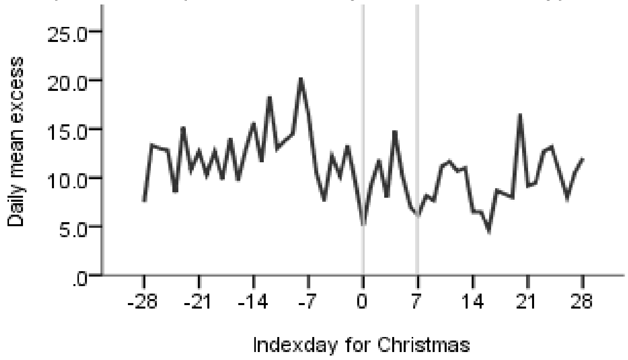
a) Easter (0=Easter Sunday)



b) Summer (Start of school summer holiday approximately indexed by 195, start of school return approximately indexed by 247)



c) Christmas (0=Christmas Day, 7=New Year's Day)



d) Average Year

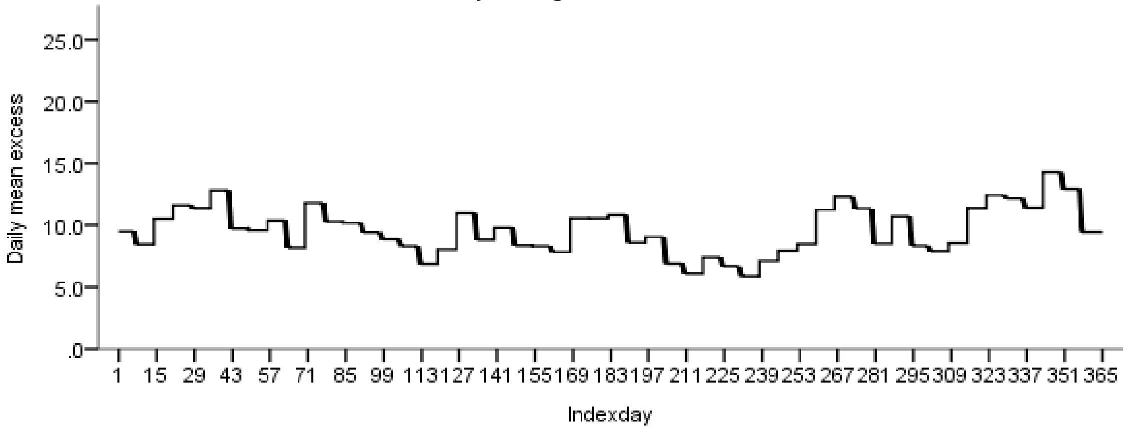
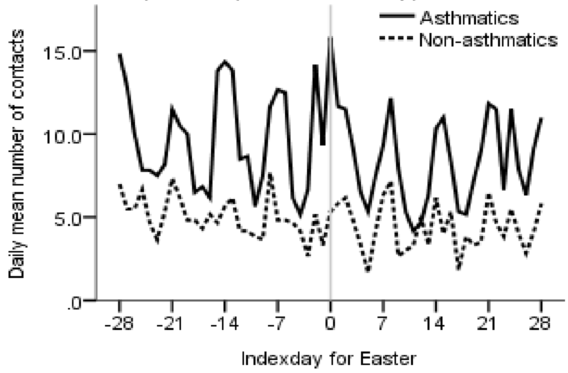
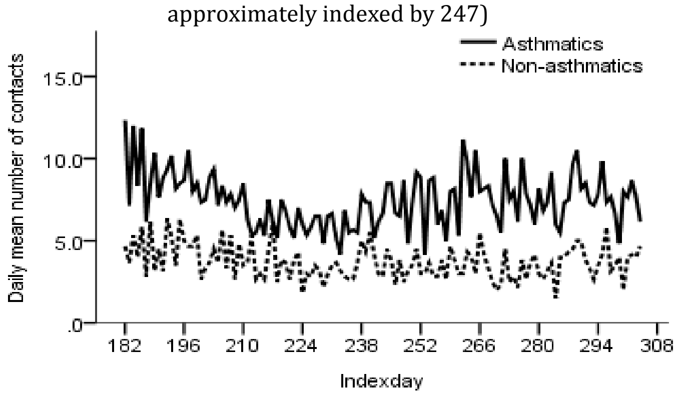


Figure D. 8: England and Wales Emergency Counts - plot of the aggregated daily mean excess a) Easter b) Summer, c) Christmas and d) Average Year (seven day average).

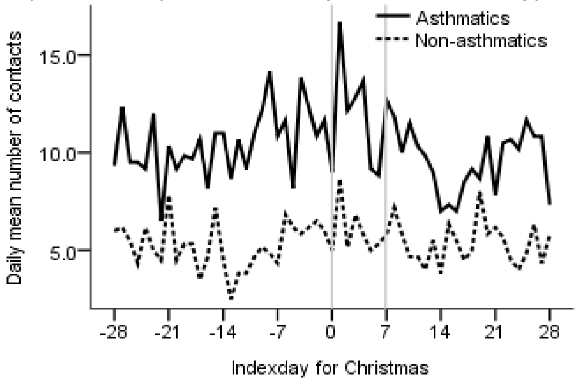
a) Easter (0=Easter Sunday)



b) Summer (Start of school summer holiday approximately indexed by 195, start of school return approximately indexed by 247)



c) Christmas (0=Christmas Day, 7=New Year's Day)



d) Average Year

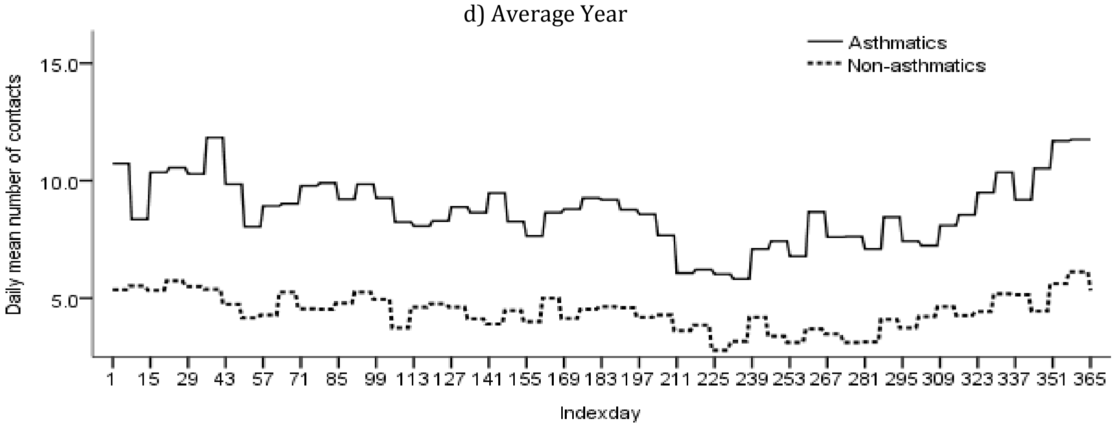
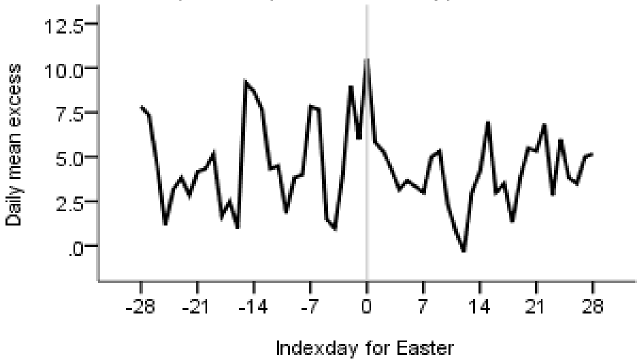
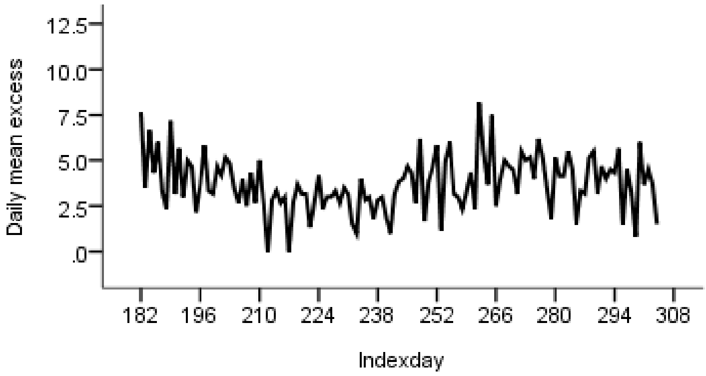


Figure D. 9: England and Wales Out of Hours Counts - plot of the aggregated daily mean number of contacts (asthmatics, non-asthmatics) a) Easter b) Summer, c) Christmas and d) Average Year (seven day average).

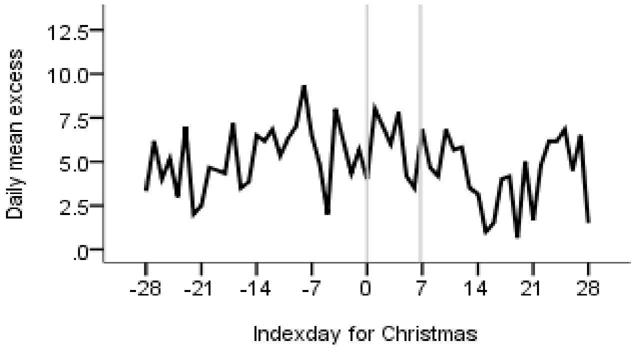
a) Easter (0=Easter Sunday)



b) Summer (Start of school summer holiday approximately indexed by 195, start of school return approximately indexed by 247)



c) Christmas (0=Christmas Day, 7=New Year's Day)



d) Average Year

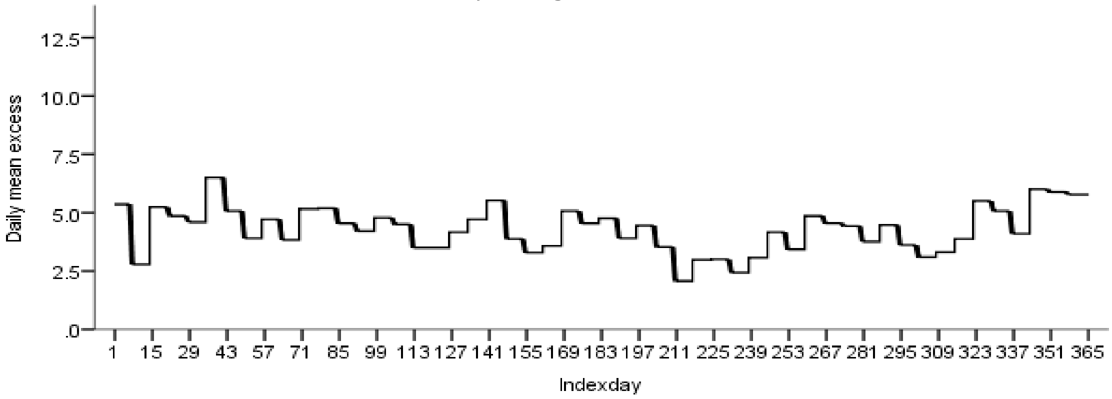


Figure D. 10: England and Wales Out of Hours Counts - plot of the aggregated daily mean excess a) Easter b) Summer, c) Christmas and d) Average Year (seven day average).

For most medical types, daily mean counts before the Easter weekend tend to be slightly higher in comparison to daily mean counts after the Easter weekend. There tends to be a drop in daily mean counts on the Easter weekend lasting around three to four days. For England and Wales, the summer period has lower daily means in August followed by an increase from mid-September.

Around the Christmas period, there is quite a prominent depression in daily mean counts for Asthmatics and non-asthmatics on Christmas Day and New Years Day. Daily mean counts before Christmas Day tend to be slightly higher in comparison to after New Year's Day.

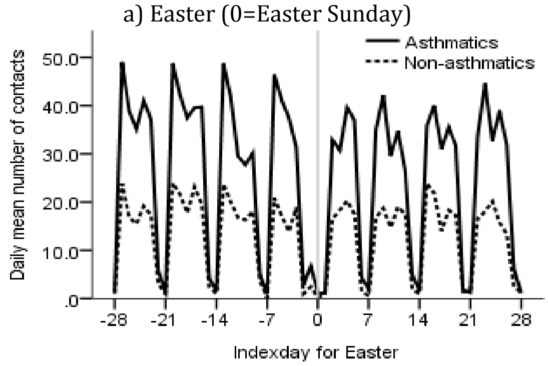
With All Counts and Emergency Counts and more so with plots that displayed counts around Easter, the weekly trend of medical contacts was quite prominent.

D1.2. Trent Region Sub-Periods

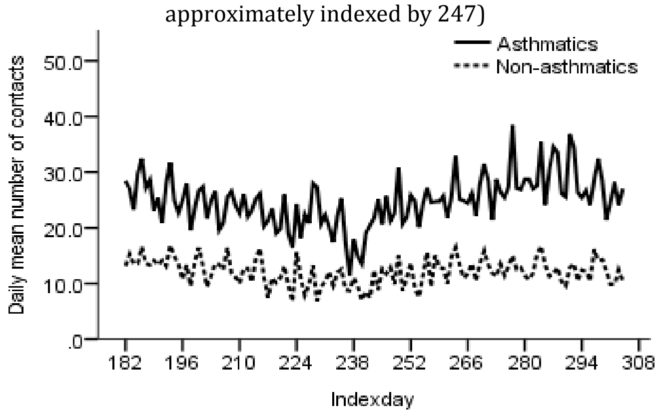
Table D. 2: Trent Region daily mean counts – sub-period descriptive statistics.

Medical contact	Statistic	Easter Asthmatics	Easter Non-asthmatics	Summer Asthmatics	Summer Non-asthmatics	Christmas Asthmatics	Christmas Non-asthmatics	All Year Asthmatics	All Year Non-asthmatics
	N	57	57	123	123	57	57	365	365
All Counts	**Mean**	26.06	13.11	25.67	12.47	27.92	13.18	27.35	13.39
	Median	32.67	16.83	25.33	12.33	30.33	13.83	27.33	13.33
	SD	17.19	8.54	4.76	2.50	8.42	3.91	5.72	2.99
	Min’	0.83	0.17	10.17	6.33	0.67	0.33	0.67	0.33
	Max’	50.83	24.67	39.50	17.50	46.50	19.00	46.50	20.67
Acute Visits	**Mean**	0.09	0.05	0.06	0.03	0.11	0.07	0.09	0.05
	Median	0.00	0.00	0.00	0.00	0.17	0.00	0.00	0.00
	SD	0.11	0.10	0.10	0.07	0.13	0.11	0.14	0.10
	Min’	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Max’	0.33	0.33	0.67	0.33	0.67	0.50	0.67	0.50
Casualty Counts	**Mean**	0.32	0.20	0.38	0.28	0.28	0.21	0.35	0.24
	Median	0.33	0.17	0.33	0.17	0.17	0.17	0.33	0.17
	SD	0.28	0.20	0.28	0.25	0.29	0.23	0.27	0.22
	Min’	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Max’	1.17	0.83	1.17	1.00	1.33	1.17	1.33	1.17
Emergency Consultations	**Mean**	0.07	0.07	0.11	0.05	0.12	0.06	0.12	0.06
	Median	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SD	0.11	0.14	0.17	0.09	0.19	0.11	0.17	0.11
	Min’	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Max’	0.33	0.67	0.83	0.33	1.00	0.33	1.00	0.83
Emergency Counts	**Mean**	1.04	0.60	0.96	0.55	1.19	0.67	1.10	0.64
	Median	1.00	0.50	1.00	0.50	1.17	0.67	1.00	0.67
	SD	0.48	0.40	0.48	0.32	0.53	0.41	0.50	0.36
	Min’	0.17	0.00	0.00	0.00	0.33	0.17	0.00	0.00
	Max’	2.50	1.50	2.33	1.50	2.67	1.67	2.83	1.67
Out of Hours Counts	**Mean**	0.56	0.28	0.41	0.19	0.68	0.33	0.55	0.27
	Median	0.50	0.17	0.33	0.17	0.67	0.33	0.50	0.17
	SD	0.32	0.23	0.28	0.18	0.32	0.26	0.32	0.24
	Min’	0.00	0.00	0.00	0.00	0.17	0.00	0.00	0.00
	Max’	1.33	0.83	1.33	1.00	1.33	1.00	1.50	1.17

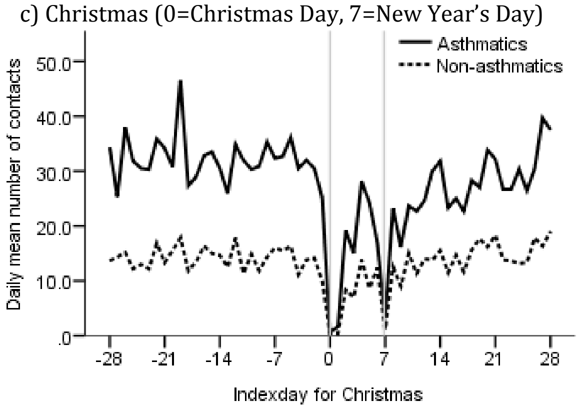
a) Easter (0=Easter Sunday)



b) Summer (Start of school summer holiday approximately indexed by 195, start of school return approximately indexed by 247)



c) Christmas (0=Christmas Day, 7=New Year's Day)



d) Average Year

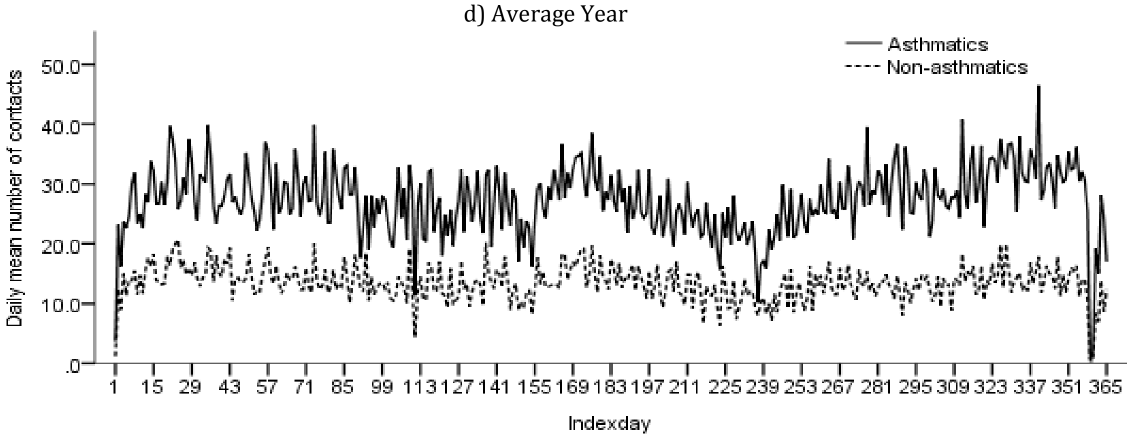
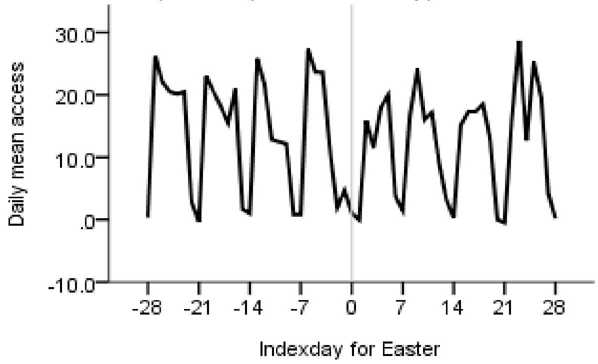
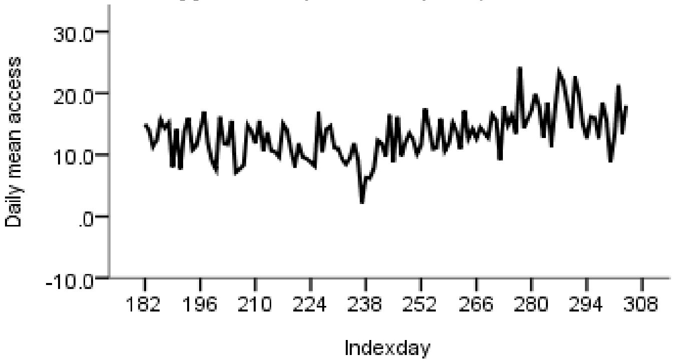


Figure D.11: Trent Region All Counts - plot of the aggregated daily mean number of contacts (asthmatics, non-asthmatics) a) Easter b) Summer, c) Christmas and d) Average Year.

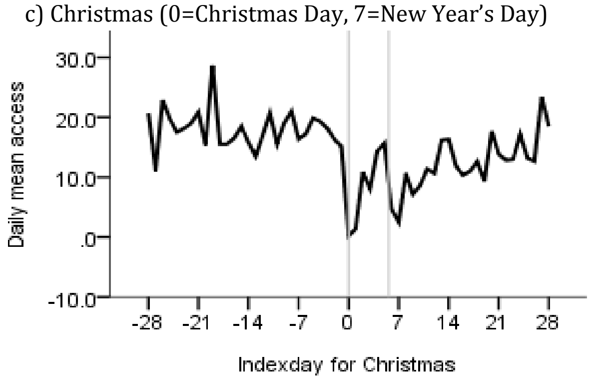
a) Easter (0=Easter Sunday)



b) Summer (Start of school summer holiday approximately indexed by 195, start of school return approximately indexed by 247)



c) Christmas (0=Christmas Day, 7=New Year's Day)



d) Average Year

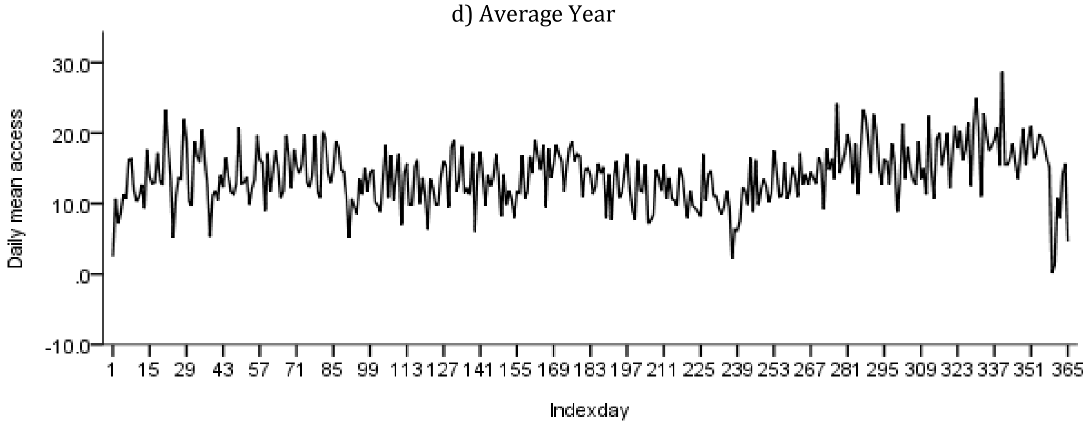
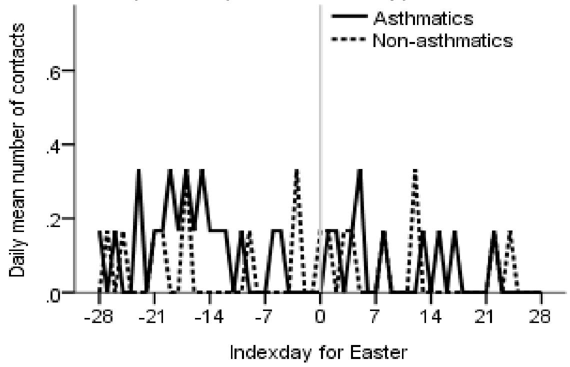
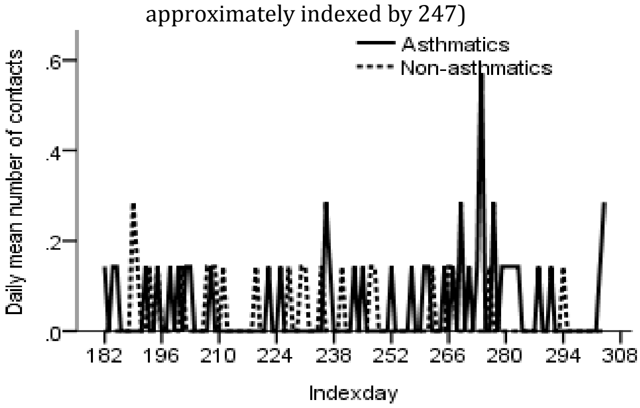


Figure D.12: Trent Region All Counts - plot of the aggregated daily mean excess at a) Easter b) Summer, c) Christmas and d) Average Year.

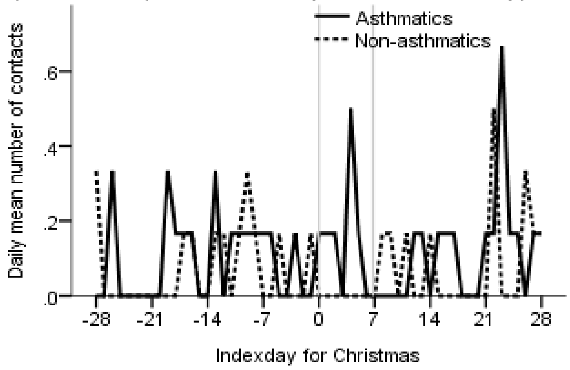
a) Easter (0=Easter Sunday)



b) Summer (Start of school summer holiday approximately indexed by 195, start of school return approximately indexed by 247)



c) Christmas (0=Christmas Day, 7=New Year's Day)



d) Average Year

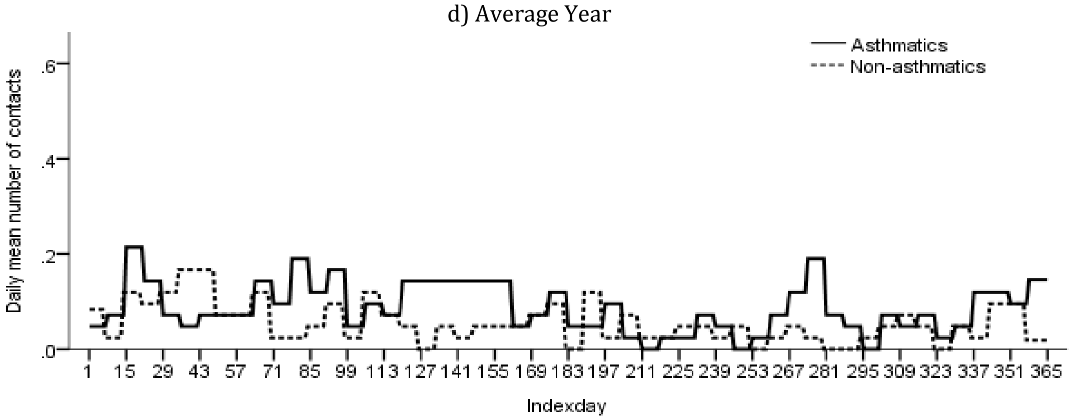
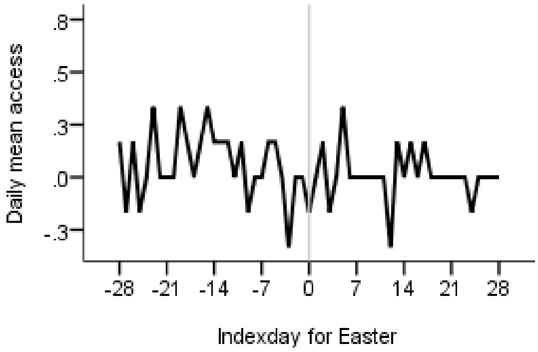
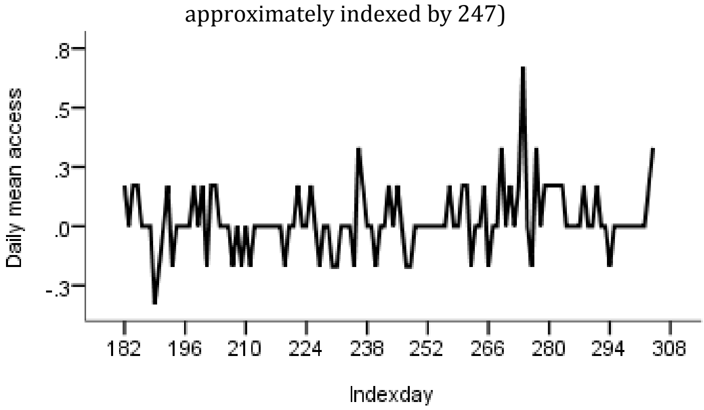


Figure D. 13: Trent Region Acute Visits - plot of the aggregated daily mean number of contacts (asthmatics, non-asthmatics) a) Easter b) Summer, c) Christmas and d) Average Year (seven day average).

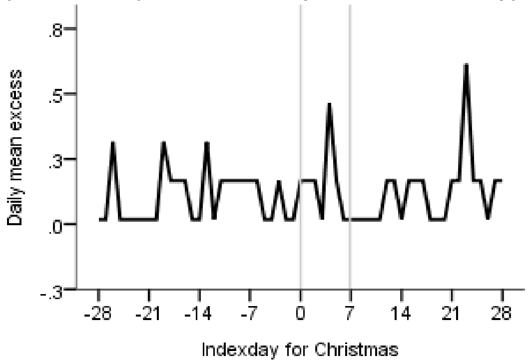
a) Easter (0=Easter Sunday)



b) Summer (Start of school summer holiday approximately indexed by 195, start of school return approximately indexed by 247)



c) Christmas (0=Christmas Day, 7=New Year's Day)



d) Average Year

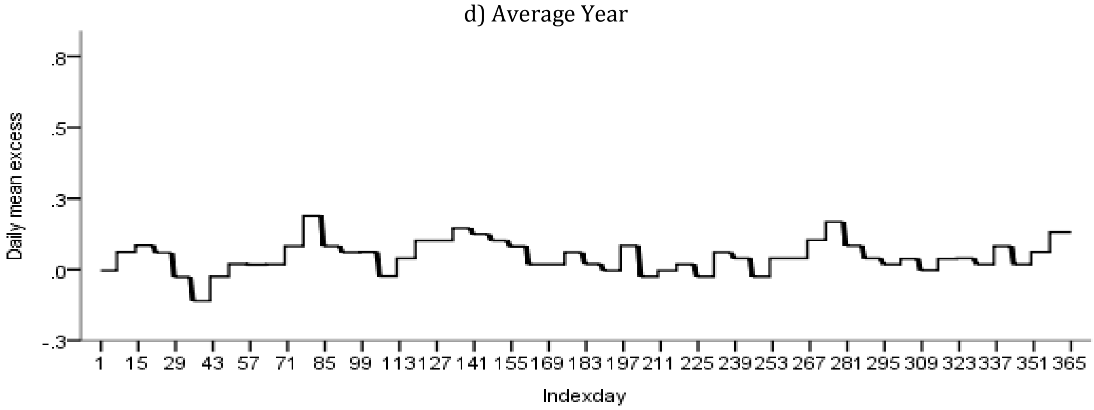
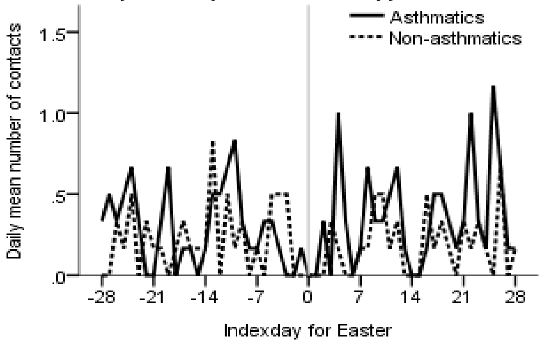
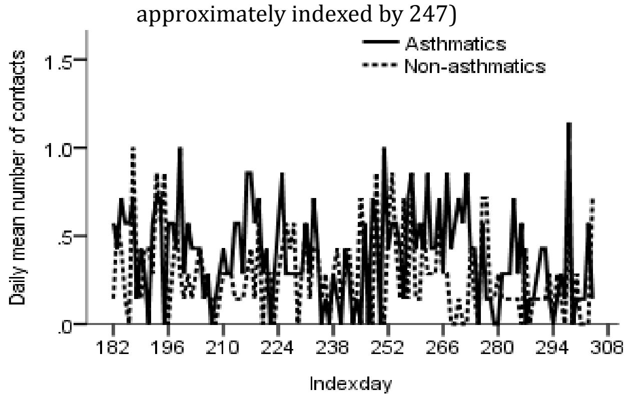


Figure D. 14: Trent Region Acute Visits - plot of the aggregated daily mean excess a) Easter b) Summer, c) Christmas and d) Average Year (seven day average).

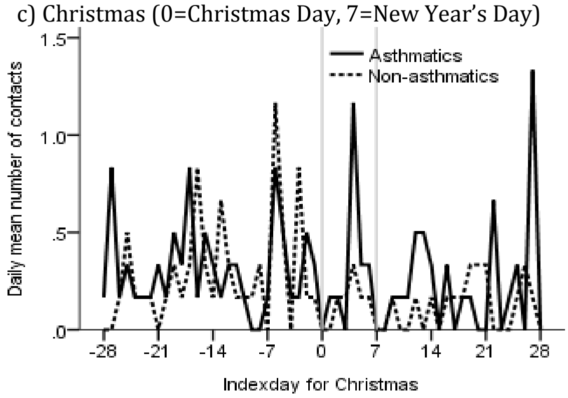
a) Easter (0=Easter Sunday)



b) Summer (Start of school summer holiday approximately indexed by 195, start of school return approximately indexed by 247)



c) Christmas (0=Christmas Day, 7=New Year's Day)



d) Average Year

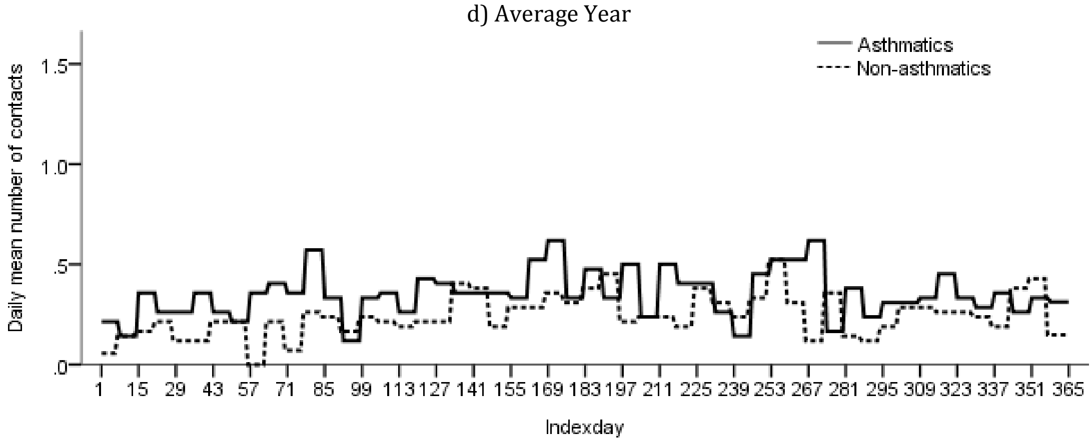
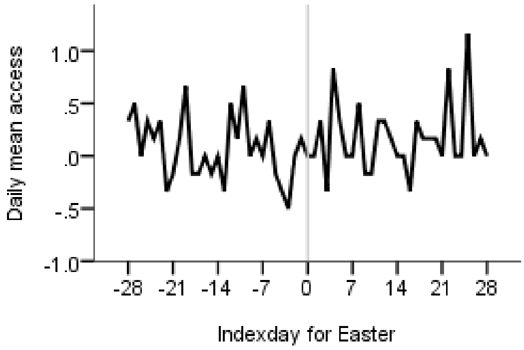
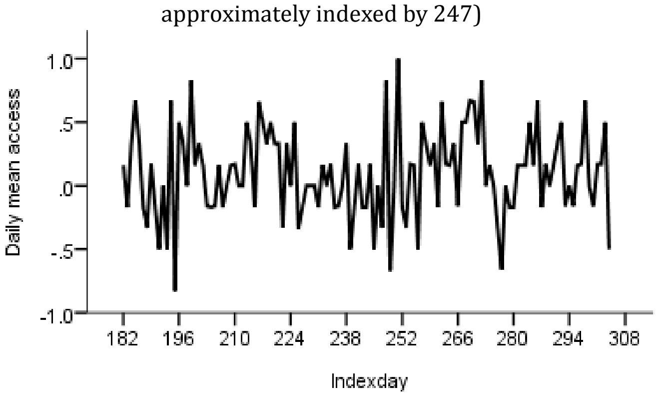


Figure D. 15: Trent Region Casualty Counts - plot of the aggregated daily mean number of contacts (asthmatics, non-asthmatics) a) Easter b) Summer, c) Christmas and d) Average Year (seven day average).

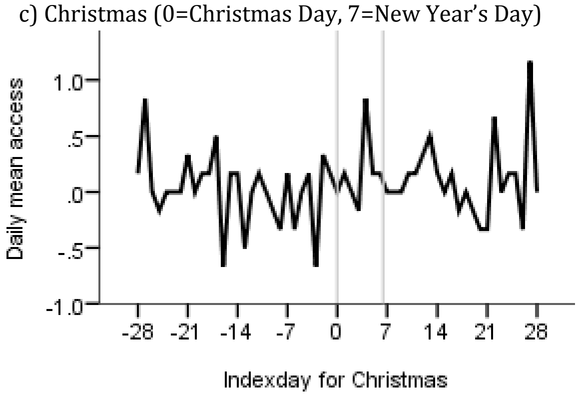
a) Easter (0=Easter Sunday)



b) Summer (Start of school summer holiday approximately indexed by 195, start of school return approximately indexed by 247)



c) Christmas (0=Christmas Day, 7=New Year's Day)



d) Average Year

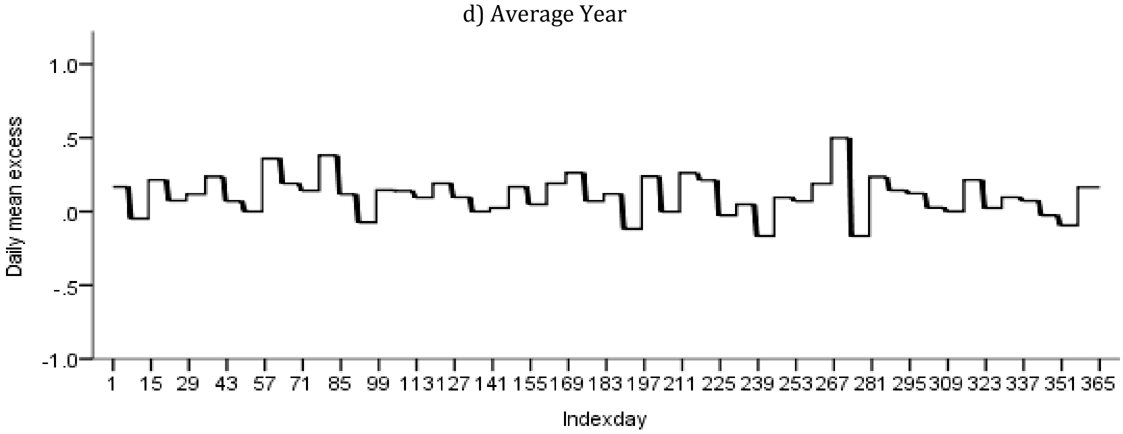
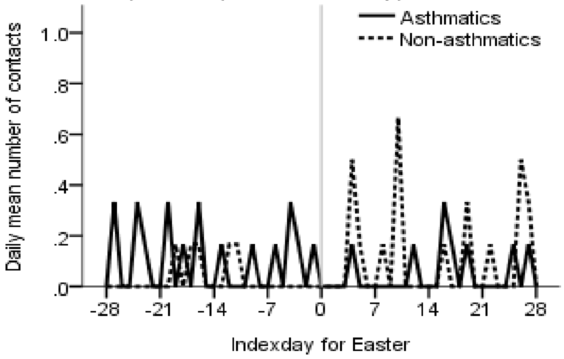
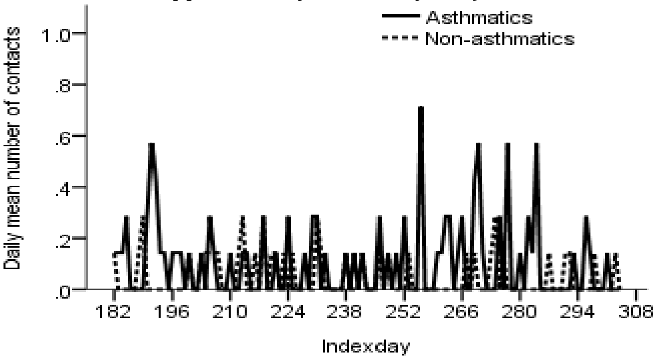


Figure D.16: Trent Region Casualty Counts - plot of the aggregated daily mean excess a) Easter b) Summer, c) Christmas and d) Average Year (seven day average).

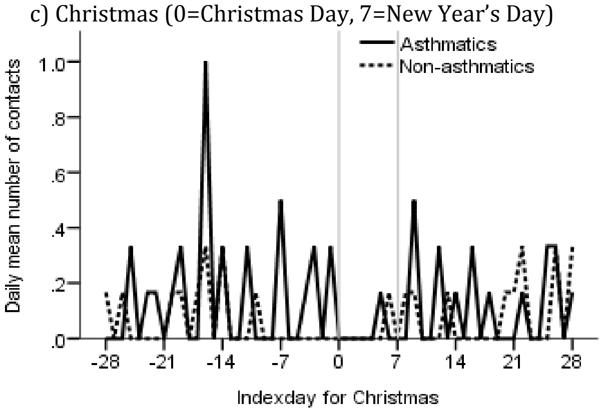
a) Easter (0=Easter Sunday)



b) Summer (Start of school summer holiday approximately indexed by 195, start of school return approximately indexed by 247)



c) Christmas (0=Christmas Day, 7=New Year's Day)



d) Average Year

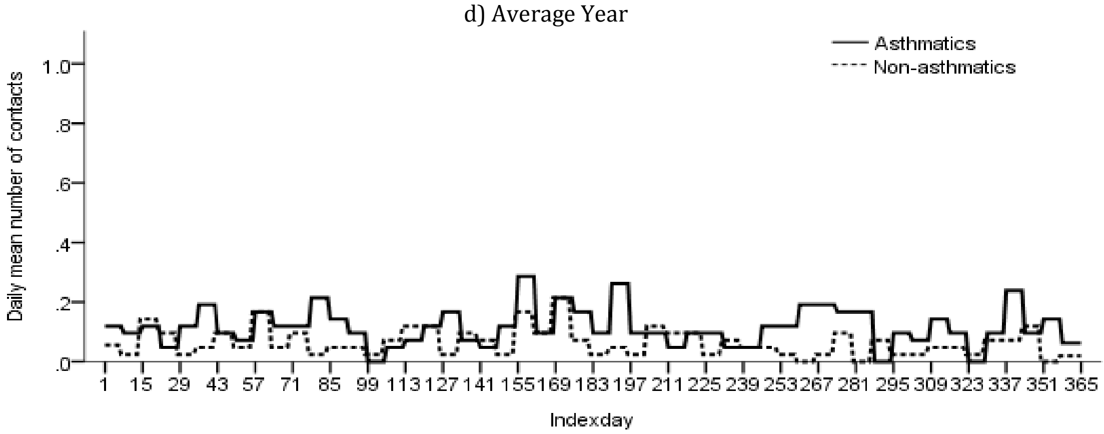
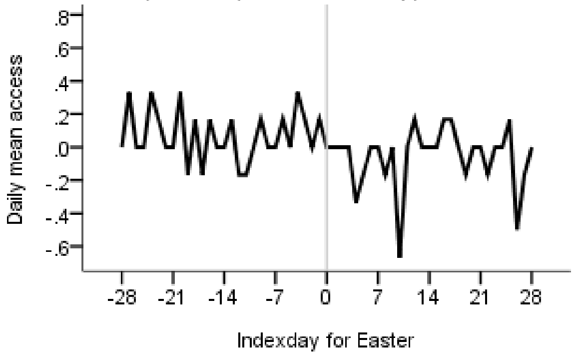
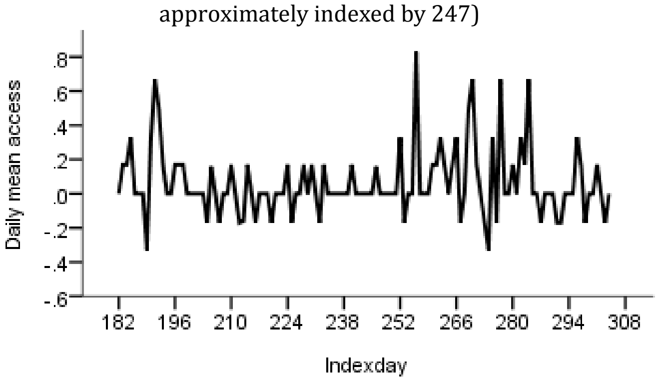


Figure D.17: Trent Region Emergency Consultations - plot of the aggregated daily mean number of contacts (asthmatics, non-asthmatics) a) Easter b) Summer, c) Christmas and d) Average Year (seven day average).

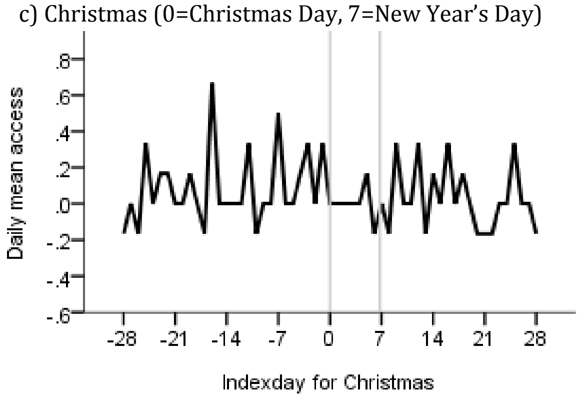
a) Easter (0=Easter Sunday)



b) Summer (Start of school summer holiday approximately indexed by 195, start of school return approximately indexed by 247)



c) Christmas (0=Christmas Day, 7=New Year's Day)



d) Average Year

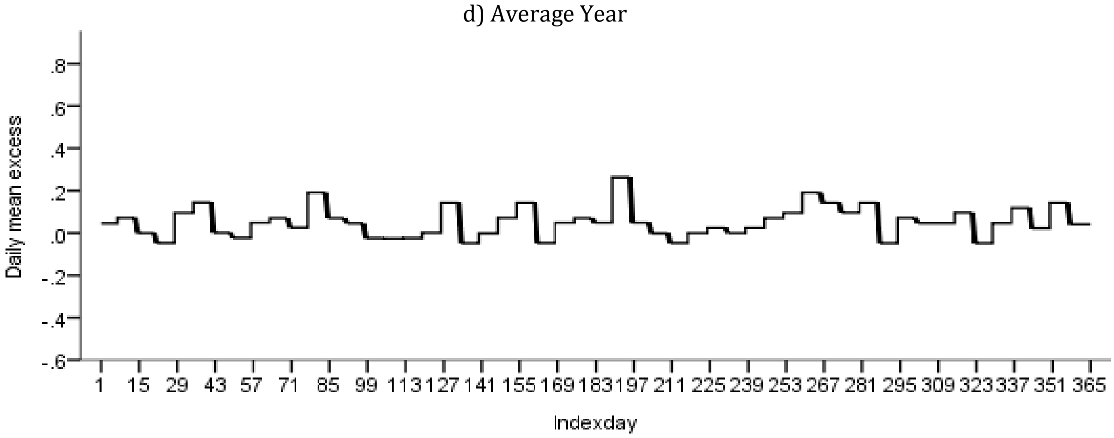
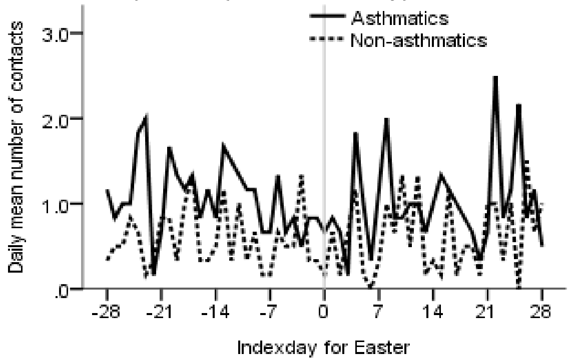
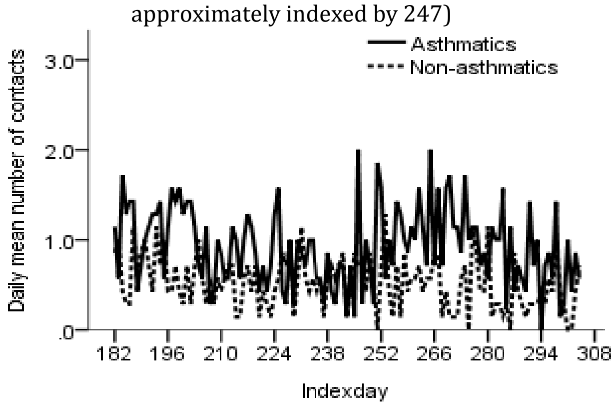


Figure D. 18: Trent Region Emergency Consultations - plot of the aggregated daily mean excess a) Easter b) Summer, c) Christmas and d) Average Year (seven day average).

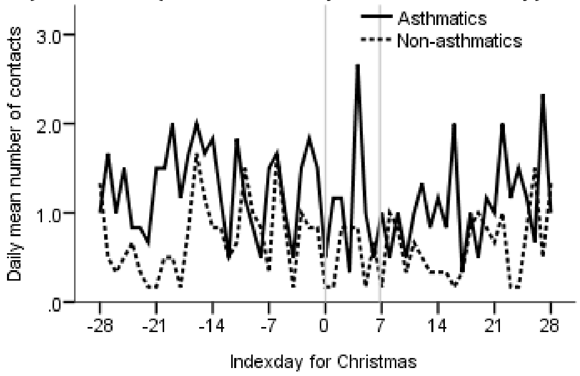
a) Easter (0=Easter Sunday)



b) Summer (Start of school summer holiday approximately indexed by 195, start of school return approximately indexed by 247)



c) Christmas (0=Christmas Day, 7=New Year's Day)



d) Average Year

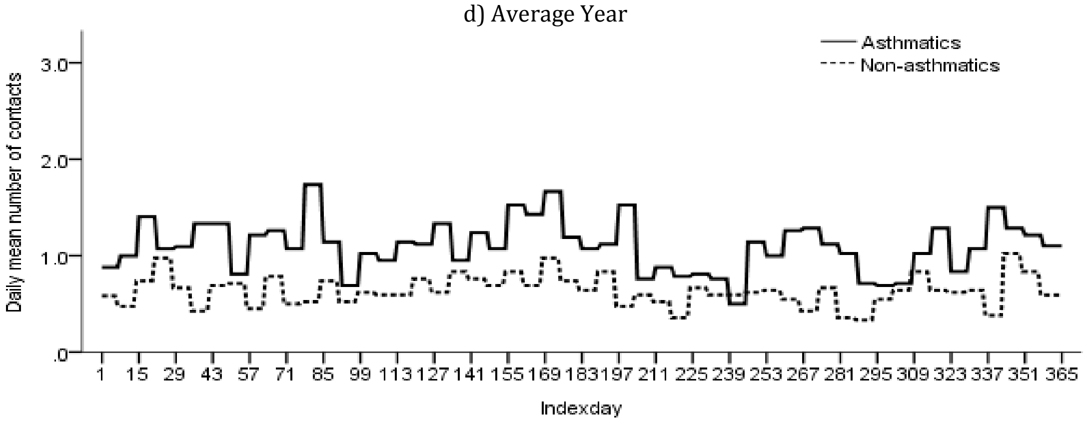
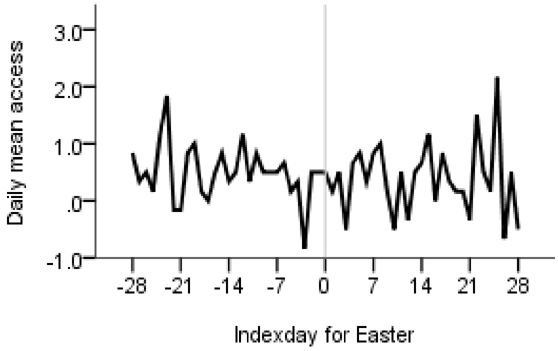
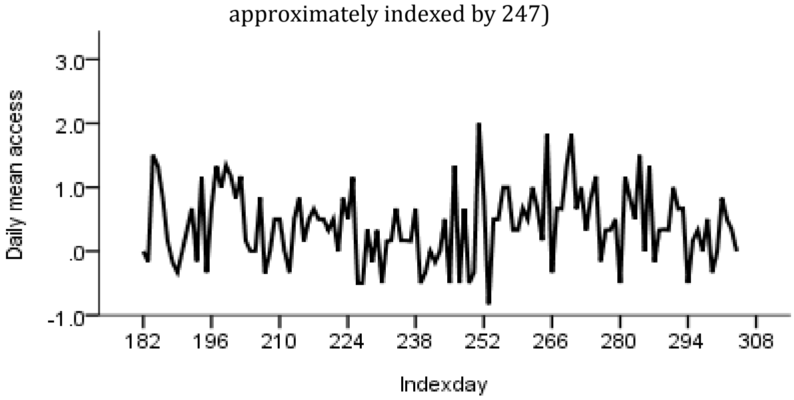


Figure D. 19: Trent Region Emergency Counts - plot of the aggregated daily mean number of contacts (asthmatics, non-asthmatics) a) Easter b) Summer, c) Christmas and d) Average Year (seven day average).

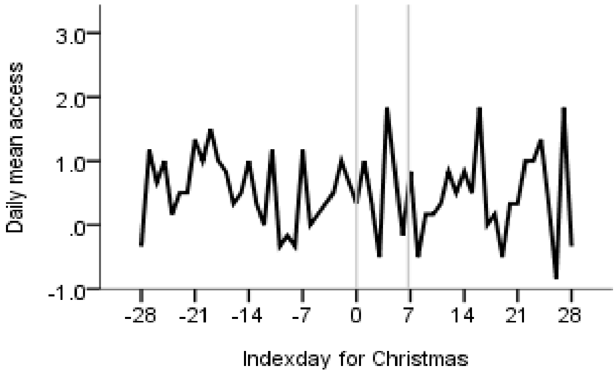
a) Easter (0=Easter Sunday)



b) Summer (Start of school summer holiday approximately indexed by 195, start of school return approximately indexed by 247)



c) Christmas (0=Christmas Day, 7=New Year's Day)



d) Average Year

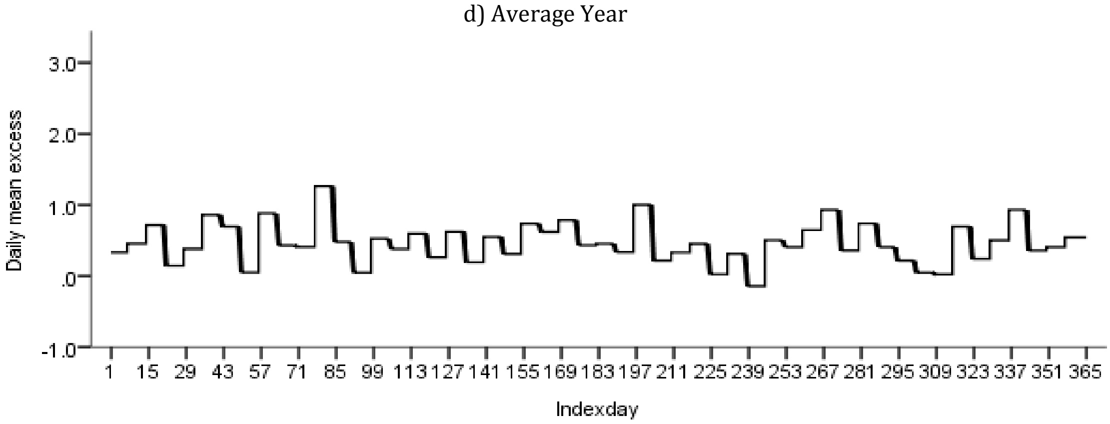
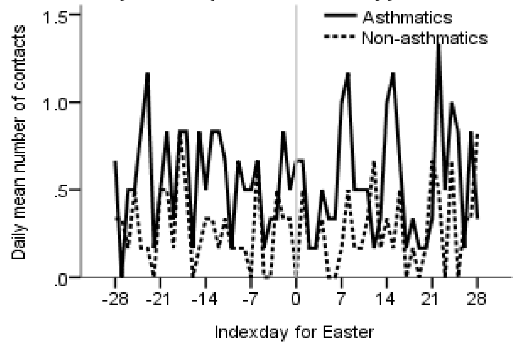
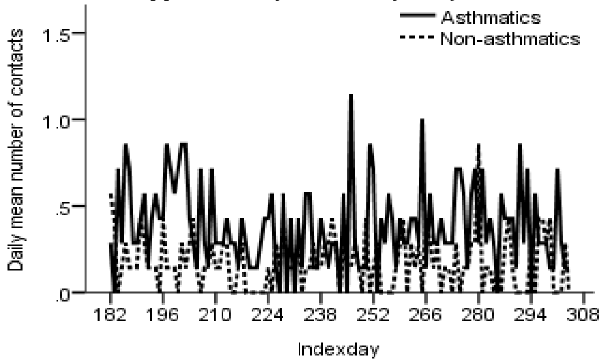


Figure D. 20: Trent Region Emergency Counts - plot of the aggregated daily mean excess a) Easter b) Summer, c) Christmas and d) Average Year (seven day average).

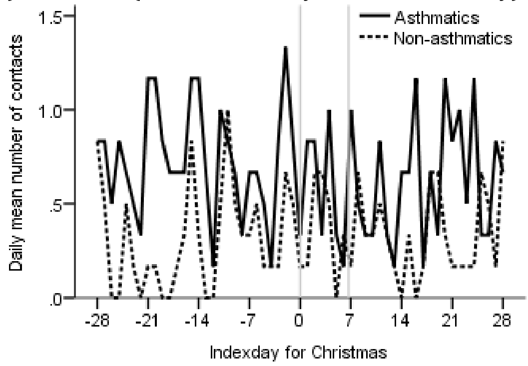
a) Easter (0=Easter Sunday)



b) Summer (Start of school summer holiday approximately indexed by 195, start of school return approximately indexed by 247)



c) Christmas (0=Christmas Day, 7=New Year's Day)



d) Average Year

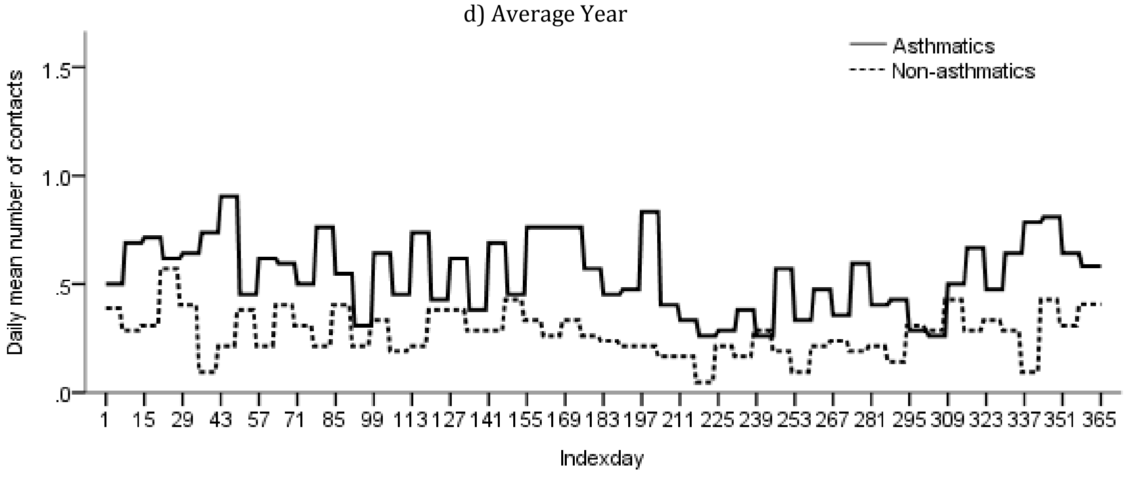
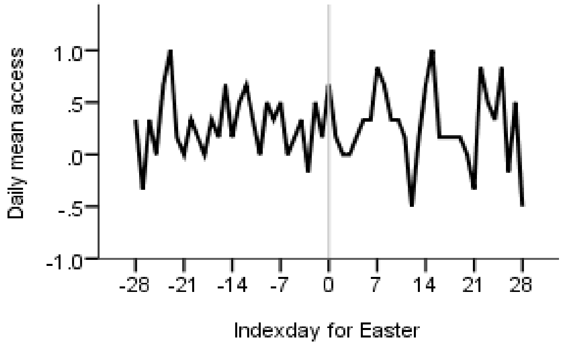
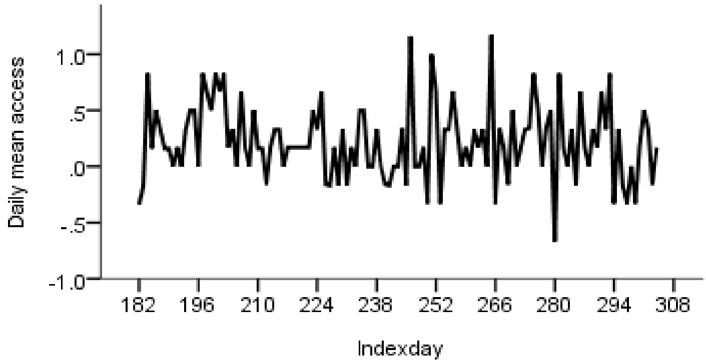


Figure D. 21: Trent Region Out of Hours Counts - plot of the aggregated daily mean number of contacts (asthmatics, non-asthmatics) a) Easter b) Summer, c) Christmas and d) Average Year (seven day average).

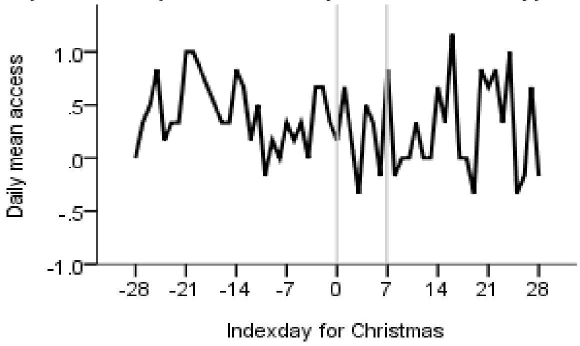
a) Easter (0=Easter Sunday)



b) Summer (Start of school summer holiday approximately indexed by 195, start of school return approximately indexed by 247)



c) Christmas (0=Christmas Day, 7=New Year's Day)



d) Average Year

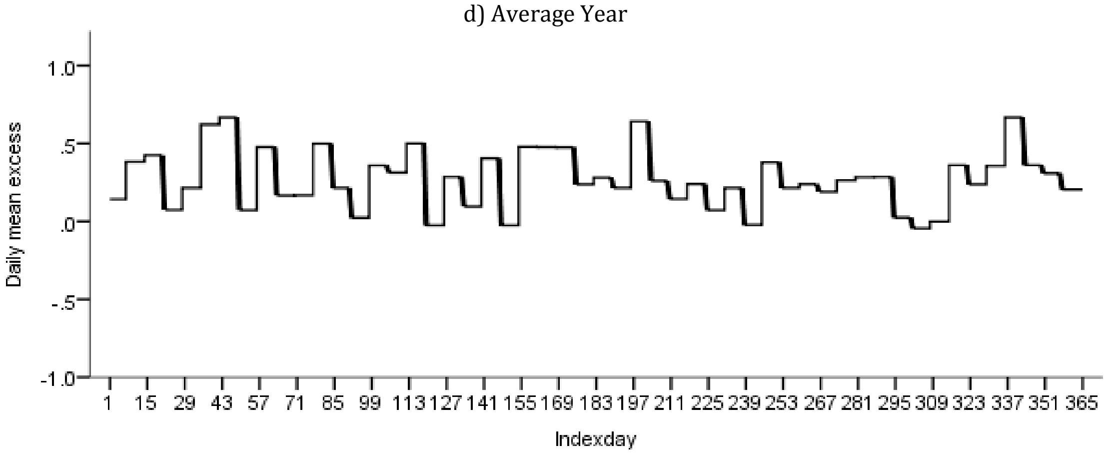


Figure D. 22: Trent Region Out of Hours Counts - plot of the aggregated daily mean excess a) Easter b) Summer, c) Christmas and d) Average Year (seven day average).

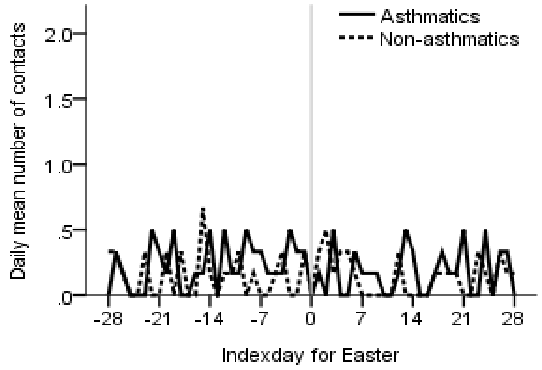
During all three time periods, mean daily counts drop increase and decrease sporadically. Overall in the summer, mean daily counts decrease slightly in August and increase in September.

D1.3. Sheffield Sub-Periods

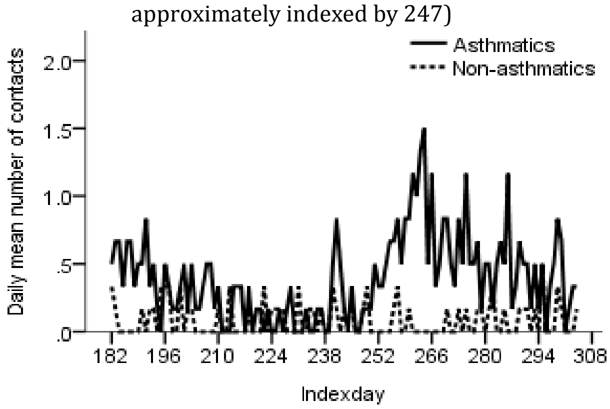
Table D. 3: Sheffield daily mean counts – sub-period descriptive statistics.

Medical contact	Statistic	Easter		Summer		Christmas		All Year	
		Asthmatics	Non-asthmatics	Asthmatics	Non-asthmatics	Asthmatics	Non-asthmatics	Asthmatics	Non-asthmatics
	N	57	57	123	123	57	57	365	365
All Counts	**Mean**	0.89	0.70	0.98	0.82	0.63	0.88	0.81	0.81
	Median	0.83	0.67	0.83	0.83	0.67	0.83	0.67	0.83
	SD	0.49	0.36	0.61	0.42	0.31	0.34	0.51	0.39
	Min’	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.00
	Max’	2.17	1.50	3.33	2.83	1.50	2.00	3.33	2.83
Admissions	**Mean**	0.27	0.24	0.39	0.31	0.20	0.32	0.30	0.30
	Median	0.17	0.17	0.33	0.33	0.17	0.33	0.33	0.33
	SD	0.22	0.19	0.32	0.24	0.18	0.19	0.26	0.23
	Min’	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Max’	0.83	0.67	1.50	1.00	0.50	0.67	1.50	1.00
A&E Counts	**Mean**	0.75	0.54	0.76	0.66	0.50	0.64	0.65	0.65
	Median	0.67	0.50	0.67	0.67	0.50	0.50	0.50	0.67
	SD	0.47	0.27	0.50	0.37	0.29	0.38	0.44	0.35
	Min’	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Max’	2.17	1.17	2.33	1.83	1.50	1.50	2.33	1.83

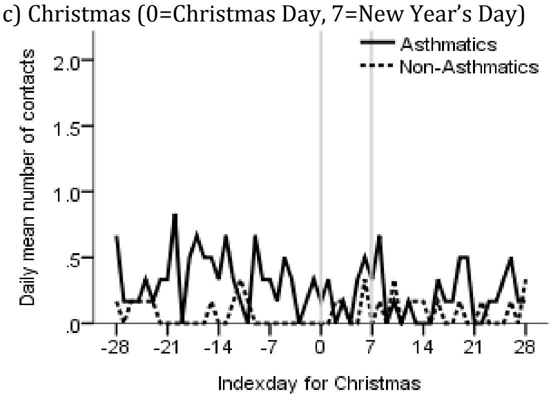
a) Easter (0=Easter Sunday)



b) Summer (Start of school summer holiday approximately indexed by 195, start of school return approximately indexed by 247)



c) Christmas (0=Christmas Day, 7=New Year's Day)



d) Average Year

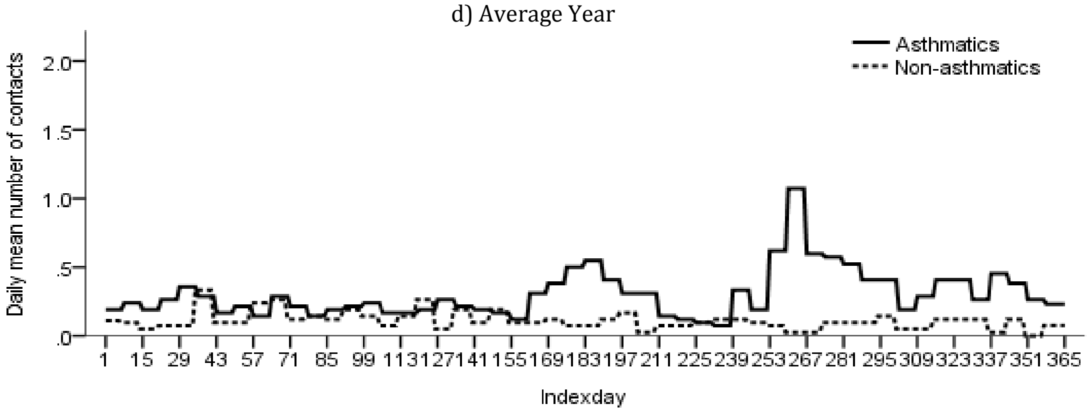
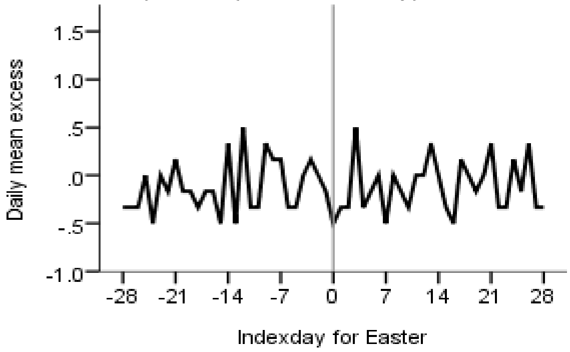
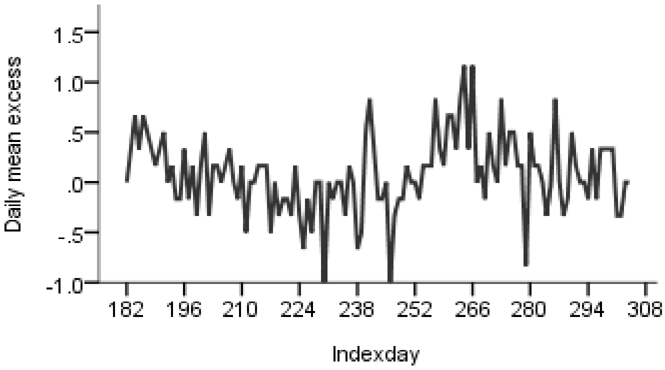


Figure D. 23: Sheffield Admissions - plot of the aggregated daily mean number of contacts at a) Easter b) Summer, c) Christmas and d) Average Year (seven day average).

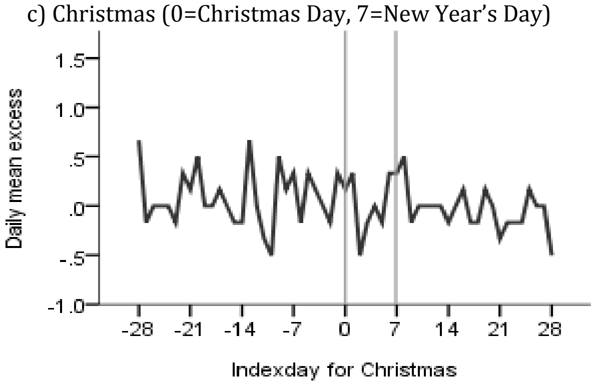
a) Easter (0=Easter Sunday)



b) Summer (Start of school summer holiday approximately indexed by 195, start of school return approximately indexed by 247)



c) Christmas (0=Christmas Day, 7=New Year's Day)



d) Average Year

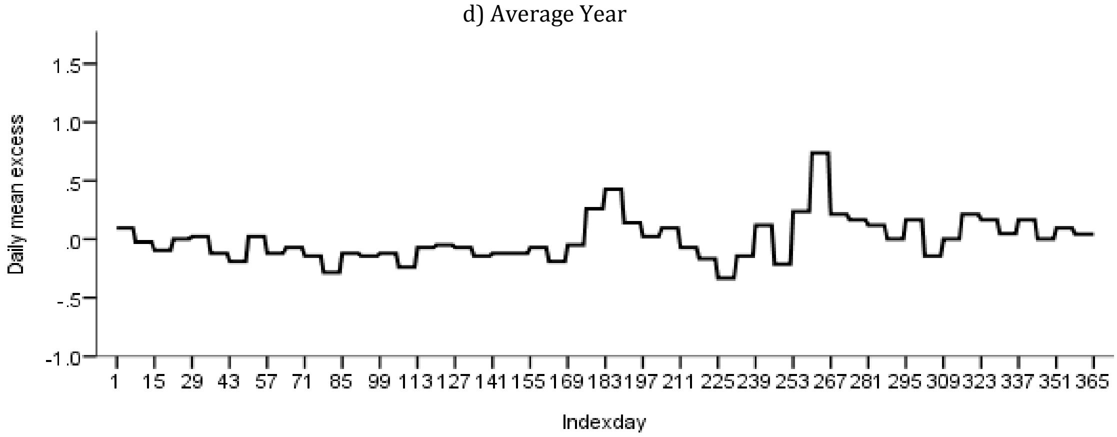
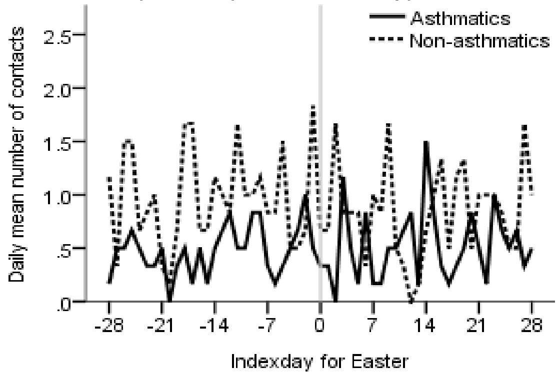
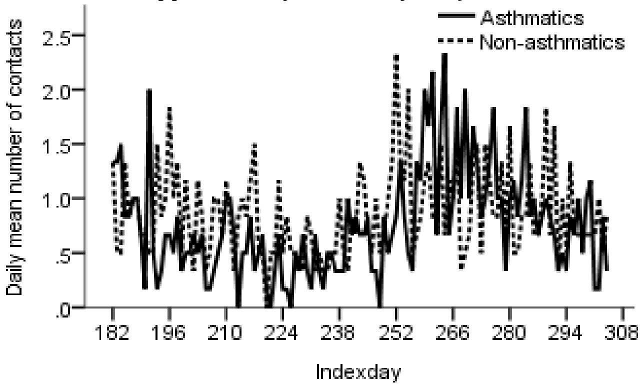


Figure D. 24: Sheffield Admissions - plot of the aggregated daily mean excess at a) Easter b) Summer, c) Christmas and d) Average Year (seven day average).

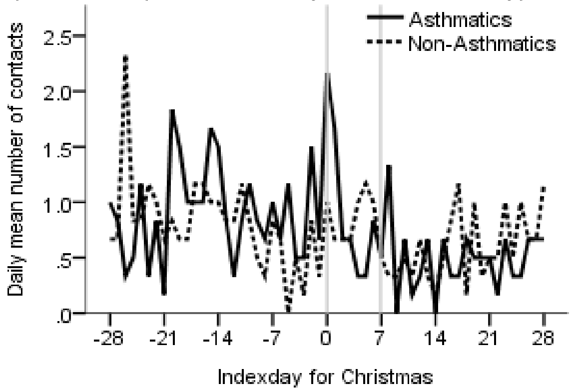
a) Easter (0=Easter Sunday)



b) Summer (Start of school summer holiday approximately indexed by 195, start of school return approximately indexed by 247)



c) Christmas (0=Christmas Day, 7=New Year's Day)



d) Average Year

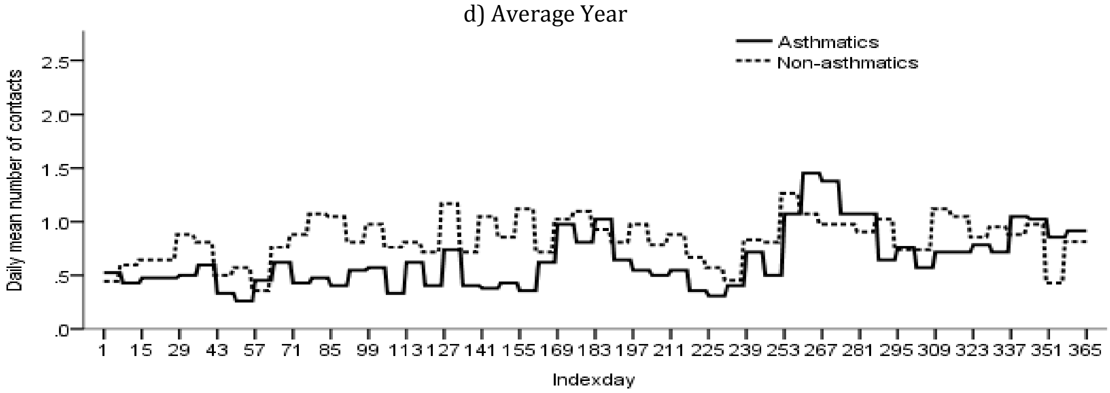
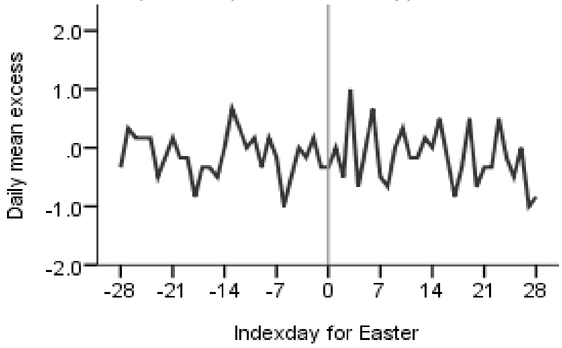
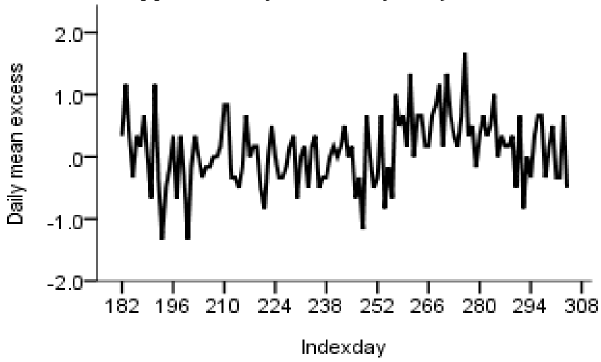


Figure D. 25: Sheffield A&E Counts - plot of the aggregated daily mean number of contacts at a) Easter b) Summer, c) Christmas and d) Average Year (seven day average).

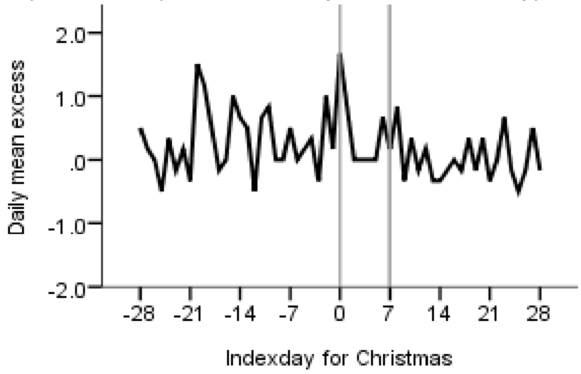
a) Easter (0=Easter Sunday)



b) Summer (Start of school summer holiday approximately indexed by 195, start of school return approximately indexed by 247)



c) Christmas (0=Christmas Day, 7=New Year's Day)



d) Average Year

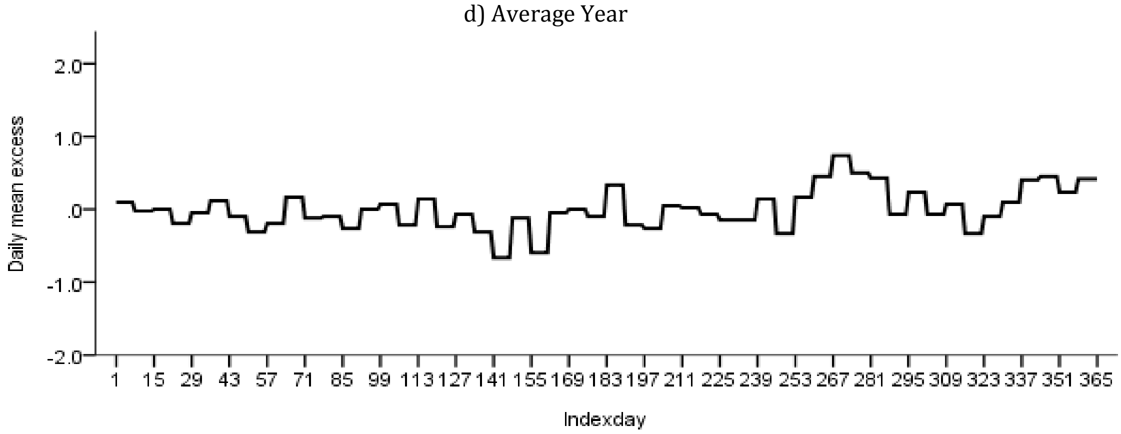


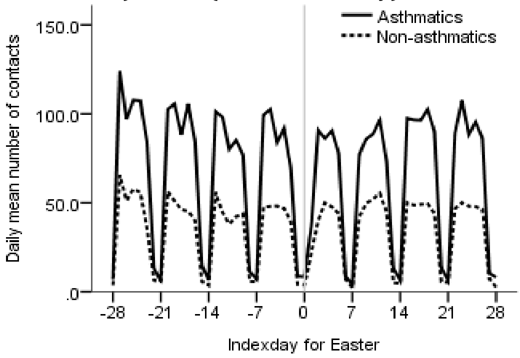
Figure D. 26: Sheffield A&E Counts - plot of the aggregated daily mean excess at a) Easter b) Summer, c) Christmas and d) Average Year (seven day average).

D1.4. Scotland Sub Periods

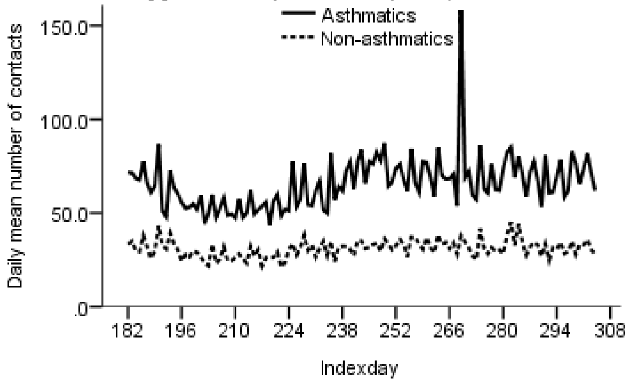
Table D. 4: Scotland daily mean counts – sub-period descriptive statistics.

		Easter		Summer		Christmas		All Year	
Medical contact	**Statistic**	**Asthmatics**	**Non-asthmatics**	**Asthmatics**	**Non-asthmatics**	**Asthmatics**	**Non-asthmatics**	**Asthmatics**	**Non-asthmatics**
	N	57	57	123	123	57	57	365	365
All Counts	**Mean**	66.66	34.54	65.77	31.03	69.23	32.04	69.62	33.63
	Median	85.83	44.50	64.17	31.00	72.83	33.33	69.33	33.50
	SD	39.78	20.44	13.95	4.64	21.65	10.32	14.40	6.61
	Min’	4.00	2.17	43.83	21.17	4.83	2.33	4.83	2.33
	Max’	123.83	65.67	158.50	45.17	104.83	48.33	158.50	49.67
Acute Visits	**Mean**	0.31	0.20	0.30	0.14	0.45	0.21	0.36	0.19
	Median	0.17	0.17	0.33	0.17	0.33	0.17	0.33	0.17
	SD	0.32	0.26	0.29	0.17	0.38	0.22	0.32	0.21
	Min’	0	0	0	0	0	0	0	0
	Max’	1.17	1.00	1.67	1.00	1.50	1.17	1.67	1.33
Casualty Counts	**Mean**	1.04	0.72	1.13	0.84	0.89	0.65	1.04	0.78
	Median	0.83	0.67	1.17	0.83	0.83	0.50	1.00	0.67
	SD	0.50	0.44	0.49	0.39	0.44	0.39	0.48	0.41
	Min’	0.33	0	0	0	0.17	0	0	0
	Max’	2.33	2.33	2.50	2.00	2.17	1.67	2.50	2.17
Emergency Consultations	**Mean**	1.05	0.53	0.81	0.43	1.13	0.60	1.01	0.53
	Median	1.17	0.50	0.67	0.33	1.17	0.50	1.00	0.50
	SD	0.82	0.44	0.47	0.29	0.60	0.35	0.55	0.33
	Min’	0	0	0	0	0	0	0	0.00
	Max’	3.17	1.50	2.17	1.33	3.00	1.50	3.17	1.50
Emergency Counts	**Mean**	4.13	2.42	3.85	2.19	4.42	2.56	4.14	2.40
	Median	4.17	2.33	3.83	2.17	4.33	2.50	4.17	2.33
	SD	0.96	0.88	1.08	0.71	1.07	0.74	1.10	0.71
	Min’	2.50	0.83	1.00	0.83	2.50	1.33	1.00	0.83
	Max’	7.50	5.00	6.50	5.17	6.50	4.33	7.50	5.17
Out of Hours Counts	**Mean**	1.73	0.96	1.60	0.77	1.95	1.10	1.73	0.91
	Median	1.17	0.83	1.50	0.67	1.67	1.00	1.67	0.83
	SD	1.09	0.63	0.66	0.41	0.82	0.47	0.68	0.44
	Min’	0.17	0	0	0	0.50	0.17	0	0
	Max’	3.83	3.33	4.17	3.50	4.33	2.17	4.33	3.50

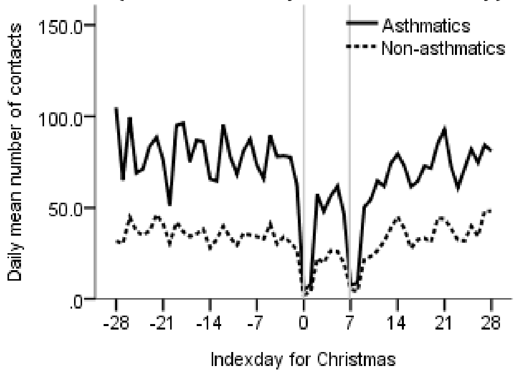
a) Easter (0=Easter Sunday)



b) Summer (Start of school summer holiday approximately indexed by 195, start of school return approximately indexed by 247)



c) Christmas (0=Christmas Day, 7=New Year's Day)



d) Average Year

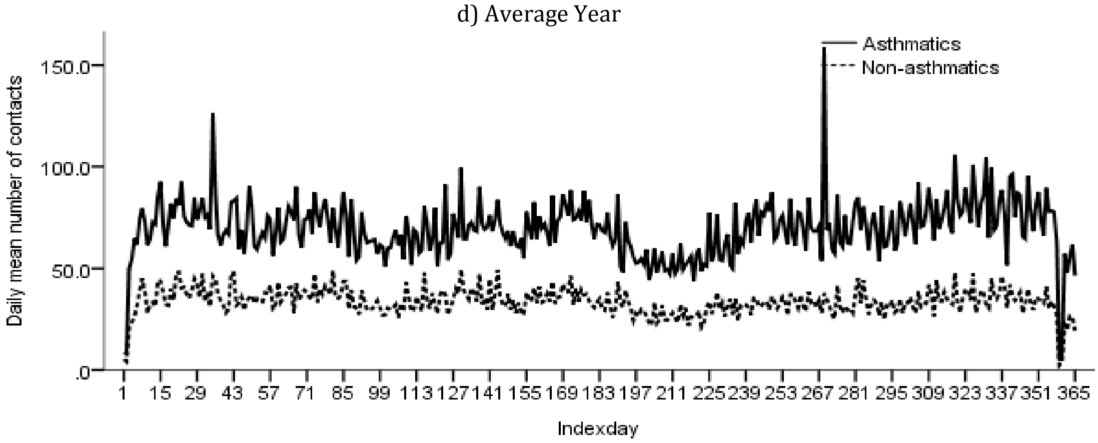
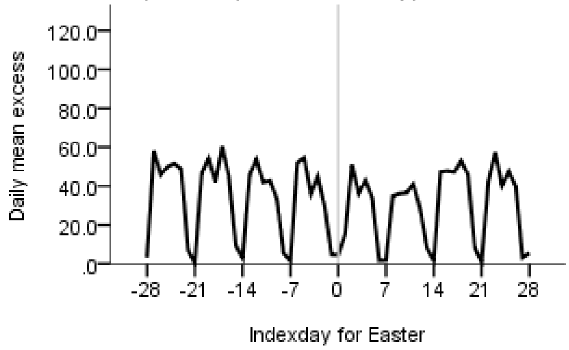
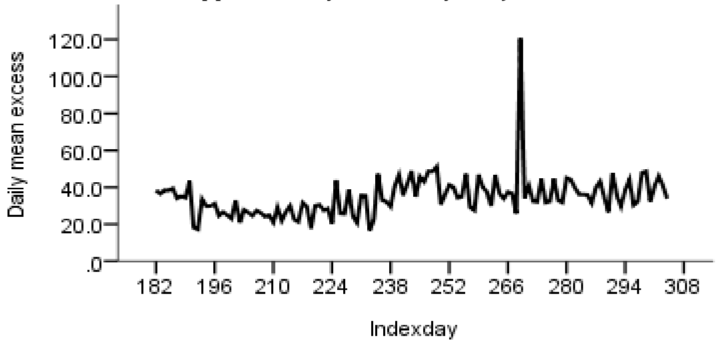


Figure D. 27: Scotland All Counts - Plot of the aggregated daily mean number of contacts (asthmatics, non-asthmatics) a) Easter b) Summer, c) Christmas and d) Average Year.

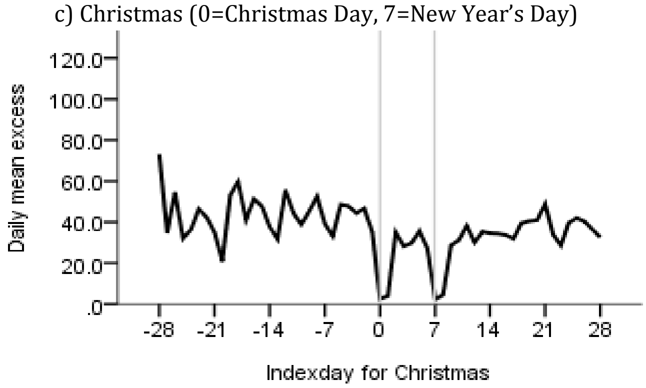
a) Easter (0=Easter Sunday)



b) Summer (Start of school summer holiday approximately indexed by 195, start of school return approximately indexed by 247)



c) Christmas (0=Christmas Day, 7=New Year's Day)



d) Average Year

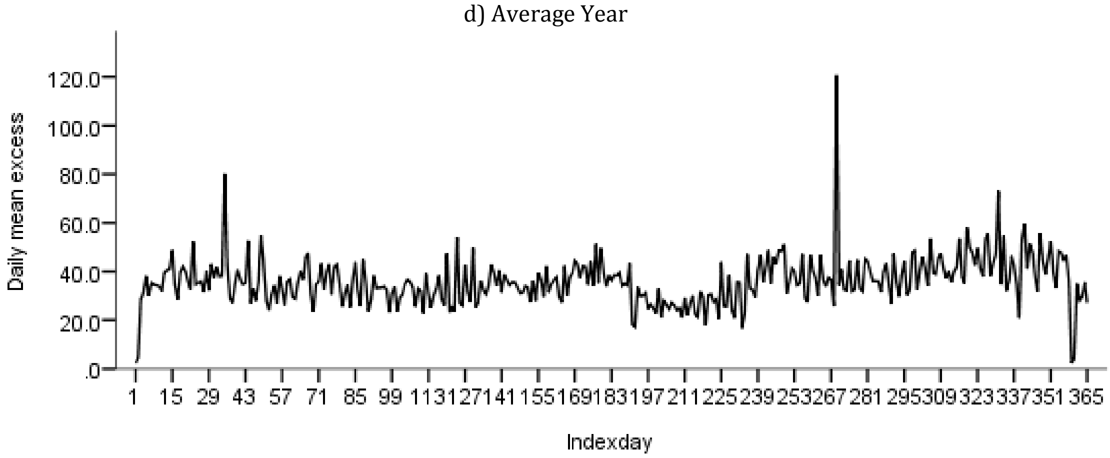
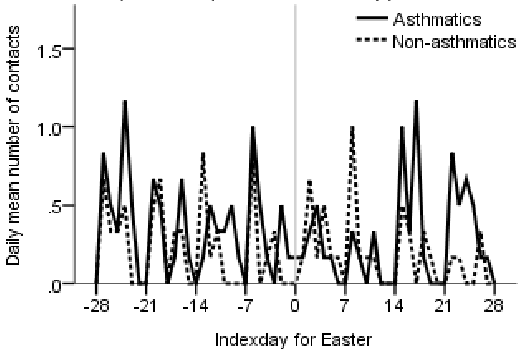
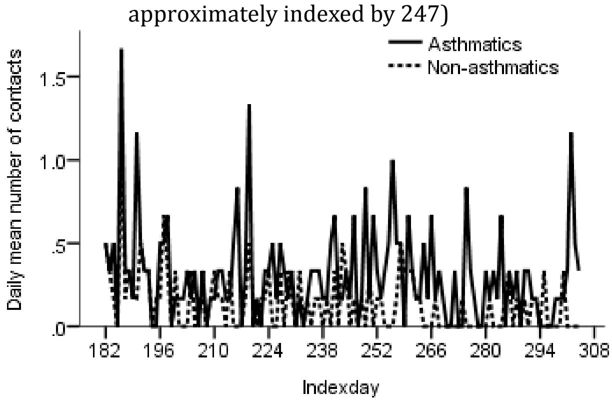


Figure D. 28: Scotland All Counts - plot of the aggregated daily mean excess a) Easter b) Summer, c) Christmas and d) Average Year.

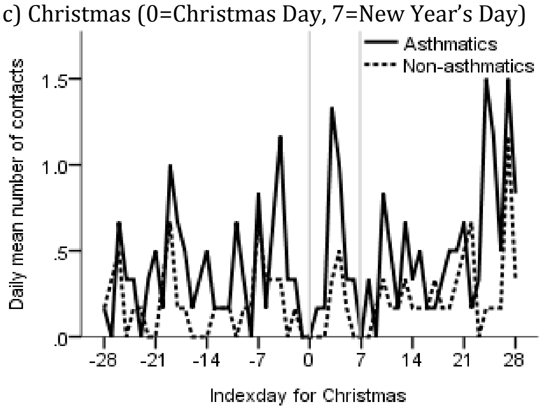
a) Easter (0=Easter Sunday)



b) Summer (Start of school summer holiday approximately indexed by 195, start of school return approximately indexed by 247)



c) Christmas (0=Christmas Day, 7=New Year's Day)



d) Average Year

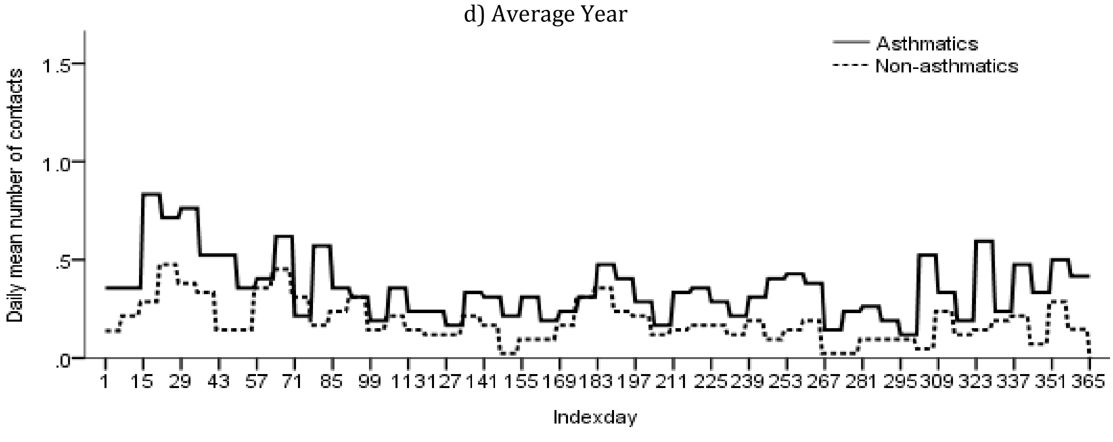
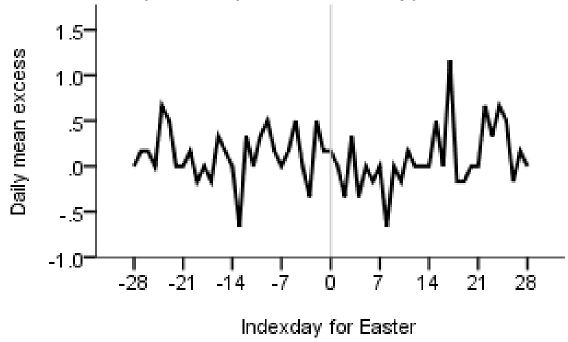
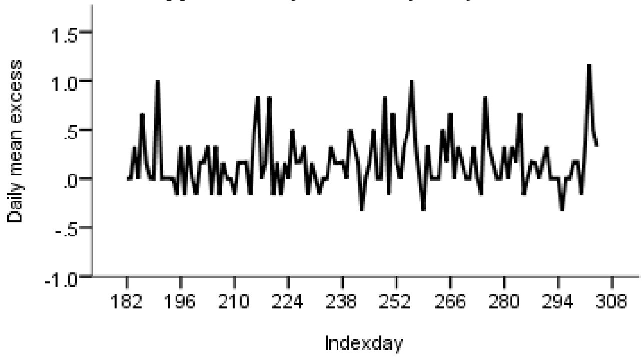


Figure D. 29: Scotland Acute Visits - Plot of the aggregated daily mean number of contacts (asthmatics, non-asthmatics) a) Easter b) Summer, c) Christmas and d) Average Year (seven day average).

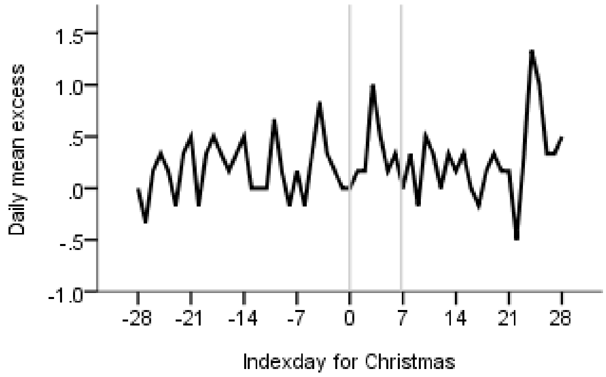
a) Easter (0=Easter Sunday)



b) Summer (Start of school summer holiday approximately indexed by 195, start of school return approximately indexed by 247)



c) Christmas (0=Christmas Day, 7=New Year's Day)



d) Average Year

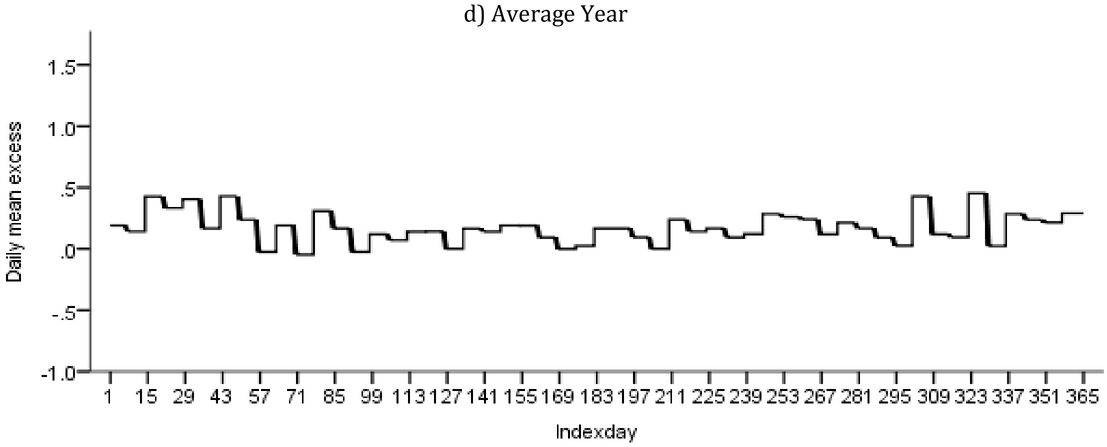
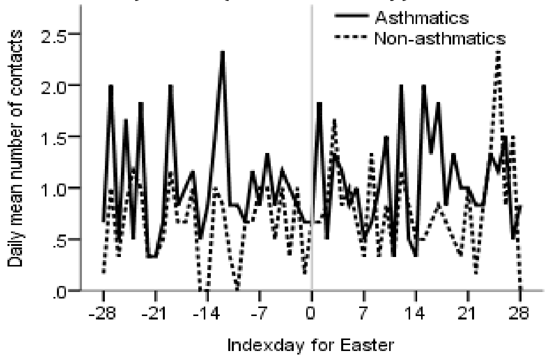
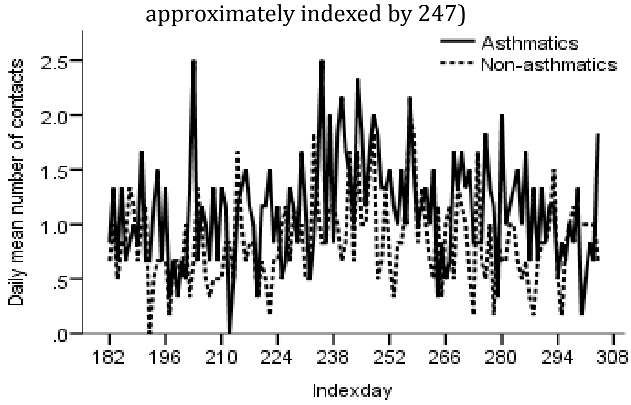


Figure D. 30: Scotland Acute Visits - plot of the aggregated daily mean excess a) Easter b) Summer, c) Christmas and d) Average Year (seven day average).

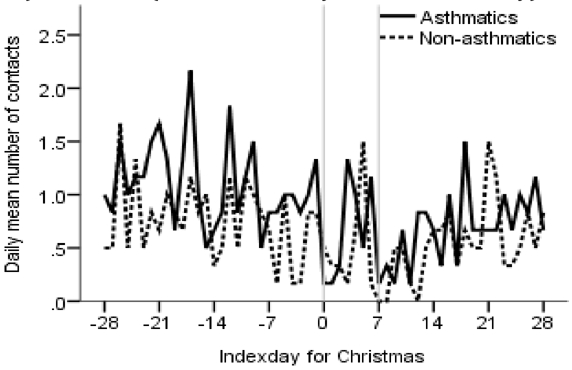
a) Easter (0=Easter Sunday)



b) Summer (Start of school summer holiday approximately indexed by 195, start of school return approximately indexed by 247)



c) Christmas (0=Christmas Day, 7=New Year's Day)



d) Average Year

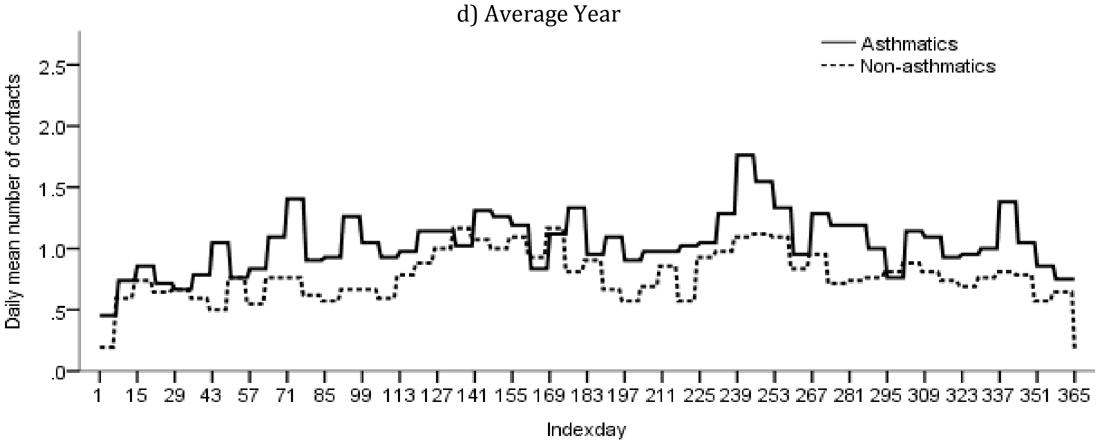
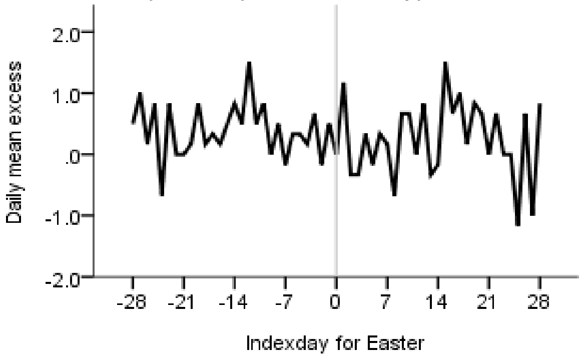
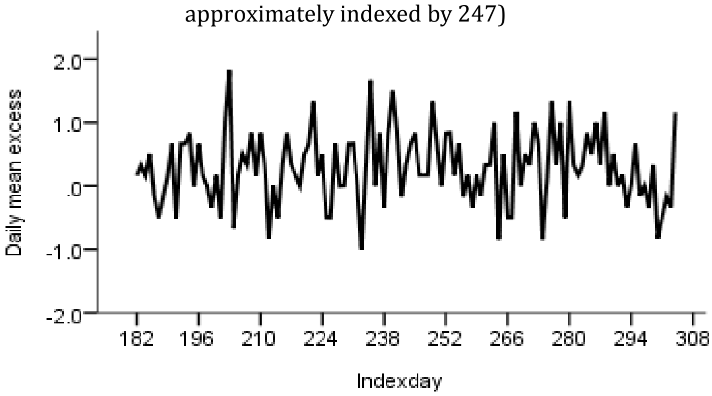


Figure D. 31: Scotland Casualty Counts - Plot of the aggregated daily mean number of contacts (asthmatics, non-asthmatics) a) Easter b) Summer, c) Christmas and d) Average Year (seven day average).

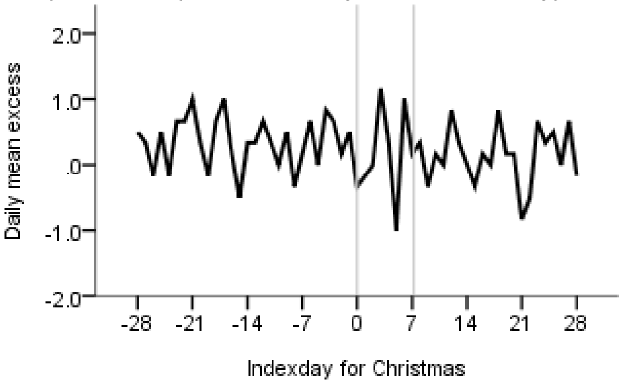
a) Easter (0=Easter Sunday)



b) Summer (Start of school summer holiday approximately indexed by 195, start of school return approximately indexed by 247)



c) Christmas (0=Christmas Day, 7=New Year's Day)



d) Average Year

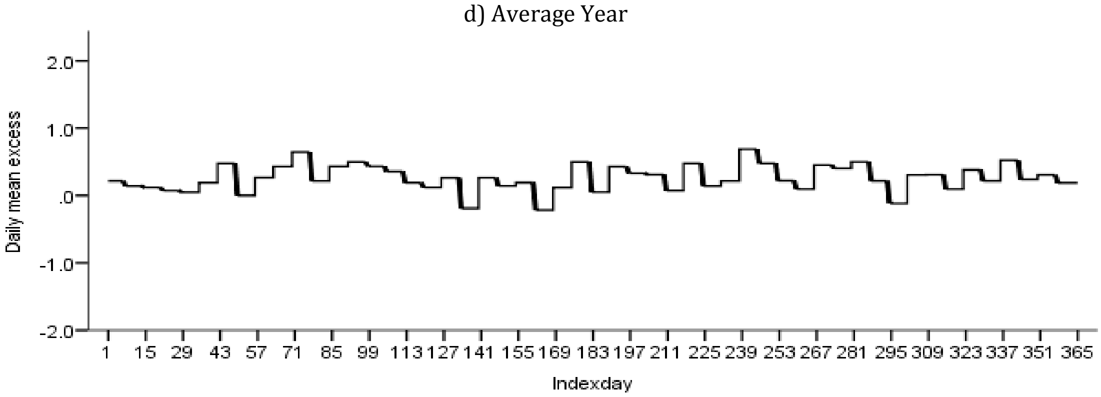
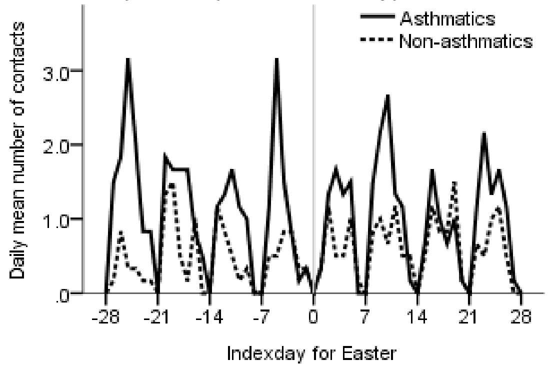
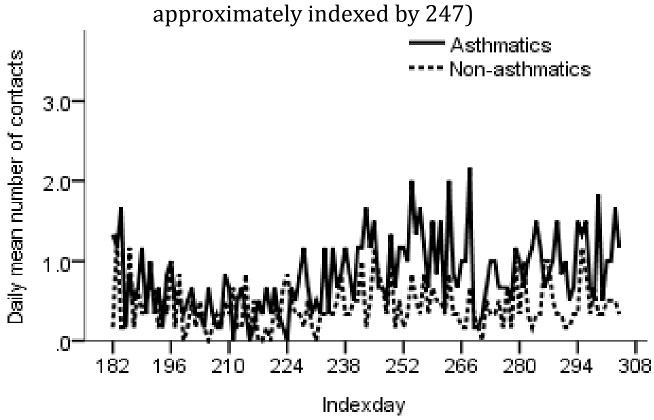


Figure D. 32: Scotland Casualty Counts - plot of the aggregated daily mean excess a) Easter b) Summer, c) Christmas and d) Average Year (seven day average).

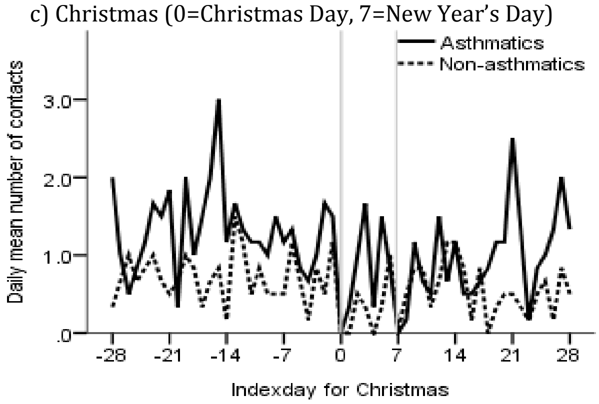
a) Easter (0=Easter Sunday)



b) Summer (Start of school summer holiday approximately indexed by 195, start of school return approximately indexed by 247)



c) Christmas (0=Christmas Day, 7=New Year's Day)



d) Average Year

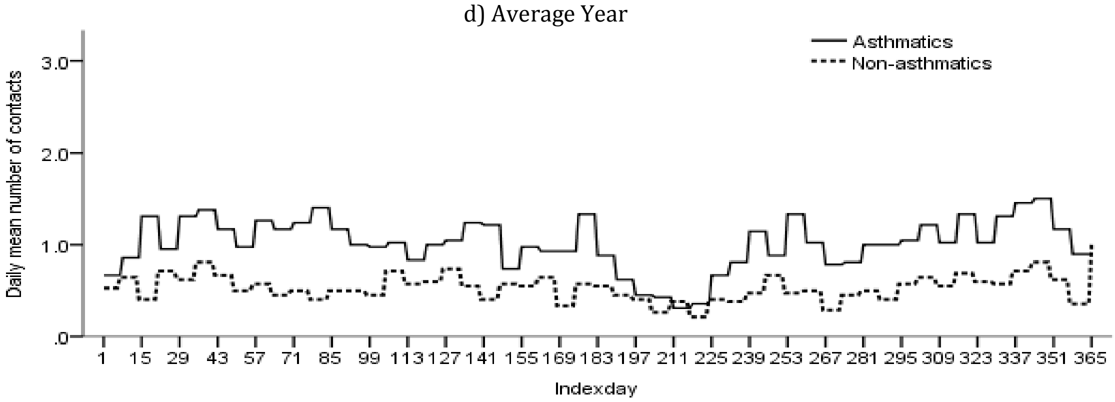
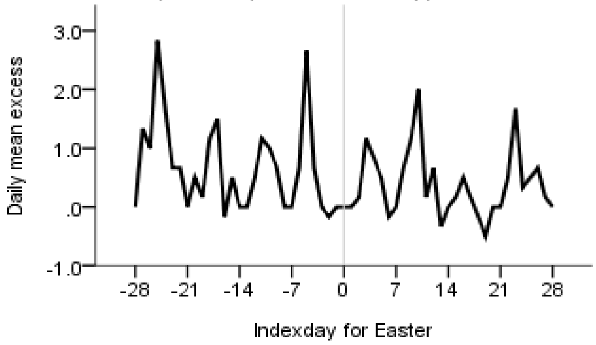
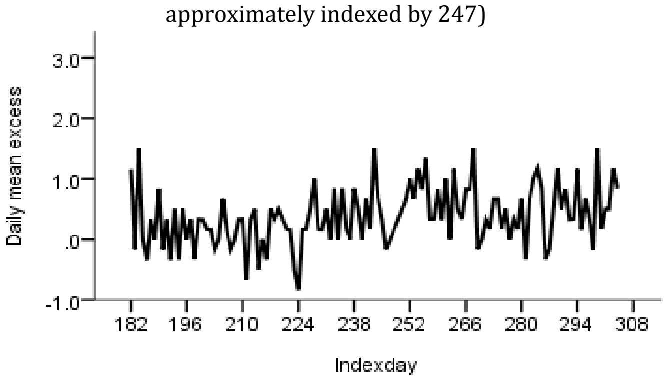


Figure D. 33: Scotland Emergency Consultations - Plot of the aggregated daily mean number of contacts (asthmatics, non-asthmatics) a) Easter b) Summer, c) Christmas and d) Average Year (seven day average).

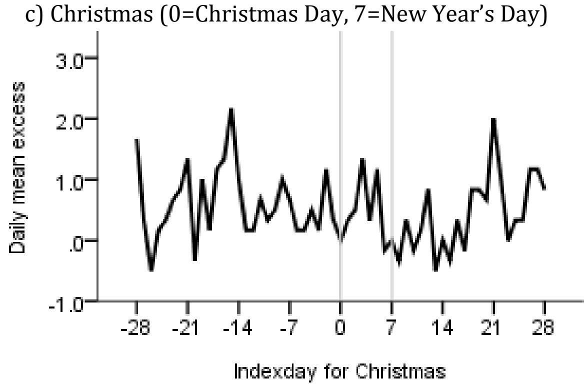
a) Easter (0=Easter Sunday)



b) Summer (Start of school summer holiday approximately indexed by 195, start of school return approximately indexed by 247)



c) Christmas (0=Christmas Day, 7=New Year's Day)



d) Average Year

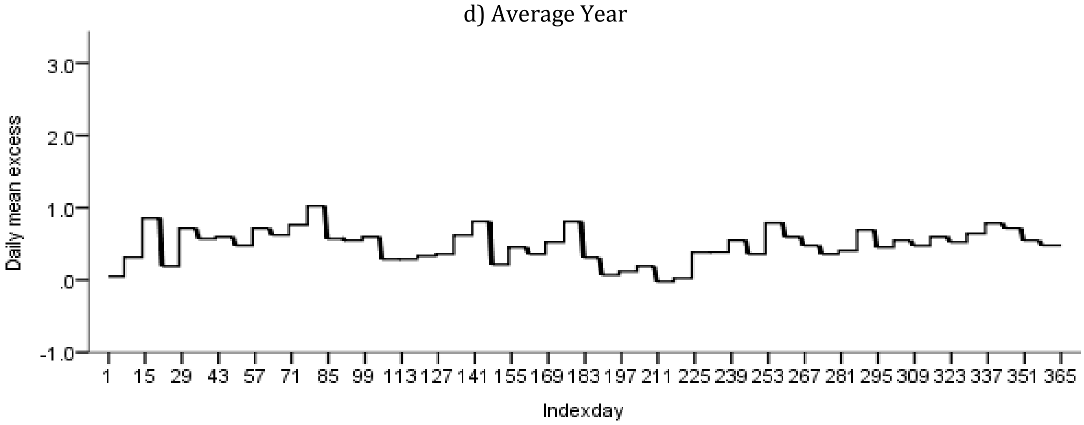
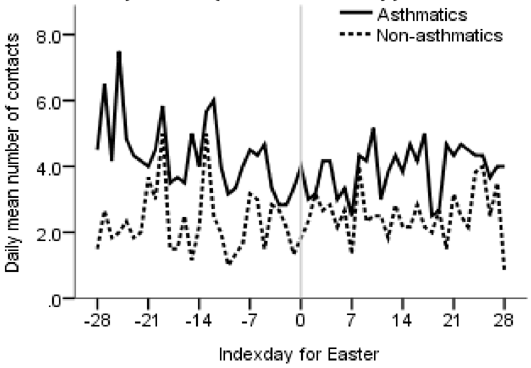
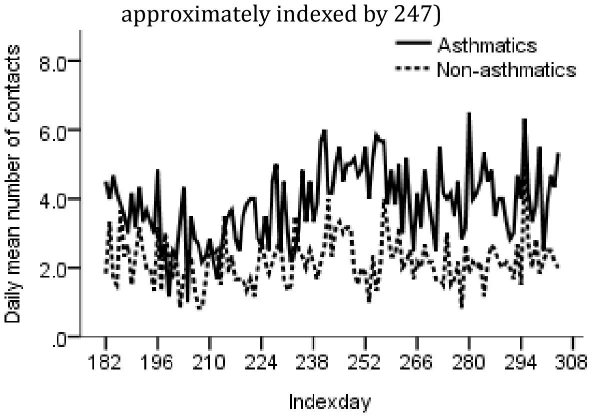


Figure D. 34: Scotland Emergency Consultations - plot of the aggregated daily mean excess a) Easter b) Summer, c) Christmas and d) Average Year (seven day average).

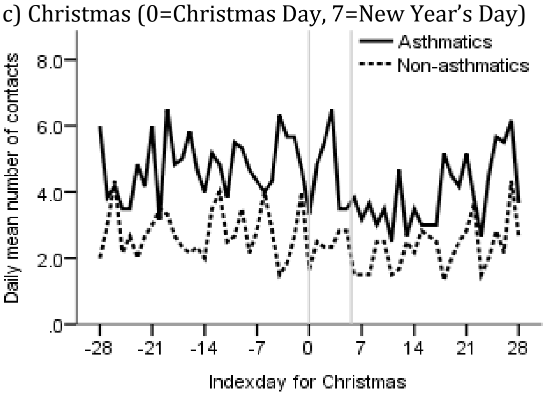
a) Easter (0=Easter Sunday)



b) Summer (Start of school summer holiday approximately indexed by 195, start of school return approximately indexed by 247)



c) Christmas (0=Christmas Day, 7=New Year's Day)



d) Average Year

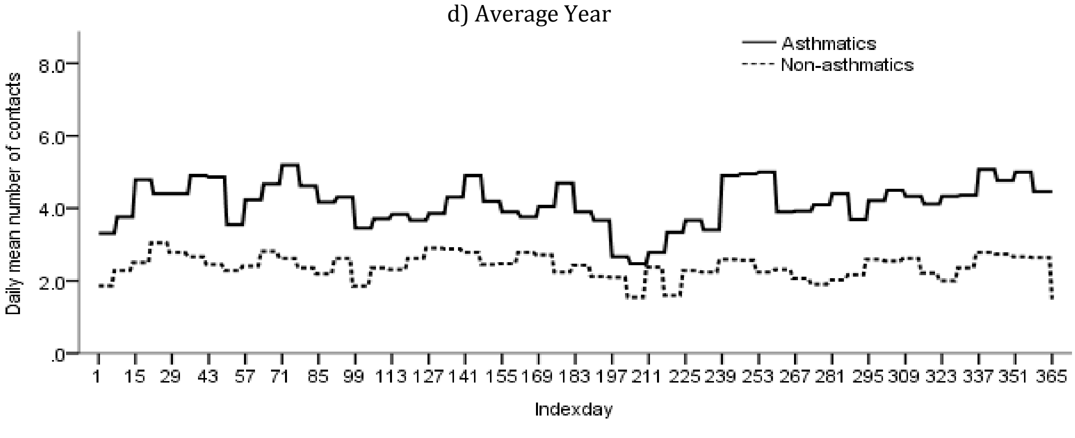


Figure D. 35: Scotland Emergency Counts - Plot of the aggregated daily mean number of contacts (asthmatics, non-asthmatics) a) Easter b) Summer, c) Christmas and d) Average Year (seven day average).

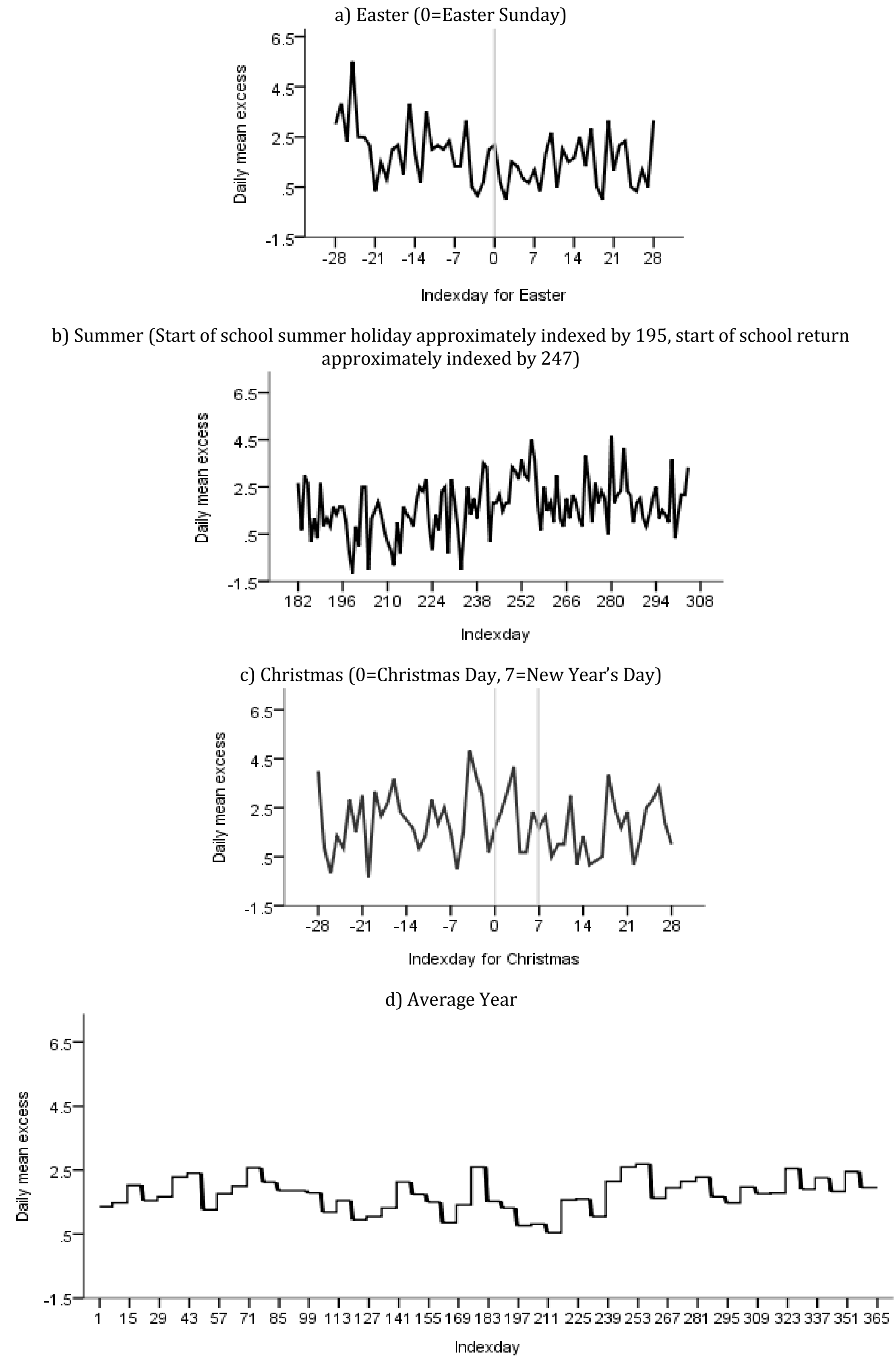
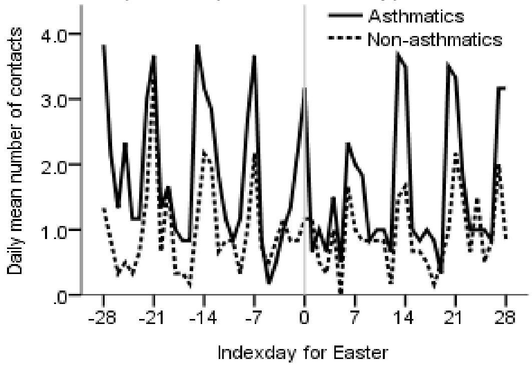
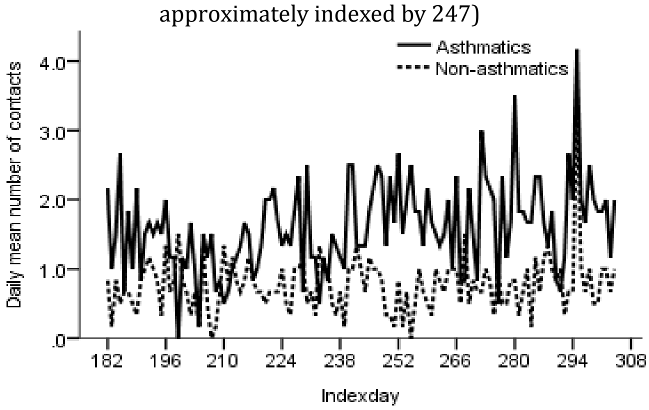


Figure D. 36: Scotland Emergency Counts - plot of the aggregated daily mean excess a) Easter b) Summer, c) Christmas and d) Average Year (seven day average).

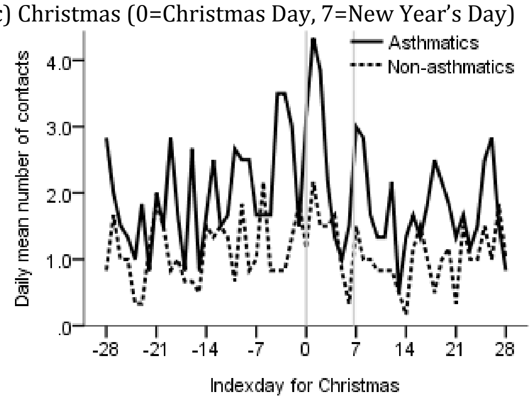
a) Easter (0=Easter Sunday)



b) Summer (Start of school summer holiday approximately indexed by 195, start of school return approximately indexed by 247)



c) Christmas (0=Christmas Day, 7=New Year's Day)



d) Average Year

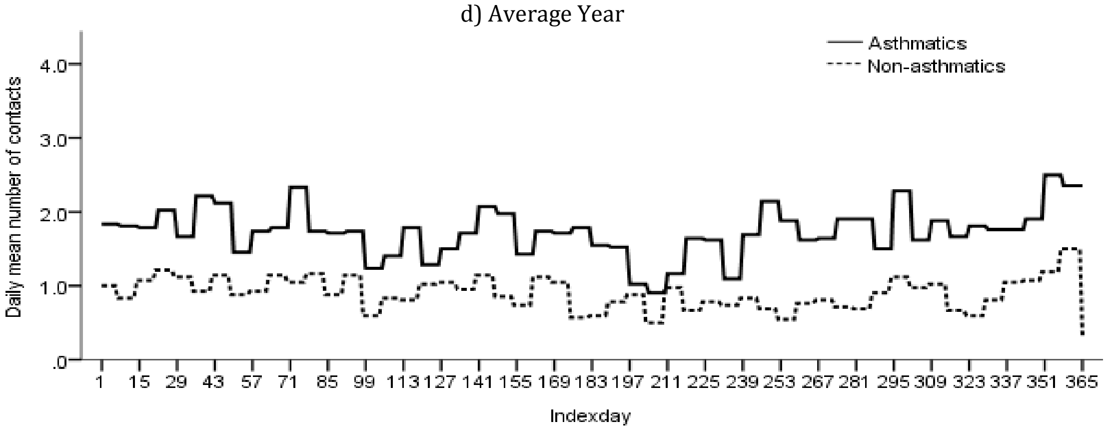
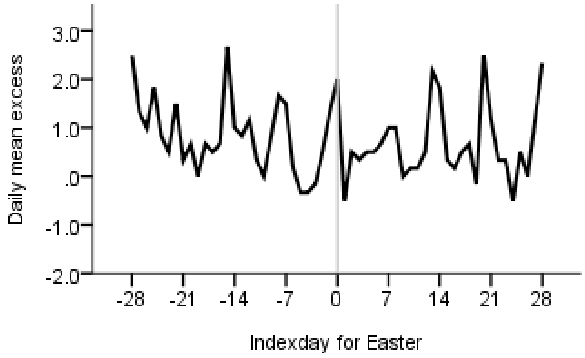
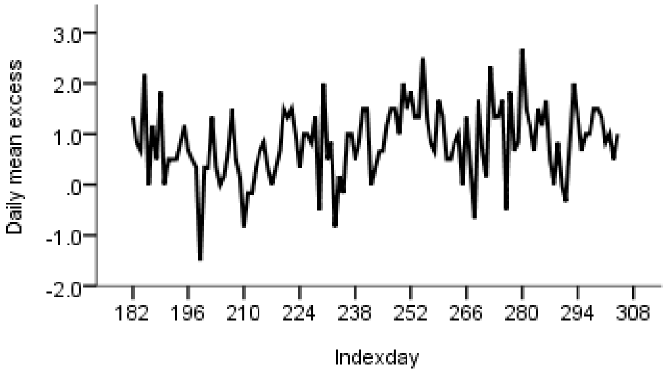


Figure D. 37: Scotland Out of Hours Counts - Plot of the aggregated daily mean number of contacts (asthmatics, non-asthmatics) a) Easter b) Summer, c) Christmas and d) Average Year (seven day average).

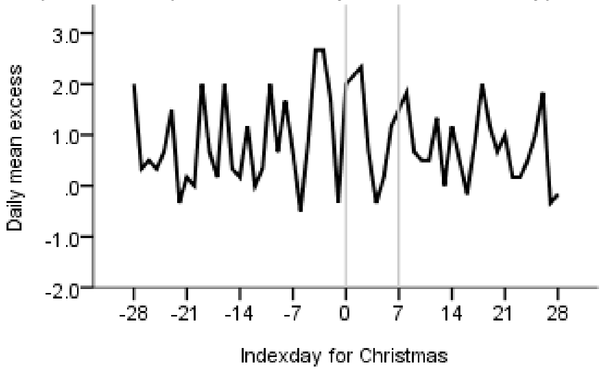
a) Easter (0=Easter Sunday)



b) Summer (Start of school summer holiday approximately indexed by 195, start of school return approximately indexed by 247)



c) Christmas (0=Christmas Day, 7=New Year's Day)



d) Average Year

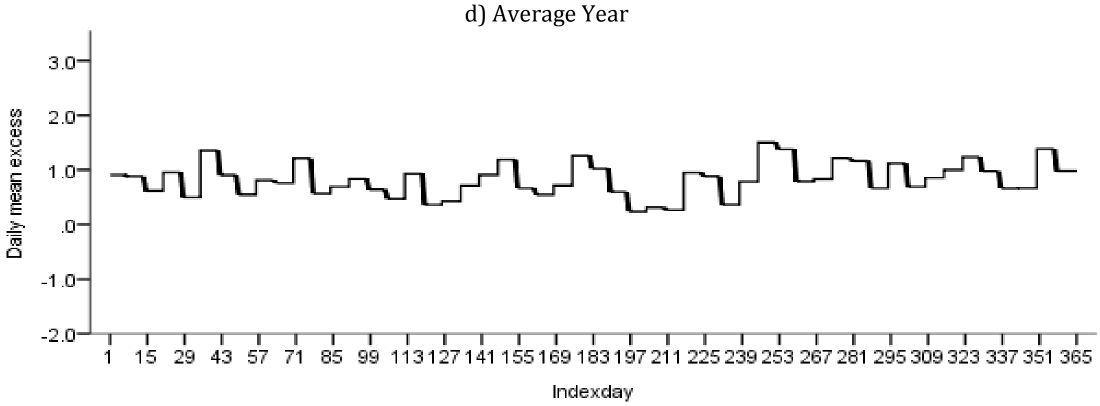


Figure D. 38: Scotland Out of Hours Counts - plot of the aggregated daily mean excess a) Easter b) Summer, c) Christmas and d) Average Year (seven day average).

D2. Day of the week Patterns

D2.1. England and Wales Day of the Week

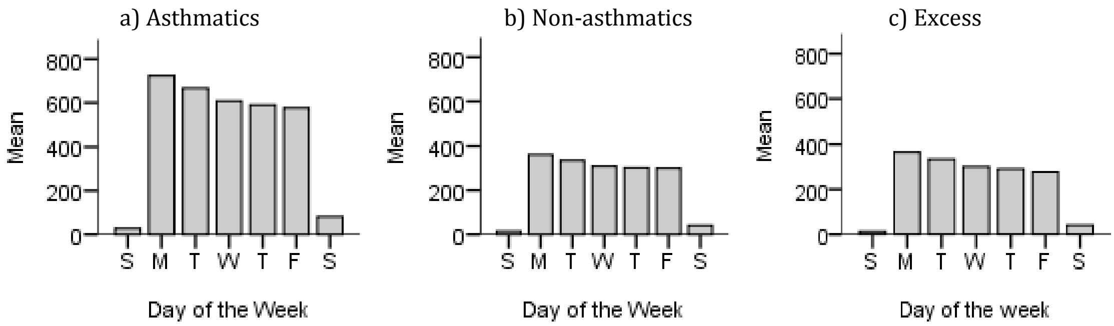


Figure D. 39: England and Wales All Counts - day of the week a) Asthmatics, b) Non-asthmatics and c) Excess.

Table D. 5: All Counts: ANOVA estimated marginal means for each day of the week, 84% confidence intervals, and P-values.

Group	Day of the week	Mean	84% Confidence Interval Lower Bound	84% Confidence Interval Upper Bound
Asthmatics	Sunday	26.38	17.68	35.08
	Monday	727.65	718.95	736.35
	Tuesday	670.08	661.37	678.80
	Wednesday	610.75	602.05	619.45
	Thursday	593.21	584.51	601.91
	Friday	576.54	567.86	585.21
	Saturday	80.90	72.19	89.61
Non-asthmatics	Sunday	14.28	9.71	18.85
	Monday	362.76	358.19	367.33
	Tuesday	336.85	332.27	341.43
	Wednesday	310.24	305.67	314.81
	Thursday	302.89	298.32	307.46
	Friday	300.24	295.69	304.80
	Saturday	40.85	36.28	45.43
Excess	Sunday	12.10	7.25	16.96
	Monday	364.89	360.04	369.75
	Tuesday	333.24	328.37	338.10
	Wednesday	300.51	295.65	305.36
	Thursday	290.32	285.47	295.18
	Friday	276.29	271.45	281.14
	Saturday	40.05	35.19	44.91

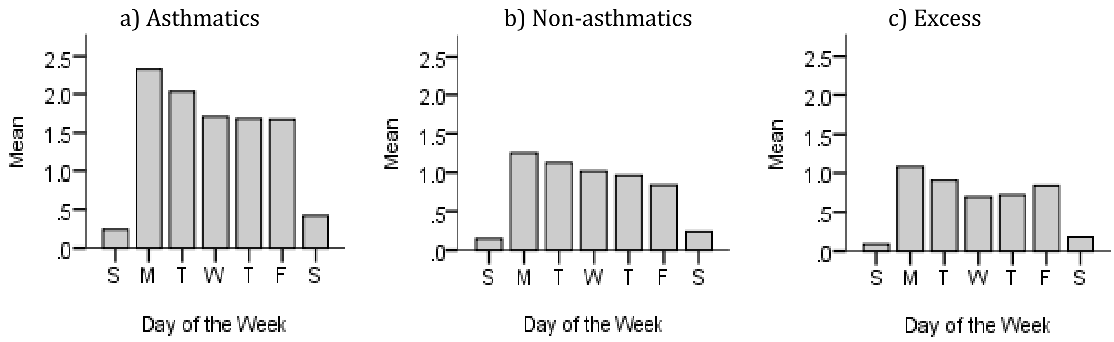


Figure D. 40: England and Wales Acute Visits - day of the week a) Asthmatics, b) Non-asthmatics and c) Excess.

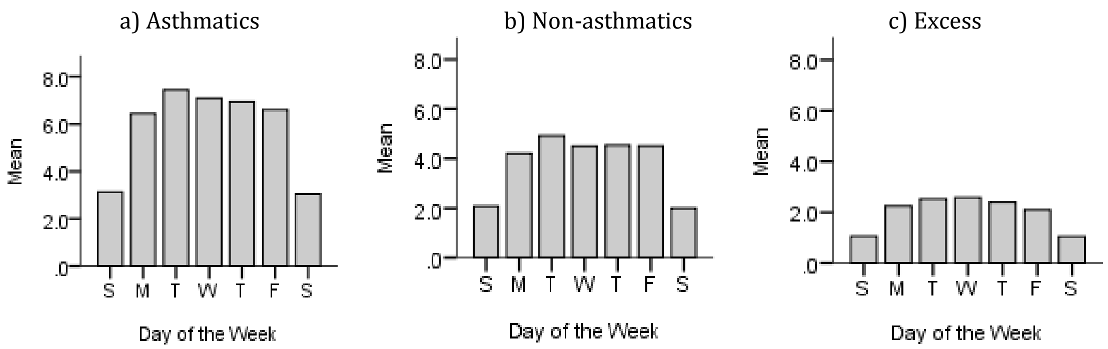


Figure D. 41: England and Wales Casualty Counts - day of the week a) Asthmatics, b) Non-asthmatics and c) Excess.

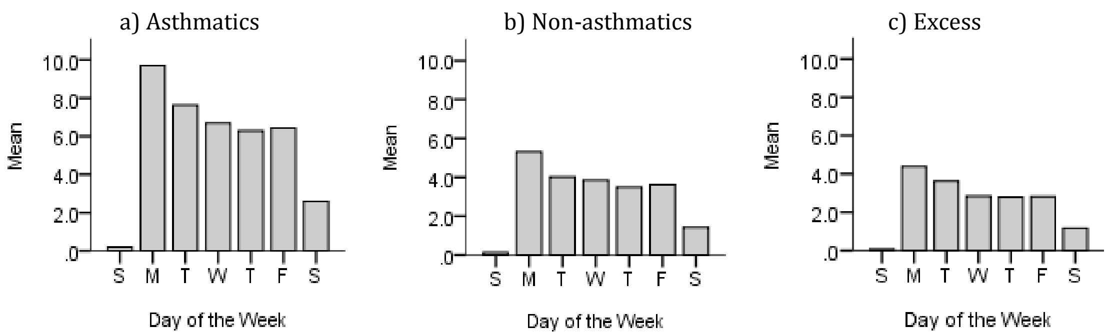


Figure D. 42: England and Wales Emergency Consultations - day of the week a) Asthmatics, b) Non-asthmatics and c) Excess.

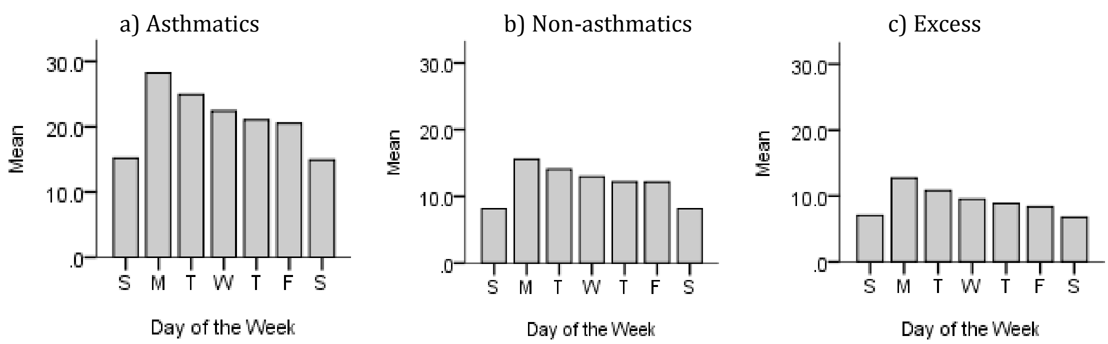


Figure D. 43: England and Wales Emergency Counts - day of the week a) Asthmatics, b) Non-asthmatics and c) Excess.

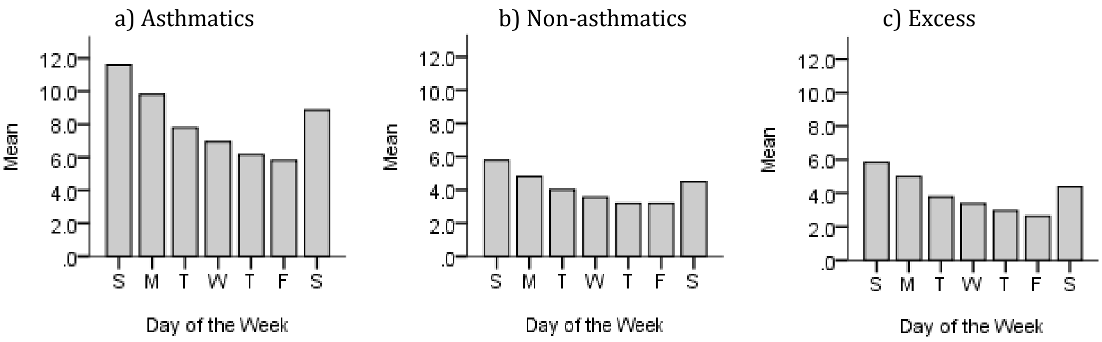


Figure D. 44: England and Wales Out of Hours Counts - day of the week a) Asthmatics, b) Non-asthmatics and c) Excess.

D2.2. Trent Region Day of the Week

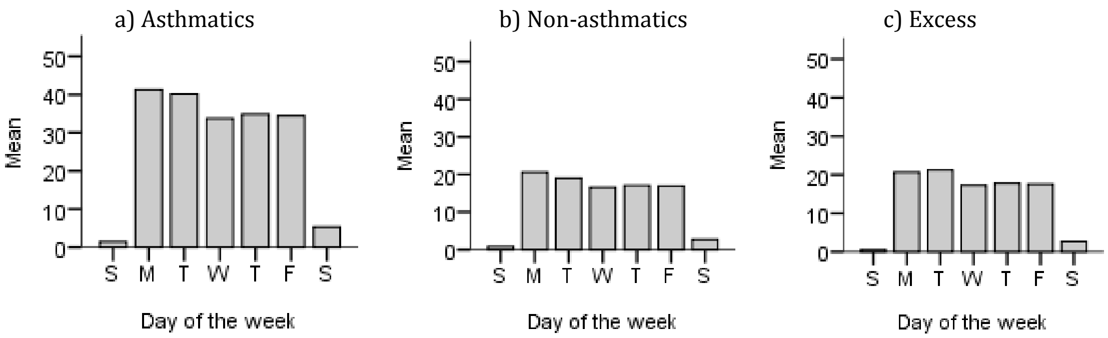


Figure D. 45: Trent Region All Counts, mean number of contacts by day of the week a) Asthmatics, b) Non-asthmatics and c) Excess.

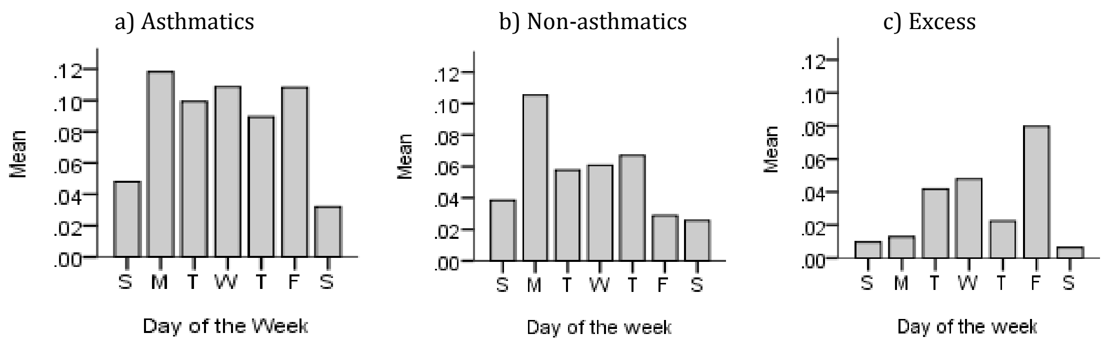


Figure D. 46: Trent Region Acute Visits - day of the week a) Asthmatics, b) Non-asthmatics and c) Excess.

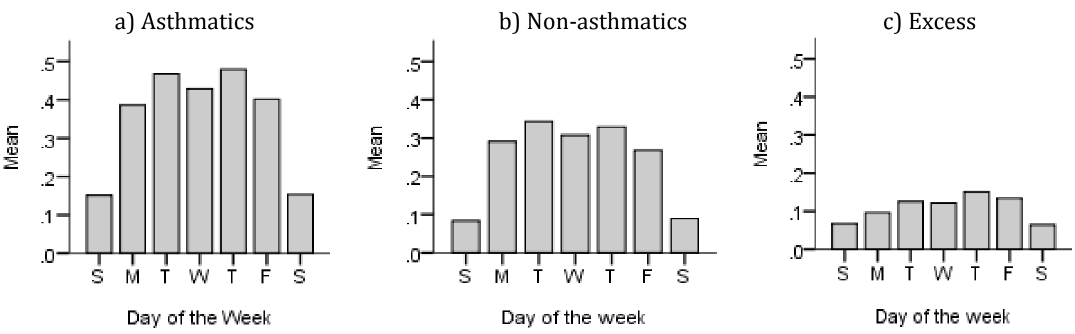


Figure D. 47: Trent Region Casualty Counts - day of the week a) Asthmatics, b) Non-asthmatics and c) Excess.

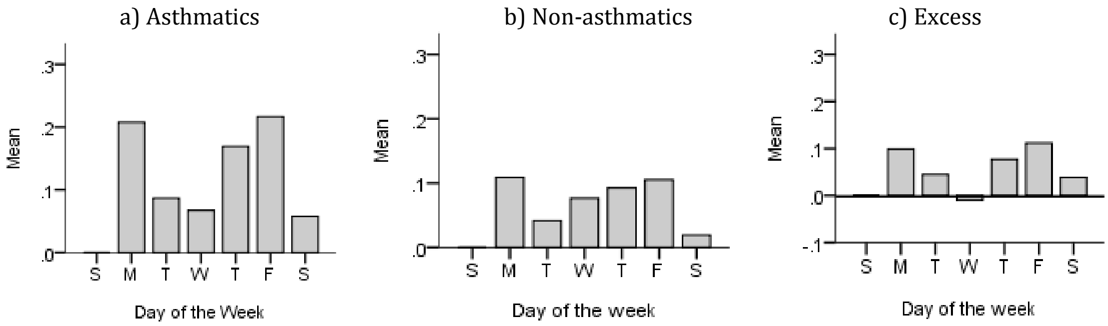


Figure D. 48: Trent Region Emergency Consultations - day of the week a) Asthmatics, b) Non-asthmatics and c) Excess.

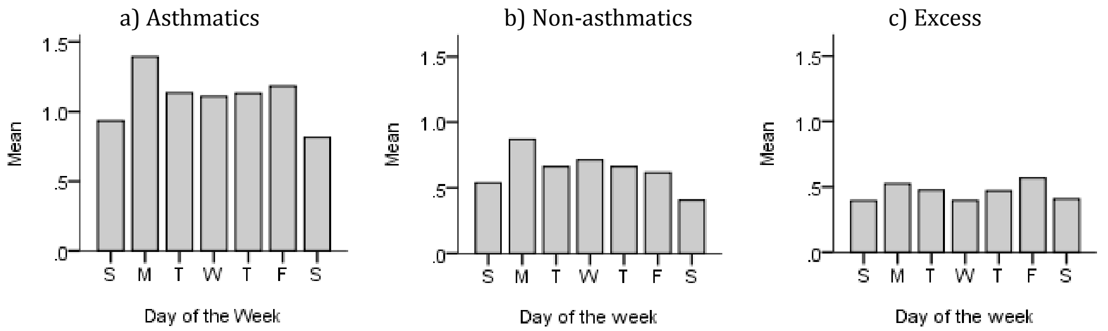


Figure D. 49: Trent Region Emergency Counts - day of the week a) Asthmatics, b) Non-asthmatics and c) Excess.

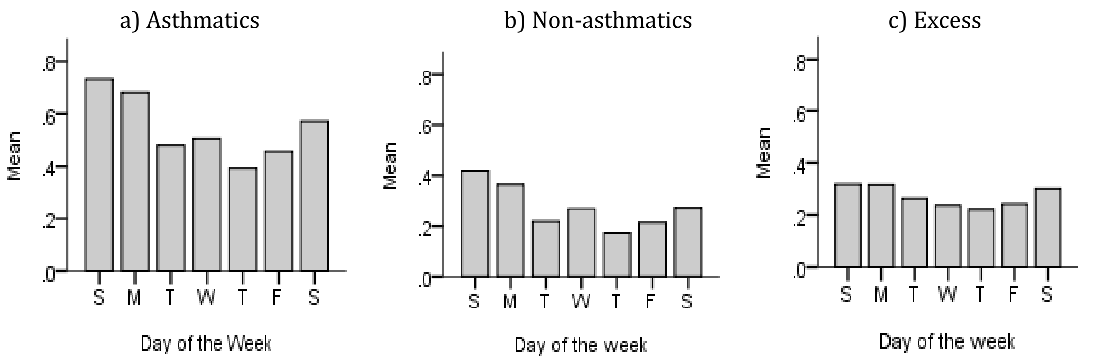


Figure D. 50: Trent Region Out of Hours Counts - day of the week a) Asthmatics, b) Non-asthmatics and c) Excess.

D2.3. Sheffield Day of the Week

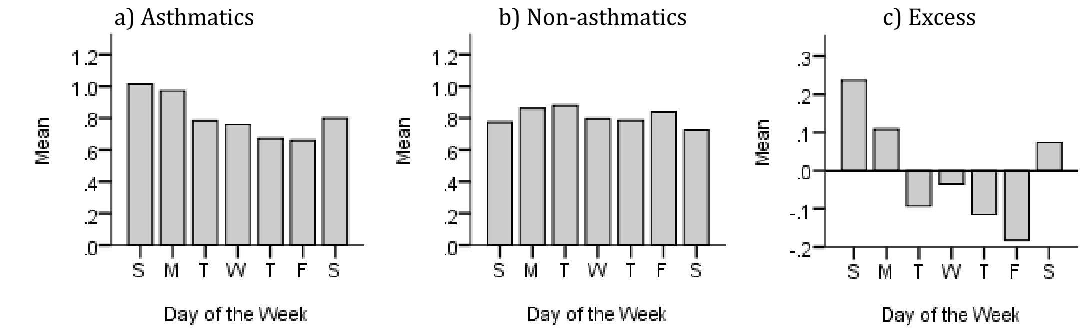


Figure D. 51: Sheffield All Counts - day of the Week a) Asthmatics, b) Non-asthmatics, and c) Excess.

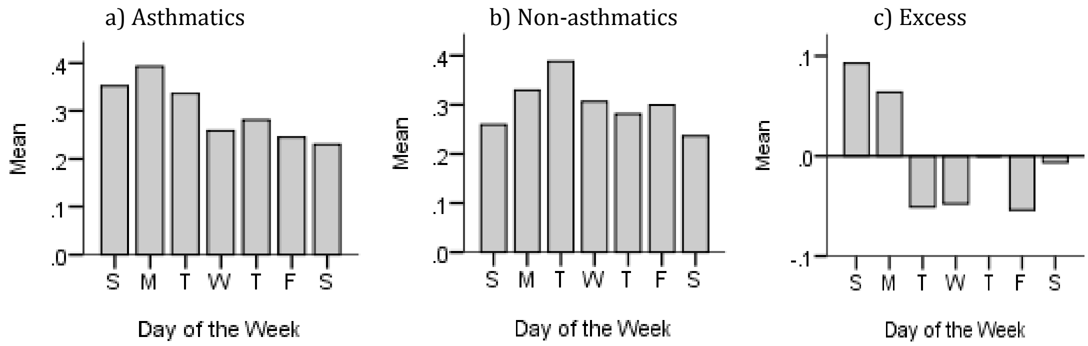


Figure D. 52: Sheffield Admissions - Day of the Week a) Asthmatics, b) Non-asthmatics and c) Excess.

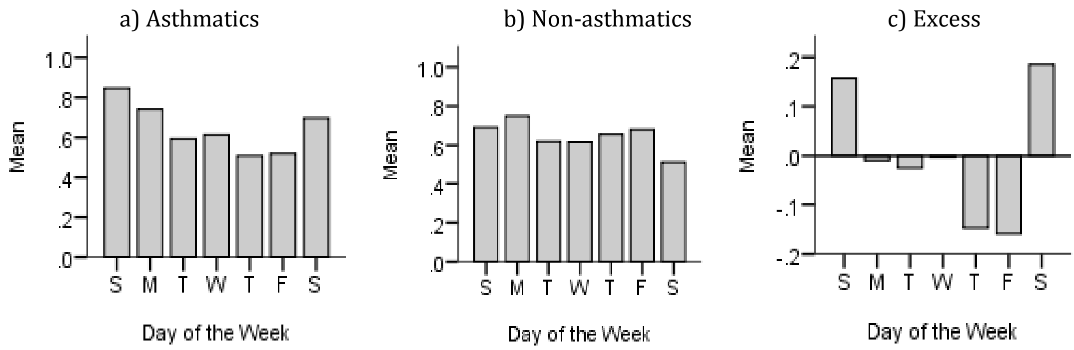


Figure D. 53: Sheffield A&E Counts - Day of the Week a) Asthmatics, b) Non-asthmatics and c) Excess

D2.4. Scotland Day of the Week

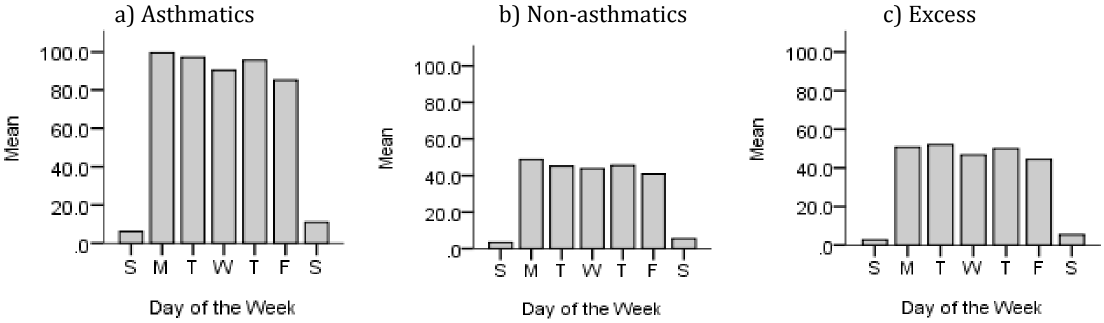


Figure D. 54: Scotland All Counts - day of the week a) Asthmatics, b) Non-asthmatics and c) Excess.

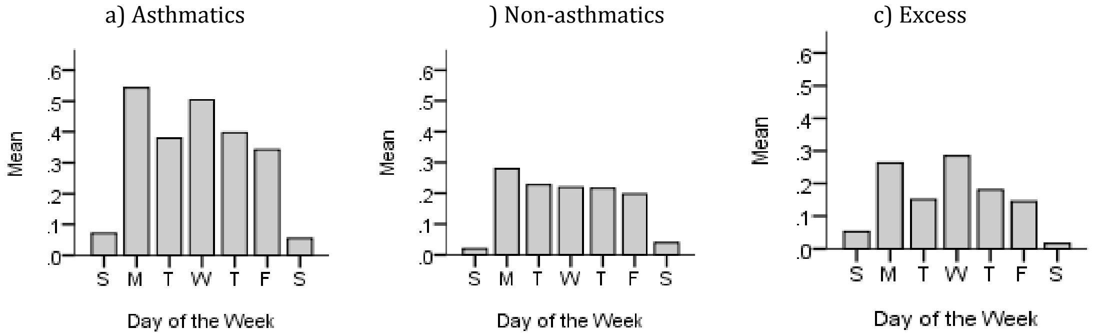


Figure D. 55: Scotland Acute Visits - day of the week a) Asthmatics, b) Non-asthmatics and c) Excess.

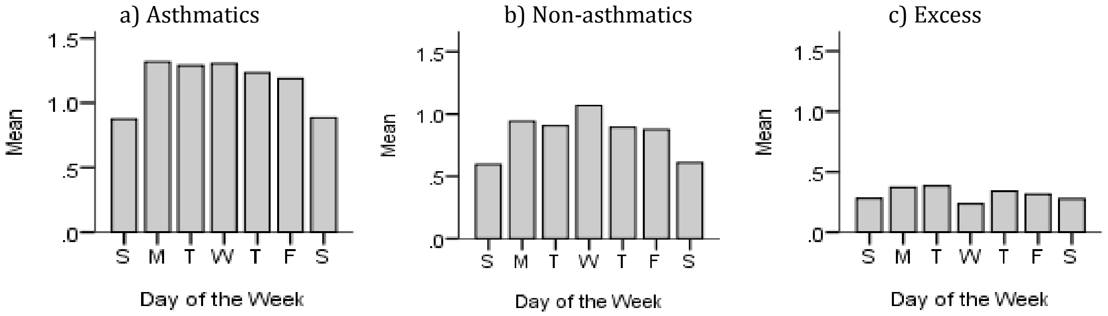


Figure D. 56: Scotland Casualty Counts - day of the week a) Asthmatics, b) Non-asthmatics and c) Excess.

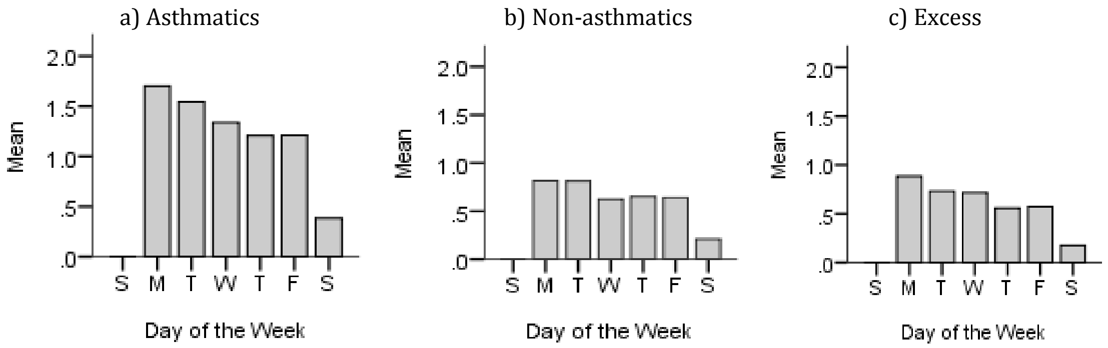


Figure D. 57: Scotland Emergency Consultations - day of the week a) Asthmatics, b) Non-asthmatics and c) Excess.

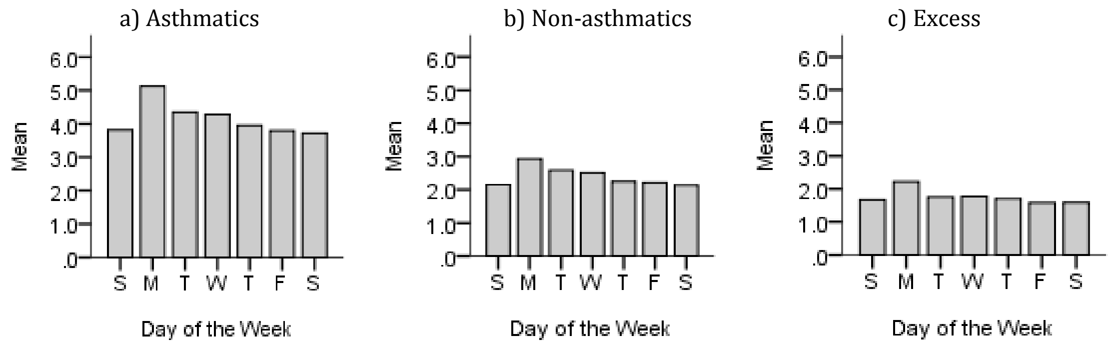


Figure D. 58: Scotland Emergency Counts - day of the week a) Asthmatics, b) Non-asthmatics and c) Excess.

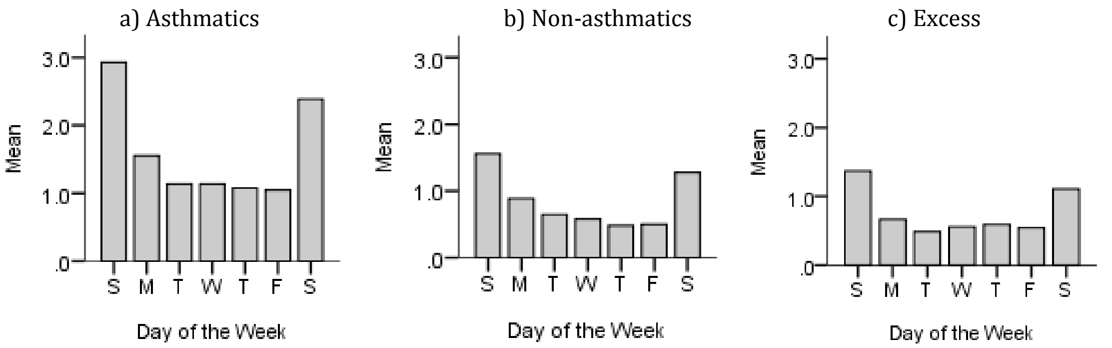


Figure D. 59: Scotland Out of Hours Counts - day of the week a) Asthmatics, b) Non-asthmatics and c) Excess.

Appendix E

Correlations

E1. Comparative Analyses for Correlations

E1.1. Pearson's vs Spearman's

a) Asthmatics b) Non-asthmatics

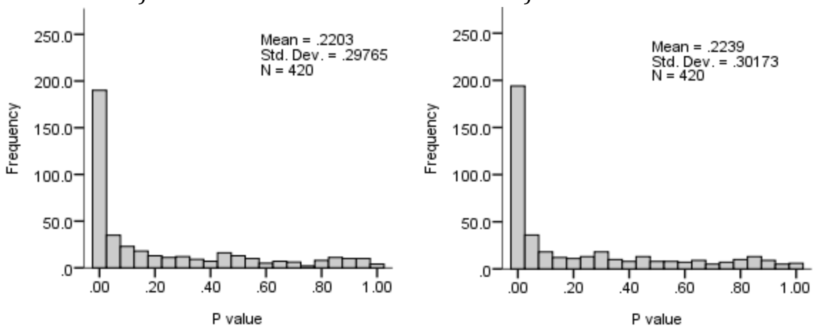


Figure E. 1: England and Wales All Counts - distribution of P-values for Pearson's Correlation a) Asthmatics and b) Non-asthmatics.

a) Asthmatics b) Non-asthmatics

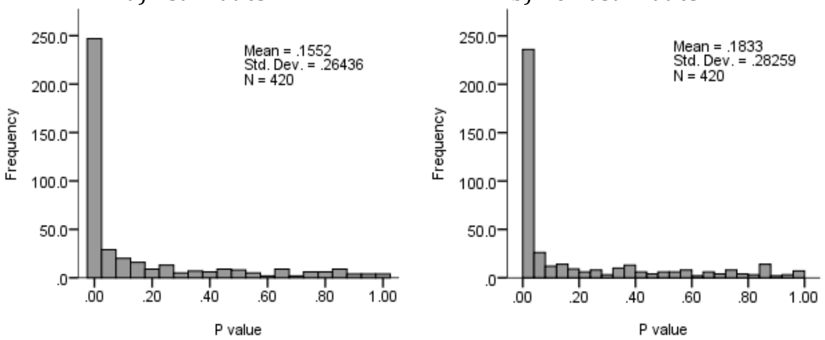


Figure E. 2: England and Wales All Counts - distribution of P-values for Spearman's Correlation a) Asthmatics and b) Non-asthmatics.

a) Asthmatics b) Non-asthmatics

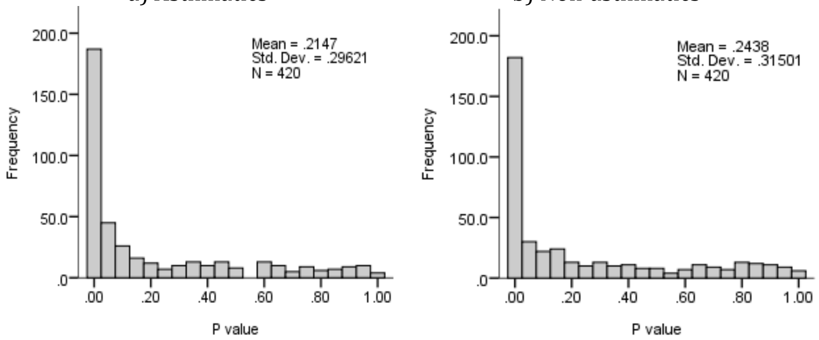


Figure E. 3: Trent Region All Counts - distribution of P-values for Pearson's Correlation a) Asthmatics and b) Non-asthmatics.

a) Asthmatics b) Non-asthmatics

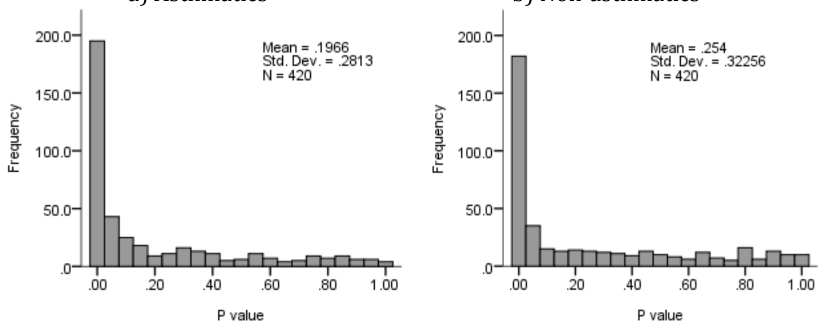


Figure E. 4: Trent Region All Counts - distribution of P-values for Spearman's Correlation a) Asthmatics and b) Non-asthmatics.

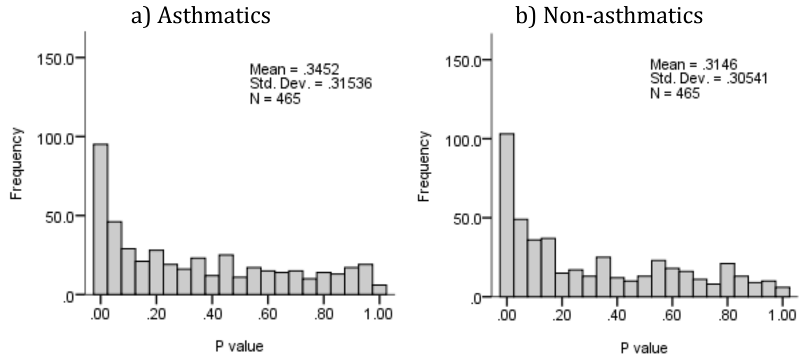


Figure E. 5: Scotland All Counts - distribution of P-values for Pearson's Correlation a) Asthmatics and b) Non-asthmatics.

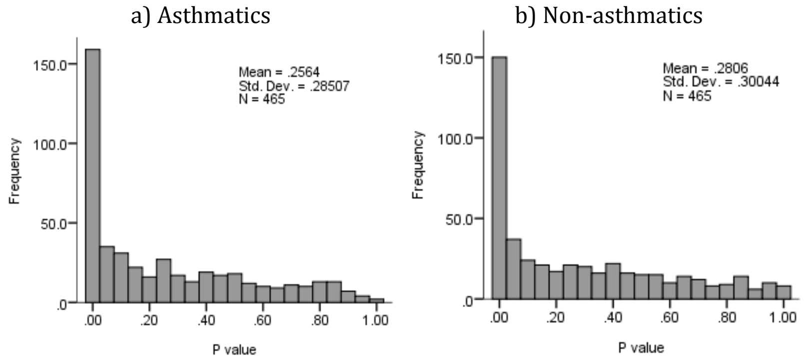


Figure E. 6: Scotland All Counts - distribution of P-values for Spearman's Correlation a) Asthmatics and b) Non-asthmatics.

Bar England and Wales All Counts asthmatics, there was little difference between Pearson's and Spearman's

E1.1. Correlations up to seven days vs correlations to fourteen days

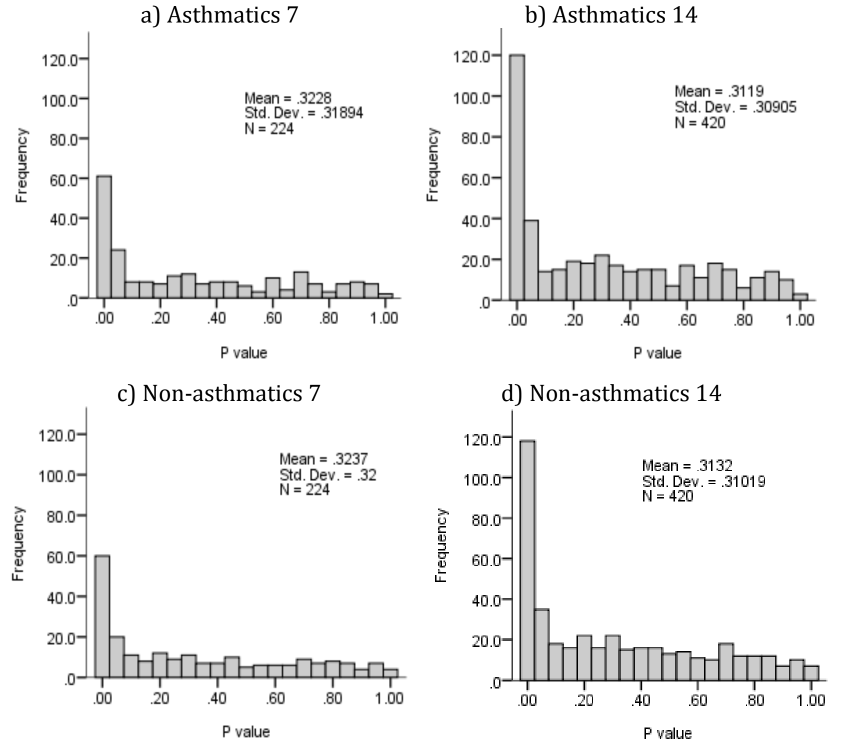


Figure E. 7: England and Wales All Counts – Distribution of the P-values from Pearson's correlations, comparison between correlations run through to seven or fourteen lag days.

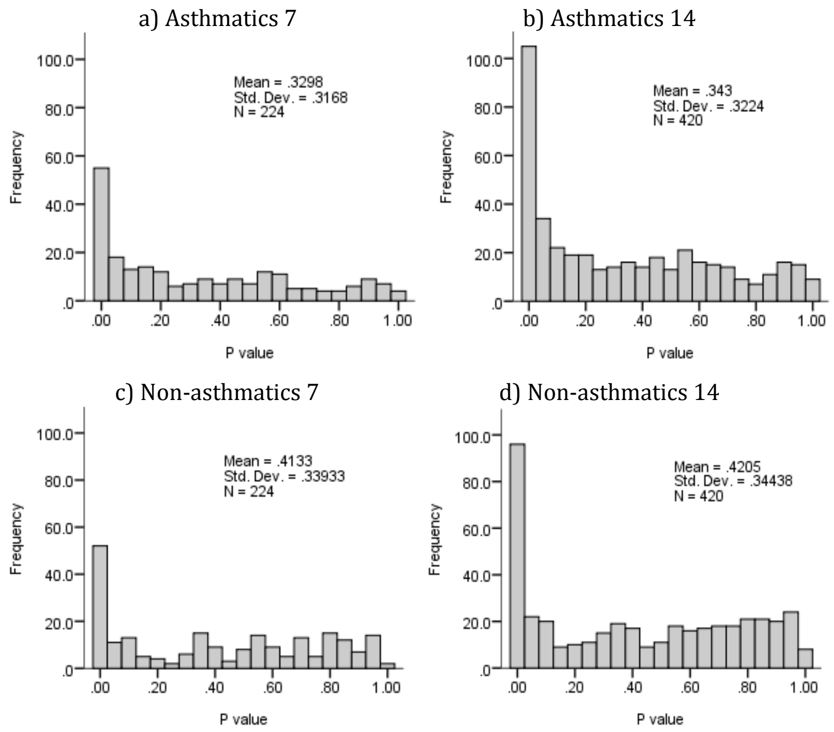


Figure E. 8: Trent Region All Counts – Distribution of the P-values from Pearson's correlations, comparison between correlations run through to seven or fourteen lag days.

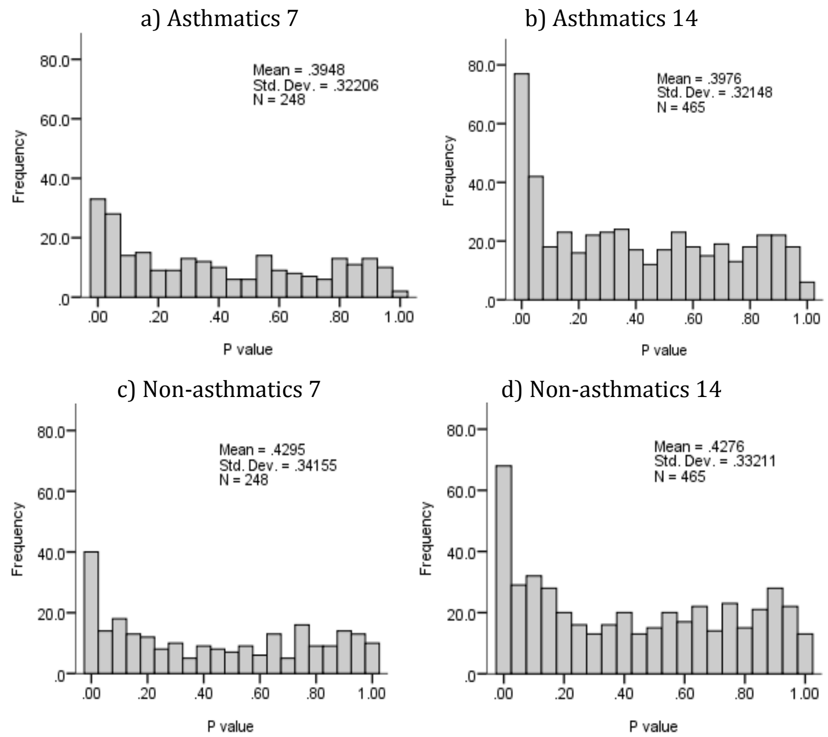


Figure E. 9: Scotland All Counts – Distribution of the P-values from Pearson's correlations, comparison between correlations run through to seven or fourteen lag days.

Very little difference between the mean P-values of correlations conducted up to seven or fourteen lag days. Conducting correlations through until fourteen lag days provides no added value thus correlations shall be conducted through to seven days only.

E2. Correlation Results

E2.1. England and Wales Correlations

E2.1.1. England and Wales Correlations Asthmatics and Non-asthmatics

Table E. 1: England and Wales – coefficient descriptive statistics (n=224), asthmatics and non-asthmatics.

Asthmatics or Non-asthmatics	Statistic	All Counts	Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours Counts
Asthmatics	**Mean**	0.01	0.02	-0.02	0.00	0.00	0.02
	Median	0.00	0.03	-0.01	0.01	0.01	0.02
	Minimum	-0.21	-0.18	-0.17	-0.18	-0.17	-0.22
	Maximum	0.26	0.21	0.10	0.19	0.16	0.19
Non-asthmatics	**Mean**	0.01	0.03	-0.02	-0.01	0.00	0.02
	Median	0.00	0.03	-0.02	-0.01	0.00	0.03
	Minimum	-0.19	-0.16	-0.18	-0.13	-0.13	-0.17
	Maximum	0.26	0.21	0.12	0.14	0.11	0.16

Table E. 2: England and Wales - number of statistically significant coefficients per environmental exposure (n=8), a) Asthmatics and b) Non-asthmatics.

a) Asthmatics Exposure			All Counts	Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours Counts
Outdoor air pollutants	Min'	NO	3	2	1	7	6	3
		NO_2	5	1	2	6	6	4
		NOD	3	2	1	7	7	3
		SO_2	3	0	5	1	2	2
		PM_{10}	7	5	3	6	4	4
		O_3	5	3	4	4	4	6
		CO	4	4	0	7	7	4
	Mean	NO	5	6	5	6	6	5
		NO_2	6	5	7	5	6	6
		NOD	5	6	5	6	6	6
		SO_2	3	6	8	6	5	5
		PM_{10}	7	4	4	4	5	6
		O_3	5	3	6	6	6	5
		CO	4	8	8	3	4	7
	Max'	NO	4	6	5	4	6	5
		NO_2	6	7	5	5	6	5
		NOD	4	6	5	4	5	5
		SO_2	4	6	8	7	7	6
		PM_{10}	5	3	4	4	3	4
		O_3	5	4	3	6	6	4
		CO	3	8	8	3	3	7
Weather	Min'	Temperature	7	8	8	8	8	8
	Max'	Temperature	8	8	8	8	8	8
		Sun	3	8	1	8	8	8
		Rain	2	2	0	0	0	1
		Pressure	0	7	5	2	0	0
		Wind speed	2	8	6	0	1	6
Pollen		Grass	2	0	8	0	4	0
Total			120	120	136	134	133	131
Mean			4.29	4.86	4.75	4.75	4.96	4.75

Table E. 2 continued

b) Non-asthmatics Exposure			All Counts	Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours Counts
Outdoor air pollutants	Min’	NO	3	2	0	2	6	3
		NO_2	5	4	1	3	6	3
		NOD	3	3	0	3	7	3
		SO_2	3	0	5	3	2	4
		PM_{10}	7	3	2	3	4	4
		O_3	5	3	2	4	4	5
		CO	4	5	0	6	7	4
	Mean	NO	4	7	5	4	6	5
		NO_2	6	6	6	5	6	4
		NOD	5	7	5	3	6	5
		SO_2	3	7	8	6	5	6
		PM_{10}	6	5	5	4	5	5
		O_3	5	6	3	3	6	5
		CO	4	8	8	2	4	7
	Max’	NO	4	6	5	3	6	5
		NO_2	6	7	5	6	6	6
		NOD	4	6	5	3	5	5
		SO_2	4	6	8	7	7	5
		PM_{10}	5	3	3	3	3	4
		O_3	5	5	3	5	6	4
		CO	3	8	8	3	3	8
Weather	Min’	Temperature	7	8	8	8	8	8
	Max’	Temperature	8	8	8	8	8	8
		Sun	2	6	4	8	8	8
		Rain	1	1	2	0	0	0
		Pressure	0	1	7	0	0	0
		Wind speed	3	3	7	1	1	6
Pollen		Grass	5	0	8	2	4	1
Total			120	136	134	133	131	133
Mean			4.29	4.79	4.68	3.86	4.96	4.68

Table E. 3: England and Wales - number of statistically significant coefficients, difference between asthmatics and non-asthmatics.

Exposure			All Counts	Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours Counts
Outdoor air pollutants	Min’	NO	0	0	1	5	0	0
		NO_2	0	-3	1	3	0	1
		NOD	0	-1	1	4	0	0
		SO_2	0	0	0	-2	0	-2
		PM_{10}	0	2	1	3	0	0
		O_3	0	0	2	0	0	1
		CO	0	-1	0	1	0	0
	Mean	NO	1	-1	0	2	0	0
		NO_2	0	-1	1	0	0	2
		NOD	0	-1	0	3	0	1
		SO_2	0	-1	0	0	0	-1
		PM_{10}	1	-1	-1	0	0	1
		O_3	0	-3	3	3	0	0
		CO	0	0	0	1	0	0
	Max’	NO	0	0	0	1	0	0
		NO_2	0	0	0	-1	0	-1
		NOD	0	0	0	1	0	0
		SO_2	0	0	0	0	0	1
		PM_{10}	0	0	1	1	0	0
		O_3	0	-1	0	1	0	0
		CO	0	0	0	0	0	-1
Weather	Min’	Temperature	0	0	0	0	0	0
	Max’	Temperature	0	0	0	0	0	0
		Sun	1	2	-3	0	0	0
		Rain	1	1	-2	0	0	1
		Pressure	0	6	-2	2	0	0
		Wind speed	-1	5	-1	-1	0	0
Pollen		Grass	-3	0	0	-2	0	-1
≤-2			1	2	3	2	0	1
<-1 to 1			27	22	23	18	28	26
≥ 2			0	4	2	8	0	1

Table E. 4: England and Wales - Wilcoxon sign rank test on the difference in the number of statistically significant correlations between asthmatics and non-asthmatics.

Medical Contact	Z statistic	P-value	Median	Lower CI	Upper CI
All Counts: Asthmatics - Non-asthmatics	-0.33	0.74	0.00	0.00	0.00
Acute Visits: Asthmatics - Non-asthmatics	-0.29	0.77	0.00	0.00	0.50
Casualty Counts: Asthmatics - Non-asthmatics	-0.29	0.77	0.00	-0.50	0.00
Emergency Consultations: Asthmatics - Non-asthmatics	-2.45	0.01	-0.50	-1.50	0.00
Emergency Counts: Asthmatics - Non-asthmatics	0.00	1.00	0.00	0.00	0.00
Out of Hours Counts: Asthmatics - Non-asthmatics	-0.46	0.64	0.00	-0.50	0.00

Correlation P-value distributions

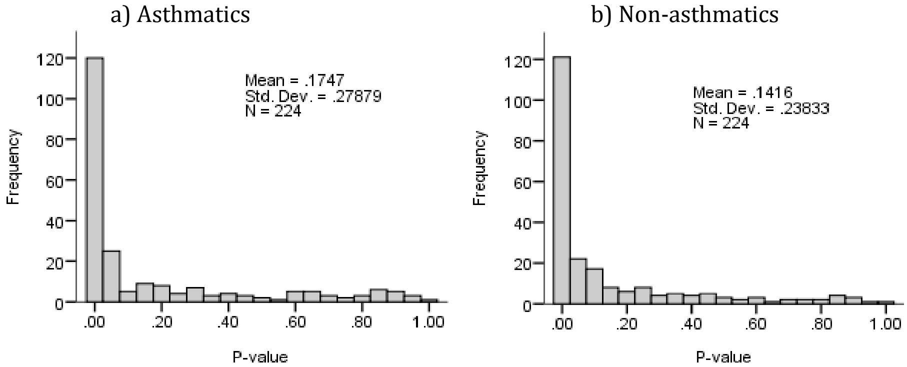


Figure E. 10: England and Wales Acute Visits – Pearson's correlation P-values a) Asthmatics and b) Non-asthmatics.

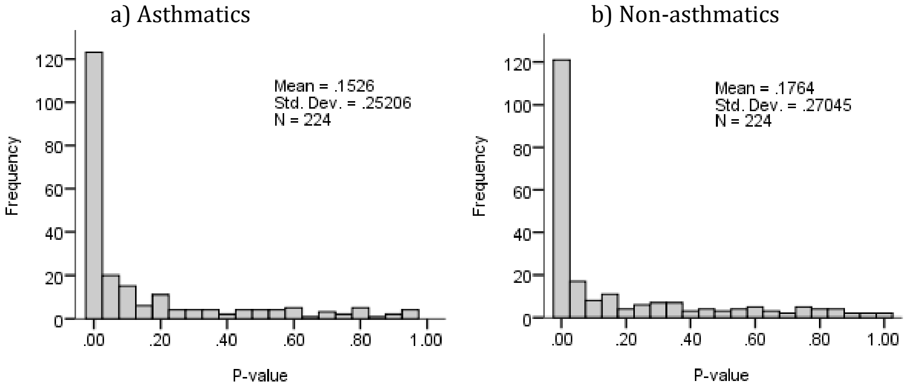


Figure E. 11: England and Wales Casualty Counts – Pearson's correlation P-values a) Asthmatics and b) Non-asthmatics.

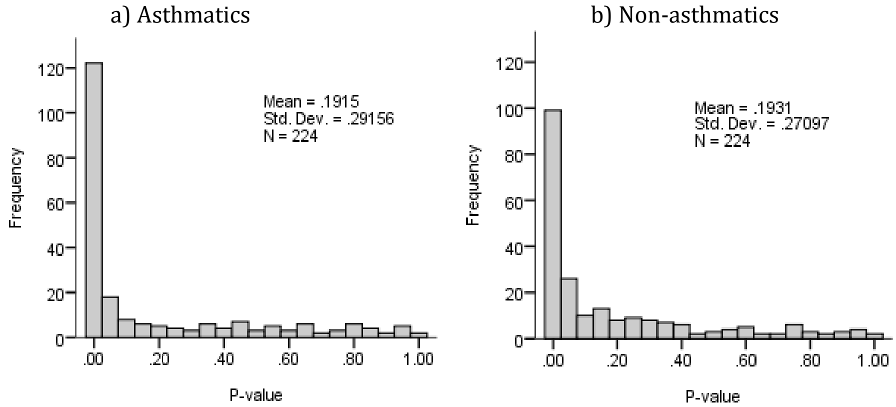


Figure E. 12: England and Wales Emergency Consultations – Pearson's correlation P-values a) Asthmatics and b) Non-asthmatics.

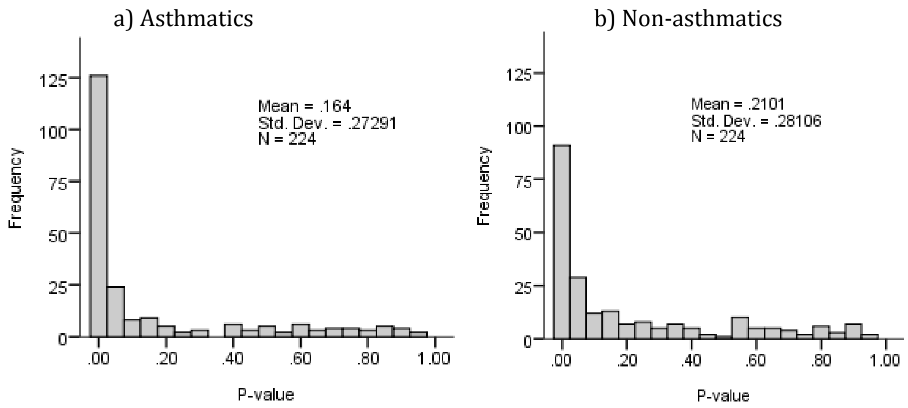


Figure E. 13: England and Wales Emergency Counts – Pearson's correlation P-values a) Asthmatics and b) Non-asthmatics.

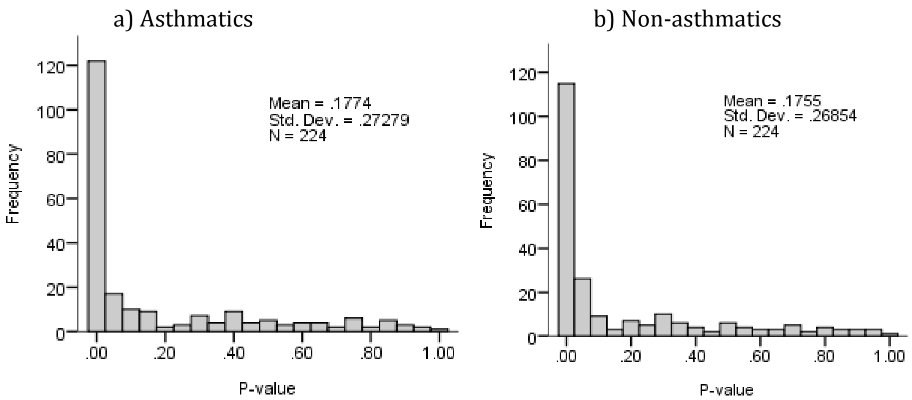


Figure E. 14: England and Wales Out of Hours Counts – Pearson's correlation P-values a) Asthmatics and b) Non-asthmatics.

Table E. 5: England and Wales – mean correlation coefficient P-value's distance from null value (0.5) and difference between asthmatics and non-asthmatics.

Medical Contact	Asthmatics	0.5 - Asthmatics	Non-asthmatics	0.5 - Non-asthmatics	Difference between asthmatics and non-asthmatics
All Counts	0.20	0.30	0.20	0.30	0.00
Acute Visits	0.17	0.33	0.14	0.36	0.03
Casualty Counts	0.15	0.35	0.18	0.32	-0.03
Emergency Consultations	0.19	0.31	0.19	0.31	0.00
Emergency Counts	0.16	0.34	0.21	0.29	-0.05
Out of Hours Counts	0.18	0.32	0.18	0.32	0.00

Lag effects

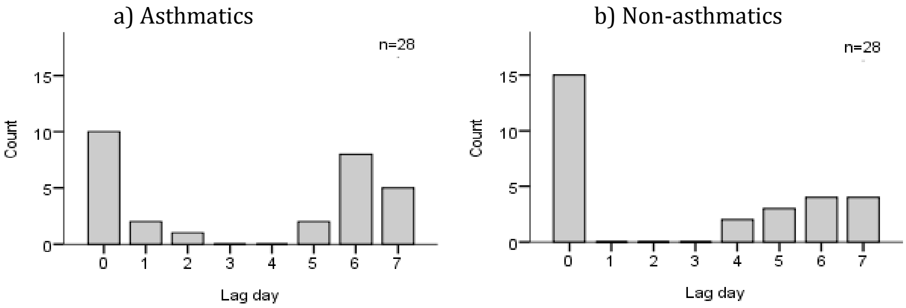


Figure E. 15: England and Wales Acute Visits – number of the most significant correlation coefficients per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

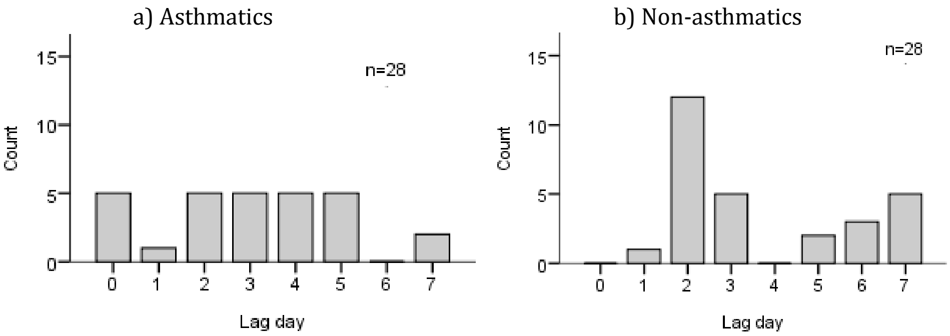


Figure E. 16: England and Wales Casualty Counts – number of the most significant correlation coefficients per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

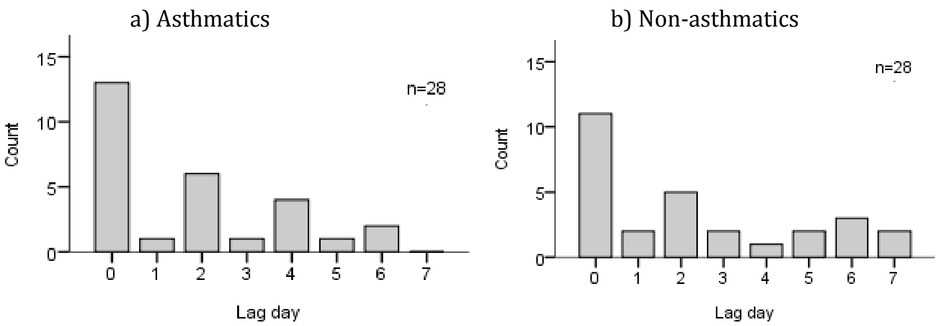


Figure E. 17: England and Wales Emergency Consultations – number of the most significant correlation coefficients per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

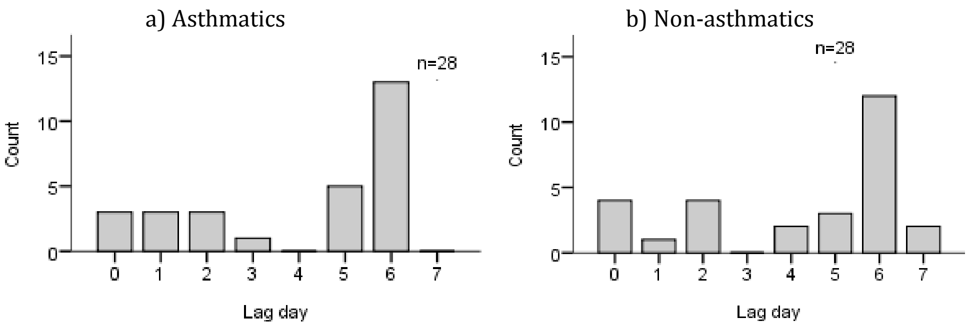


Figure E. 18: England and Wales Emergency Counts – number of the most significant correlation coefficients per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

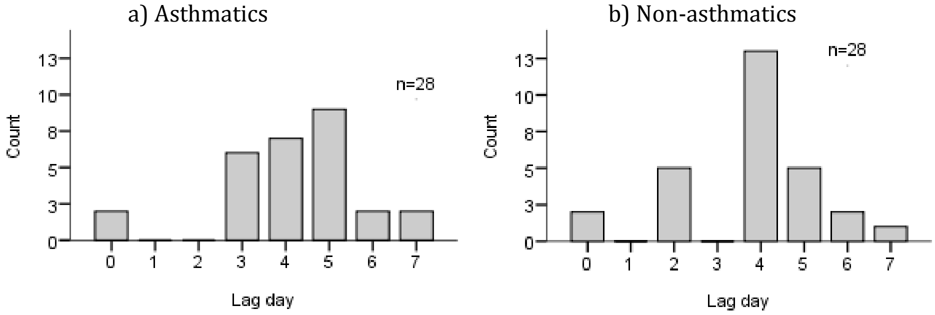


Figure E. 19: England and Wales Out of Hours Counts – number of the most significant correlation coefficients per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

E2.1.1. England and Wales Correlations Excess

Table E. 6: England and Wales – coefficient descriptive statistics (n=224), Excess.

Statistic	All Counts	Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours Counts
Mean	0.01	0.01	-0.01	0.01	0.00	0.01
Median	0.00	0.01	-0.01	0.01	0.01	0.01
Minimum	-0.21	-0.10	-0.09	-0.15	-0.14	-0.13
Maximum	0.26	0.12	0.08	0.15	0.14	0.11

Table E. 7: England and Wales - number of statistically significant coefficients per environmental exposure (n=8), Excess.

Exposure			All Counts	Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours Counts
Outdoor air pollutants	Min'	NO	3	0	1	6	7	1
		NO_2	5	1	0	7	5	0
		NOD	3	0	1	7	7	1
		SO_2	1	0	4	0	1	2
		PM_{10}	7	0	2	0	2	2
		O_3	5	3	1	4	4	0
		CO	4	1	0	6	3	0
	Mean	NO	5	3	2	6	6	4
		NO_2	6	3	4	3	4	4
		NOD	5	3	1	6	6	4
		SO_2	4	2	7	3	3	1
		PM_{10}	6	3	2	2	1	3
		O_3	5	3	2	7	6	3
		CO	4	7	4	3	5	5
	Max'	NO	4	4	1	6	7	5
		NO_2	6	3	5	3	4	5
		NOD	4	4	1	6	6	5
		SO_2	4	2	7	5	4	2
		PM_{10}	5	0	1	2	2	1
		O_3	4	1	2	7	7	3
		CO	3	7	5	3	6	5
Weather	Min'	Temperature	6	8	0	8	8	8
	Max'	Temperature	8	8	0	8	8	8
		Sun	5	4	0	7	8	4
		Rain	1	1	1	0	1	1
		Pressure	0	1	2	4	1	0
		Wind speed	1	4	1	2	0	2
Pollen		Grass	2	0	0	0	0	0
Total			116	76	57	121	122	79
Mean			4.14	2.71	2.04	4.32	4.36	2.82

Correlation P-value distributions

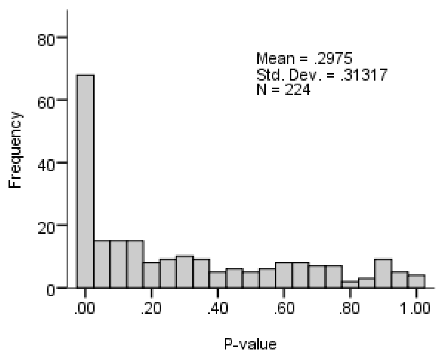


Figure E. 20: England and Wales Acute Visits – distribution of the coefficient P-values, Excess.

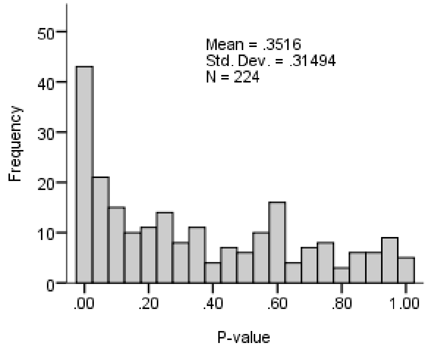


Figure E. 21: England and Wales Casualty Counts – distribution of the coefficient P-values, Excess.

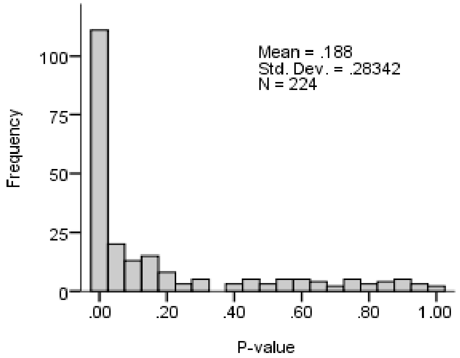


Figure E. 22: England and Wales Emergency Consultations – distribution of the coefficient P-values, Excess.

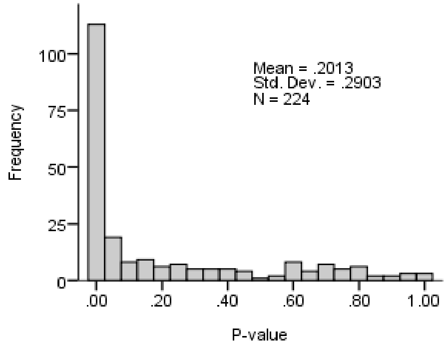


Figure E. 23: England and Wales Emergency Counts – distribution of the coefficient P-values, Excess.

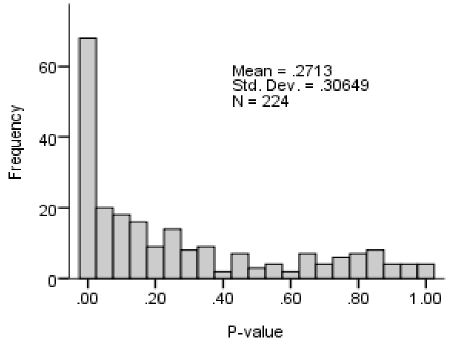


Figure E. 24: England and Wales Out of Hours Counts – distribution of the coefficient P-values, Excess.

Table E. 8: England and Wales – mean correlation coefficient P-value's distance from null value (0.5), Excess.

Medical Contact	Excess	0.5 - Excess
All Counts	0.20	0.30
Acute Visits	0.30	0.20
Casualty Counts	0.35	0.15
Emergency Consultations	0.19	0.31
Emergency Counts	0.20	0.30
Out of Hours Counts	0.27	0.23

Lag effects

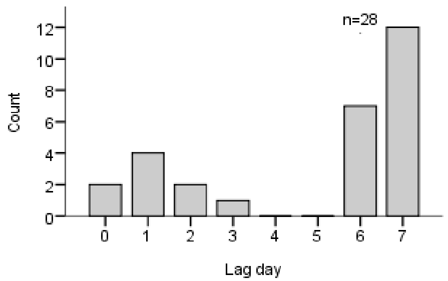


Figure E. 25: England and Wales Acute Visits – number of the most significant correlation coefficients per environmental exposure by lag day, Excess.

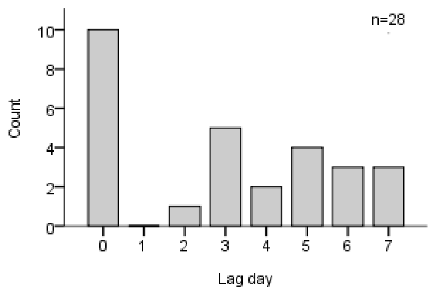


Figure E. 26: England and Wales Casualty Counts – number of the most significant correlation coefficients per environmental exposure by lag day, Excess.

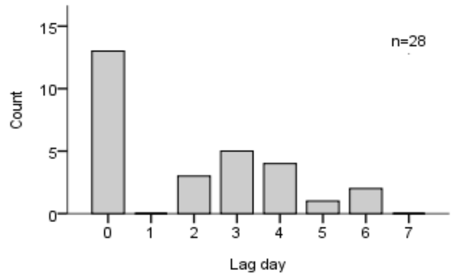


Figure E. 27: England and Wales Emergency Consultations – number of the most significant correlation coefficients per environmental exposure by lag day, Excess.

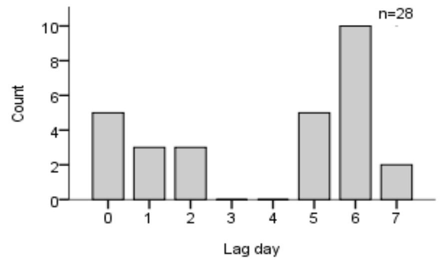


Figure E. 28: England and Wales Emergency Counts – number of the most significant correlation coefficients per environmental exposure by lag day, Excess.

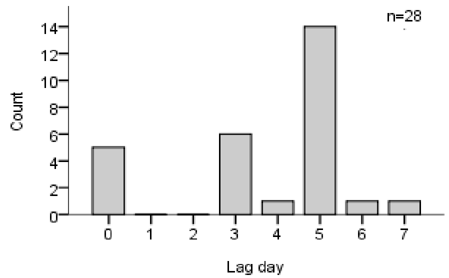


Figure E. 29: England and Wales Out of Hours Counts – number of the most significant correlation coefficients per environmental exposure by lag day, Excess.

E2.2. Trent Region Correlations

E2.2.1. Trent Region Correlations Asthmatics and non-asthmatics

Table E. 9: Trent Region – coefficient descriptive statistics (n=224), asthmatics and non-asthmatics.

Asthmatics or Non-asthmatics	Statistic	All Counts	Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours Counts
Asthmatics	**Mean**	0.01	0.00	-0.01	-0.01	0.00	0.01
	Median	0.01	0.00	-0.01	-0.01	-0.01	0.01
	Minimum	-0.18	-0.07	-0.12	-0.13	-0.09	-0.11
	Maximum	0.29	0.07	0.07	0.07	0.06	0.09
Non-asthmatics	**Mean**	0.01	0.01	-0.01	-0.01	0.00	0.01
	Median	-0.01	0.01	0.00	0.00	0.00	0.01
	Minimum	-0.14	-0.07	-0.12	-0.11	-0.08	-0.06
	Maximum	0.25	0.06	0.11	0.09	0.05	0.08

Table E. 10: Trent Region - number of statistically significant coefficients (n=8), asthmatics and non-asthmatics.

		Exposure	All counts		Acute Visits		Casualty Counts		Emergency Consultations		Emergency Counts		Out of Hours Counts	
			Asthmatics	Non-asthmatics	Asthmatics	Non-asthmatics	Asthmatics	Non-asthmatics	Asthmatics	Non-asthmatics	Asthmatics	Non-asthmatics	Asthmatics	Non-asthmatics
		NO	7	5	5	0	1	0	5	6	5	0	1	0
		NO_2	3	3	3	0	1	1	0	0	1	1	1	1
		NOD	4	4	4	0	1	0	0	1	1	0	0	1
	Min'	**SO_2**	2	3	3	1	1	0	0	2	0	0	0	1
		PM_{10}	6	6	6	1	0	1	0	0	0	0	1	0
		O_3	3	5	5	0	1	1	1	1	1	0	1	0
		CO	4	1	1	0	0	0	1	2	0	1	1	1
		NO	5	5	5	1	4	4	3	4	0	1	4	2
		NO_2	5	5	5	0	1	2	3	1	0	0	2	3
		NOD	5	5	5	0	4	4	3	3	0	0	2	2
Outdoor air pollutants	**Mean**	**SO_2**	3	4	4	2	8	5	4	7	3	3	2	0
		PM_{10}	6	6	6	0	2	1	2	1	0	0	1	1
		O_3	4	5	5	0	1	1	3	3	3	0	2	0
		CO	6	4	4	1	6	8	6	7	1	4	5	2
		NO	5	5	5	2	4	4	3	4	0	1	5	1
		NO_2	5	5	5	0	1	3	2	1	0	0	3	1
		NOD	4	5	5	1	4	3	3	1	0	1	3	1
	Max'	**SO_2**	5	5	5	2	8	5	6	6	6	5	2	1
		PM_{10}	5	5	5	1	3	0	1	3	0	1	1	1
		O_3	6	5	5	0	0	1	4	4	2	1	2	1
		CO	4	4	4	3	8	8	7	6	1	6	6	3
	Min'	**Temperature**	8	8	8	8	8	8	0	0	2	0	8	8
	Max'	**Temperature**	8	8	8	6	6	8	0	0	0	0	8	7
Weather		**Sun**	6	0	0	0	3	3	1	0	1	0	1	1
		Rain	0	0	0	0	3	1	0	2	0	0	0	0
		Pressure	0	0	0	0	2	1	0	2	0	1	0	0
		Wind speed	1	4	4	2	4	3	0	2	0	2	1	2
Pollen		**Grass**	0	0	0	0	0	8	8	8	8	5	0	0
Total			120	115	34	31	85	84	66	77	35	33	63	41
Mean			4.29	4.11	1.21	1.11	3.04	3.00	2.36	2.75	1.25	1.18	2.25	1.46

Table E. 11: Trent Region - number of statistically significant correlations, difference between asthmatics and non-asthmatics.

Exposure			All Counts	Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours Counts
Outdoor air pollutants	Min’	NO	2	0	1	-1	5	1
		NO_2	0	1	0	0	0	0
		NOD	0	1	1	-1	1	-1
		SO_2	-1	-1	1	-2	0	-1
		PM_{10}	0	-1	-1	0	0	1
		O_3	-2	0	0	0	1	1
		CO	3	0	0	-1	-1	0
	Mean	NO	0	0	0	-1	-1	2
		NO_2	0	1	-1	2	0	-1
		NOD	0	1	0	0	0	0
		SO_2	-1	0	3	-3	0	2
		PM_{10}	0	0	1	1	0	0
		O_3	-1	0	0	0	3	2
		CO	2	1	-2	-1	-3	3
	Max’	NO	0	-1	0	-1	-1	4
		NO_2	0	1	-2	1	0	2
		NOD	-1	0	1	2	-1	2
		SO_2	0	0	3	0	1	1
		PM_{10}	0	0	3	-2	-1	0
		O_3	1	0	-1	0	1	1
		CO	0	-2	0	1	-5	3
Weather	Min’	Temperature	0	-1	0	0	2	0
	Max’	Temperature	0	1	-2	0	0	1
		Sun	6	2	0	1	1	0
		Rain	0	1	2	-2	0	0
		Pressure	0	0	1	-2	-1	0
		Wind speed	-3	-1	1	-2	-2	-1
Pollen		Grass	0	0	-8	0	3	0
<=-2			2	1	4	6	3	0
<-1 to 1			22	26	20	20	21	20
>=2			4	1	4	2	4	8

Table E. 12: Trent Region - Wilcoxon sign rank test on the difference in the number of statistically significant correlations between asthmatics and non-asthmatics.

Medical Contact	Z statistic	P-value	Median	Lower CI	Upper CI
All Counts: Asthmatics - Non-asthmatics	-0.41	0.69	0.00	0.00	0.50
Acute Visits: Asthmatics - Non-asthmatics	-0.65	0.52	0.00	-0.50	0.00
Casualty Counts: Asthmatics - Non-asthmatics	-0.60	0.55	0.00	-0.50	0.50
Emergency Consultations: Asthmatics - Non-asthmatics	-1.59	0.11	0.50	0.00	1.00
Emergency Counts: Asthmatics - Non-asthmatics	-0.20	0.84	0.00	-0.50	0.50
Out of Hours Counts: Asthmatics - Non-asthmatics	-2.83	0.00	-0.50	-1.50	0.00

Correlation P-value distributions

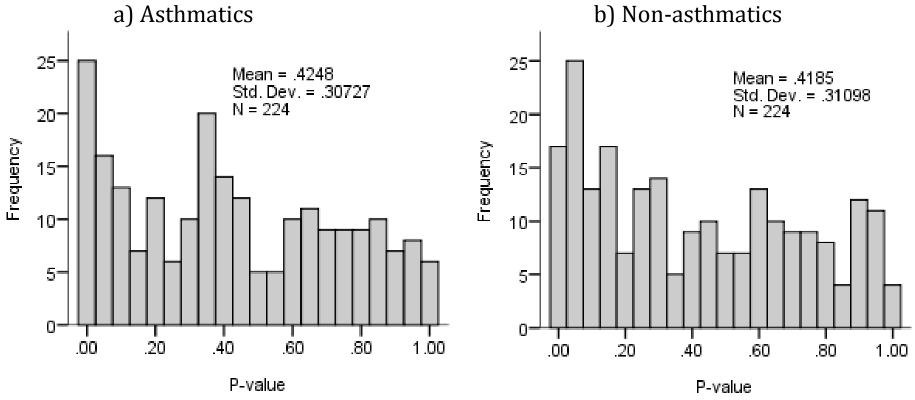


Figure E. 30: Trent Region Acute Visits – distribution of the Spearman's correlation P-values a) Asthmatics and b) Non-asthmatics.

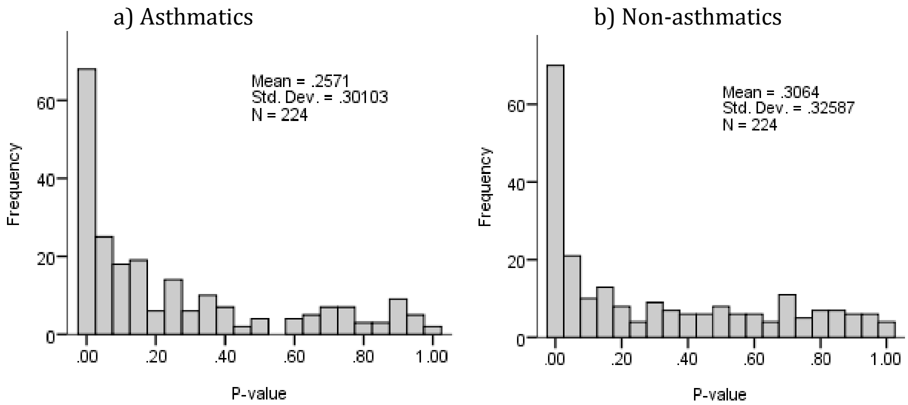


Figure E. 31: Trent Region Casualty Counts – distribution of the Spearman's correlation P-values a) Asthmatics and b) Non-asthmatics.

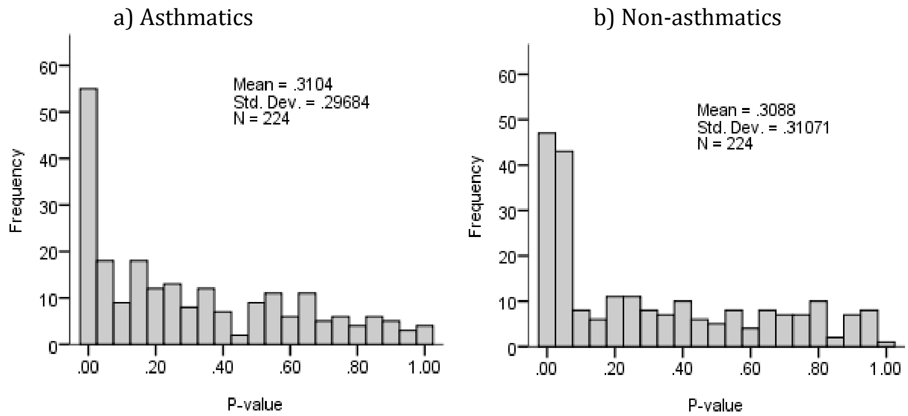


Figure E. 32: Trent Region Emergency Consultations – distribution of the Spearman's correlation P-values a) Asthmatics and b) Non-asthmatics.

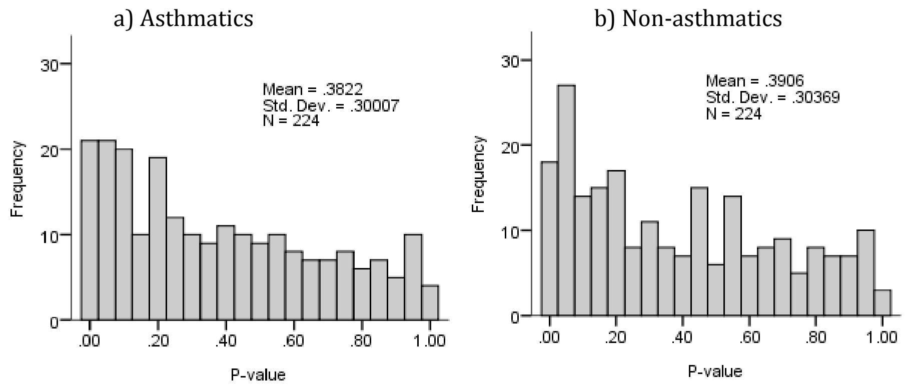


Figure E.33: Trent Region Emergency Counts – distribution of the Spearman's correlation P-values a) Asthmatics and b) Non-asthmatics.

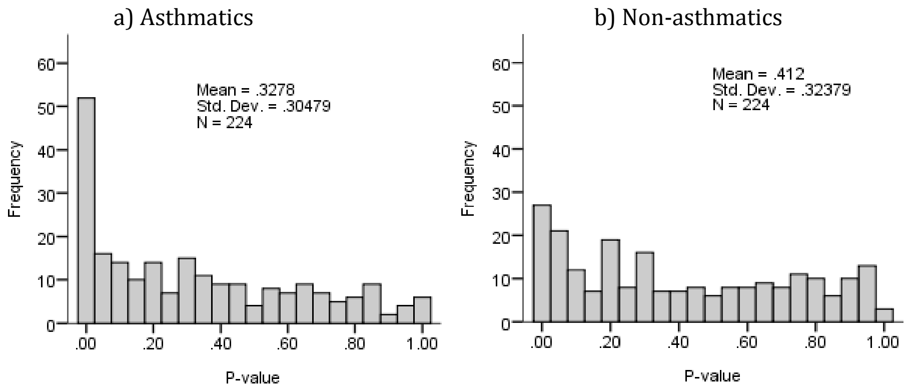


Figure E. 34: Trent Region Out of Hours Counts – distribution of the Spearman's correlation P-values a) Asthmatics and b) Non-asthmatics.

Table E. 13: Trent Region - mean correlation coefficient P-value's distance from null value (0.5) and difference between asthmatics and non-asthmatics.

Medical Contact	Asthmatics	0.5 – Asthmatics	Non-asthmatics	0.5 - Non-asthmatics	Difference between asthmatics and non-asthmatics
All Counts	0.21	0.29	0.23	0.27	0.02
Acute Visits	0.42	0.08	0.42	0.08	0.00
Casualty Counts	0.26	0.24	0.31	0.19	0.05
Emergency Consultations	0.31	0.19	0.31	0.19	0.00
Emergency Counts	0.38	0.12	0.39	0.11	0.01
Out of Hours Counts	0.33	0.17	0.41	0.09	0.08

Lag effects

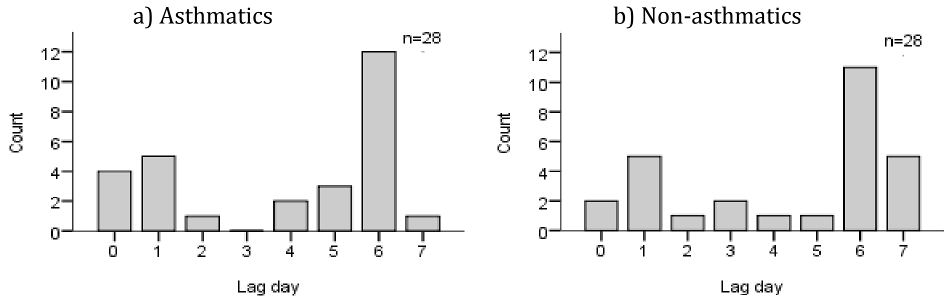


Figure E. 35: Trent Region Acute Visits – number of the most significant correlation coefficients per environmental exposure by lag day a) asthmatics and b) Non-asthmatics.

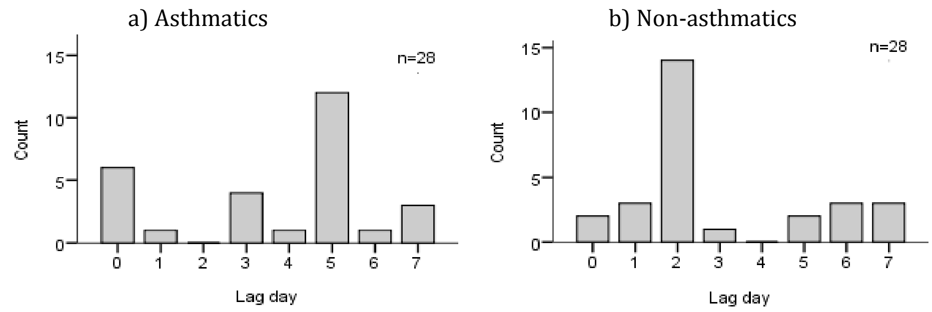


Figure E. 36: Trent Region Casualty Counts – number of the most significant correlation coefficients per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

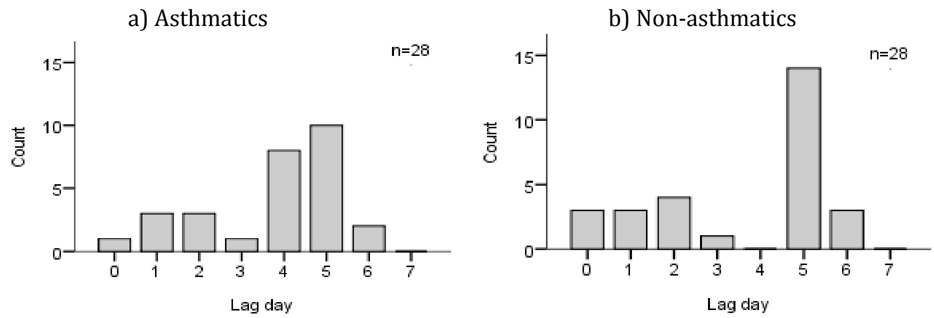


Figure E. 37: Trent Region Emergency Consultations – number of the most significant correlation coefficients per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

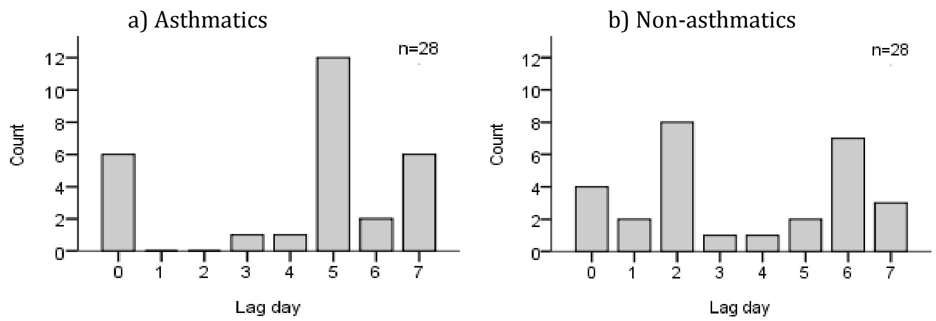


Figure E. 38.: Trent Region Emergency Counts – number of the most significant correlation coefficients per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

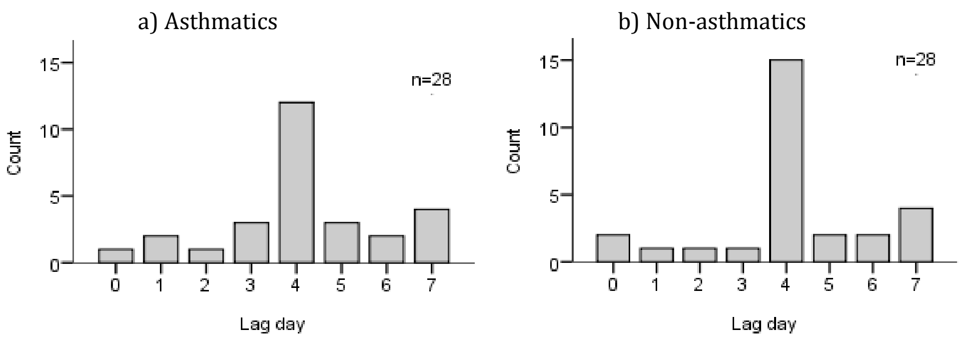


Figure E. 39: Trent Region Out of Hours Counts – number of the most significant correlation coefficients per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

E2.2.2. Trent Region Correlations Excess

Table E. 14: Trent Region – coefficient descriptive statistics (n=224), Excess.

Statistic	All Counts	Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours Counts
Mean	0.01	0.00	-0.01	0.00	0.00	0.00
Median	-0.01	0.00	-0.01	0.00	0.00	0.00
Minimum	-0.18	-0.06	-0.05	-0.06	-0.05	-0.06
Maximum	0.28	0.04	0.05	0.05	0.05	0.05

Table E. 15: Trent Region - number of statistically significant correlations (n=8), Excess.

Exposure			All Counts	Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours Counts
Outdoor air pollutants	**Min'**	**NO**	5	0	0	0	3	0
		NO_2	5	0	0	0	0	0
		NOD	4	0	0	0	0	0
		SO_2	3	1	0	1	0	0
		PM_{10}	4	0	0	0	1	1
		O_3	3	0	0	0	0	0
		CO	3	0	0	0	0	0
	Mean	**NO**	4	0	0	0	0	0
		NO_2	4	0	0	1	0	0
		NOD	4	0	0	1	0	0
		SO_2	6	0	2	0	0	0
		PM_{10}	5	0	1	0	0	0
		O_3	4	0	1	0	0	0
		CO	3	0	0	1	0	1
	Max'	**NO**	4	0	0	0	0	0
		NO_2	5	0	0	1	0	0
		NOD	4	0	0	1	0	0
		SO_2	6	1	3	0	0	1
		PM_{10}	5	0	1	1	0	0
		O_3	4	1	0	0	0	0
		CO	3	0	1	1	0	3
Weather	**Min'**	**Temperature**	5	0	0	0	1	1
	Max'	**Temperature**	8	0	0	0	3	4
		Sun	4	0	0	0	0	0
		Rain	0	0	0	0	0	0
		Pressure	0	0	0	0	0	0
		Wind speed	0	0	0	0	0	0
Pollen		**Grass**	0	0	0	0	0	0
Total			105	3	9	8	8	11
Mean			3.75	0.11	0.32	0.29	0.29	0.39

Correlation P-value distributions

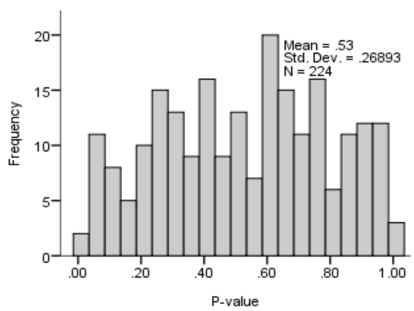


Figure E. 40: Trent Region Acute Visits – distribution of the Spearman's correlation P-values, Excess.

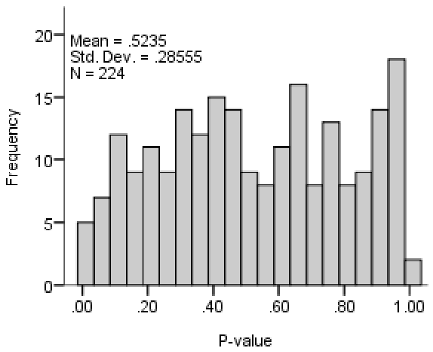


Figure E. 41: Trent Region Casualty Counts – distribution of the Spearman's correlation P-values, Excess.

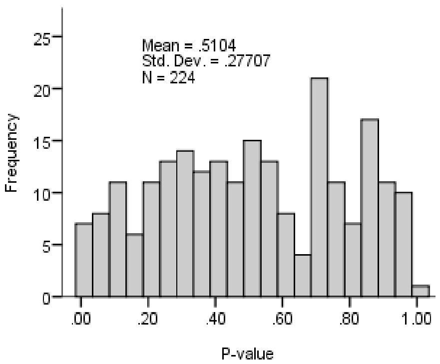


Figure E. 42: Trent Region Emergency Consultations – distribution of the Spearman's correlation P-values, Excess.

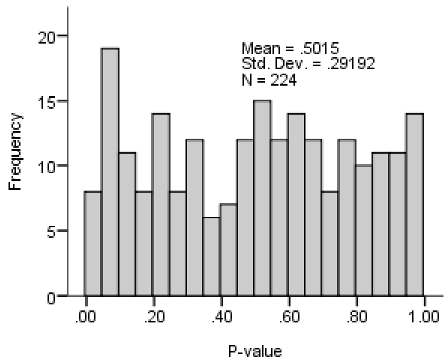


Figure E. 43: Trent Region Emergency Counts – distribution of the Spearman's correlation P-values, Excess.

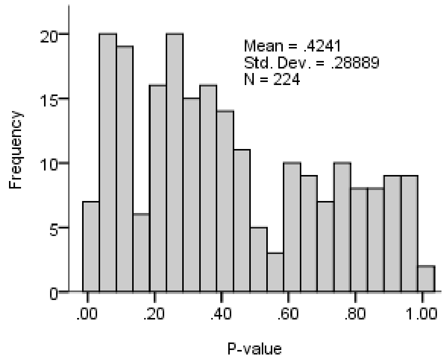


Figure E. 44: Trent Region Out of Hours Counts – distribution of the Spearman's correlation P-values, Excess.

Table E. 16: Trent Region - mean correlation coefficient P-value's distance from null hypothesis (0.5), Excess.

Medical Contact	Excess	0.5 – Excess
All Counts	0.24	0.26
Acute Visits	0.53	-0.03
Casualty Counts	0.52	-0.02
Emergency Consultations	0.51	-0.01
Emergency Counts	0.51	-0.01
Out of Hours Counts	0.42	0.08

Lag effects

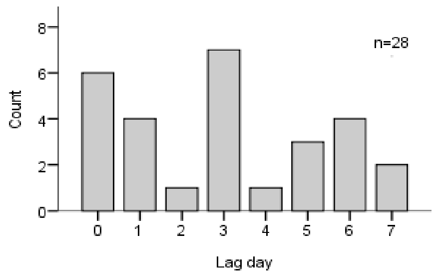


Figure E.45: Trent Region Acute Visits – number of the most significant autoregressive point-estimates per environmental exposure by lag day, Excess.

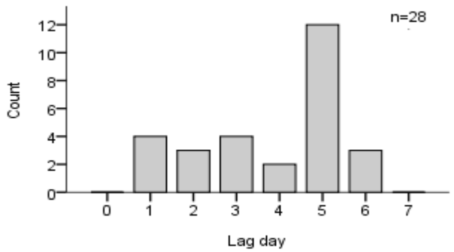


Figure E. 46: Trent Region Casualty Counts – number of the most significant autoregressive point-estimates per environmental exposure by lag day, Excess.

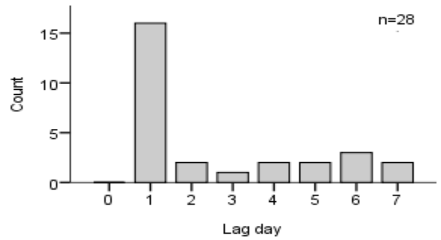


Figure E. 47: Trent Region Emergency Consultations – number of the most significant autoregressive point-estimates per environmental exposure by lag day, Excess.

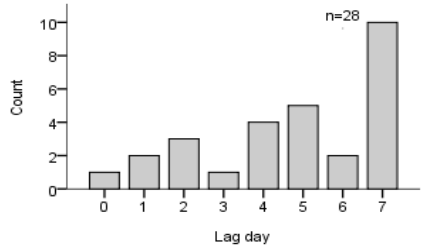


Figure E. 48: Trent Region Emergency Counts – number of the most significant autoregressive point-estimates per environmental exposure by lag day, Excess.

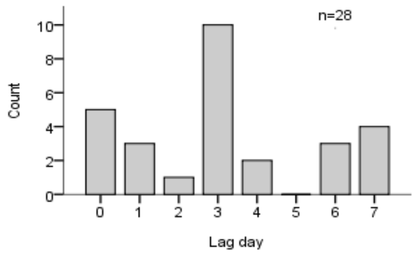


Figure E. 49: Trent Region Out of Hours Counts – number of the most significant autoregressive point-estimates per environmental exposure by lag day, Excess.

E2.3. Sheffield Correlations

E2.3.1. Sheffield Correlations Asthmatics and Non-asthmatics

Table E. 17: Sheffield – coefficient descriptive statistics (n=224), asthmatics and non-asthmatics.

Statistic	All Counts		Admissions		A&E Counts	
	Asthmatics	Non-asthmatics	Asthmatics	Non-asthmatics	Asthmatics	Non-asthmatics
Mean	-0.01	-0.01	0.00	0.00	-0.01	-0.02
Median	0.00	0.00	0.00	0.00	-0.01	-0.02
Minimum	-0.11	-0.06	-0.07	-0.06	-0.11	-0.10
Maximum	0.07	0.05	0.08	0.04	0.06	0.06

Table E. 18: Sheffield- number of statistically significant correlations (n=8), asthmatics and non-asthmatics.

Exposure			All Counts		Admissions		A&E Counts	
			Asthmatics	Non-asthmatics	Asthmatics	Non-asthmatics	Asthmatics	Non-asthmatics
Outdoor air pollutants	Min’	NO	2	0	0	0	2	0
		NO_2	3	0	0	0	2	0
		NOD	3	0	0	0	2	0
		SO_2	1	0	0	0	0	1
		PM_{10}	2	0	0	1	5	1
		O_3	6	0	0	0	6	0
		CO	0	1	0	0	0	0
	Mean	NO	1	2	0	0	1	5
		NO_2	0	0	0	0	1	3
		NOD	1	0	0	0	1	4
		SO_2	3	0	0	0	4	7
		PM_{10}	2	0	1	0	4	2
		O_3	6	0	4	0	7	0
		CO	1	4	0	0	1	7
	Max’	NO	1	0	0	0	1	4
		NO_2	2	0	2	0	2	4
		NOD	0	0	0	0	1	4
		SO_2	4	3	2	0	7	8
		PM_{10}	1	0	0	0	1	1
		O_3	8	0	7	0	8	0
		CO	1	6	0	0	1	7
Weather	Min’	Temperature	4	0	8	0	0	2
	Max’	Temperature	0	0	7	0	0	0
		Sun	2	1	0	1	3	0
		Rain	0	1	0	1	0	0
		Pressure	1	0	0	0	1	2
		Wind speed	2	0	0	0	2	1
Pollen		Grass	0	0	0	0	0	7
Total			57	18	31	3	63	70
Mean			2.04	0.64	1.11	0.11	2.25	2.50

Table E. 19: Sheffield - number of statistically significant correlations, difference between asthmatics and non-asthmatics.

Exposure			Al Counts	Admissions	A&E Counts
Outdoor air pollutants	Min'	**NO**	2	0	2
		NO_2	3	0	2
		NOD	3	0	2
		SO_2	1	0	-1
		PM_{10}	2	-1	4
		O_3	6	0	6
		CO	-1	0	0
	Mean	**NO**	-1	0	-4
		NO_2	0	0	-2
		NOD	1	0	-3
		SO_2	3	0	-3
		PM_{10}	2	1	2
		O_3	6	4	7
		CO	-3	0	-6
	Max'	**NO**	1	0	-3
		NO_2	2	2	-2
		NOD	0	0	-3
		SO_2	1	2	-1
		PM_{10}	1	0	0
		O_3	8	7	8
		CO	-5	0	-6
Weather	Min'	**Temperature**	4	8	-2
	Max'	**Temperature**	0	7	0
		Sun	1	-1	3
		Rain	-1	-1	0
		Pressure	1	0	-1
		Wind speed	2	0	1
Pollen		**Grass**	0	0	-7
<=-2			2	0	11
<-1 to 1			17	25	11
>=2			12	6	9

Table E. 20: Sheffield - Wilcoxon sign rank test on the difference in the number of statistically significant coefficients between asthmatics and non-asthmatics.

Medical Contact	Z statistic	P-value	Median	Lower CI	Upper CI
All Counts: Asthmatics - Non-asthmatics	-2.74	0.01	-1.50	-2.00	-0.50
Admissions: Asthmatics - Non-asthmatics	-2.05	0.04	0.00	-1.00	0.00
A&E Counts: Asthmatics - Non-asthmatics	-0.50	0.62	0.50	-1.00	2.00

Correlation P-value distributions

a) Asthmatics b) Non-asthmatics

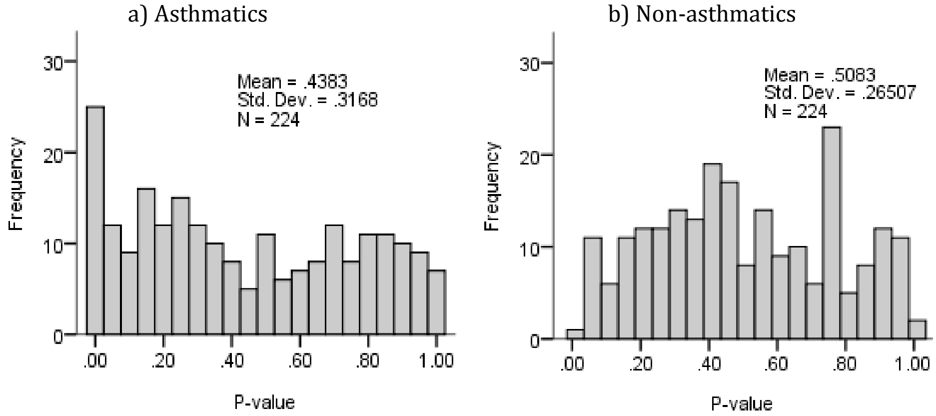


Figure E. 50: Sheffield Admissions – distribution of the Spearman's correlation P-values a) Asthmatics and b) Non-asthmatics.

a) Asthmatics b) Non-asthmatics

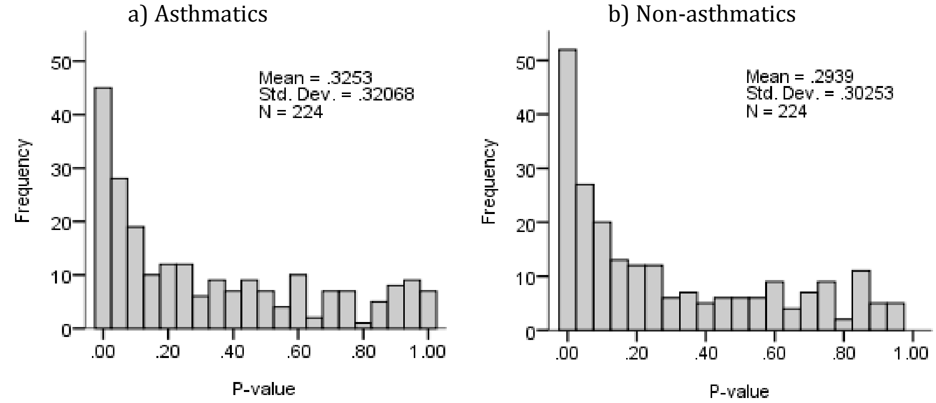


Figure E. 51: Sheffield A&E Counts – distribution of the Spearman's correlation P-values a) Asthmatics and b) Non-asthmatics.

Table E. 21: Sheffield – mean correlation coefficient P-value's distance from null value (0.5) and difference between asthmatics and non-asthmatics.

Medical Contact	Asthmatics	0.5 – Asthmatics	Non-asthmatics	0.5 - Non-asthmatics	Difference between asthmatics and non-asthmatics
All Counts	0.27	0.23	0.45	0.05	-0.18
Admissions	0.44	0.06	0.51	-0.01	-0.07
A&E Counts	0.33	0.17	0.29	0.21	0.03

Lag effects

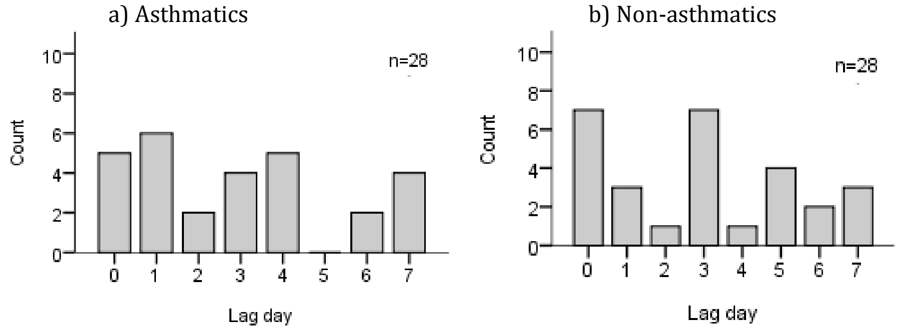


Figure E. 52: Sheffield Admissions – number of the most significant correlation coefficients per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

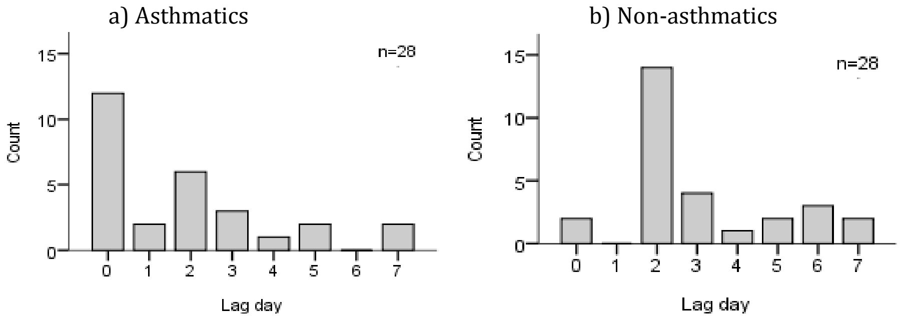


Figure E. 53: Sheffield A&E Counts – number of the most significant correlation coefficients per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

E2.3.2. Sheffield: Excess

Table E. 22: Sheffield – coefficient descriptive statistics (n=224), Excess.

Statistic	All Counts	Acute Visits	A&E Counts
Mean	0.00	0.00	0.00
Median	0.00	0.00	0.01
Minimum	-0.07	-0.09	-0.09
Maximum	0.05	0.07	0.06

Table E. 23: Sheffield - number of statistically significant correlations (n=8), Excess.

Exposure			All Counts	Admissions	A&E Counts
Outdoor air pollutants	Min'	**NO**	1	0	0
		NO_2	1	0	1
		NOD	1	0	2
		SO_2	0	0	1
		PM_{10}	1	1	1
		O_3	3	4	2
		CO	0	0	0
	Mean	**NO**	3	0	4
		NO_2	2	0	3
		NOD	3	0	4
		SO_2	0	6	0
		PM_{10}	1	3	2
		O_3	6	6	4
		CO	2	3	3
	Max'	**NO**	2	0	4
		NO_2	1	4	3
		NOD	2	0	4
		SO_2	2	6	0
		PM_{10}	1	0	1
		O_3	8	8	6
		CO	2	6	4
Weather	Min'	**Temperature**	0	8	0
	Max'	**Temperature**	0	6	0
		Sunshine	1	0	4
		Rain	0	0	1
		Pressure	0	0	0
		Wind speed	2	2	0
Pollen		**Pollen**	0	1	0
Total			45	64	54
Mean			1.61	2.29	1.93

Correlation P-value distributions

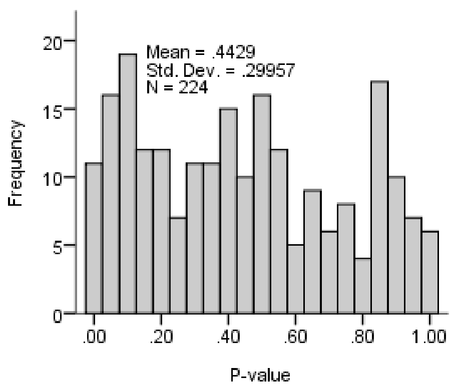


Figure E. 54: Sheffield Admissions – distribution of the Spearman's correlation P-values, Excess.

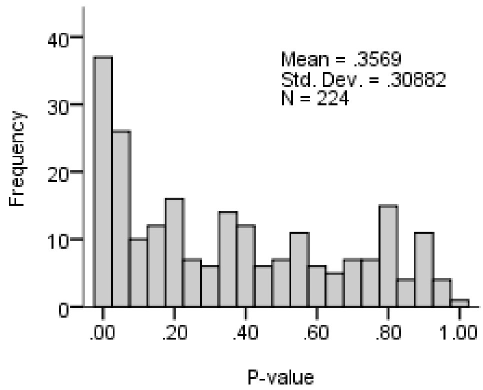


Figure E. 55: Sheffield A&E Counts – distribution of the Spearman's correlation P-values, Excess.

Lag effects

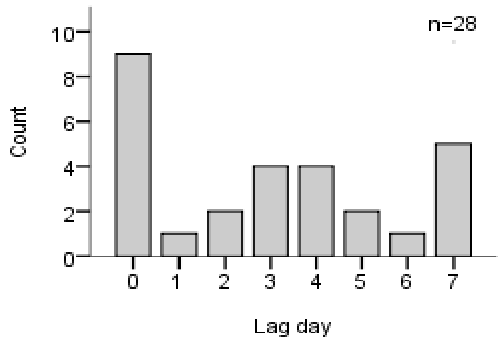


Figure E. 56: Sheffield Admissions – number of the most significant correlation coefficients per environmental exposure by lag day, Excess.

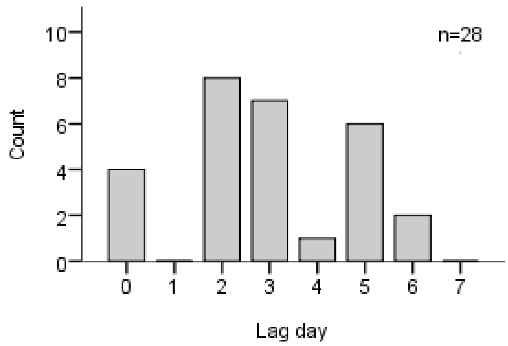


Figure E. 57: Sheffield A&E Counts – number of the most significant correlation coefficients per environmental exposure by lag day, Excess.

E2.4. Scotland Correlations

E2.4.1. Scotland Correlations Asthmatics and Non-asthmatics

Table E. 24: Scotland – coefficient descriptive statistics (n=248), asthmatics and non-asthmatics.

Asthmatics or Non-asthmatics	Statistic	All Counts	Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours Counts
Asthmatics	Mean	0.00	0.00	0.04	0.04	0.04	0.01
	Median	0.00	0.00	0.02	0.03	0.03	0.01
	Minimum	-0.15	-0.12	-0.13	-0.11	-0.14	-0.11
	Maximum	0.22	0.12	0.35	0.32	0.28	0.11
Non-asthmatics	Mean	0.01	-0.01	0.04	0.04	0.04	0.00
	Median	0.01	-0.01	0.03	0.02	0.03	0.00
	Minimum	-0.11	-0.12	-0.13	-0.10	-0.08	-0.08
	Maximum	0.22	0.10	0.30	0.30	0.26	0.08

Table E. 25: Scotland - number of statistically significant correlations across lag days (n=8), asthmatics and non-asthmatics.

Exposure			All Counts		Acute Visits		Casualty Counts		Emergency Consultations		Emergency Counts		Out of Hours Counts	
			Asthmatics	Non-	Asthmatics	Non-	Asthmatics	Non-	Asthmatics	Non-	Asthmatics	Non-	Asthmatics	Non-
Outdoor air pollutants	Min'	NO	2	0	1	0	8	8	8	3	8	7	1	1
		NO_2	0	1	0	1	7	8	8	8	8	8	3	1
		NOD	0	2	1	1	7	8	8	8	8	8	4	1
		SO_2	2	2	0	1	8	7	7	8	6	6	1	3
		PM_{10}	0	0	2	2	8	8	8	8	8	8	1	2
		O_3	3	2	4	6	8	8	8	8	8	8	1	2
		CO	2	1	0	2	1	0	7	6	7	2	3	1
	Mean	NO	5	6	3	3	0	0	4	3	7	2	5	5
		NO_2	5	6	4	3	1	1	8	6	8	8	4	5
		NOD	5	4	5	4	5	5	8	6	8	8	4	6
		SO_2	4	4	1	1	5	3	3	2	0	0	3	4
		PM_{10}	3	4	2	2	8	8	5	5	8	8	3	4
		O_3	4	2	8	8	8	8	8	8	8	8	3	2
		CO	6	4	7	1	8	8	1	1	0	5	6	1
	Max'	NO	4	6	4	4	0	0	4	3	7	2	5	4
		NO_2	3	3	5	3	0	0	6	5	7	6	4	4
		NOD	5	5	5	4	1	2	6	5	8	7	4	3
		SO_2	5	4	1	2	0	0	2	3	0	0	2	5
		PM_{10}	4	5	1	0	0	0	1	0	4	2	2	2
		O_3	5	0	8	8	8	8	8	8	8	8	3	0
		CO	4	3	7	2	8	8	3	5	1	6	5	1
Weather	Min'	Temperature	8	8	8	8	8	8	7	0	8	1	7	7
	Max'	Temperature	8	8	8	8	8	8	8	0	8	0	7	8
		Sun	1	0	1	1	5	5	0	1	0	1	2	2
		Rain	0	0	0	0	0	0	1	0	0	0	0	0
		Pressure	0	0	3	1	7	7	4	1	4	3	0	0
		Wind speed	3	2	1	0	3	2	0	0	0	0	1	1
Pollen		Grass	8	7	6	0	0	0	8	7	8	5	8	6
		Birch	0	3	1	0	3	8	3	4	0	8	0	0
		Oak	2	3	3	1	4	8	1	0	0	7	1	0
		Nettle	8	7	4	0	0	0	8	8	8	8	8	8
Total			109	102	104	77	137	144	161	130	163	150	101	89
Mean			3.52	3.29	3.35	2.48	4.42	4.65	5.19	4.19	5.26	4.84	3.26	2.87

Table E. 26: Scotland - number of statistically significant correlations, difference between asthmatics and non-asthmatics.

Exposure			All Counts	Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours Counts
Outdoor air pollutants	Min’	NO	2	1	0	5	1	0
		NO_2	-1	-1	-1	0	0	2
		NOD	-2	0	-1	0	0	3
		SO_2	0	-1	1	-1	0	-2
		PM_{10}	0	0	0	0	0	-1
		O_3	1	-2	0	0	0	-1
		CO	1	-2	1	1	5	2
	Mean	NO	-1	0	0	1	5	0
		NO_2	-1	1	0	2	0	-1
		NOD	1	1	0	2	0	-2
		SO_2	0	0	2	1	0	-1
		PM_{10}	-1	0	0	0	0	-1
		O_3	2	0	0	0	0	1
		CO	2	6	0	0	-5	5
	Max’	NO	-2	0	0	1	5	1
		NO_2	0	2	0	1	1	0
		NOD	0	1	-1	1	1	1
		SO_2	1	-1	0	-1	0	-3
		PM_{10}	-1	1	0	1	2	0
		O_3	5	0	0	0	0	3
		CO	1	5	0	-2	-5	4
Weather	Min’	Temperature	0	0	0	7	7	0
	Max’	Temperature	0	0	0	8	8	-1
		Sun	1	0	0	-1	-1	0
		Rain	0	0	0	1	0	0
		Pressure	0	2	0	3	1	0
		Wind speed	1	1	1	0	0	0
Pollen		Grass	1	6	0	1	3	2
		Birch	-3	1	-5	-1	-8	0
		Oak	-1	2	-4	1	-7	1
		Nettle	1	4	0	0	0	0
<=-2			3	2	2	1	4	3
<-1 to 1			24	22	28	24	20	21
>=2			4	7	1	6	7	7

Table E. 27: Scotland - Wilcoxon sign rank test on differences of the number of statistically significant correlations between asthmatics and non-asthmatics.

Medical Contact	Z statistic	Asymp. Sig. (2-tailed)	Median	Lower CI	Upper CI
All Counts: Asthmatics - Non-asthmatics	-0.73	0.47	0.00	-0.50	0.50
Acute Visits: Asthmatics - Non-asthmatics	-2.15	0.03	-0.50	-1.00	0.00
Casualty Counts: Asthmatics - Non-asthmatics	-0.61	0.54	0.00	0.00	0.00
Emergency Consultations: Asthmatics - Non-asthmatics	-2.50	0.01	-0.50	-1.00	0.00
Emergency Counts: Asthmatics - Non-asthmatics	-0.83	0.40	0.00	-1.50	0.00
Out of Hours Counts: Asthmatics - Non-asthmatics	-1.10	0.27	0.00	-1.00	0.50

Correlation P-value distributions

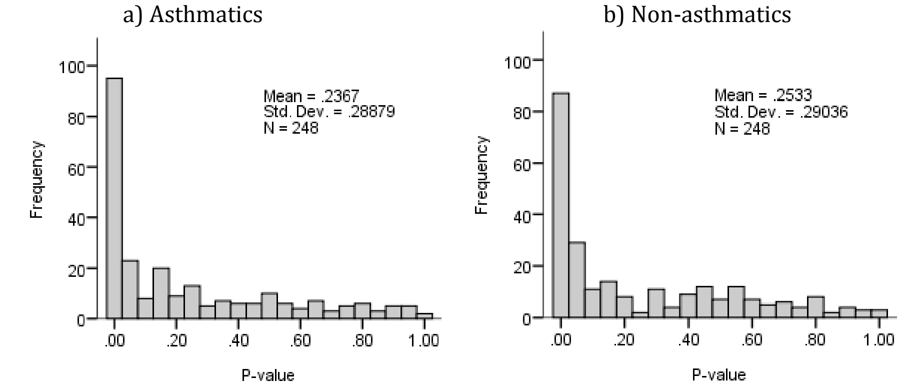


Figure E. 58. Scotland All Counts– distribution of the Spearman's correlation P-values a) Asthmatics and b) Non-asthmatics.

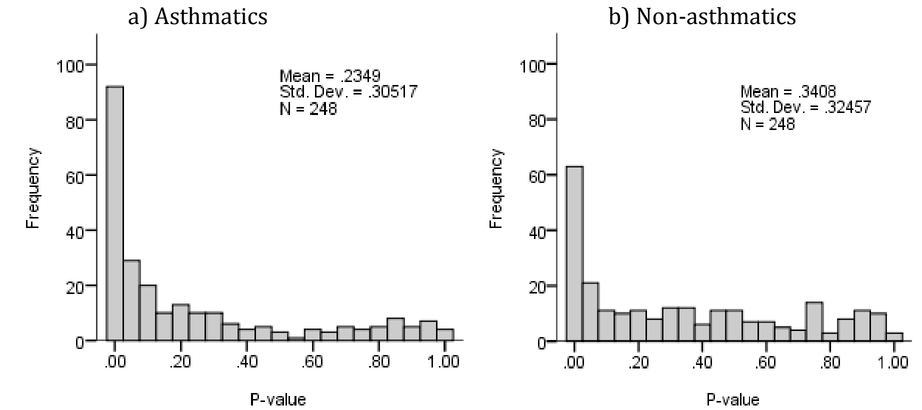


Figure E. 59. Scotland Acute Visits – distribution of the Spearman's correlation P-values a) Asthmatics and b) Non-asthmatics.

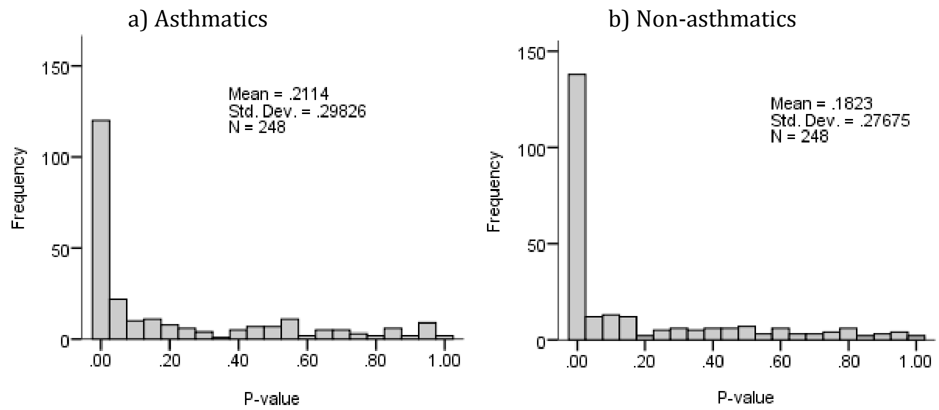


Figure E. 60. Scotland Casualty Counts– distribution of the Spearman's correlation P-values a) Asthmatics and b) Non-asthmatics.

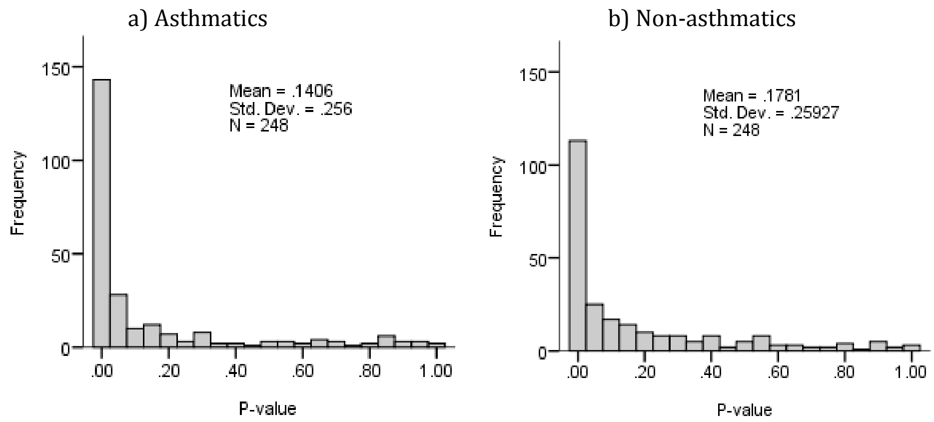


Figure E. 61: Scotland Emergency Consultations – distribution of the Spearman's correlation P-values a) Asthmatics and b) Non-asthmatics.

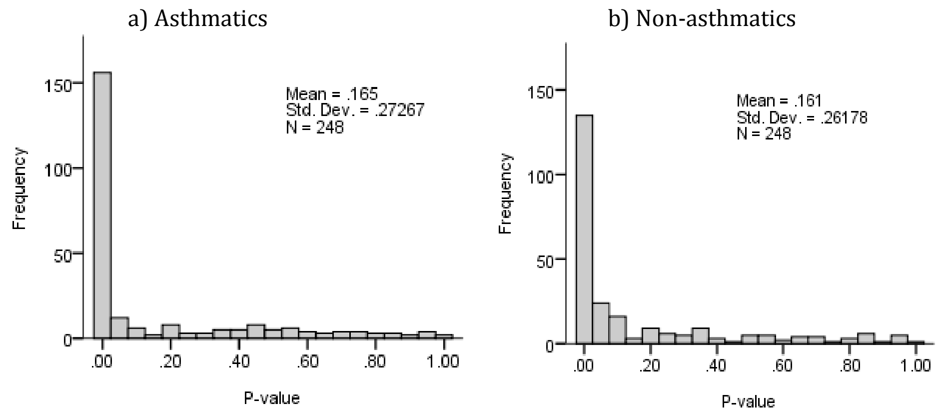


Figure E. 62: Scotland Emergency Counts – distribution of the Spearman's correlation P-values a) Asthmatics and b) Non-asthmatics.

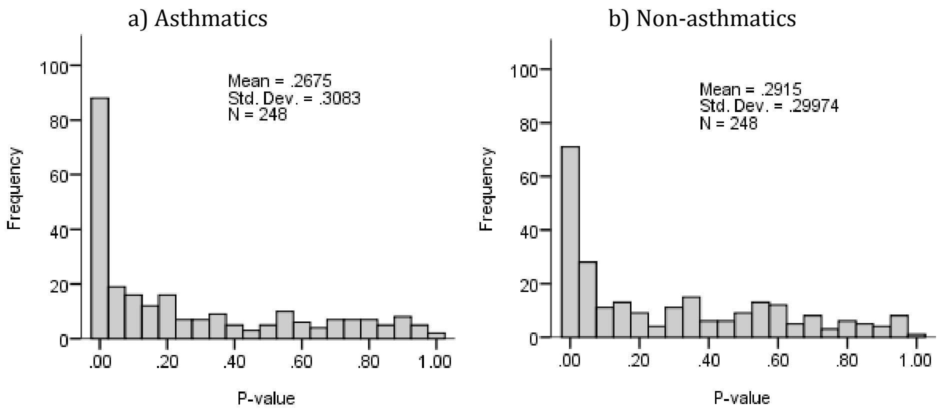


Figure E. 63: Scotland Out of Hours Counts – distribution of the Spearman's correlation P-values a) Asthmatics and b) Non-asthmatics.

Table E. 28: Scotland – mean correlation coefficient P-value's distance from null value (0.5) and difference between asthmatics and non-asthmatics.

Medical Contact	Asthmatics	0.5 - Asthmatics	Non-asthmatics	0.5 - Non-asthmatics	Difference between Asthmatics and Non-asthmatics
All Counts	0.24	0.26	0.25	0.25	0.02
Acute Visits	0.23	0.27	0.34	0.16	0.11
Casualty Counts	0.21	0.29	0.18	0.32	-0.03
Emergency Consultations	0.14	0.36	0.18	0.32	0.04
Emergency Counts	0.17	0.34	0.16	0.34	0.00
Out of Hours Counts	0.27	0.23	0.29	0.21	0.02

Lag effects

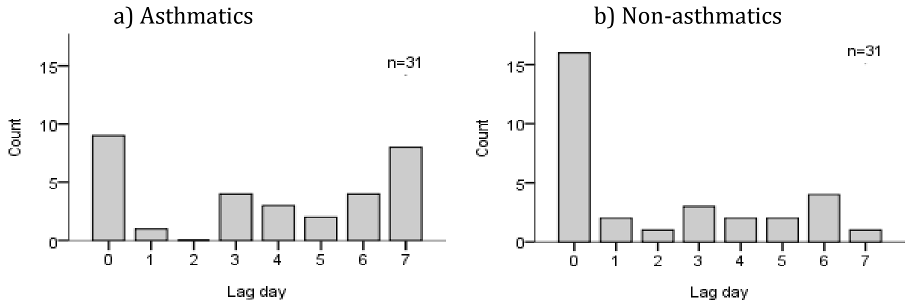


Figure E. 64: All Counts: Scotland – number of the most significant correlation coefficients per environmental exposure by lag day) Asthmatics and b) Non-asthmatics.

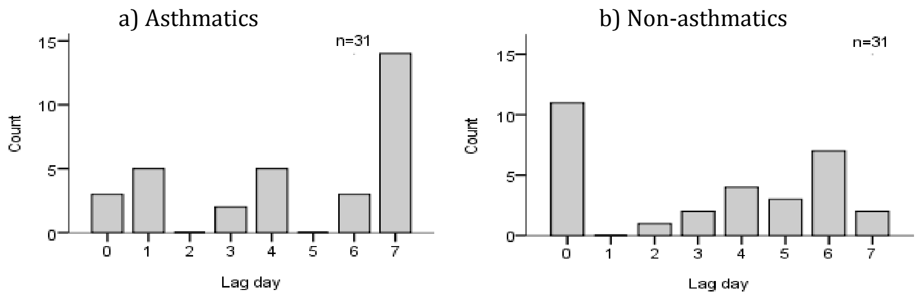


Figure E. 65. Acute Visits: Scotland – number of the most significant correlation coefficients per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

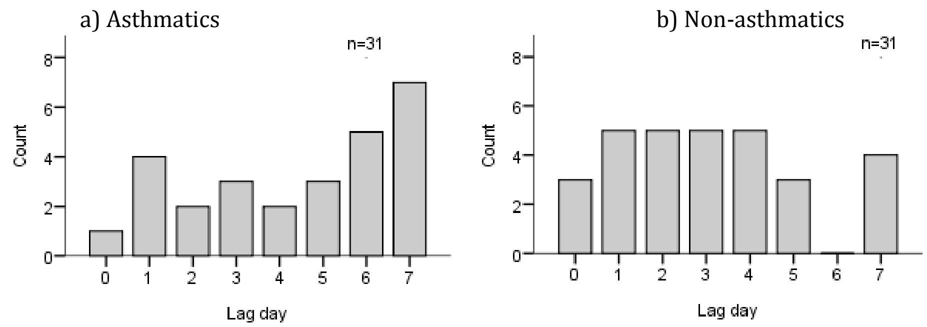


Figure E. 66: Scotland Casualty Counts – number of the most significant correlation coefficients per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

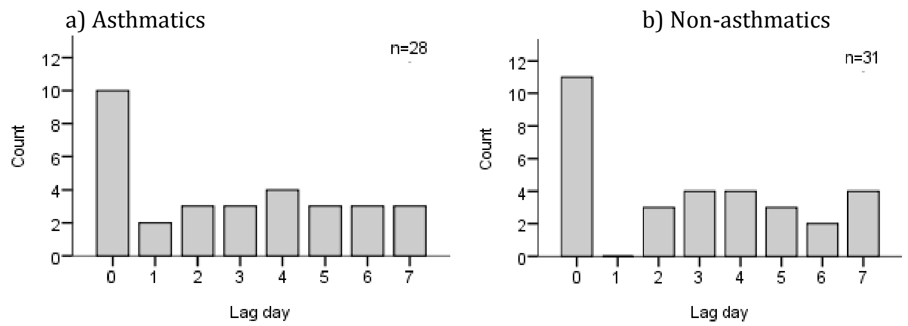


Figure E. 67: Scotland Emergency Consultations – number of the most significant correlation coefficients per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

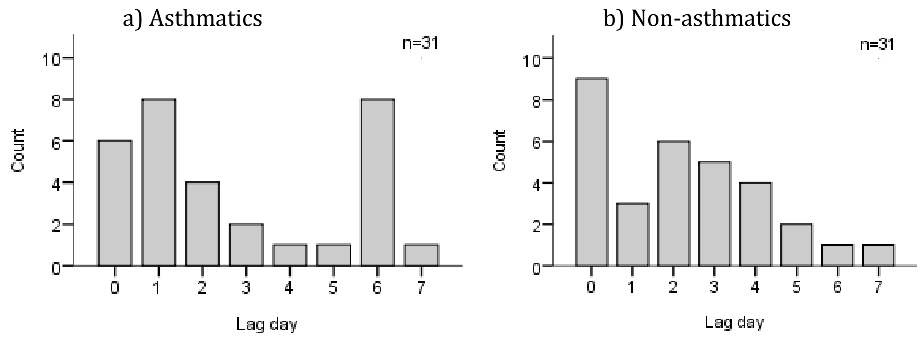


Figure E. 68: Scotland Emergency Counts – number of the most significant correlation coefficients per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

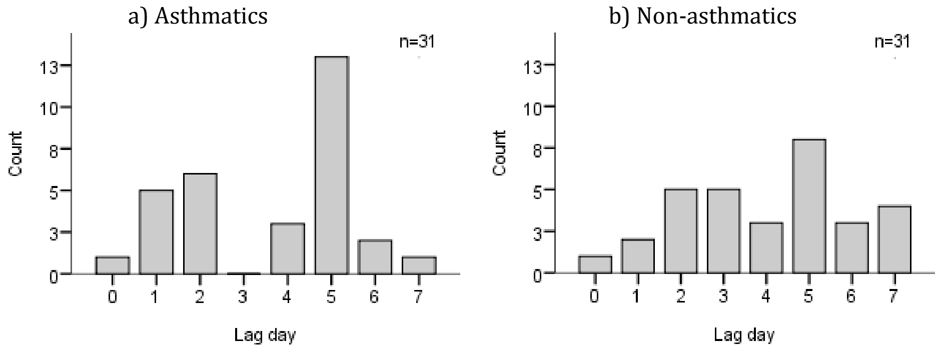


Figure E. 69: Scotland Out of Hours Counts – number of the most significant correlation coefficients per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

E2.4.2. Scotland: Excess

Table E. 29. Scotland –coefficient descriptive statistics (n=248), Excess.

Statistic	All Counts	Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours Counts
Mean	0.00	0.00	0.00	0.00	0.02	0.01
Median	0.00	-0.01	0.00	0.00	0.01	0.01
Minimum	-0.08	-0.11	-0.07	-0.06	-0.08	-0.09
Maximum	0.08	0.21	0.07	0.11	0.14	0.12

Table E. 30. Scotland - number of statistically significant correlations across lag days (n=8), Excess.

Exposure			All Counts	Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours Counts
Outdoor air pollutants	Min'	NO	2	0	4	3	3	1
		NO_2	0	0	1	7	4	0
		NOD	0	0	0	7	6	0
		SO_2	2	0	2	0	2	0
		PM_{10}	1	0	1	7	4	1
		O_3	3	1	6	8	8	0
		CO	2	1	2	1	4	2
	Mean	NO	6	4	0	3	1	3
		NO_2	6	1	0	4	5	0
		NOD	6	4	0	5	6	3
		SO_2	4	0	0	0	0	0
		PM_{10}	3	0	0	3	2	0
		O_3	4	1	8	8	8	1
		CO	3	3	0	0	0	1
	Max'	NO	4	2	0	3	1	2
		NO_2	4	2	0	3	1	0
		NOD	6	3	0	5	4	2
		SO_2	4	0	0	0	0	0
		PM_{10}	1	0	0	1	1	0
		O_3	4	1	8	8	8	1
		CO	3	3	0	0	0	3
Weather	Min'	Temperature	4	5	0	6	2	0
	Max'	Temperature	6	5	0	3	2	0
		Sun	0	1	0	0	0	0
		Rain	0	0	0	0	0	1
		Pressure	0	2	0	3	0	0
		Wind speed	2	0	0	0	0	0
Pollen		Grass	8	1	0	7	8	2
		Birch	2	0	1	0	3	1
		Oak	3	0	0	0	0	0
		Nettle	8	0	0	8	8	3
Total			101	40	33	103	91	27
Mean			3.26	1.29	1.06	3.32	2.94	0.87

Correlation P-value distributions

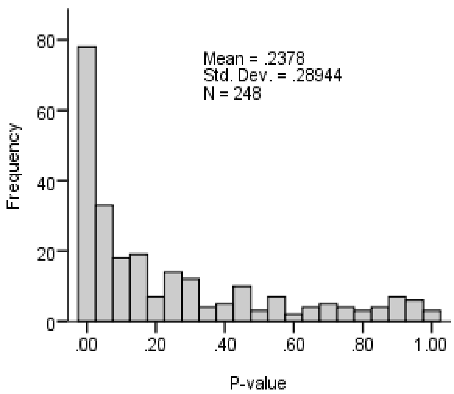


Figure E. 70: Scotland All Counts – distribution of the Spearman's correlation P-values, Excess.

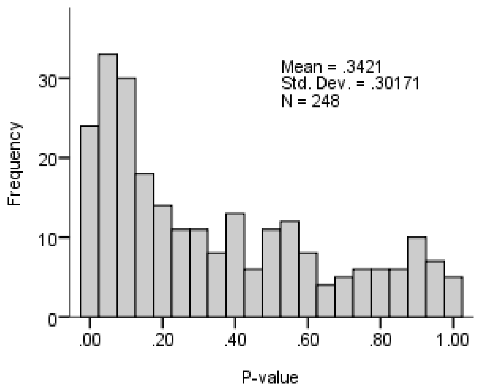


Figure E. 71: Scotland Acute Visits – distribution of the Spearman's correlation P-values, Excess.

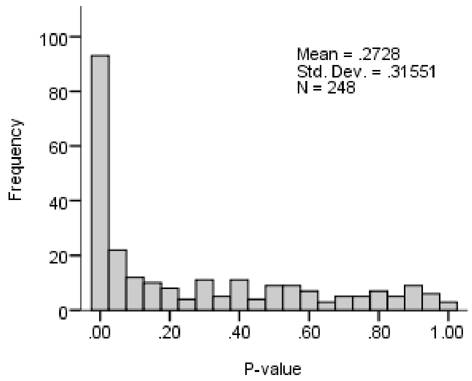


Figure E. 73: Emergency Consultations: Scotland – distribution of the Spearman's correlation P-values, Excess.

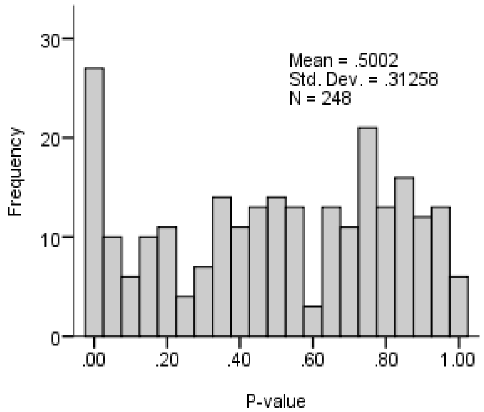


Figure E. 72: Scotland Casualty Counts – distribution of the Spearman's correlation P-values, Excess.

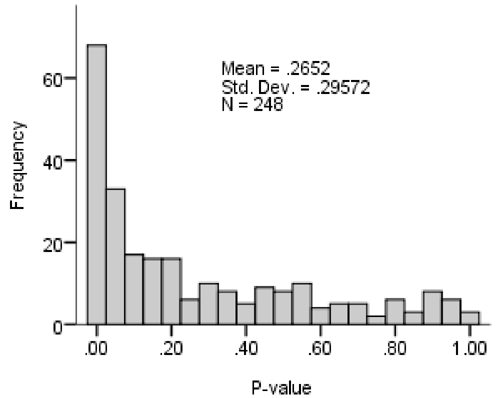


Figure E. 74: Emergency Counts: Scotland – distribution of the Spearman's correlation P-values, Excess.

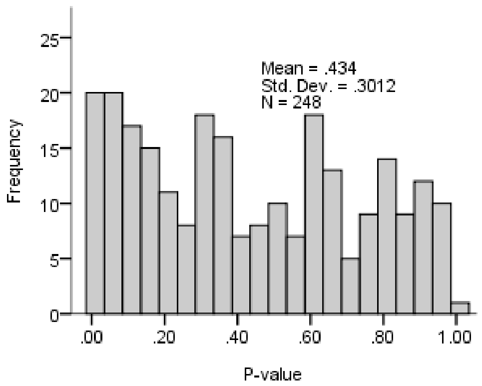


Figure E. 75: Out of Hours Counts: Scotland – distribution of the Spearman's correlation P-values, Excess.

Table E. 31. Scotland – mean correlation coefficient P-value's distance from null value (0.5), Excess.

Medical Contact	Excess	0.5 - Excess
All Counts	0.24	0.26
Acute Visits	0.34	0.16
Casualty Counts	0.50	0.00
Emergency Consultations	0.27	0.23
Emergency Counts	0.27	0.23
Out of Hours Counts	0.43	0.07

Lag effects

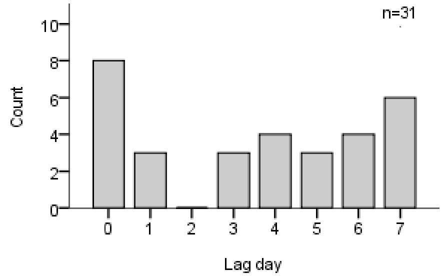


Figure E. 76. Scotland All Counts – number of the most significant correlation coefficients per environmental exposure by lag day, Excess.

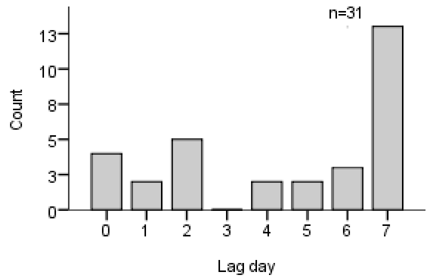


Figure E. 77. Scotland Acute Visits – number of the most significant correlation coefficients per environmental exposure by lag day, Excess.

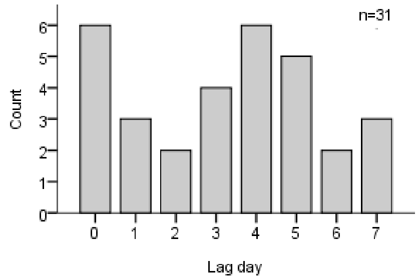


Figure E. 78: Scotland Casualty Counts – number of the most significant correlation coefficients per environmental exposure by lag day, Excess.

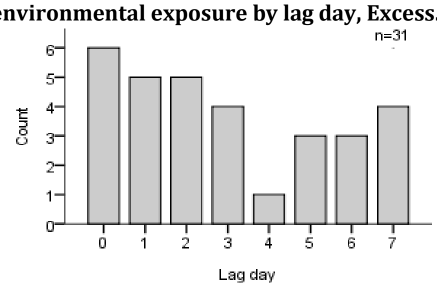


Figure E. 79: Scotland Emergency Consultations – number of the most significant correlation coefficients per environmental exposure by lag day, Excess.

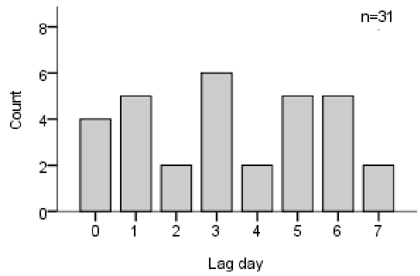


Figure E. 80: Scotland Emergency Counts – number of the most significant correlation coefficients per environmental exposure by lag day, Excess.

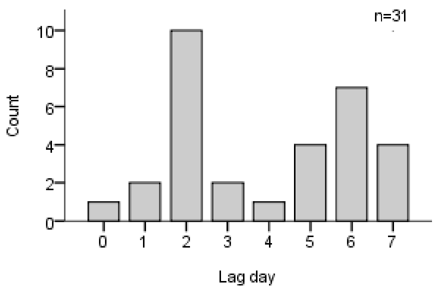


Figure E. 81: Scotland Out of Hours Counts: Scotland – number of the most significant correlation coefficients per environmental exposure by lag day, Excess.

E3. Correlation coefficients and P-values

E3.1. England and Wales Correlation coefficients and P-values

Table E. 32: England and Wales All Counts Asthmatics – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		r	P	r	P	r	P	r	P	r	P	r	P	r	P	r	P
Outdoor air pollutants	NO Min’	0.00	0.93	-0.06	0.00	0.01	0.75	0.02	0.46	0.03	0.24	0.11	0.00	0.07	0.00	-0.02	0.00
	NO_2 Min’	0.05	0.03	-0.09	0.00	-0.06	0.01	0.00	0.99	0.02	0.40	0.06	0.01	0.10	0.00	0.02	0.05
	NOD Min’	0.02	0.35	-0.08	0.00	-0.03	0.20	0.01	0.69	0.03	0.24	0.09	0.00	0.09	0.00	-0.01	0.02
	SO_2 Min’	0.07	0.00	-0.02	0.31	-0.04	0.05	-0.02	0.28	-0.04	0.08	-0.02	0.46	0.04	0.07	0.04	0.07
	PM_{10} Min’	0.08	0.00	-0.06	0.00	-0.09	0.00	-0.08	0.00	-0.01	0.75	0.07	0.00	0.11	0.00	0.05	0.08
	O_3 Min’	-0.15	0.00	0.06	0.00	0.08	0.00	0.02	0.34	0.01	0.76	0.00	0.96	-0.12	0.00	-0.13	-0.15
	CO Min’	0.00	0.87	-0.05	0.01	0.00	0.92	0.03	0.14	0.06	0.01	0.07	0.00	0.05	0.01	-0.01	0.00
	NO Mean	0.22	0.00	-0.03	0.17	-0.06	0.01	-0.01	0.74	0.00	0.91	0.05	0.03	0.18	0.00	0.17	0.22
	NO_2 Mean	0.25	0.00	-0.07	0.00	-0.11	0.00	-0.05	0.02	-0.02	0.32	0.03	0.20	0.21	0.00	0.21	0.25
	NOD Mean	0.23	0.00	-0.04	0.06	-0.08	0.00	-0.02	0.34	-0.01	0.73	0.04	0.04	0.20	0.00	0.19	0.23
	SO_2 Mean	0.14	0.00	0.00	0.85	-0.03	0.19	-0.03	0.18	-0.02	0.30	-0.02	0.33	0.06	0.01	0.11	0.14
	PM_{10} Mean	0.14	0.00	-0.05	0.02	-0.10	0.00	-0.07	0.00	-0.03	0.22	0.04	0.05	0.14	0.00	0.12	0.14
	O_3 Mean	-0.21	0.00	0.05	0.02	0.09	0.00	0.01	0.52	-0.01	0.77	-0.03	0.18	-0.17	0.00	-0.17	-0.21
	CO Mean	0.16	0.00	-0.02	0.45	-0.02	0.32	0.03	0.19	0.03	0.23	0.05	0.01	0.15	0.00	0.13	0.16
	NO Max’	0.23	0.00	0.00	0.91	-0.06	0.00	-0.03	0.22	-0.02	0.44	0.02	0.26	0.18	0.00	0.20	0.23
	NO_2 Max’	0.26	0.00	-0.05	0.02	-0.11	0.00	-0.06	0.01	-0.03	0.24	0.00	0.86	0.19	0.00	0.22	0.26
	NOD Max’	0.13	0.00	0.00	0.83	-0.05	0.02	-0.03	0.12	-0.02	0.28	-0.03	0.18	0.06	0.01	0.10	0.13
	SO_2 Max’	0.13	0.00	0.00	0.83	-0.05	0.02	-0.03	0.12	-0.02	0.28	-0.03	0.18	0.06	0.01	0.10	0.13
	PM_{10} Max’	0.12	0.00	-0.01	0.66	-0.08	0.00	-0.07	0.00	-0.02	0.29	0.03	0.16	0.12	0.00	0.10	0.12
	O_3 Max’	-0.15	0.00	0.04	0.07	0.06	0.00	0.00	0.97	-0.03	0.24	-0.05	0.01	-0.15	0.00	-0.12	-0.15
	CO Max’	0.19	0.00	0.03	0.21	-0.02	0.35	0.01	0.73	0.02	0.48	0.03	0.18	0.13	0.00	0.16	0.19
Weather	Temp Min’	-0.08	0.00	-0.07	0.00	-0.08	0.00	-0.07	0.00	-0.05	0.03	-0.04	0.08	-0.05	0.02	-0.06	-0.08
	Temp Max’	-0.07	0.00	-0.06	0.00	-0.08	0.00	-0.09	0.00	-0.08	0.00	-0.08	0.00	-0.07	0.00	-0.06	-0.07
	Sun	-0.02	0.44	-0.03	0.12	-0.04	0.10	-0.05	0.03	-0.06	0.00	-0.06	0.00	-0.04	0.06	-0.01	-0.02
	Rain	0.00	0.84	0.04	0.04	0.02	0.32	-0.03	0.13	-0.04	0.04	-0.01	0.74	0.03	0.18	-0.01	0.00
	Pressure	-0.02	0.32	-0.01	0.61	0.00	0.82	0.01	0.78	0.01	0.66	-0.01	0.52	-0.02	0.29	-0.02	-0.02
	Wind speed	-0.02	0.32	0.04	0.04	0.03	0.11	0.00	0.88	-0.02	0.36	0.01	0.53	0.04	0.06	0.06	-0.02
Pollen	Grass	0.04	0.07	0.06	0.01	0.07	0.00	0.04	0.07	0.03	0.17	0.00	0.95	0.01	0.60	0.03	0.04

Table E. 33: England and Wales All Counts Non-asthmatics – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		r	P	r	P	r	P	r	P	r	P	r	P	r	P	r	P
Outdoor air pollutants	NO Min’	0.00	0.94	-0.07	0.00	0.00	0.88	0.01	0.69	0.02	0.39	0.10	0.00	0.07	0.00	-0.02	0.27
	NO_2 Min’	0.05	0.03	-0.09	0.00	-0.07	0.00	-0.01	0.67	0.01	0.65	0.05	0.02	0.09	0.00	0.01	0.61
	NOD Min’	0.02	0.34	-0.09	0.00	-0.03	0.12	0.00	0.98	0.02	0.42	0.09	0.00	0.09	0.00	-0.01	0.60
	SO_2 Min’	0.07	0.00	-0.02	0.41	-0.04	0.05	-0.02	0.28	-0.04	0.07	-0.02	0.42	0.04	0.07	0.05	0.02
	PM_{10} Min’	0.09	0.00	-0.05	0.01	-0.09	0.00	-0.07	0.00	-0.01	0.81	0.08	0.00	0.12	0.00	0.06	0.01
	O_3 Min’	-0.14	0.00	0.07	0.00	0.09	0.00	0.03	0.11	0.02	0.42	0.02	0.46	-0.10	0.00	-0.12	0.00
	CO Min’	0.00	0.93	-0.05	0.02	0.00	0.93	0.03	0.19	0.06	0.01	0.08	0.00	0.06	0.01	-0.01	0.65
	NO Mean	0.20	0.00	-0.04	0.08	-0.07	0.00	-0.02	0.34	-0.01	0.51	0.03	0.16	0.16	0.00	0.16	0.00
	NO_2 Mean	0.25	0.00	-0.07	0.00	-0.12	0.00	-0.06	0.00	-0.03	0.11	0.01	0.57	0.20	0.00	0.20	0.00
	NOD Mean	0.23	0.00	-0.05	0.03	-0.09	0.00	-0.03	0.12	-0.02	0.35	0.03	0.21	0.18	0.00	0.18	0.00
	SO_2 Mean	0.14	0.00	0.00	0.85	-0.03	0.19	-0.03	0.18	-0.02	0.30	-0.02	0.33	0.06	0.01	0.11	0.00
	PM_{10} Mean	0.15	0.00	-0.04	0.05	-0.10	0.00	-0.07	0.00	-0.03	0.24	0.04	0.04	0.15	0.00	0.12	0.00
	O_3 Mean	-0.19	0.00	0.07	0.00	0.11	0.00	0.03	0.14	0.01	0.58	-0.01	0.73	-0.15	0.00	-0.15	0.00
	CO Mean	0.15	0.00	-0.02	0.36	-0.03	0.20	0.02	0.39	0.02	0.41	0.05	0.04	0.14	0.00	0.12	0.00
	NO Max’	0.22	0.00	-0.01	0.77	-0.07	0.00	-0.04	0.08	-0.03	0.20	0.01	0.72	0.16	0.00	0.19	0.00
	NO_2 Max’	0.26	0.00	-0.05	0.03	-0.11	0.00	-0.06	0.00	-0.03	0.14	-0.01	0.79	0.18	0.00	0.22	0.00
	NOD Max’	0.24	0.00	-0.01	0.61	-0.08	0.00	-0.04	0.06	-0.03	0.21	0.01	0.76	0.17	0.00	0.20	0.00
	SO_2 Max’	0.13	0.00	0.01	0.66	-0.04	0.04	-0.03	0.22	-0.02	0.39	-0.03	0.24	0.06	0.01	0.10	0.00
	PM_{10} Max’	0.13	0.00	-0.01	0.71	-0.08	0.00	-0.07	0.00	-0.02	0.26	0.03	0.14	0.12	0.00	0.11	0.00
	O_3 Max’	-0.13	0.00	0.06	0.01	0.08	0.00	0.02	0.46	-0.01	0.71	-0.03	0.11	-0.13	0.00	-0.10	0.00
	CO Max’	0.17	0.00	0.02	0.40	-0.03	0.18	0.00	0.91	0.00	0.84	0.02	0.42	0.11	0.00	0.15	0.00
Weather	Temp Min’	-0.07	0.00	-0.07	0.00	-0.08	0.00	-0.07	0.00	-0.05	0.02	-0.04	0.07	-0.05	0.02	-0.07	0.00
	Temp Max’	-0.06	0.01	-0.06	0.01	-0.07	0.00	-0.08	0.00	-0.08	0.00	-0.07	0.00	-0.07	0.00	-0.05	0.01
	Sun	-0.01	0.74	-0.03	0.20	-0.02	0.27	-0.04	0.07	-0.05	0.02	-0.05	0.01	-0.03	0.13	-0.01	0.65
	Rain	-0.01	0.67	0.04	0.10	0.02	0.33	-0.03	0.11	-0.05	0.02	-0.01	0.62	0.02	0.30	-0.01	0.50
	Pressure	-0.02	0.41	-0.01	0.71	0.00	0.88	0.01	0.59	0.02	0.42	-0.01	0.75	-0.02	0.45	-0.02	0.35
	Wind speed	-0.02	0.41	0.04	0.04	0.04	0.07	0.01	0.80	-0.02	0.35	0.01	0.63	0.04	0.04	0.07	0.00
Pollen	Grass	0.05	0.02	0.07	0.00	0.08	0.00	0.05	0.02	0.04	0.06	0.01	0.62	0.02	0.29	0.05	0.03

Table E. 34: England and Wales Acute Visits Asthmatics – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
	Exposure	r	P	r	P	r	P	r	P	r	P	r	P	r	P	r	P
	NO Min’	0.00	0.86	0.00	0.91	0.01	0.61	0.00	0.94	0.03	0.16	0.06	0.00	0.04	0.04	0.00	0.83
	NO_2 Min’	0.02	0.31	-0.04	0.04	-0.02	0.37	0.02	0.32	0.01	0.60	0.03	0.22	0.04	0.05	0.00	0.93
	NOD Min’	0.01	0.63	-0.02	0.31	0.00	0.83	0.02	0.42	0.03	0.22	0.05	0.02	0.05	0.03	0.01	0.78
	SO_2 Min’	0.02	0.25	-0.01	0.63	0.00	0.89	0.02	0.43	-0.01	0.75	-0.01	0.60	0.03	0.13	0.03	0.18
	PM_{10} Min’	0.04	0.04	-0.04	0.05	-0.04	0.06	-0.01	0.64	0.02	0.48	0.05	0.03	0.08	0.00	0.04	0.04
	O_3 Min’	-0.10	0.00	0.02	0.39	0.03	0.13	0.00	0.84	-0.03	0.21	0.01	0.81	-0.07	0.00	-0.08	0.00
	CO Min’	0.03	0.20	0.01	0.75	0.03	0.22	0.04	0.04	0.07	0.00	0.08	0.00	0.09	0.00	0.02	0.31
	NO Mean	0.16	0.00	0.04	0.08	0.04	0.06	0.05	0.02	0.06	0.00	0.09	0.00	0.15	0.00	0.14	0.00
	NO_2 Mean	0.17	0.00	-0.01	0.78	0.00	0.98	0.04	0.05	0.04	0.05	0.07	0.00	0.15	0.00	0.15	0.00
Outdoor air pollutants	NOD Mean	0.17	0.00	0.03	0.19	0.03	0.14	0.05	0.02	0.06	0.01	0.09	0.00	0.15	0.00	0.15	0.00
	SO_2 Mean	0.10	0.00	0.03	0.16	0.05	0.01	0.04	0.05	0.04	0.05	0.03	0.24	0.07	0.00	0.14	0.00
	PM_{10} Mean	0.10	0.00	-0.02	0.31	-0.02	0.30	0.00	0.93	0.01	0.67	0.05	0.04	0.10	0.00	0.08	0.00
	O_3 Mean	-0.12	0.00	0.00	0.91	0.02	0.35	-0.03	0.16	-0.04	0.07	-0.03	0.22	-0.10	0.00	-0.10	0.00
	CO Mean	0.17	0.00	0.08	0.00	0.10	0.00	0.11	0.00	0.12	0.00	0.14	0.00	0.19	0.00	0.16	0.00
	NO Max’	0.18	0.00	0.05	0.01	0.04	0.06	0.04	0.08	0.05	0.02	0.08	0.00	0.15	0.00	0.15	0.00
	NO_2 Max’	0.19	0.00	0.04	0.04	0.03	0.14	0.06	0.01	0.06	0.01	0.08	0.00	0.17	0.00	0.18	0.00
	NOD Max’	0.19	0.00	0.06	0.01	0.04	0.06	0.04	0.06	0.05	0.01	0.09	0.00	0.16	0.00	0.16	0.00
	SO_2 Max’	0.09	0.00	0.03	0.13	0.04	0.04	0.05	0.02	0.06	0.01	0.02	0.31	0.07	0.00	0.12	0.00
	PM_{10} Max’	0.09	0.00	0.02	0.40	-0.01	0.51	-0.01	0.72	0.01	0.65	0.03	0.12	0.08	0.00	0.06	0.00
	O_3 Max’	-0.08	0.00	-0.02	0.43	0.00	0.92	-0.04	0.09	-0.05	0.04	-0.04	0.07	-0.08	0.00	-0.07	0.00
	CO Max’	0.21	0.00	0.12	0.00	0.11	0.00	0.10	0.00	0.12	0.00	0.14	0.00	0.19	0.00	0.18	0.00
	Temp Min’	-0.16	0.00	-0.16	0.00	-0.17	0.00	-0.16	0.00	-0.16	0.00	-0.16	0.00	-0.17	0.00	-0.18	0.00
	Temp Max’	-0.17	0.00	-0.16	0.00	-0.16	0.00	-0.18	0.00	-0.17	0.00	-0.17	0.00	-0.18	0.00	-0.17	0.00
Weather	Sun	-0.05	0.02	-0.08	0.00	-0.08	0.00	-0.07	0.00	-0.07	0.00	-0.08	0.00	-0.08	0.00	-0.07	0.00
	Rain	0.01	0.54	0.07	0.00	0.05	0.03	0.02	0.44	0.00	0.84	0.00	0.84	0.03	0.16	0.02	0.39
	Pressure	-0.05	0.01	-0.05	0.02	-0.07	0.00	-0.06	0.01	-0.03	0.10	-0.06	0.01	-0.05	0.02	-0.05	0.02
	Wind speed	-0.05	0.01	0.08	0.00	0.09	0.00	0.07	0.00	0.06	0.01	0.09	0.00	0.09	0.00	0.10	0.00
Pollen	Grass	0.00	0.90	0.01	0.68	0.02	0.37	0.01	0.58	0.01	0.69	-0.01	0.59	-0.02	0.26	-0.03	0.24

Table E. 35: England and Wales Acute Visits Non-asthmatics – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
	Exposure	r	P	r	P	r	P	r	P	r	P	r	P	r	P	r	P
	NO Min’	0.04	0.10	0.00	0.95	0.00	0.87	0.02	0.27	0.07	0.00	0.10	0.00	0.01	0.51	-0.03	0.17
	NO_2 Min’	0.05	0.02	-0.01	0.76	0.00	0.88	0.04	0.04	0.06	0.00	0.04	0.05	0.04	0.07	-0.01	0.50
	NOD Min’	0.05	0.03	0.00	0.84	0.00	0.85	0.04	0.06	0.08	0.00	0.09	0.00	0.03	0.17	-0.02	0.30
	SO_2 Min’	0.03	0.10	0.02	0.38	-0.02	0.33	0.01	0.56	0.02	0.36	0.02	0.46	0.03	0.24	0.03	0.24
	PM_{10} Min’	0.04	0.06	-0.02	0.26	-0.02	0.32	0.02	0.38	0.07	0.00	0.06	0.00	0.07	0.00	0.02	0.37
	O_3 Min’	-0.08	0.00	0.01	0.70	0.00	0.91	-0.03	0.14	-0.01	0.81	0.01	0.72	-0.05	0.03	-0.05	0.02
	CO Min’	0.06	0.01	0.02	0.46	0.03	0.23	0.06	0.01	0.09	0.00	0.09	0.00	0.05	0.03	-0.01	0.75
	NO Mean	0.17	0.00	0.06	0.01	0.04	0.09	0.05	0.02	0.09	0.00	0.09	0.00	0.13	0.00	0.08	0.00
	NO_2 Mean	0.16	0.00	0.04	0.09	0.02	0.38	0.06	0.01	0.07	0.00	0.07	0.00	0.13	0.00	0.11	0.00
Outdoor air pollutants	NOD Mean	0.17	0.00	0.06	0.01	0.03	0.12	0.05	0.01	0.09	0.00	0.09	0.00	0.13	0.00	0.09	0.00
	SO_2 Mean	0.08	0.00	0.05	0.03	0.03	0.14	0.06	0.01	0.09	0.00	0.08	0.00	0.09	0.00	0.13	0.00
	PM_{10} Mean	0.09	0.00	-0.02	0.38	-0.01	0.59	0.02	0.48	0.06	0.01	0.05	0.02	0.09	0.00	0.06	0.01
	O_3 Mean	-0.12	0.00	-0.02	0.47	0.00	0.88	-0.04	0.04	-0.05	0.03	-0.05	0.03	-0.08	0.00	-0.07	0.00
	CO Mean	0.19	0.00	0.10	0.00	0.10	0.00	0.11	0.00	0.13	0.00	0.12	0.00	0.14	0.00	0.09	0.00
	NO Max’	0.19	0.00	0.06	0.00	0.04	0.08	0.03	0.13	0.07	0.00	0.06	0.01	0.13	0.00	0.11	0.00
	NO_2 Max’	0.19	0.00	0.07	0.00	0.03	0.22	0.05	0.02	0.09	0.00	0.07	0.00	0.15	0.00	0.13	0.00
	NOD Max’	0.20	0.00	0.07	0.00	0.04	0.10	0.04	0.09	0.07	0.00	0.06	0.00	0.14	0.00	0.12	0.00
	SO_2 Max’	0.06	0.00	0.04	0.04	0.03	0.11	0.04	0.08	0.10	0.00	0.08	0.00	0.09	0.00	0.12	0.00
	PM_{10} Max’	0.09	0.00	-0.01	0.79	-0.02	0.27	0.00	0.87	0.04	0.07	0.03	0.18	0.08	0.00	0.05	0.02
	O_3 Max’	-0.09	0.00	-0.02	0.32	0.00	0.99	-0.05	0.04	-0.06	0.01	-0.07	0.00	-0.08	0.00	-0.04	0.09
	CO Max’	0.21	0.00	0.12	0.00	0.09	0.00	0.08	0.00	0.13	0.00	0.10	0.00	0.13	0.00	0.12	0.00
	Temp Min’	-0.16	0.00	-0.16	0.00	-0.15	0.00	-0.12	0.00	-0.13	0.00	-0.14	0.00	-0.14	0.00	-0.15	0.00
	Temp Max’	-0.14	0.00	-0.14	0.00	-0.14	0.00	-0.14	0.00	-0.14	0.00	-0.14	0.00	-0.14	0.00	-0.15	0.00
Weather	Sun	-0.03	0.17	-0.04	0.05	-0.05	0.02	-0.06	0.01	-0.07	0.00	-0.05	0.02	-0.06	0.00	-0.06	0.00
	Rain	0.02	0.43	0.03	0.16	0.04	0.06	-0.01	0.58	0.01	0.55	-0.01	0.63	0.05	0.03	0.02	0.34
	Pressure	-0.03	0.20	-0.04	0.10	-0.04	0.06	-0.04	0.06	-0.04	0.08	-0.03	0.10	-0.03	0.12	-0.04	0.05
	Wind speed	-0.03	0.20	0.04	0.07	0.03	0.20	0.02	0.30	0.03	0.11	0.09	0.00	0.10	0.00	0.09	0.00
Pollen	Grass	0.02	0.34	-0.01	0.58	-0.02	0.45	-0.03	0.16	-0.03	0.24	-0.03	0.18	-0.04	0.10	-0.02	0.25

Table E. 36: England and Wales Casualty Counts Asthmatics – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		r	P	r	P	r	P	r	P	r	P	r	P	r	P	r	P
Outdoor air pollutants	NO Min’	0.01	0.49	-0.03	0.12	0.00	0.86	-0.01	0.74	0.01	0.57	0.07	0.00	0.03	0.13	0.02	0.37
	NO_2 Min’	0.05	0.02	-0.03	0.20	-0.02	0.34	-0.01	0.49	-0.01	0.66	0.04	0.09	0.05	0.03	0.03	0.21
	NOD Min’	0.03	0.20	-0.04	0.09	-0.02	0.46	-0.01	0.50	0.00	0.90	0.06	0.01	0.04	0.06	0.02	0.40
	SO_2 Min’	-0.03	0.17	-0.07	0.00	-0.09	0.00	-0.10	0.00	-0.08	0.00	-0.06	0.00	-0.04	0.05	-0.03	0.14
	PM_{10} Min’	0.04	0.07	-0.03	0.11	-0.10	0.00	-0.09	0.00	-0.05	0.02	0.00	0.91	0.03	0.18	0.02	0.45
	O_3 Min’	-0.07	0.00	0.00	0.82	0.06	0.01	0.03	0.21	0.02	0.28	0.02	0.27	-0.04	0.04	-0.05	0.02
	CO Min’	0.01	0.79	-0.03	0.21	-0.02	0.27	-0.01	0.60	0.00	0.96	0.03	0.12	0.02	0.37	0.01	0.79
	NO Mean	0.03	0.19	-0.06	0.00	-0.09	0.00	-0.08	0.00	-0.09	0.00	-0.04	0.05	0.01	0.50	0.03	0.21
	NO_2 Mean	0.07	0.00	-0.06	0.01	-0.12	0.00	-0.11	0.00	-0.10	0.00	-0.06	0.01	0.04	0.05	0.05	0.02
	NOD Mean	0.04	0.06	-0.06	0.00	-0.10	0.00	-0.10	0.00	-0.10	0.00	-0.05	0.03	0.02	0.30	0.03	0.11
	SO_2 Mean	-0.08	0.00	-0.12	0.00	-0.15	0.00	-0.16	0.00	-0.16	0.00	-0.16	0.00	-0.12	0.00	-0.09	0.00
	PM_{10} Mean	0.06	0.00	-0.02	0.31	-0.09	0.00	-0.09	0.00	-0.07	0.00	-0.01	0.54	0.04	0.05	0.04	0.07
	O_3 Mean	-0.07	0.00	0.03	0.15	0.07	0.00	0.05	0.02	0.05	0.02	0.03	0.24	-0.05	0.01	-0.05	0.03
	CO Mean	-0.08	0.00	-0.14	0.00	-0.16	0.00	-0.15	0.00	-0.16	0.00	-0.13	0.00	-0.09	0.00	-0.07	0.00
	NO Max’	0.03	0.12	-0.04	0.04	-0.09	0.00	-0.10	0.00	-0.11	0.00	-0.06	0.00	0.01	0.79	0.02	0.35
	NO_2 Max’	0.03	0.11	-0.07	0.00	-0.14	0.00	-0.15	0.00	-0.13	0.00	-0.10	0.00	0.00	0.95	0.02	0.30
	NOD Max’	0.04	0.08	-0.04	0.04	-0.10	0.00	-0.11	0.00	-0.11	0.00	-0.07	0.00	0.01	0.71	0.02	0.25
	SO_2 Max’	-0.09	0.00	-0.12	0.00	-0.15	0.00	-0.16	0.00	-0.15	0.00	-0.16	0.00	-0.12	0.00	-0.09	0.00
	PM_{10} Max’	0.05	0.03	0.01	0.61	-0.06	0.01	-0.08	0.00	-0.06	0.01	-0.01	0.72	0.03	0.18	0.04	0.10
	O_3 Max’	-0.06	0.01	0.03	0.19	0.05	0.02	0.04	0.05	0.04	0.10	-0.01	0.77	-0.05	0.02	-0.03	0.14
	CO Max’	-0.09	0.00	-0.14	0.00	-0.17	0.00	-0.17	0.00	-0.17	0.00	-0.16	0.00	-0.11	0.00	-0.09	0.00
Weather	Temp Min’	0.06	0.01	0.05	0.01	0.06	0.01	0.07	0.00	0.09	0.00	0.10	0.00	0.09	0.00	0.08	0.00
	Temp Max’	0.07	0.00	0.07	0.00	0.06	0.01	0.07	0.00	0.06	0.00	0.08	0.00	0.09	0.00	0.10	0.00
	Sun	0.03	0.16	0.02	0.42	0.01	0.57	0.01	0.59	0.01	0.61	0.00	0.96	0.04	0.09	0.04	0.05
	Rain	-0.02	0.44	0.01	0.70	-0.01	0.53	-0.02	0.45	-0.04	0.10	0.00	0.95	0.00	0.82	-0.01	0.58
	Pressure	0.08	0.00	0.07	0.00	0.06	0.00	0.06	0.01	0.04	0.05	0.04	0.08	0.04	0.05	0.03	0.21
	Wind speed	0.08	0.00	-0.07	0.00	-0.05	0.02	-0.08	0.00	-0.07	0.00	-0.07	0.00	-0.04	0.06	-0.04	0.10
Pollen	Grass	0.09	0.00	0.09	0.00	0.06	0.01	0.05	0.02	0.06	0.01	0.05	0.02	0.07	0.00	0.07	0.00

Table E. 37: England and Wales Casualty Counts Non-asthmatics – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		r	P	r	P	r	P	r	P	r	P	r	P	r	P	r	P
Outdoor air pollutants	NO Min’	0.00	0.82	-0.01	0.50	-0.02	0.44	-0.02	0.36	-0.01	0.79	0.01	0.54	0.03	0.16	0.00	0.85
	NO_2 Min’	0.02	0.29	-0.01	0.66	-0.02	0.35	0.01	0.63	0.01	0.62	0.02	0.25	0.04	0.05	0.04	0.08
	NOD Min’	0.01	0.76	-0.01	0.53	-0.02	0.31	0.00	0.93	0.01	0.76	0.02	0.30	0.04	0.10	0.01	0.61
	SO_2 Min’	-0.03	0.23	-0.04	0.04	-0.06	0.01	-0.05	0.02	-0.05	0.01	-0.05	0.02	-0.03	0.15	-0.01	0.51
	PM_{10} Min’	0.03	0.16	-0.04	0.07	-0.06	0.00	-0.06	0.01	-0.04	0.06	-0.01	0.75	0.04	0.07	0.04	0.10
	O_3 Min’	-0.04	0.08	0.03	0.17	0.03	0.14	0.00	0.90	0.03	0.22	0.02	0.31	-0.05	0.02	-0.05	0.02
	CO Min’	-0.02	0.45	-0.02	0.46	-0.03	0.19	0.00	0.88	0.00	0.99	0.01	0.74	0.02	0.41	-0.01	0.66
	NO Mean	-0.01	0.56	-0.07	0.00	-0.10	0.00	-0.10	0.00	-0.09	0.00	-0.07	0.00	-0.02	0.46	-0.01	0.60
	NO_2 Mean	0.02	0.42	-0.06	0.00	-0.11	0.00	-0.08	0.00	-0.08	0.00	-0.05	0.02	0.02	0.33	0.04	0.04
	NOD Mean	0.00	0.83	-0.07	0.00	-0.11	0.00	-0.10	0.00	-0.09	0.00	-0.07	0.00	-0.01	0.78	0.00	0.87
	SO_2 Mean	-0.09	0.00	-0.11	0.00	-0.13	0.00	-0.13	0.00	-0.13	0.00	-0.13	0.00	-0.09	0.00	-0.06	0.01
	PM_{10} Mean	0.04	0.07	-0.02	0.34	-0.05	0.01	-0.05	0.02	-0.05	0.02	-0.02	0.34	0.04	0.04	0.05	0.01
	O_3 Mean	-0.02	0.29	0.05	0.03	0.09	0.00	0.03	0.12	0.06	0.01	0.04	0.05	-0.02	0.34	-0.03	0.17
	CO Mean	-0.11	0.00	-0.14	0.00	-0.16	0.00	-0.15	0.00	-0.15	0.00	-0.13	0.00	-0.10	0.00	-0.09	0.00
	NO Max’	-0.01	0.54	-0.05	0.02	-0.11	0.00	-0.11	0.00	-0.11	0.00	-0.07	0.00	-0.02	0.25	0.00	0.99
	NO_2 Max’	-0.01	0.69	-0.08	0.00	-0.13	0.00	-0.12	0.00	-0.10	0.00	-0.09	0.00	-0.01	0.61	0.03	0.12
	NOD Max’	-0.01	0.61	-0.05	0.01	-0.12	0.00	-0.11	0.00	-0.11	0.00	-0.07	0.00	-0.02	0.28	0.01	0.73
	SO_2 Max’	-0.08	0.00	-0.10	0.00	-0.13	0.00	-0.14	0.00	-0.13	0.00	-0.12	0.00	-0.09	0.00	-0.06	0.00
	PM_{10} Max’	0.03	0.21	0.00	0.95	-0.05	0.04	-0.07	0.00	-0.06	0.01	-0.02	0.42	0.02	0.25	0.04	0.09
	O_3 Max’	-0.02	0.36	0.04	0.06	0.10	0.00	0.04	0.04	0.05	0.03	0.03	0.20	-0.01	0.78	-0.01	0.71
	CO Max’	-0.12	0.00	-0.14	0.00	-0.17	0.00	-0.18	0.00	-0.17	0.00	-0.16	0.00	-0.12	0.00	-0.11	0.00
Weather	Temp Min’	0.09	0.00	0.09	0.00	0.09	0.00	0.08	0.00	0.10	0.00	0.12	0.00	0.08	0.00	0.07	0.00
	Temp Max’	0.11	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.09	0.00	0.11	0.00	0.12	0.00	0.12	0.00
	Sun	0.05	0.02	0.02	0.30	0.03	0.14	0.04	0.05	0.03	0.14	0.02	0.25	0.08	0.00	0.09	0.00
	Rain	-0.03	0.15	-0.01	0.49	-0.03	0.15	-0.02	0.26	-0.04	0.04	0.00	0.86	-0.03	0.14	-0.07	0.00
	Pressure	0.05	0.01	0.05	0.01	0.05	0.02	0.07	0.00	0.06	0.01	0.06	0.00	0.05	0.01	0.04	0.08
	Wind speed	0.05	0.01	-0.06	0.01	-0.07	0.00	-0.08	0.00	-0.07	0.00	-0.07	0.00	-0.06	0.00	-0.04	0.05
Pollen	Grass	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.08	0.00	0.07	0.00

Table E. 38: England and Wales Emergency Consultations Asthmatics – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
	Exposure	r	P	r	P	r	P	r	P	r	P	r	P	r	P	r	P
Outdoor air pollutants	NO Min’	0.07	0.00	0.00	0.82	0.07	0.00	0.10	0.00	0.07	0.00	0.13	0.00	0.11	0.00	0.05	0.02
	NO_2 Min’	0.09	0.00	-0.01	0.78	0.04	0.07	0.07	0.00	0.08	0.00	0.09	0.00	0.11	0.00	0.08	0.00
	NOD Min’	0.08	0.00	0.00	0.86	0.06	0.00	0.09	0.00	0.08	0.00	0.12	0.00	0.12	0.00	0.06	0.00
	SO_2 Min’	0.02	0.40	-0.03	0.13	-0.04	0.07	-0.01	0.65	-0.05	0.01	-0.03	0.12	0.00	0.82	0.00	0.86
	PM_{10} Min’	0.04	0.04	-0.05	0.03	-0.07	0.00	-0.05	0.01	0.02	0.28	0.05	0.03	0.05	0.02	0.02	0.34
	O_3 Min’	-0.14	0.00	0.03	0.23	-0.01	0.77	-0.03	0.17	-0.04	0.05	-0.04	0.04	-0.08	0.00	-0.12	0.00
	CO Min’	0.06	0.01	0.02	0.33	0.06	0.01	0.08	0.00	0.09	0.00	0.09	0.00	0.08	0.00	0.06	0.01
	NO Mean	0.18	0.00	0.00	0.90	0.02	0.48	0.06	0.01	0.07	0.00	0.06	0.00	0.14	0.00	0.15	0.00
	NO_2 Mean	0.18	0.00	-0.04	0.04	-0.05	0.03	0.00	0.98	0.03	0.21	0.03	0.11	0.12	0.00	0.14	0.00
	NOD Mean	0.19	0.00	-0.01	0.67	0.00	0.95	0.05	0.04	0.06	0.00	0.06	0.01	0.14	0.00	0.15	0.00
	SO_2 Mean	0.01	0.66	-0.09	0.00	-0.10	0.00	-0.09	0.00	-0.09	0.00	-0.09	0.00	-0.06	0.00	-0.03	0.12
	PM_{10} Mean	0.10	0.00	-0.03	0.11	-0.06	0.01	-0.02	0.43	0.02	0.31	0.03	0.17	0.09	0.00	0.07	0.00
	O_3 Mean	-0.18	0.00	0.01	0.80	-0.01	0.76	-0.05	0.01	-0.07	0.00	-0.06	0.00	-0.12	0.00	-0.15	0.00
	CO Mean	0.09	0.00	-0.02	0.26	-0.02	0.37	0.02	0.45	0.02	0.43	0.01	0.54	0.06	0.00	0.07	0.00
	NO Max’	0.17	0.00	0.02	0.45	0.01	0.75	0.03	0.19	0.04	0.05	0.05	0.02	0.13	0.00	0.15	0.00
	NO_2 Max’	0.16	0.00	-0.06	0.01	-0.07	0.00	-0.04	0.06	-0.01	0.81	0.01	0.68	0.08	0.00	0.12	0.00
	NOD Max’	0.18	0.00	0.01	0.65	0.00	0.99	0.02	0.27	0.04	0.06	0.05	0.03	0.13	0.00	0.16	0.00
	SO_2 Max’	-0.03	0.19	-0.10	0.00	-0.12	0.00	-0.11	0.00	-0.10	0.00	-0.11	0.00	-0.08	0.00	-0.05	0.01
	PM_{10} Max’	0.09	0.00	-0.01	0.58	-0.05	0.02	-0.02	0.26	0.00	0.94	0.02	0.34	0.07	0.00	0.05	0.02
	O_3 Max’	-0.14	0.00	-0.02	0.41	-0.03	0.21	-0.08	0.00	-0.10	0.00	-0.08	0.00	-0.13	0.00	-0.13	0.00
	CO Max’	0.09	0.00	-0.01	0.55	-0.03	0.16	-0.01	0.57	0.00	0.93	-0.01	0.68	0.04	0.05	0.07	0.00
Weather	Temp Min’	-0.13	0.00	-0.13	0.00	-0.13	0.00	-0.11	0.00	-0.11	0.00	-0.10	0.00	-0.12	0.00	-0.12	0.00
	Temp Max’	-0.13	0.00	-0.12	0.00	-0.14	0.00	-0.13	0.00	-0.13	0.00	-0.12	0.00	-0.13	0.00	-0.12	0.00
	Sun	-0.07	0.00	-0.08	0.00	-0.10	0.00	-0.08	0.00	-0.09	0.00	-0.09	0.00	-0.09	0.00	-0.06	0.01
	Rain	0.00	0.87	0.01	0.52	0.01	0.51	-0.04	0.07	-0.03	0.12	-0.02	0.38	0.04	0.08	-0.02	0.46
	Pressure	0.01	0.62	0.01	0.56	0.03	0.13	0.04	0.05	0.04	0.04	0.02	0.43	0.00	0.83	0.00	0.94
	Wind speed	0.01	0.62	0.01	0.64	-0.01	0.81	-0.02	0.35	-0.03	0.14	0.01	0.54	0.02	0.33	0.03	0.21
Pollen	Grass	0.02	0.28	0.04	0.08	0.04	0.10	0.01	0.67	0.00	0.89	-0.02	0.47	0.00	0.94	0.02	0.42

Table E.39: England and Wales Emergency Consultations Non-asthmatics – Correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
	Exposure	r	P	r	P	r	P	r	P	r	P	r	P	r	P	r	P
Outdoor air pollutants	NO Min’	0.04	0.09	0.01	0.73	0.04	0.09	0.03	0.15	0.04	0.07	0.10	0.00	0.09	0.00	0.04	0.09
	NO_2 Min’	0.05	0.02	-0.01	0.53	0.00	0.97	0.02	0.32	0.04	0.07	0.06	0.00	0.09	0.00	0.04	0.05
	NOD Min’	0.05	0.03	-0.01	0.80	0.02	0.37	0.03	0.20	0.04	0.06	0.09	0.00	0.09	0.00	0.04	0.07
	SO_2 Min’	0.01	0.60	-0.04	0.05	-0.06	0.01	-0.03	0.16	-0.05	0.01	-0.04	0.05	-0.02	0.31	-0.01	0.60
	PM_{10} Min’	0.03	0.11	-0.04	0.07	-0.06	0.00	-0.05	0.01	0.00	0.99	0.03	0.11	0.06	0.00	0.02	0.29
	O_3 Min’	-0.10	0.00	0.05	0.03	0.04	0.09	-0.01	0.61	-0.02	0.27	-0.01	0.62	-0.07	0.00	-0.09	0.00
	CO Min’	0.04	0.05	0.02	0.39	0.04	0.07	0.05	0.01	0.07	0.00	0.09	0.00	0.08	0.00	0.05	0.02
	NO Mean	0.13	0.00	0.00	0.95	-0.01	0.64	0.00	0.83	0.02	0.30	0.05	0.03	0.11	0.00	0.11	0.00
	NO_2 Mean	0.13	0.00	-0.05	0.02	-0.06	0.01	-0.03	0.17	0.01	0.77	0.02	0.37	0.10	0.00	0.11	0.00
	NOD Mean	0.14	0.00	-0.01	0.64	-0.02	0.26	-0.01	0.81	0.02	0.38	0.04	0.06	0.11	0.00	0.11	0.00
	SO_2 Mean	-0.02	0.43	-0.09	0.00	-0.11	0.00	-0.10	0.00	-0.08	0.00	-0.11	0.00	-0.07	0.00	-0.03	0.16
	PM_{10} Mean	0.09	0.00	-0.03	0.15	-0.05	0.01	-0.03	0.13	0.00	0.90	0.02	0.25	0.08	0.00	0.07	0.00
	O_3 Mean	-0.12	0.00	0.02	0.26	0.04	0.07	-0.02	0.34	-0.04	0.07	-0.04	0.05	-0.11	0.00	-0.11	0.00
	CO Mean	0.06	0.01	-0.02	0.25	-0.04	0.06	-0.02	0.42	-0.01	0.76	0.00	0.83	0.05	0.03	0.04	0.06
	NO Max’	0.13	0.00	0.02	0.48	-0.02	0.25	-0.02	0.37	0.01	0.77	0.02	0.25	0.08	0.00	0.11	0.00
	NO_2 Max’	0.13	0.00	-0.06	0.00	-0.07	0.00	-0.05	0.01	-0.02	0.26	-0.02	0.42	0.05	0.01	0.10	0.00
	NOD Max’	0.14	0.00	0.01	0.69	-0.03	0.18	-0.02	0.31	0.01	0.77	0.02	0.32	0.08	0.00	0.12	0.00
	SO_2 Max’	-0.04	0.06	-0.10	0.00	-0.13	0.00	-0.13	0.00	-0.09	0.00	-0.12	0.00	-0.08	0.00	-0.05	0.01
	PM_{10} Max’	0.07	0.00	-0.01	0.60	-0.03	0.12	-0.05	0.01	-0.02	0.30	0.02	0.48	0.04	0.09	0.04	0.04
	O_3 Max’	-0.10	0.00	0.00	0.95	0.02	0.38	-0.03	0.11	-0.06	0.01	-0.06	0.01	-0.11	0.00	-0.09	0.00
	CO Max’	0.05	0.03	-0.01	0.50	-0.05	0.02	-0.05	0.01	-0.03	0.12	-0.03	0.21	0.00	0.88	0.03	0.16
Weather	Temp Min’	-0.11	0.00	-0.11	0.00	-0.12	0.00	-0.11	0.00	-0.11	0.00	-0.09	0.00	-0.10	0.00	-0.12	0.00
	Temp Max’	-0.11	0.00	-0.11	0.00	-0.13	0.00	-0.13	0.00	-0.13	0.00	-0.12	0.00	-0.11	0.00	-0.11	0.00
	Sun	-0.06	0.01	-0.08	0.00	-0.05	0.01	-0.08	0.00	-0.09	0.00	-0.07	0.00	-0.06	0.01	-0.06	0.00
	Rain	0.01	0.54	0.03	0.13	0.02	0.45	-0.03	0.16	-0.02	0.33	-0.01	0.54	0.03	0.22	-0.01	0.71
	Pressure	-0.03	0.16	-0.02	0.40	-0.03	0.21	-0.01	0.53	0.00	0.97	-0.03	0.20	-0.03	0.16	-0.04	0.07
	Wind	-0.03	0.16	0.02	0.26	0.03	0.18	0.02	0.34	0.00	0.91	0.03	0.20	0.03	0.13	0.05	0.02
Pollen	Grass	0.04	0.07	0.05	0.01	0.04	0.04	0.00	0.82	0.02	0.30	0.01	0.75	0.00	0.99	0.02	0.35

Table E. 40: England and Wales Emergency Counts Asthmatics – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		r	P	r	P	r	P	r	P	r	P	r	P	r	P	r	P
Outdoor air pollutants	NO Min’	0.05	0.03	0.01	0.58	0.06	0.01	0.08	0.00	0.07	0.00	0.12	0.00	0.08	0.00	0.04	0.06
	NO_2 Min’	0.06	0.00	-0.02	0.41	0.04	0.07	0.07	0.00	0.07	0.00	0.09	0.00	0.09	0.00	0.06	0.01
	NOD Min’	0.05	0.02	0.00	0.86	0.05	0.01	0.08	0.00	0.08	0.00	0.12	0.00	0.09	0.00	0.05	0.03
	SO_2 Min’	-0.01	0.52	-0.05	0.01	-0.05	0.01	-0.03	0.22	-0.03	0.13	-0.02	0.41	-0.01	0.76	-0.01	0.58
	PM_{10} Min’	0.01	0.73	-0.07	0.00	-0.08	0.00	-0.03	0.11	0.03	0.15	0.05	0.02	0.04	0.04	0.00	0.97
	O_3 Min’	-0.09	0.00	0.04	0.05	0.00	0.82	-0.04	0.08	-0.04	0.07	-0.04	0.05	-0.08	0.00	-0.09	0.00
	CO Min’	0.05	0.04	0.03	0.20	0.06	0.01	0.08	0.00	0.09	0.00	0.10	0.00	0.07	0.00	0.05	0.02
	NO Mean	0.13	0.00	0.00	0.85	0.02	0.46	0.07	0.00	0.09	0.00	0.11	0.00	0.15	0.00	0.13	0.00
	NO_2 Mean	0.13	0.00	-0.06	0.01	-0.04	0.06	0.03	0.23	0.05	0.01	0.09	0.00	0.14	0.00	0.12	0.00
	NOD Mean	0.14	0.00	-0.02	0.41	0.00	0.93	0.06	0.00	0.08	0.00	0.11	0.00	0.16	0.00	0.13	0.00
	SO_2 Mean	-0.02	0.31	-0.10	0.00	-0.09	0.00	-0.07	0.00	-0.08	0.00	-0.07	0.00	-0.04	0.07	-0.01	0.57
	PM_{10} Mean	0.06	0.01	-0.05	0.01	-0.07	0.00	0.00	0.88	0.03	0.17	0.05	0.03	0.08	0.00	0.04	0.05
	O_3 Mean	-0.12	0.00	0.03	0.14	0.01	0.80	-0.06	0.01	-0.07	0.00	-0.08	0.00	-0.12	0.00	-0.12	0.00
	CO Mean	0.06	0.01	-0.02	0.38	-0.01	0.82	0.03	0.11	0.04	0.08	0.05	0.01	0.08	0.00	0.07	0.00
	NO Max’	0.13	0.00	0.01	0.61	0.01	0.59	0.04	0.04	0.07	0.00	0.09	0.00	0.15	0.00	0.13	0.00
	NO_2 Max’	0.13	0.00	-0.05	0.03	-0.05	0.03	-0.01	0.66	0.03	0.13	0.06	0.00	0.12	0.00	0.12	0.00
	NOD Max’	0.14	0.00	0.01	0.74	0.01	0.70	0.04	0.05	0.07	0.00	0.09	0.00	0.15	0.00	0.14	0.00
	SO_2 Max’	-0.05	0.03	-0.10	0.00	-0.10	0.00	-0.08	0.00	-0.07	0.00	-0.08	0.00	-0.05	0.02	-0.02	0.27
	PM_{10} Max’	0.05	0.02	-0.01	0.70	-0.05	0.03	-0.02	0.46	0.01	0.66	0.04	0.05	0.07	0.00	0.04	0.05
	O_3 Max’	-0.11	0.00	0.00	0.92	-0.02	0.30	-0.08	0.00	-0.09	0.00	-0.10	0.00	-0.13	0.00	-0.10	0.00
	CO Max’	0.07	0.00	-0.01	0.68	-0.01	0.61	0.01	0.66	0.03	0.17	0.04	0.08	0.08	0.00	0.07	0.00
Weather	Temp Min’	-0.17	0.00	-0.17	0.00	-0.16	0.00	-0.15	0.00	-0.14	0.00	-0.14	0.00	-0.16	0.00	-0.17	0.00
	Temp Max’	-0.16	0.00	-0.16	0.00	-0.17	0.00	-0.17	0.00	-0.17	0.00	-0.16	0.00	-0.16	0.00	-0.15	0.00
	Sun	-0.06	0.00	-0.08	0.00	-0.11	0.00	-0.10	0.00	-0.10	0.00	-0.11	0.00	-0.07	0.00	-0.07	0.00
	Rain	0.00	0.86	0.01	0.50	-0.01	0.74	-0.03	0.19	-0.03	0.17	0.02	0.43	0.03	0.11	0.00	0.86
	Pressure	0.02	0.48	0.02	0.28	0.03	0.21	0.03	0.16	0.02	0.38	0.01	0.70	0.00	0.90	0.00	0.85
	Wind	0.02	0.48	0.02	0.40	0.01	0.58	-0.01	0.57	0.00	0.91	0.04	0.08	0.06	0.01	0.04	0.06
Pollen	Grass	0.05	0.02	0.07	0.00	0.05	0.03	0.03	0.21	0.03	0.15	0.01	0.49	0.03	0.10	0.05	0.03

Table E.41: England and Wales Emergency Counts Non-asthmatics – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		r	P	r	P	r	P	r	P	r	P	r	P	r	P	r	P
Outdoor air pollutants	NO Min’	0.01	0.52	0.01	0.54	0.04	0.09	0.03	0.15	0.05	0.02	0.08	0.00	0.05	0.01	0.01	0.55
	NO_2 Min’	0.04	0.07	-0.01	0.73	0.02	0.33	0.05	0.02	0.06	0.00	0.07	0.00	0.07	0.00	0.03	0.10
	NOD Min’	0.03	0.22	0.00	0.84	0.03	0.15	0.04	0.04	0.07	0.00	0.08	0.00	0.06	0.00	0.02	0.31
	SO_2 Min’	0.01	0.80	-0.02	0.31	-0.04	0.06	-0.02	0.35	-0.03	0.16	-0.02	0.42	0.00	0.92	0.01	0.69
	PM_{10} Min’	0.02	0.37	-0.05	0.01	-0.05	0.02	-0.03	0.23	0.02	0.27	0.04	0.05	0.06	0.00	0.01	0.57
	O_3 Min’	-0.06	0.01	0.05	0.02	0.02	0.45	-0.04	0.08	-0.02	0.38	-0.01	0.54	-0.06	0.00	-0.06	0.01
	CO Min’	0.03	0.14	0.03	0.17	0.04	0.07	0.06	0.01	0.08	0.00	0.08	0.00	0.07	0.00	0.03	0.16
	NO Mean	0.09	0.00	0.00	0.92	-0.01	0.69	0.01	0.54	0.05	0.03	0.06	0.01	0.10	0.00	0.08	0.00
	NO_2 Mean	0.09	0.00	-0.05	0.04	-0.05	0.03	0.00	0.86	0.04	0.07	0.05	0.03	0.10	0.00	0.08	0.00
	NOD Mean	0.09	0.00	-0.01	0.53	-0.02	0.37	0.01	0.62	0.05	0.03	0.06	0.01	0.11	0.00	0.08	0.00
	SO_2 Mean	-0.03	0.20	-0.07	0.00	-0.08	0.00	-0.07	0.00	-0.05	0.02	-0.06	0.00	-0.03	0.13	-0.01	0.71
	PM_{10} Mean	0.06	0.00	-0.04	0.08	-0.03	0.14	-0.01	0.78	0.03	0.12	0.04	0.06	0.08	0.00	0.06	0.01
	O_3 Mean	-0.07	0.00	0.05	0.03	0.04	0.05	-0.04	0.07	-0.04	0.09	-0.04	0.04	-0.09	0.00	-0.07	0.00
	CO Mean	0.02	0.25	-0.02	0.27	-0.03	0.18	0.00	0.84	0.01	0.55	0.01	0.57	0.04	0.08	0.02	0.34
	NO Max’	0.09	0.00	0.01	0.81	-0.03	0.15	-0.01	0.61	0.03	0.19	0.04	0.06	0.08	0.00	0.08	0.00
	NO_2 Max’	0.09	0.00	-0.04	0.05	-0.06	0.01	-0.02	0.31	0.02	0.40	0.02	0.35	0.07	0.00	0.08	0.00
	NOD Max’	0.10	0.00	0.00	0.88	-0.03	0.11	-0.01	0.63	0.03	0.15	0.04	0.06	0.08	0.00	0.09	0.00
	SO_2 Max’	-0.04	0.05	-0.08	0.00	-0.09	0.00	-0.09	0.00	-0.05	0.01	-0.06	0.00	-0.04	0.05	-0.03	0.19
	PM_{10} Max’	0.05	0.02	-0.01	0.75	-0.02	0.39	-0.03	0.23	0.01	0.58	0.03	0.19	0.05	0.02	0.04	0.04
	O_3 Max’	-0.05	0.02	0.03	0.23	0.04	0.07	-0.03	0.11	-0.05	0.01	-0.05	0.01	-0.09	0.00	-0.05	0.01
	CO Max’	0.03	0.23	-0.02	0.31	-0.05	0.02	-0.04	0.05	-0.01	0.68	-0.02	0.46	0.01	0.81	0.01	0.59
Weather	Temp Min’	-0.10	0.00	-0.11	0.00	-0.12	0.00	-0.11	0.00	-0.10	0.00	-0.09	0.00	-0.11	0.00	-0.13	0.00
	Temp Max’	-0.09	0.00	-0.09	0.00	-0.12	0.00	-0.11	0.00	-0.12	0.00	-0.11	0.00	-0.10	0.00	-0.10	0.00
	Sun	-0.04	0.08	-0.07	0.00	-0.06	0.01	-0.06	0.00	-0.07	0.00	-0.06	0.00	-0.03	0.16	-0.04	0.08
	Rain	-0.01	0.79	0.01	0.53	-0.01	0.63	-0.03	0.15	-0.03	0.10	-0.01	0.80	0.00	0.91	-0.03	0.21
	Pressure	0.00	0.89	0.00	0.97	-0.01	0.66	0.01	0.64	0.01	0.57	0.00	0.97	-0.01	0.60	-0.03	0.23
	Wind speed	0.00	0.89	0.02	0.33	0.02	0.41	-0.01	0.65	0.00	0.92	0.02	0.28	0.05	0.03	0.05	0.03
Pollen	Grass	0.09	0.00	0.08	0.00	0.07	0.00	0.04	0.05	0.06	0.01	0.05	0.03	0.03	0.16	0.04	0.05

Table E.42: England and Wales Out of Hours Counts Asthmatics – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		r	P	r	P	r	P	r	P	r	P	r	P	r	P	r	P
Outdoor air pollutants	NO Min’	0.00	0.86	0.05	0.01	0.04	0.07	0.07	0.00	0.05	0.03	0.02	0.40	-0.01	0.68	0.01	0.78
	NO_2 Min’	-0.03	0.14	0.01	0.49	0.06	0.00	0.07	0.00	0.06	0.00	0.05	0.03	-0.01	0.65	0.00	0.85
	NOD Min’	-0.02	0.36	0.04	0.06	0.06	0.01	0.08	0.00	0.06	0.00	0.03	0.12	-0.01	0.65	0.00	0.84
	SO_2 Min’	-0.03	0.11	-0.01	0.76	0.02	0.40	0.04	0.05	0.07	0.00	0.07	0.00	0.02	0.41	0.00	0.90
	PM_{10} Min’	-0.09	0.00	-0.04	0.08	0.02	0.39	0.08	0.00	0.08	0.00	0.04	0.10	-0.03	0.23	-0.06	0.01
	O_3 Min’	0.07	0.00	0.05	0.03	-0.05	0.02	-0.07	0.00	-0.04	0.04	-0.06	0.00	0.00	0.92	0.04	0.10
	CO Min’	0.01	0.68	0.06	0.01	0.06	0.00	0.06	0.00	0.04	0.04	0.04	0.07	0.00	0.86	0.02	0.31
	NO Mean	-0.03	0.14	0.03	0.13	0.09	0.00	0.14	0.00	0.16	0.00	0.15	0.00	0.08	0.00	0.02	0.47
	NO_2 Mean	-0.07	0.00	-0.01	0.74	0.08	0.00	0.14	0.00	0.16	0.00	0.17	0.00	0.05	0.01	-0.02	0.44
	NOD Mean	-0.04	0.04	0.02	0.29	0.09	0.00	0.15	0.00	0.17	0.00	0.17	0.00	0.08	0.00	0.01	0.76
	SO_2 Mean	-0.02	0.33	0.00	0.93	0.05	0.04	0.08	0.00	0.08	0.00	0.11	0.00	0.07	0.00	0.04	0.10
	PM_{10} Mean	-0.10	0.00	-0.04	0.05	0.02	0.48	0.10	0.00	0.10	0.00	0.06	0.01	-0.02	0.42	-0.07	0.00
	O_3 Mean	0.07	0.00	0.03	0.13	-0.06	0.01	-0.09	0.00	-0.10	0.00	-0.11	0.00	-0.03	0.21	0.02	0.26
	CO Mean	0.02	0.25	0.08	0.00	0.12	0.00	0.15	0.00	0.16	0.00	0.17	0.00	0.10	0.00	0.07	0.00
	NO Max’	-0.03	0.13	0.02	0.28	0.08	0.00	0.14	0.00	0.17	0.00	0.16	0.00	0.10	0.00	0.01	0.55
	NO_2 Max’	-0.04	0.10	0.02	0.47	0.10	0.00	0.14	0.00	0.17	0.00	0.19	0.00	0.09	0.00	0.01	0.73
	NOD Max’	-0.03	0.12	0.02	0.31	0.09	0.00	0.15	0.00	0.18	0.00	0.17	0.00	0.10	0.00	0.01	0.50
	SO_2 Max’	-0.02	0.42	-0.01	0.65	0.05	0.02	0.10	0.00	0.08	0.00	0.10	0.00	0.06	0.00	0.05	0.03
	PM_{10} Max’	-0.08	0.00	-0.02	0.31	0.02	0.35	0.08	0.00	0.07	0.00	0.06	0.01	0.00	0.90	-0.03	0.15
	O_3 Max’	0.03	0.21	0.01	0.78	-0.06	0.00	-0.09	0.00	-0.10	0.00	-0.09	0.00	-0.04	0.08	0.00	0.99
	CO Max’	0.03	0.13	0.08	0.00	0.12	0.00	0.15	0.00	0.17	0.00	0.18	0.00	0.14	0.00	0.07	0.00
Weather	Temp Min’	-0.19	0.00	-0.19	0.00	-0.17	0.00	-0.18	0.00	-0.19	0.00	-0.21	0.00	-0.22	0.00	-0.21	0.00
	Temp Max’	-0.18	0.00	-0.19	0.00	-0.19	0.00	-0.19	0.00	-0.19	0.00	-0.20	0.00	-0.20	0.00	-0.21	0.00
	Sun	-0.06	0.01	-0.06	0.00	-0.09	0.00	-0.10	0.00	-0.08	0.00	-0.10	0.00	-0.05	0.02	-0.09	0.00
	Rain	0.02	0.29	-0.02	0.28	-0.04	0.07	0.00	0.84	0.01	0.56	0.06	0.01	0.01	0.59	0.01	0.50
	Pressure	-0.03	0.15	-0.01	0.49	-0.01	0.62	-0.02	0.38	-0.04	0.09	-0.02	0.47	-0.02	0.42	-0.01	0.60
	Wind speed	-0.03	0.15	0.06	0.01	0.04	0.05	0.04	0.06	0.07	0.00	0.09	0.00	0.09	0.00	0.04	0.04
Pollen	Grass	0.00	0.95	0.01	0.62	-0.01	0.66	-0.01	0.75	0.01	0.57	0.01	0.73	0.02	0.40	0.02	0.34

Table E.43: England and Wales Out of Hours Counts Non-asthmatics – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		r	P	r	P	r	P	r	P	r	P	r	P	r	P	r	P
Outdoor air pollutants	NO Min’	-0.02	0.34	0.04	0.09	0.06	0.01	0.04	0.04	0.04	0.04	0.01	0.79	-0.02	0.28	0.00	0.90
	NO_2 Min’	-0.02	0.35	0.01	0.56	0.07	0.00	0.05	0.01	0.06	0.01	0.03	0.19	-0.02	0.41	-0.01	0.70
	NOD Min’	-0.02	0.30	0.03	0.18	0.07	0.00	0.05	0.02	0.06	0.01	0.02	0.48	-0.02	0.27	0.00	0.95
	SO_2 Min’	0.01	0.55	0.04	0.06	0.05	0.01	0.04	0.06	0.05	0.03	0.06	0.00	0.05	0.01	0.04	0.09
	PM_{10} Min’	-0.05	0.03	-0.02	0.44	0.04	0.06	0.06	0.00	0.07	0.00	0.03	0.12	-0.01	0.77	-0.05	0.03
	O_3 Min’	0.07	0.00	0.01	0.50	-0.04	0.04	-0.05	0.02	-0.04	0.05	-0.04	0.04	0.02	0.41	0.05	0.02
	CO Min’	0.01	0.51	0.05	0.01	0.06	0.00	0.05	0.03	0.05	0.03	0.03	0.22	0.01	0.52	0.02	0.31
	NO Mean	-0.01	0.57	0.04	0.06	0.09	0.00	0.12	0.00	0.15	0.00	0.11	0.00	0.05	0.01	0.02	0.34
	NO_2 Mean	-0.04	0.05	0.01	0.57	0.08	0.00	0.11	0.00	0.14	0.00	0.11	0.00	0.03	0.11	-0.04	0.07
	NOD Mean	-0.02	0.31	0.03	0.12	0.09	0.00	0.12	0.00	0.15	0.00	0.11	0.00	0.05	0.02	0.01	0.81
	SO_2 Mean	0.03	0.22	0.05	0.03	0.08	0.00	0.08	0.00	0.08	0.00	0.10	0.00	0.07	0.00	0.03	0.22
	PM_{10} Mean	-0.05	0.02	-0.02	0.45	0.05	0.01	0.08	0.00	0.10	0.00	0.06	0.01	0.00	0.85	-0.04	0.05
	O_3 Mean	0.07	0.00	0.03	0.20	-0.05	0.03	-0.08	0.00	-0.08	0.00	-0.08	0.00	-0.01	0.68	0.03	0.23
	CO Mean	0.04	0.09	0.09	0.00	0.12	0.00	0.13	0.00	0.15	0.00	0.12	0.00	0.08	0.00	0.06	0.01
	NO Max’	-0.01	0.68	0.02	0.29	0.07	0.00	0.11	0.00	0.14	0.00	0.11	0.00	0.05	0.02	0.01	0.73
	NO_2 Max’	-0.02	0.48	0.04	0.05	0.08	0.00	0.13	0.00	0.15	0.00	0.13	0.00	0.05	0.03	-0.03	0.15
	NOD Max’	-0.01	0.67	0.03	0.18	0.07	0.00	0.11	0.00	0.15	0.00	0.12	0.00	0.05	0.01	0.00	0.84
	SO_2 Max’	0.02	0.36	0.04	0.10	0.08	0.00	0.08	0.00	0.08	0.00	0.10	0.00	0.06	0.01	0.02	0.41
	PM_{10} Max’	-0.04	0.05	0.00	0.96	0.06	0.01	0.08	0.00	0.10	0.00	0.05	0.02	0.01	0.64	-0.02	0.38
	O_3 Max’	0.06	0.01	0.02	0.37	-0.04	0.05	-0.07	0.00	-0.07	0.00	-0.05	0.01	-0.02	0.26	0.01	0.81
	CO Max’	0.05	0.03	0.08	0.00	0.11	0.00	0.13	0.00	0.16	0.00	0.13	0.00	0.08	0.00	0.06	0.00
Weather	Temp Min’	-0.14	0.00	-0.14	0.00	-0.15	0.00	-0.15	0.00	-0.16	0.00	-0.17	0.00	-0.15	0.00	-0.16	0.00
	Temp Max’	-0.13	0.00	-0.14	0.00	-0.16	0.00	-0.16	0.00	-0.16	0.00	-0.17	0.00	-0.17	0.00	-0.16	0.00
	Sun	-0.06	0.00	-0.06	0.00	-0.07	0.00	-0.07	0.00	-0.04	0.04	-0.06	0.00	-0.06	0.00	-0.08	0.00
	Rain	0.00	0.99	0.00	0.84	-0.02	0.26	0.00	0.96	-0.01	0.69	0.01	0.58	-0.02	0.35	0.01	0.52
	Pressure	-0.02	0.31	-0.02	0.31	-0.03	0.16	-0.02	0.28	-0.02	0.28	-0.02	0.26	-0.04	0.10	-0.04	0.10
	Wind	-0.02	0.31	0.06	0.00	0.07	0.00	0.03	0.13	0.06	0.01	0.06	0.00	0.09	0.00	0.05	0.02
Pollen	Grass	0.05	0.03	0.01	0.65	0.01	0.79	0.00	0.88	0.01	0.59	0.01	0.60	-0.01	0.71	0.00	0.92

Table E.44: England and Wales All Counts Excess – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		r	P	r	P	r	P	r	P	r	P	r	P	r	P	r	P
Outdoor air pollutants	NO Min'	0.00	0.92	-0.06	0.01	0.01	0.63	0.02	0.29	0.03	0.15	0.11	0.00	0.07	0.00	-0.02	0.42
	NO_2 Min'	0.05	0.03	-0.08	0.00	-0.05	0.03	0.01	0.65	0.03	0.23	0.06	0.00	0.11	0.00	0.03	0.22
	NOD Min'	0.02	0.38	-0.07	0.00	-0.02	0.36	0.02	0.42	0.03	0.13	0.10	0.00	0.10	0.00	0.00	0.95
	SO_2 Min'	0.06	0.01	-0.03	0.23	-0.04	0.05	-0.02	0.30	-0.04	0.10	-0.01	0.52	0.04	0.07	0.04	0.09
	PM_{10} Min'	0.07	0.00	-0.07	0.00	-0.09	0.00	-0.08	0.00	-0.01	0.69	0.07	0.00	0.11	0.00	0.05	0.02
	O_3 Min'	-0.16	0.00	0.05	0.01	0.07	0.00	0.01	0.76	0.00	0.84	-0.01	0.51	-0.13	0.00	-0.14	0.00
	CO Min'	-0.01	0.67	-0.06	0.01	0.01	0.78	0.03	0.11	0.06	0.01	0.07	0.00	0.05	0.02	-0.02	0.47
	NO Mean	0.22	0.00	-0.02	0.35	-0.05	0.04	0.01	0.77	0.01	0.66	0.06	0.00	0.19	0.00	0.17	0.00
	NO_2 Mean	0.24	0.00	-0.07	0.00	-0.10	0.00	-0.04	0.07	-0.01	0.70	0.04	0.05	0.21	0.00	0.21	0.00
	NOD Mean	0.24	0.00	-0.03	0.12	-0.06	0.00	-0.01	0.76	0.01	0.81	0.06	0.01	0.20	0.00	0.19	0.00
	SO_2 Mean	0.12	0.00	-0.01	0.66	-0.04	0.05	-0.04	0.06	-0.03	0.13	-0.02	0.30	0.06	0.01	0.09	0.00
	PM_{10} Mean	0.13	0.00	-0.06	0.01	-0.11	0.00	-0.07	0.00	-0.03	0.22	0.04	0.06	0.14	0.00	0.11	0.00
	O_3 Mean	-0.21	0.00	0.03	0.12	0.07	0.00	0.00	0.83	-0.02	0.26	-0.05	0.02	-0.19	0.00	-0.18	0.00
	CO Mean	0.16	0.00	-0.01	0.58	-0.01	0.50	0.04	0.09	0.03	0.13	0.06	0.00	0.15	0.00	0.13	0.00
	NO Max'	0.24	0.00	0.01	0.60	-0.05	0.02	-0.01	0.50	-0.01	0.82	0.04	0.06	0.19	0.00	0.20	0.00
	NO_2 Max'	0.26	0.00	-0.05	0.03	-0.11	0.00	-0.06	0.00	-0.03	0.14	-0.01	0.79	0.18	0.00	0.22	0.00
	NOD Max'	0.25	0.00	0.00	0.85	-0.06	0.01	-0.02	0.38	0.00	0.82	0.04	0.07	0.19	0.00	0.21	0.00
	SO_2 Max'	0.11	0.00	0.00	0.99	-0.06	0.01	-0.04	0.07	-0.03	0.20	-0.03	0.14	0.06	0.01	0.09	0.00
	PM_{10} Max'	0.12	0.00	-0.01	0.61	-0.08	0.00	-0.06	0.00	-0.02	0.35	0.03	0.18	0.11	0.00	0.10	0.00
	O_3 Max'	-0.17	0.00	0.02	0.40	0.04	0.06	-0.02	0.42	-0.04	0.05	-0.07	0.00	-0.17	0.00	-0.13	0.00
	CO Max'	0.20	0.00	0.03	0.11	-0.01	0.61	0.02	0.42	0.03	0.23	0.04	0.07	0.14	0.00	0.16	0.00
Weather	Temp Min'	-0.08	0.00	-0.07	0.00	-0.07	0.00	-0.06	0.00	-0.04	0.06	-0.03	0.11	-0.05	0.03	-0.06	0.01
	Temp Max'	-0.07	0.00	-0.07	0.00	-0.08	0.00	-0.09	0.00	-0.08	0.00	-0.07	0.00	-0.07	0.00	-0.05	0.01
	Sun	-0.03	0.23	-0.04	0.08	-0.05	0.03	-0.05	0.02	-0.08	0.00	-0.07	0.00	-0.05	0.03	-0.02	0.46
	Rain	0.00	0.97	0.05	0.02	0.02	0.32	-0.03	0.18	-0.04	0.09	0.00	0.88	0.03	0.11	-0.01	0.52
	Pressure	-0.02	0.26	-0.01	0.53	-0.01	0.77	0.00	1.00	0.00	0.96	-0.02	0.34	-0.03	0.18	-0.03	0.18
	Wind speed	-0.02	0.26	0.04	0.06	0.03	0.17	0.00	0.96	-0.02	0.39	0.02	0.46	0.03	0.11	0.05	0.01
Pollen	Grass	0.03	0.24	0.04	0.04	0.05	0.02	0.03	0.21	0.02	0.44	-0.01	0.54	0.00	0.98	0.02	0.35

Table E.45: England and Wales Acute Visits Excess – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		r	P	r	P	r	P	r	P	r	P	r	P	r	P	r	P
Outdoor air pollutants	NO Min'	-0.03	0.20	0.00	0.87	0.01	0.66	-0.01	0.51	-0.01	0.55	0.00	0.99	0.04	0.08	0.03	0.24
	NO_2 Min'	-0.01	0.67	-0.04	0.04	-0.02	0.28	-0.01	0.76	-0.03	0.17	0.00	1.00	0.02	0.37	0.01	0.72
	NOD Min'	-0.02	0.34	-0.03	0.21	-0.01	0.72	-0.01	0.71	-0.02	0.30	0.00	0.82	0.03	0.13	0.02	0.32
	SO_2 Min'	0.00	0.87	-0.02	0.27	0.01	0.61	0.01	0.64	-0.02	0.34	-0.02	0.28	0.02	0.40	0.01	0.49
	PM_{10} Min'	0.02	0.32	-0.03	0.16	-0.03	0.17	-0.02	0.27	-0.03	0.17	0.01	0.66	0.04	0.09	0.03	0.11
	O_3 Min'	-0.05	0.02	0.01	0.49	0.03	0.12	0.02	0.45	-0.03	0.23	0.00	0.99	-0.05	0.03	-0.06	0.01
	CO Min'	-0.01	0.73	0.00	0.88	0.01	0.60	0.01	0.65	0.02	0.30	0.02	0.28	0.06	0.00	0.03	0.18
	NO Mean	0.06	0.01	0.00	0.95	0.02	0.37	0.02	0.30	0.01	0.67	0.04	0.08	0.08	0.00	0.10	0.00
	NO_2 Mean	0.07	0.00	-0.03	0.15	-0.01	0.54	0.01	0.72	0.00	0.96	0.03	0.23	0.07	0.00	0.10	0.00
	NOD Mean	0.07	0.00	-0.01	0.74	0.01	0.59	0.02	0.37	0.01	0.76	0.04	0.09	0.08	0.00	0.10	0.00
	SO_2 Mean	0.05	0.02	0.00	0.94	0.04	0.08	0.01	0.72	-0.01	0.57	-0.03	0.17	0.02	0.42	0.06	0.00
	PM_{10} Mean	0.05	0.03	-0.01	0.61	-0.02	0.44	-0.01	0.57	-0.03	0.19	0.01	0.51	0.05	0.02	0.05	0.03
	O_3 Mean	-0.05	0.01	0.01	0.71	0.02	0.27	0.00	0.91	-0.01	0.62	0.00	0.92	-0.05	0.01	-0.07	0.00
	CO Mean	0.06	0.00	0.03	0.24	0.04	0.04	0.05	0.01	0.05	0.03	0.07	0.00	0.12	0.00	0.11	0.00
	NO Max'	0.07	0.00	0.02	0.46	0.02	0.38	0.02	0.37	0.01	0.73	0.05	0.02	0.07	0.00	0.09	0.00
	NO_2 Max'	0.08	0.00	0.00	0.88	0.02	0.45	0.03	0.19	0.00	0.92	0.04	0.06	0.08	0.00	0.11	0.00
	NOD Max'	0.08	0.00	0.02	0.48	0.02	0.37	0.02	0.36	0.01	0.65	0.05	0.02	0.08	0.00	0.10	0.00
	SO_2 Max'	0.06	0.01	0.01	0.80	0.03	0.23	0.03	0.17	0.00	0.88	-0.03	0.19	0.02	0.35	0.05	0.01
	PM_{10} Max'	0.04	0.08	0.02	0.28	0.00	0.98	-0.01	0.62	-0.02	0.46	0.02	0.41	0.04	0.09	0.03	0.14
	O_3 Max'	-0.03	0.16	0.00	0.85	0.00	0.91	-0.01	0.68	-0.01	0.67	0.00	0.94	-0.04	0.07	-0.05	0.03
	CO Max'	0.08	0.00	0.05	0.02	0.06	0.01	0.06	0.01	0.04	0.06	0.09	0.00	0.11	0.00	0.12	0.00
Weather	Temp Min'	-0.07	0.00	-0.07	0.00	-0.08	0.00	-0.09	0.00	-0.09	0.00	-0.09	0.00	-0.09	0.00	-0.09	0.00
	Temp Max'	-0.09	0.00	-0.08	0.00	-0.08	0.00	-0.10	0.00	-0.09	0.00	-0.09	0.00	-0.10	0.00	-0.09	0.00
	Sun	-0.04	0.08	-0.06	0.01	-0.05	0.03	-0.04	0.06	-0.03	0.16	-0.05	0.02	-0.05	0.02	-0.03	0.15
	Rain	0.00	0.89	0.05	0.01	0.02	0.29	0.03	0.23	-0.01	0.54	0.01	0.59	0.00	0.96	0.01	0.76
	Pressure	-0.04	0.07	-0.03	0.17	-0.05	0.02	-0.04	0.10	-0.01	0.55	-0.04	0.09	-0.03	0.12	-0.03	0.22
	Wind speed	-0.04	0.07	0.06	0.00	0.08	0.00	0.06	0.00	0.04	0.07	0.04	0.08	0.03	0.13	0.05	0.02
Pollen	Grass	-0.02	0.44	0.02	0.41	0.03	0.14	0.03	0.12	0.03	0.22	0.01	0.74	0.00	0.92	-0.01	0.61

Table E.46: England and Wales Casualty Counts Excess – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
	Exposure	r	P	r	P	r	P	r	P	r	P	r	P	r	P	r	P
	NO Min’	0.02	0.28	-0.03	0.18	0.01	0.63	0.01	0.69	0.02	0.35	0.08	0.00	0.01	0.53	0.03	0.19
	NO_2 Min’	0.04	0.05	-0.03	0.23	-0.01	0.73	-0.03	0.20	-0.02	0.32	0.02	0.29	0.02	0.32	0.00	0.98
	NOD Min’	0.03	0.18	-0.03	0.12	0.00	1.00	-0.02	0.45	0.00	0.91	0.05	0.01	0.02	0.40	0.01	0.55
	SO_2 Min’	-0.01	0.53	-0.04	0.04	-0.06	0.00	-0.08	0.00	-0.05	0.02	-0.03	0.11	-0.02	0.26	-0.03	0.21
	PM_{10} Min’	0.02	0.31	-0.01	0.70	-0.06	0.00	-0.06	0.01	-0.02	0.25	0.00	0.88	0.00	0.96	-0.01	0.59
	O_3 Min’	-0.05	0.01	-0.02	0.33	0.04	0.06	0.04	0.10	0.01	0.81	0.01	0.65	-0.01	0.61	-0.02	0.39
	CO Min’	0.02	0.31	-0.02	0.38	0.00	0.85	-0.01	0.60	0.00	0.95	0.04	0.10	0.01	0.70	0.02	0.46
	NO Mean	0.05	0.03	-0.02	0.35	-0.02	0.31	-0.01	0.53	-0.03	0.23	0.01	0.71	0.03	0.13	0.04	0.04
	NO_2 Mean	0.07	0.00	-0.01	0.52	-0.05	0.03	-0.07	0.00	-0.05	0.02	-0.02	0.31	0.03	0.12	0.02	0.33
Outdoor air pollutants	NOD Mean	0.05	0.01	-0.02	0.35	-0.03	0.18	-0.03	0.18	-0.03	0.10	0.00	0.99	0.03	0.12	0.04	0.06
	SO_2 Mean	-0.02	0.38	-0.06	0.01	-0.07	0.00	-0.09	0.00	-0.08	0.00	-0.08	0.00	-0.07	0.00	-0.05	0.01
	PM_{10} Mean	0.04	0.05	-0.01	0.69	-0.06	0.01	-0.06	0.00	-0.04	0.09	0.00	0.93	0.01	0.54	0.00	0.99
	O_3 Mean	-0.07	0.00	0.00	0.89	0.01	0.62	0.03	0.17	0.01	0.60	-0.01	0.77	-0.05	0.03	-0.03	0.12
	CO Mean	0.01	0.77	-0.04	0.04	-0.05	0.03	-0.06	0.01	-0.06	0.00	-0.04	0.06	-0.02	0.36	-0.01	0.56
	NO Max’	0.05	0.01	-0.01	0.65	-0.01	0.67	-0.02	0.25	-0.04	0.10	-0.02	0.44	0.03	0.17	0.03	0.24
	NO_2 Max’	0.05	0.02	-0.01	0.60	-0.06	0.01	-0.07	0.00	-0.06	0.00	-0.05	0.03	0.01	0.59	0.00	0.92
	NOD Max’	0.06	0.01	-0.01	0.76	-0.02	0.48	-0.03	0.15	-0.04	0.06	-0.02	0.34	0.03	0.15	0.02	0.26
	SO_2 Max’	-0.04	0.09	-0.05	0.02	-0.06	0.00	-0.07	0.00	-0.07	0.00	-0.09	0.00	-0.07	0.00	-0.06	0.01
	PM_{10} Max’	0.03	0.12	0.01	0.56	-0.03	0.18	-0.04	0.05	-0.02	0.27	0.01	0.78	0.01	0.52	0.01	0.60
	O_3 Max’	-0.05	0.01	0.00	0.97	-0.03	0.23	0.01	0.56	0.00	0.88	-0.03	0.13	-0.06	0.01	-0.03	0.13
	CO Max’	0.00	0.97	-0.05	0.03	-0.05	0.02	-0.05	0.02	-0.06	0.01	-0.05	0.01	-0.03	0.14	-0.02	0.43
	Temp Min’	-0.01	0.76	-0.01	0.58	-0.01	0.71	0.01	0.51	0.02	0.33	0.01	0.54	0.03	0.12	0.03	0.12
	Temp Max’	-0.01	0.60	0.00	0.93	-0.01	0.58	-0.01	0.62	0.00	0.86	0.00	0.83	0.01	0.60	0.02	0.26
Weather	Sun	-0.01	0.71	0.00	0.94	-0.01	0.52	-0.02	0.27	-0.02	0.48	-0.02	0.33	-0.03	0.18	-0.03	0.21
	Rain	0.01	0.73	0.02	0.27	0.01	0.62	0.00	0.95	0.00	0.83	0.01	0.81	0.04	0.10	0.04	0.04
	Pressure	0.05	0.03	0.04	0.04	0.03	0.15	0.01	0.59	0.00	0.97	-0.01	0.61	0.00	0.85	0.00	0.99
	Wind speed	0.05	0.03	-0.04	0.07	0.00	0.91	-0.02	0.26	-0.02	0.34	-0.02	0.36	0.00	0.85	-0.01	0.76
Pollen	Grass	0.03	0.24	0.03	0.20	-0.01	0.74	-0.02	0.46	-0.01	0.54	-0.02	0.44	0.02	0.44	0.03	0.14

Table E.47: England and Wales Emergency Consultations Excess – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
	Exposure	r	P	r	P	r	P	r	P	r	P	r	P	r	P	r	P
	NO Min’	0.08	0.00	0.00	0.97	0.07	0.00	0.11	0.00	0.07	0.00	0.10	0.00	0.08	0.00	0.04	0.07
	NO_2 Min’	0.08	0.00	0.00	0.89	0.06	0.01	0.09	0.00	0.08	0.00	0.08	0.00	0.08	0.00	0.08	0.00
	NOD Min’	0.08	0.00	0.00	0.97	0.07	0.00	0.11	0.00	0.07	0.00	0.09	0.00	0.09	0.00	0.06	0.00
	SO_2 Min’	0.02	0.44	-0.01	0.60	-0.01	0.73	0.01	0.60	-0.03	0.16	-0.01	0.56	0.01	0.58	0.00	0.85
	PM_{10} Min’	0.03	0.11	-0.04	0.09	-0.04	0.07	-0.03	0.16	0.03	0.12	0.04	0.08	0.02	0.39	0.01	0.63
	O_3 Min’	-0.11	0.00	0.00	0.86	-0.04	0.06	-0.03	0.13	-0.04	0.06	-0.06	0.01	-0.06	0.00	-0.09	0.00
	CO Min’	0.05	0.03	0.01	0.50	0.05	0.03	0.06	0.00	0.07	0.00	0.05	0.02	0.05	0.02	0.04	0.08
	NO Mean	0.14	0.00	0.00	0.89	0.03	0.16	0.08	0.00	0.08	0.00	0.05	0.01	0.11	0.00	0.12	0.00
	NO_2 Mean	0.14	0.00	-0.02	0.27	-0.02	0.40	0.03	0.23	0.03	0.12	0.03	0.13	0.09	0.00	0.10	0.00
Outdoor air pollutants	NOD Mean	0.15	0.00	0.00	0.83	0.02	0.38	0.07	0.00	0.07	0.00	0.05	0.02	0.11	0.00	0.12	0.00
	SO_2 Mean	0.03	0.20	-0.05	0.02	-0.05	0.03	-0.04	0.09	-0.07	0.00	-0.04	0.08	-0.03	0.21	-0.02	0.29
	PM_{10} Mean	0.06	0.00	-0.02	0.28	-0.04	0.06	0.00	0.88	0.03	0.18	0.02	0.32	0.06	0.00	0.04	0.06
	O_3 Mean	-0.15	0.00	-0.01	0.56	-0.04	0.05	-0.06	0.00	-0.07	0.00	-0.05	0.02	-0.09	0.00	-0.13	0.00
	CO Mean	0.08	0.00	-0.01	0.51	0.01	0.78	0.04	0.08	0.03	0.17	0.02	0.48	0.05	0.02	0.06	0.00
	NO Max’	0.14	0.00	0.01	0.62	0.03	0.15	0.06	0.01	0.05	0.01	0.05	0.02	0.11	0.00	0.12	0.00
	NO_2 Max’	0.12	0.00	-0.03	0.20	-0.03	0.11	-0.01	0.56	0.01	0.55	0.03	0.20	0.07	0.00	0.09	0.00
	NOD Max’	0.15	0.00	0.01	0.75	0.02	0.25	0.05	0.01	0.05	0.01	0.05	0.02	0.11	0.00	0.13	0.00
	SO_2 Max’	-0.01	0.78	-0.06	0.01	-0.07	0.00	-0.05	0.02	-0.07	0.00	-0.06	0.01	-0.04	0.06	-0.03	0.15
	PM_{10} Max’	0.06	0.00	-0.01	0.74	-0.04	0.06	0.01	0.58	0.02	0.32	0.02	0.44	0.07	0.00	0.03	0.12
	O_3 Max’	-0.12	0.00	-0.03	0.22	-0.05	0.01	-0.09	0.00	-0.10	0.00	-0.06	0.00	-0.09	0.00	-0.12	0.00
	CO Max’	0.09	0.00	-0.01	0.76	0.00	0.98	0.03	0.21	0.03	0.15	0.01	0.64	0.06	0.01	0.07	0.00
	Temp Min’	-0.09	0.00	-0.09	0.00	-0.08	0.00	-0.06	0.00	-0.06	0.00	-0.07	0.00	-0.09	0.00	-0.07	0.00
	Temp Max’	-0.09	0.00	-0.08	0.00	-0.10	0.00	-0.08	0.00	-0.08	0.00	-0.08	0.00	-0.10	0.00	-0.08	0.00
Weather	Sun	-0.05	0.02	-0.04	0.04	-0.09	0.00	-0.05	0.03	-0.05	0.03	-0.07	0.00	-0.08	0.00	-0.03	0.12
	Rain	-0.02	0.45	-0.01	0.71	0.01	0.76	-0.03	0.15	-0.03	0.16	-0.02	0.47	0.03	0.15	-0.02	0.45
	Pressure	0.04	0.06	0.03	0.12	0.07	0.00	0.07	0.00	0.06	0.00	0.05	0.03	0.03	0.14	0.03	0.15
	Wind speed	0.04	0.06	-0.01	0.79	-0.03	0.14	-0.05	0.03	-0.04	0.04	0.00	0.85	0.00	0.89	0.00	0.88
Pollen	Grass	0.00	0.98	0.01	0.66	0.01	0.54	0.01	0.67	-0.02	0.28	-0.03	0.19	0.00	0.93	0.01	0.72

Table E.48: England and Wales Emergency Counts Excess – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
	Exposure	r	P	r	P	r	P	r	P	r	P	r	P	r	P	r	P
Outdoor air pollutants	NO Min’	0.05	0.02	0.00	0.82	0.05	0.02	0.09	0.00	0.06	0.01	0.10	0.00	0.07	0.00	0.04	0.04
	NO_2 Min’	0.05	0.02	-0.02	0.41	0.03	0.11	0.06	0.01	0.04	0.06	0.07	0.00	0.06	0.01	0.05	0.03
	NOD Min’	0.05	0.02	-0.01	0.68	0.05	0.03	0.08	0.00	0.05	0.02	0.09	0.00	0.07	0.00	0.05	0.03
	SO_2 Min’	-0.02	0.26	-0.05	0.01	-0.04	0.06	-0.02	0.38	-0.02	0.39	-0.01	0.67	-0.01	0.62	-0.02	0.27
	PM_{10} Min’	-0.01	0.75	-0.05	0.02	-0.06	0.00	-0.03	0.24	0.02	0.30	0.03	0.12	0.01	0.80	-0.01	0.65
	O_3 Min’	-0.08	0.00	0.02	0.48	-0.01	0.73	-0.02	0.35	-0.04	0.09	-0.05	0.03	-0.06	0.01	-0.07	0.00
	CO Min’	0.03	0.11	0.01	0.59	0.04	0.05	0.05	0.01	0.05	0.01	0.06	0.00	0.04	0.08	0.04	0.06
	NO Mean	0.10	0.00	0.00	0.86	0.03	0.17	0.09	0.00	0.08	0.00	0.10	0.00	0.12	0.00	0.11	0.00
	NO_2 Mean	0.10	0.00	-0.04	0.09	-0.02	0.47	0.03	0.14	0.04	0.06	0.08	0.00	0.10	0.00	0.09	0.00
	NOD Mean	0.10	0.00	-0.01	0.55	0.02	0.37	0.08	0.00	0.07	0.00	0.10	0.00	0.12	0.00	0.11	0.00
	SO_2 Mean	-0.01	0.79	-0.07	0.00	-0.05	0.01	-0.04	0.06	-0.06	0.00	-0.03	0.12	-0.02	0.26	-0.01	0.64
	PM_{10} Mean	0.02	0.28	-0.04	0.06	-0.07	0.00	0.00	0.97	0.01	0.58	0.03	0.16	0.04	0.06	0.01	0.70
	O_3 Mean	-0.11	0.00	0.00	0.86	-0.03	0.17	-0.05	0.03	-0.07	0.00	-0.07	0.00	-0.10	0.00	-0.10	0.00
	CO Mean	0.06	0.00	-0.01	0.80	0.02	0.40	0.05	0.02	0.04	0.06	0.06	0.00	0.07	0.00	0.08	0.00
	NO Max’	0.10	0.00	0.01	0.62	0.04	0.05	0.07	0.00	0.07	0.00	0.09	0.00	0.14	0.00	0.11	0.00
	NO_2 Max’	0.09	0.00	-0.03	0.22	-0.01	0.60	0.01	0.78	0.03	0.18	0.07	0.00	0.10	0.00	0.09	0.00
	NOD Max’	0.11	0.00	0.01	0.75	0.04	0.06	0.07	0.00	0.07	0.00	0.09	0.00	0.14	0.00	0.11	0.00
	SO_2 Max’	-0.03	0.23	-0.07	0.00	-0.06	0.01	-0.02	0.26	-0.06	0.01	-0.06	0.01	-0.03	0.14	-0.01	0.72
	PM_{10} Max’	0.03	0.19	-0.01	0.80	-0.05	0.03	0.00	0.98	0.00	0.90	0.03	0.14	0.05	0.02	0.02	0.37
	O_3 Max’	-0.11	0.00	-0.02	0.37	-0.07	0.00	-0.08	0.00	-0.08	0.00	-0.09	0.00	-0.10	0.00	-0.09	0.00
	CO Max’	0.07	0.00	0.01	0.75	0.03	0.18	0.05	0.02	0.05	0.02	0.07	0.00	0.10	0.00	0.08	0.00
Weather	Temp Min’	-0.14	0.00	-0.13	0.00	-0.11	0.00	-0.11	0.00	-0.11	0.00	-0.12	0.00	-0.13	0.00	-0.12	0.00
	Temp Max’	-0.14	0.00	-0.13	0.00	-0.14	0.00	-0.13	0.00	-0.13	0.00	-0.13	0.00	-0.13	0.00	-0.12	0.00
	Sun	-0.05	0.01	-0.05	0.01	-0.10	0.00	-0.08	0.00	-0.07	0.00	-0.10	0.00	-0.08	0.00	-0.06	0.01
	Rain	0.01	0.63	0.01	0.71	0.00	0.98	-0.01	0.59	-0.01	0.62	0.03	0.19	0.05	0.02	0.02	0.40
	Pressure	0.02	0.28	0.03	0.14	0.04	0.04	0.03	0.13	0.02	0.47	0.01	0.62	0.01	0.53	0.02	0.44
	Wind speed	0.02	0.28	0.01	0.76	0.00	0.96	-0.01	0.71	0.00	0.95	0.03	0.15	0.04	0.09	0.02	0.46
Pollen	Grass	-0.01	0.68	0.03	0.23	0.00	0.88	0.00	0.99	-0.01	0.68	-0.02	0.33	0.02	0.32	0.03	0.18

Table E. 49: England and Wales Out of Hours Counts Excess – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
	Exposure	r	P	r	P	r	P	r	P	r	P	r	P	r	P	r	P
Outdoor air pollutants	NO Min’	0.01	0.65	0.03	0.12	0.00	0.82	0.05	0.03	0.02	0.29	0.02	0.46	0.01	0.77	0.00	0.83
	NO_2 Min’	-0.02	0.33	0.01	0.71	0.03	0.24	0.04	0.05	0.03	0.18	0.03	0.14	0.00	0.96	0.00	0.96
	NOD Min’	-0.01	0.77	0.03	0.24	0.02	0.48	0.05	0.02	0.03	0.21	0.03	0.23	0.01	0.79	0.00	0.85
	SO_2 Min’	-0.05	0.03	-0.03	0.11	-0.02	0.46	0.02	0.39	0.05	0.03	0.03	0.11	-0.02	0.43	-0.03	0.20
	PM_{10} Min’	-0.07	0.00	-0.03	0.17	-0.01	0.76	0.04	0.04	0.04	0.06	0.02	0.46	-0.02	0.26	-0.03	0.15
	O_3 Min’	0.04	0.09	0.04	0.06	-0.02	0.27	-0.04	0.05	-0.02	0.37	-0.04	0.07	-0.01	0.65	0.01	0.78
	CO Min’	0.00	0.99	0.02	0.26	0.03	0.20	0.04	0.07	0.02	0.45	0.02	0.26	-0.01	0.53	0.01	0.67
	NO Mean	-0.03	0.22	0.01	0.73	0.03	0.13	0.08	0.00	0.08	0.00	0.09	0.00	0.05	0.02	0.00	0.90
	NO_2 Mean	-0.05	0.02	-0.02	0.45	0.04	0.10	0.08	0.00	0.08	0.00	0.11	0.00	0.04	0.10	0.01	0.70
	NOD Mean	-0.03	0.12	0.00	0.92	0.03	0.10	0.08	0.00	0.09	0.00	0.10	0.00	0.05	0.02	0.00	0.86
	SO_2 Mean	-0.04	0.06	-0.03	0.12	0.00	0.92	0.03	0.14	0.03	0.14	0.05	0.01	0.03	0.13	0.02	0.33
	PM_{10} Mean	-0.07	0.00	-0.04	0.10	-0.02	0.35	0.06	0.01	0.04	0.09	0.02	0.27	-0.02	0.31	-0.04	0.05
	O_3 Mean	0.03	0.19	0.02	0.43	-0.03	0.15	-0.05	0.03	-0.05	0.01	-0.06	0.00	-0.02	0.28	0.01	0.68
	CO Mean	0.00	0.93	0.03	0.16	0.05	0.03	0.08	0.00	0.07	0.00	0.10	0.00	0.05	0.02	0.04	0.09
	NO Max’	-0.03	0.17	0.01	0.64	0.04	0.04	0.08	0.00	0.09	0.00	0.10	0.00	0.08	0.00	0.01	0.67
	NO_2 Max’	-0.03	0.19	-0.01	0.58	0.05	0.01	0.07	0.00	0.09	0.00	0.11	0.00	0.07	0.00	0.03	0.17
	NOD Max’	-0.03	0.16	0.00	0.84	0.05	0.02	0.08	0.00	0.09	0.00	0.11	0.00	0.08	0.00	0.01	0.55
	SO_2 Max’	-0.03	0.13	-0.03	0.11	0.00	0.83	0.05	0.02	0.03	0.12	0.04	0.04	0.03	0.16	0.04	0.07
	PM_{10} Max’	-0.06	0.01	-0.02	0.28	-0.02	0.40	0.03	0.15	0.01	0.57	0.03	0.21	0.00	0.86	-0.02	0.32
	O_3 Max’	-0.01	0.63	-0.01	0.76	-0.04	0.07	-0.06	0.01	-0.05	0.01	-0.07	0.00	-0.03	0.24	0.00	0.86
	CO Max’	0.00	0.88	0.03	0.10	0.06	0.00	0.08	0.00	0.08	0.00	0.11	0.00	0.09	0.00	0.03	0.11
Weather	Temp Min’	-0.12	0.00	-0.11	0.00	-0.08	0.00	-0.10	0.00	-0.10	0.00	-0.12	0.00	-0.13	0.00	-0.12	0.00
	Temp Max’	-0.11	0.00	-0.12	0.00	-0.10	0.00	-0.10	0.00	-0.10	0.00	-0.11	0.00	-0.11	0.00	-0.12	0.00
	Sun	-0.02	0.28	-0.02	0.27	-0.05	0.03	-0.06	0.01	-0.06	0.01	-0.07	0.00	-0.01	0.58	-0.04	0.09
	Rain	0.02	0.25	-0.02	0.29	-0.03	0.23	0.00	0.85	0.02	0.37	0.05	0.01	0.03	0.22	0.01	0.77
	Pressure	-0.02	0.37	0.00	0.95	0.01	0.68	0.00	0.82	-0.02	0.25	0.00	0.98	0.01	0.80	0.01	0.57
	Wind speed	-0.02	0.37	0.02	0.29	0.00	0.99	0.02	0.33	0.04	0.08	0.06	0.01	0.04	0.05	0.01	0.51
Pollen	Grass	-0.03	0.17	0.00	0.82	-0.01	0.50	-0.01	0.65	0.01	0.80	0.00	0.98	0.03	0.24	0.02	0.33

E3.2. Trent Region Correlation coefficients and P-values

Table E. 50: Trent Region All Counts Asthmatics – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P
Outdoor air pollutants	NO Min'	-0.05	0.02	-0.10	0.00	0.02	0.30	0.06	0.00	0.06	0.00	0.09	0.00	0.08	0.00	-0.05	0.02
	NO_2 Min'	0.03	0.11	-0.09	0.00	-0.05	0.02	0.02	0.39	0.03	0.15	0.03	0.14	0.09	0.00	0.00	0.87
	NOD Min'	-0.01	0.76	-0.10	0.00	-0.03	0.11	0.04	0.07	0.05	0.02	0.05	0.02	0.08	0.00	-0.03	0.19
	SO_2 Min'	0.05	0.01	-0.03	0.14	-0.06	0.01	-0.02	0.27	-0.04	0.07	-0.02	0.31	0.02	0.39	0.03	0.22
	PM_{10} Min'	0.07	0.00	-0.06	0.01	-0.08	0.00	-0.07	0.00	0.00	0.88	0.06	0.01	0.09	0.00	0.03	0.19
	O_3 Min'	-0.12	0.00	0.01	0.76	0.03	0.14	-0.03	0.13	-0.03	0.14	-0.02	0.30	-0.10	0.00	-0.11	0.00
	CO Min'	0.01	0.67	-0.04	0.08	0.02	0.39	0.05	0.02	0.06	0.01	0.05	0.03	0.05	0.02	0.01	0.72
	NO Mean	0.29	0.00	-0.07	0.00	-0.10	0.00	0.02	0.43	0.02	0.28	0.02	0.29	0.22	0.00	0.25	0.00
	NO_2 Mean	0.23	0.00	-0.06	0.00	-0.11	0.00	-0.01	0.71	0.02	0.34	0.02	0.29	0.18	0.00	0.19	0.00
	NOD Mean	0.27	0.00	-0.06	0.00	-0.11	0.00	0.01	0.65	0.03	0.24	0.02	0.26	0.21	0.00	0.23	0.00
	SO_2 Mean	0.11	0.00	-0.02	0.45	-0.07	0.00	-0.04	0.09	-0.03	0.20	-0.03	0.14	0.03	0.11	0.07	0.00
	PM_{10} Mean	0.15	0.00	-0.05	0.03	-0.10	0.00	-0.05	0.02	0.00	0.99	0.03	0.18	0.12	0.00	0.11	0.00
	O_3 Mean	-0.18	0.00	0.04	0.08	0.07	0.00	-0.02	0.27	-0.04	0.08	-0.02	0.31	-0.14	0.00	-0.16	0.00
	CO Mean	0.18	0.00	-0.01	0.59	-0.02	0.46	0.05	0.02	0.05	0.01	0.04	0.04	0.16	0.00	0.15	0.00
	NO Max'	0.27	0.00	-0.04	0.04	-0.09	0.00	0.01	0.79	0.02	0.34	0.01	0.56	0.19	0.00	0.25	0.00
	NO_2 Max'	0.22	0.00	-0.05	0.02	-0.11	0.00	-0.02	0.46	0.02	0.44	0.01	0.76	0.15	0.00	0.20	0.00
	NOD Max'	0.27	0.00	-0.04	0.06	-0.09	0.00	0.01	0.81	0.02	0.28	0.01	0.58	0.19	0.00	0.25	0.00
	SO_2 Max'	0.12	0.00	0.00	0.91	-0.07	0.00	-0.04	0.04	-0.03	0.12	-0.03	0.20	0.05	0.01	0.08	0.00
	PM_{10} Max'	0.14	0.00	-0.03	0.24	-0.10	0.00	-0.04	0.04	0.02	0.40	0.02	0.38	0.09	0.00	0.11	0.00
	O_3 Max'	-0.14	0.00	0.03	0.18	0.05	0.01	-0.03	0.21	-0.05	0.02	-0.05	0.03	-0.13	0.00	-0.11	0.00
	CO Max'	0.21	0.00	0.01	0.58	-0.03	0.14	0.04	0.07	0.05	0.03	0.04	0.09	0.16	0.00	0.19	0.00
Weather	Temp Min'	-0.10	0.00	-0.10	0.00	-0.10	0.00	-0.09	0.00	-0.07	0.00	-0.06	0.00	-0.07	0.00	-0.09	0.00
	Temp Max'	-0.10	0.00	-0.10	0.00	-0.11	0.00	-0.12	0.00	-0.11	0.00	-0.10	0.00	-0.09	0.00	-0.08	0.00
	Sun	-0.03	0.24	-0.06	0.00	-0.05	0.01	-0.05	0.02	-0.08	0.00	-0.07	0.00	-0.05	0.02	-0.02	0.45
	Rain	-0.01	0.68	0.01	0.69	0.02	0.41	0.01	0.59	0.00	0.97	0.02	0.38	0.01	0.62	-0.01	0.58
	Pressure	0.00	0.99	0.01	0.63	0.01	0.57	0.01	0.79	0.01	0.69	-0.01	0.75	-0.01	0.65	0.01	0.55
	Wind	0.00	0.99	0.04	0.09	0.02	0.26	-0.01	0.81	-0.02	0.37	0.02	0.33	0.04	0.06	0.06	0.00
Pollen	Grass	0.00	0.88	0.01	0.53	0.01	0.66	0.01	0.78	0.00	0.90	0.00	0.88	0.00	0.92	0.00	0.94

Table E.51: Trent Region All Counts Non-asthmatics – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P
Outdoor air pollutants	NO Min'	-0.10	0.00	-0.13	0.00	-0.01	0.52	0.03	0.19	0.02	0.28	0.05	0.02	0.04	0.04	-0.08	0.00
	NO_2 Min'	-0.01	0.56	-0.12	0.00	-0.07	0.00	-0.01	0.60	-0.01	0.50	0.00	0.99	0.06	0.00	-0.01	0.67
	NOD Min'	-0.06	0.01	-0.14	0.00	-0.06	0.00	0.01	0.79	0.00	1.00	0.02	0.43	0.05	0.02	-0.04	0.06
	SO_2 Min'	0.04	0.04	-0.03	0.17	-0.05	0.02	-0.03	0.20	-0.02	0.34	0.00	0.88	0.03	0.12	0.05	0.01
	PM_{10} Min'	0.04	0.06	-0.07	0.00	-0.08	0.00	-0.08	0.00	-0.02	0.38	0.05	0.02	0.10	0.00	0.06	0.00
	O_3 Min'	-0.08	0.00	0.05	0.01	0.06	0.00	0.01	0.68	0.00	0.92	0.02	0.41	-0.05	0.02	-0.08	0.00
	CO Min'	-0.03	0.23	-0.06	0.00	-0.01	0.50	0.02	0.47	0.02	0.34	0.03	0.21	0.02	0.34	-0.01	0.71
	NO Mean	0.25	0.00	-0.10	0.00	-0.12	0.00	-0.02	0.34	-0.01	0.68	-0.02	0.34	0.19	0.00	0.22	0.00
	NO_2 Mean	0.20	0.00	-0.09	0.00	-0.12	0.00	-0.04	0.09	-0.02	0.38	-0.01	0.79	0.16	0.00	0.17	0.00
	NOD Mean	0.24	0.00	-0.10	0.00	-0.13	0.00	-0.03	0.22	-0.01	0.63	-0.02	0.42	0.18	0.00	0.20	0.00
	SO_2 Mean	0.12	0.00	-0.01	0.55	-0.06	0.01	-0.04	0.10	-0.02	0.37	-0.02	0.26	0.06	0.00	0.11	0.00
	PM_{10} Mean	0.13	0.00	-0.06	0.01	-0.11	0.00	-0.06	0.01	-0.02	0.38	0.02	0.30	0.14	0.00	0.13	0.00
	O_3 Mean	-0.14	0.00	0.08	0.00	0.10	0.00	0.01	0.50	0.01	0.76	0.02	0.33	-0.09	0.00	-0.12	0.00
	CO Mean	0.15	0.00	-0.05	0.03	-0.04	0.06	0.02	0.46	0.02	0.37	0.02	0.35	0.12	0.00	0.13	0.00
	NO Max'	0.23	0.00	-0.08	0.00	-0.11	0.00	-0.03	0.18	-0.01	0.74	-0.02	0.34	0.17	0.00	0.22	0.00
	NO_2 Max'	0.21	0.00	-0.05	0.01	-0.11	0.00	-0.03	0.23	0.00	0.82	0.00	0.93	0.15	0.00	0.19	0.00
	NOD Max'	0.23	0.00	-0.07	0.00	-0.11	0.00	-0.03	0.20	0.00	0.88	-0.02	0.38	0.17	0.00	0.22	0.00
	SO_2 Max'	0.13	0.00	0.01	0.55	-0.05	0.02	-0.05	0.03	-0.02	0.39	-0.02	0.30	0.08	0.00	0.12	0.00
	PM_{10} Max'	0.13	0.00	-0.03	0.12	-0.11	0.00	-0.05	0.01	0.00	0.83	0.01	0.58	0.11	0.00	0.13	0.00
	O_3 Max'	-0.08	0.00	0.07	0.00	0.10	0.00	0.01	0.65	-0.02	0.44	0.00	0.98	-0.08	0.00	-0.07	0.00
	CO Max'	0.18	0.00	-0.01	0.63	-0.05	0.02	0.01	0.56	0.03	0.22	0.01	0.79	0.13	0.00	0.16	0.00
Weather	Temp Min'	-0.08	0.00	-0.08	0.00	-0.08	0.00	-0.07	0.00	-0.06	0.01	-0.05	0.02	-0.05	0.01	-0.07	0.00
	Temp Max'	-0.07	0.00	-0.07	0.00	-0.08	0.00	-0.08	0.00	-0.07	0.00	-0.07	0.00	-0.06	0.00	-0.06	0.01
	Sun	-0.01	0.59	-0.04	0.06	-0.03	0.13	-0.01	0.59	-0.03	0.12	-0.04	0.05	-0.02	0.36	0.00	0.85
	Rain	0.00	0.94	0.01	0.61	0.02	0.42	0.00	0.82	-0.02	0.45	0.00	0.98	0.02	0.29	-0.02	0.30
	Pressure	-0.01	0.70	-0.01	0.75	-0.01	0.61	0.02	0.48	0.02	0.34	-0.01	0.78	0.00	0.83	0.00	0.93
	Wind speed	-0.01	0.70	0.05	0.02	0.05	0.03	0.00	0.84	-0.01	0.69	0.02	0.31	0.05	0.02	0.07	0.00
Pollen	Grass	0.03	0.19	0.04	0.10	0.04	0.09	0.03	0.14	0.03	0.19	0.03	0.15	0.04	0.10	0.03	0.14

Table E.52: Trent Region Acute Visits Asthmatics – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P
Outdoor air pollutants	NO Min’	0.00	0.82	-0.02	0.28	0.01	0.68	0.02	0.28	0.02	0.44	0.01	0.65	0.02	0.34	0.00	0.99
	NO_2 Min’	-0.05	0.02	-0.03	0.24	-0.02	0.36	-0.03	0.22	0.00	0.86	-0.02	0.47	0.02	0.36	0.00	0.86
	NOD Min’	-0.05	0.03	-0.02	0.29	-0.02	0.34	-0.01	0.57	0.01	0.65	-0.02	0.45	0.01	0.61	0.00	0.87
	SO_2 Min’	-0.03	0.12	-0.01	0.62	-0.02	0.46	0.03	0.12	0.01	0.66	-0.02	0.35	0.02	0.27	0.03	0.11
	PM_{10} Min’	0.00	0.95	-0.04	0.10	0.00	0.92	-0.02	0.33	-0.02	0.26	-0.02	0.33	0.04	0.06	0.04	0.06
	O_3 Min’	0.02	0.29	0.03	0.18	0.03	0.18	0.04	0.09	-0.01	0.75	0.00	0.85	-0.02	0.29	0.03	0.17
	CO Min’	-0.01	0.74	-0.04	0.10	0.00	0.97	-0.01	0.62	0.02	0.37	-0.01	0.73	0.02	0.37	0.03	0.18
	NO Mean	0.02	0.42	0.00	0.86	-0.02	0.47	-0.02	0.48	0.01	0.75	0.02	0.38	0.06	0.00	0.03	0.24
	NO_2 Mean	0.00	0.85	-0.01	0.67	-0.01	0.60	-0.03	0.19	0.00	0.98	0.01	0.76	0.05	0.01	0.03	0.14
	NOD Mean	0.01	0.63	0.00	0.94	-0.02	0.48	-0.02	0.33	0.01	0.79	0.02	0.46	0.06	0.00	0.03	0.19
	SO_2 Mean	-0.02	0.40	0.01	0.81	0.01	0.50	0.01	0.60	0.00	0.83	-0.01	0.70	0.05	0.03	0.06	0.01
	PM_{10} Mean	0.01	0.58	-0.01	0.54	-0.01	0.58	-0.02	0.47	-0.01	0.69	0.00	0.84	0.04	0.06	0.03	0.11
	O_3 Mean	0.03	0.17	0.04	0.08	0.03	0.16	0.03	0.18	0.00	0.97	-0.01	0.55	-0.03	0.18	0.01	0.71
	CO Mean	0.02	0.42	-0.02	0.32	0.01	0.62	-0.01	0.64	0.02	0.41	0.02	0.40	0.06	0.01	0.04	0.04
	NO Max’	0.02	0.33	-0.01	0.82	-0.02	0.36	-0.02	0.47	0.00	0.88	0.02	0.36	0.06	0.01	0.01	0.78
	NO_2 Max’	0.04	0.10	0.02	0.45	0.00	0.96	-0.01	0.77	0.00	0.92	0.02	0.36	0.07	0.00	0.03	0.17
	NOD Max’	0.02	0.31	0.00	0.90	-0.02	0.36	-0.01	0.51	0.00	0.88	0.02	0.33	0.06	0.01	0.01	0.62
	SO_2 Max’	-0.01	0.66	0.03	0.16	0.02	0.40	0.01	0.69	0.00	0.94	-0.01	0.71	0.06	0.01	0.06	0.00
	PM_{10} Max’	0.01	0.80	0.00	0.99	-0.01	0.70	-0.01	0.64	-0.01	0.75	0.00	0.98	0.05	0.01	0.02	0.33
	O_3 Max’	0.04	0.09	0.03	0.19	0.04	0.05	0.03	0.21	-0.01	0.57	0.00	0.98	-0.01	0.63	0.00	1.00
	CO Max’	0.03	0.19	-0.01	0.65	-0.01	0.73	0.00	0.93	0.01	0.52	0.02	0.28	0.05	0.01	0.03	0.18
Weather	Temp Min’	-0.04	0.06	-0.06	0.01	-0.06	0.01	-0.04	0.05	-0.05	0.03	-0.06	0.01	-0.06	0.00	-0.07	0.00
	Temp Max’	-0.04	0.08	-0.06	0.00	-0.06	0.01	-0.05	0.01	-0.04	0.05	-0.05	0.03	-0.05	0.02	-0.05	0.01
	Sun	0.00	0.90	-0.02	0.38	-0.04	0.04	-0.02	0.30	-0.05	0.03	-0.02	0.41	0.02	0.36	-0.01	0.65
	Rain	-0.02	0.41	0.02	0.46	0.04	0.06	0.06	0.01	0.03	0.12	0.00	0.82	-0.02	0.26	0.02	0.39
	Pressure	-0.01	0.79	0.02	0.43	0.01	0.58	0.00	0.85	-0.02	0.42	-0.04	0.05	0.00	0.85	0.00	0.97
	Wind speed	-0.01	0.79	0.05	0.01	0.03	0.14	0.02	0.33	0.01	0.68	0.03	0.12	0.02	0.26	0.02	0.34
Pollen	Grass	0.00	0.88	-0.01	0.77	-0.01	0.69	-0.01	0.54	-0.02	0.43	-0.02	0.40	-0.02	0.30	-0.02	0.41

Table E.53: Trent Region Acute Visits Non-asthmatics – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P
Outdoor air pollutants	NO Min’	0.00	0.91	-0.01	0.49	-0.01	0.52	-0.01	0.76	-0.03	0.11	0.00	0.92	0.01	0.79	-0.01	0.74
	NO_2 Min’	0.01	0.73	-0.03	0.18	0.02	0.33	0.02	0.37	0.02	0.41	0.00	0.92	0.01	0.81	-0.01	0.53
	NOD Min’	0.00	0.95	-0.02	0.32	0.02	0.45	0.01	0.53	0.01	0.72	-0.01	0.80	0.00	0.93	-0.02	0.32
	SO_2 Min’	0.04	0.05	0.03	0.11	0.02	0.37	0.04	0.06	0.03	0.15	0.03	0.13	0.02	0.41	0.02	0.47
	PM_{10} Min’	-0.01	0.62	-0.01	0.54	0.01	0.54	0.00	0.99	0.00	0.97	0.02	0.43	0.06	0.01	0.00	0.91
	O_3 Min’	-0.02	0.49	0.04	0.07	0.01	0.63	0.01	0.52	0.03	0.11	0.00	0.94	-0.02	0.27	-0.02	0.32
	CO Min’	0.02	0.45	0.01	0.68	0.01	0.63	0.01	0.81	0.01	0.61	0.00	0.95	0.02	0.44	-0.01	0.72
	NO Mean	0.04	0.06	-0.03	0.17	0.00	0.94	0.02	0.40	0.00	0.83	0.04	0.08	0.04	0.05	0.02	0.37
	NO_2 Mean	0.02	0.25	-0.03	0.16	0.00	0.89	0.03	0.24	0.00	0.89	0.02	0.25	0.03	0.15	0.00	0.90
	NOD Mean	0.04	0.10	-0.03	0.15	0.00	0.98	0.02	0.32	0.00	0.88	0.03	0.14	0.04	0.09	0.01	0.62
	SO_2 Mean	0.04	0.10	0.02	0.25	0.03	0.18	0.02	0.27	0.01	0.81	0.05	0.03	0.05	0.03	0.02	0.40
	PM_{10} Mean	0.02	0.39	-0.01	0.73	0.00	0.89	0.01	0.63	0.01	0.77	0.03	0.14	0.04	0.05	0.02	0.47
	O_3 Mean	-0.02	0.25	0.04	0.06	0.01	0.54	0.00	0.98	0.01	0.76	-0.02	0.29	-0.02	0.32	-0.02	0.40
	CO Mean	0.05	0.03	0.01	0.76	0.00	0.95	0.03	0.17	0.01	0.68	0.02	0.25	0.04	0.06	0.03	0.22
	NO Max’	0.04	0.05	-0.03	0.14	0.00	0.92	0.01	0.74	-0.01	0.61	0.03	0.16	0.04	0.04	0.04	0.10
	NO_2 Max’	0.03	0.10	-0.02	0.27	-0.01	0.63	0.03	0.17	0.00	0.98	0.03	0.15	0.03	0.13	0.00	0.82
	NOD Max’	0.04	0.06	-0.03	0.13	0.00	0.82	0.01	0.59	-0.01	0.68	0.03	0.18	0.04	0.05	0.03	0.15
	SO_2 Max’	0.02	0.47	0.01	0.51	0.02	0.34	0.01	0.50	0.01	0.80	0.06	0.01	0.04	0.04	0.02	0.38
	PM_{10} Max’	0.02	0.29	-0.02	0.40	-0.01	0.70	0.02	0.30	0.01	0.55	0.04	0.05	0.03	0.24	0.01	0.59
	O_3 Max’	-0.02	0.27	0.01	0.72	-0.01	0.61	0.00	0.86	0.00	0.95	-0.02	0.28	-0.03	0.24	-0.01	0.67
	CO Max’	0.06	0.01	0.00	0.88	0.00	0.85	0.03	0.12	0.01	0.71	0.03	0.12	0.06	0.01	0.05	0.03
Weather	Temp Min’	-0.07	0.00	-0.05	0.01	-0.04	0.04	-0.05	0.02	-0.05	0.02	-0.06	0.01	-0.06	0.01	-0.06	0.01
	Temp Max’	-0.06	0.00	-0.07	0.00	-0.05	0.02	-0.04	0.07	-0.05	0.02	-0.04	0.06	-0.05	0.03	-0.06	0.01
	Sun	0.00	0.84	-0.03	0.20	-0.03	0.11	-0.03	0.14	-0.02	0.40	0.02	0.48	-0.02	0.46	-0.01	0.64
	Rain	0.02	0.28	0.04	0.07	0.01	0.59	0.01	0.62	0.01	0.53	-0.03	0.19	-0.04	0.07	-0.03	0.22
	Pressure	-0.01	0.60	-0.02	0.29	0.00	0.93	0.00	0.94	-0.02	0.26	0.01	0.67	0.01	0.61	0.02	0.31
	Wind speed	-0.01	0.60	0.03	0.11	0.02	0.30	0.01	0.63	0.05	0.03	0.05	0.02	0.02	0.47	0.02	0.30
Pollen	Grass	0.00	0.96	0.02	0.44	0.01	0.69	0.00	0.91	0.01	0.75	0.01	0.59	0.01	0.65	0.01	0.64

Table E.54: Trent Region Casualty Counts Asthmatics – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P
Outdoor air pollutants	NO Min'	0.02	0.38	0.01	0.72	-0.02	0.27	0.02	0.38	0.04	0.09	0.04	0.04	0.02	0.28	0.01	0.71
	NO_2 Min'	0.06	0.00	0.03	0.14	0.03	0.14	0.00	0.96	0.02	0.25	0.00	0.93	0.02	0.37	-0.02	0.43
	NOD Min'	0.05	0.02	0.02	0.27	0.02	0.39	0.00	0.95	0.03	0.15	0.00	0.82	0.02	0.32	-0.03	0.22
	SO_2 Min'	-0.01	0.69	-0.03	0.12	-0.03	0.17	-0.04	0.07	-0.03	0.13	-0.05	0.02	-0.04	0.07	-0.02	0.37
	PM_{10} Min'	0.04	0.09	0.00	0.89	-0.03	0.15	-0.03	0.12	-0.03	0.18	-0.03	0.15	0.01	0.75	-0.01	0.64
	O_3 Min'	-0.04	0.04	-0.02	0.37	0.00	0.94	0.00	0.87	-0.01	0.68	0.01	0.65	-0.02	0.39	0.01	0.74
	CO Min'	0.00	0.92	0.02	0.26	0.00	0.89	0.01	0.67	0.00	0.92	-0.01	0.62	0.00	0.86	0.00	0.91
	NO Mean	0.02	0.41	-0.02	0.37	-0.07	0.00	-0.07	0.00	-0.07	0.00	-0.07	0.00	-0.01	0.70	-0.03	0.17
	NO_2 Mean	0.04	0.05	0.01	0.50	-0.03	0.21	-0.03	0.15	-0.03	0.23	-0.05	0.02	0.01	0.59	-0.01	0.74
	NOD Mean	0.03	0.23	-0.01	0.75	-0.06	0.01	-0.06	0.01	-0.05	0.02	-0.06	0.00	0.00	0.98	-0.02	0.32
	SO_2 Mean	-0.06	0.00	-0.05	0.01	-0.08	0.00	-0.08	0.00	-0.08	0.00	-0.10	0.00	-0.07	0.00	-0.05	0.04
	PM_{10} Mean	0.05	0.03	0.03	0.11	-0.03	0.15	-0.06	0.01	-0.03	0.14	-0.01	0.78	0.02	0.25	0.02	0.40
	O_3 Mean	-0.02	0.31	-0.01	0.62	0.03	0.15	0.03	0.17	0.02	0.28	0.05	0.03	0.00	0.89	0.03	0.12
	CO Mean	-0.03	0.11	-0.04	0.09	-0.07	0.00	-0.08	0.00	-0.09	0.00	-0.08	0.00	-0.06	0.00	-0.07	0.00
	NO Max'	0.03	0.14	-0.01	0.67	-0.06	0.01	-0.07	0.00	-0.06	0.00	-0.07	0.00	-0.01	0.74	-0.02	0.25
	NO_2 Max'	0.03	0.11	0.00	0.92	-0.03	0.14	-0.04	0.08	-0.04	0.05	-0.06	0.01	0.00	0.95	-0.01	0.74
	NOD Max'	0.03	0.10	-0.01	0.81	-0.06	0.01	-0.06	0.01	-0.06	0.00	-0.07	0.00	0.00	0.89	-0.02	0.31
	SO_2 Max'	-0.07	0.00	-0.07	0.00	-0.10	0.00	-0.11	0.00	-0.10	0.00	-0.12	0.00	-0.08	0.00	-0.08	0.00
	PM_{10} Max'	0.06	0.01	0.05	0.03	-0.03	0.15	-0.06	0.01	-0.02	0.37	0.01	0.76	0.03	0.17	0.02	0.37
	O_3 Max'	-0.01	0.65	-0.01	0.71	0.02	0.40	0.02	0.26	0.02	0.25	0.03	0.12	-0.01	0.50	0.03	0.22
	CO Max'	-0.05	0.03	-0.05	0.01	-0.10	0.00	-0.11	0.00	-0.11	0.00	-0.10	0.00	-0.08	0.00	-0.09	0.00
Weather	Temp Min'	0.05	0.03	0.05	0.04	0.05	0.02	0.04	0.04	0.06	0.01	0.06	0.00	0.06	0.01	0.05	0.03
	Temp Max'	0.05	0.01	0.04	0.04	0.05	0.01	0.04	0.06	0.04	0.08	0.05	0.01	0.07	0.00	0.07	0.00
	Sun	0.04	0.04	0.00	0.84	-0.01	0.62	0.03	0.12	0.00	0.98	0.03	0.11	0.05	0.04	0.05	0.01
	Rain	-0.04	0.04	-0.02	0.48	-0.05	0.03	-0.02	0.34	-0.01	0.72	-0.04	0.07	-0.06	0.01	-0.03	0.24
	Pressure	0.07	0.00	0.05	0.01	0.03	0.13	0.02	0.33	0.01	0.50	0.03	0.11	0.02	0.35	0.02	0.34
	Wind speed	0.07	0.00	-0.06	0.01	-0.04	0.07	-0.04	0.06	-0.05	0.02	-0.04	0.04	-0.02	0.46	0.00	0.90
Pollen	Grass	0.03	0.22	0.02	0.25	0.03	0.23	0.03	0.17	0.03	0.24	0.03	0.19	0.03	0.12	0.04	0.08

Table E.55: Trent Region Casualty Counts Non-asthmatics – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P
Outdoor air pollutants	NO Min'	-0.01	0.56	-0.03	0.23	-0.01	0.61	-0.02	0.34	0.00	0.88	0.01	0.70	0.00	0.88	-0.02	0.46
	NO_2 Min'	0.03	0.15	0.01	0.69	0.01	0.77	0.02	0.33	0.03	0.19	0.04	0.05	0.05	0.03	0.01	0.61
	NOD Min'	0.01	0.57	-0.01	0.72	0.00	0.98	0.01	0.49	0.03	0.23	0.04	0.08	0.04	0.08	0.00	0.94
	SO_2 Min'	0.01	0.62	0.00	0.91	-0.02	0.25	-0.03	0.20	-0.02	0.29	-0.01	0.49	0.00	0.90	0.01	0.51
	PM_{10} Min'	-0.01	0.68	-0.04	0.08	-0.05	0.03	-0.02	0.37	0.00	0.90	-0.02	0.46	0.02	0.35	0.01	0.77
	O_3 Min'	-0.05	0.01	-0.01	0.65	0.01	0.57	0.00	0.84	0.00	0.82	-0.03	0.21	-0.02	0.30	-0.01	0.80
	CO Min'	0.00	0.86	-0.03	0.24	-0.02	0.29	0.01	0.63	0.01	0.72	-0.01	0.68	-0.01	0.77	-0.03	0.12
	NO Mean	0.03	0.15	-0.05	0.02	-0.10	0.00	-0.08	0.00	-0.07	0.00	-0.03	0.11	0.01	0.80	-0.01	0.68
	NO_2 Mean	0.04	0.05	-0.03	0.17	-0.06	0.01	-0.04	0.04	-0.04	0.07	-0.02	0.39	0.02	0.28	0.01	0.63
	NOD Mean	0.03	0.11	-0.04	0.04	-0.09	0.00	-0.07	0.00	-0.06	0.01	-0.03	0.17	0.01	0.49	0.00	0.98
	SO_2 Mean	0.00	0.90	-0.04	0.05	-0.07	0.00	-0.07	0.00	-0.05	0.02	-0.07	0.00	-0.01	0.71	-0.03	0.19
	PM_{10} Mean	0.01	0.53	-0.02	0.32	-0.05	0.02	-0.03	0.16	-0.01	0.68	0.01	0.81	0.03	0.13	0.02	0.32
	O_3 Mean	-0.03	0.19	0.02	0.47	0.05	0.03	0.02	0.36	0.01	0.50	0.00	0.95	-0.02	0.45	0.00	0.95
	CO Mean	-0.04	0.04	-0.10	0.00	-0.09	0.00	-0.08	0.00	-0.07	0.00	-0.08	0.00	-0.06	0.00	-0.07	0.00
	NO Max'	0.04	0.05	-0.03	0.14	-0.10	0.00	-0.08	0.00	-0.08	0.00	-0.03	0.21	0.01	0.61	0.00	0.82
	NO_2 Max'	0.02	0.39	-0.04	0.09	-0.09	0.00	-0.06	0.00	-0.06	0.00	-0.04	0.10	0.00	1.00	-0.01	0.77
	NOD Max'	0.04	0.06	-0.03	0.15	-0.09	0.00	-0.08	0.00	-0.08	0.00	-0.03	0.16	0.01	0.69	0.00	0.83
	SO_2 Max'	-0.02	0.43	-0.06	0.00	-0.10	0.00	-0.08	0.00	-0.08	0.00	-0.08	0.00	-0.03	0.22	-0.04	0.10
	PM_{10} Max'	0.02	0.31	0.00	0.85	-0.04	0.07	-0.02	0.28	0.00	0.96	0.01	0.51	0.03	0.15	0.02	0.40
	O_3 Max'	-0.01	0.65	0.02	0.46	0.05	0.03	0.02	0.42	0.01	0.52	-0.01	0.80	0.00	0.99	0.01	0.72
	CO Max'	-0.06	0.00	-0.09	0.00	-0.12	0.00	-0.10	0.00	-0.10	0.00	-0.10	0.00	-0.07	0.00	-0.08	0.00
Weather	Temp Min'	0.07	0.00	0.09	0.00	0.09	0.00	0.08	0.00	0.08	0.00	0.11	0.00	0.09	0.00	0.08	0.00
	Temp Max'	0.08	0.00	0.08	0.00	0.09	0.00	0.08	0.00	0.09	0.00	0.09	0.00	0.10	0.00	0.09	0.00
	Sun	0.05	0.03	0.00	0.83	0.01	0.77	0.03	0.13	0.00	0.85	0.01	0.52	0.07	0.00	0.06	0.00
	Rain	-0.01	0.61	0.00	0.95	0.00	0.86	-0.01	0.57	0.00	0.82	-0.02	0.37	-0.04	0.06	-0.04	0.04
	Pressure	0.05	0.03	0.02	0.35	0.00	0.97	0.02	0.39	0.01	0.54	0.02	0.40	0.03	0.20	0.02	0.30
	Wind speed	0.05	0.03	-0.07	0.00	-0.03	0.16	-0.04	0.05	-0.04	0.06	-0.03	0.13	-0.03	0.11	-0.01	0.60
Pollen	Grass	0.06	0.01	0.06	0.01	0.06	0.01	0.05	0.02	0.05	0.01	0.05	0.02	0.05	0.01	0.06	0.00

Table E.56: Trent Region Emergency Consultations Asthmatics – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P
	NO Min’	0.04	0.10	0.02	0.36	0.06	0.01	0.04	0.04	0.04	0.06	0.05	0.02	0.06	0.01	0.04	0.04
	NO_2 Min’	0.00	0.98	-0.03	0.19	-0.02	0.28	-0.02	0.45	-0.04	0.06	-0.01	0.65	0.01	0.81	-0.01	0.58
	NOD Min’	0.00	0.91	-0.02	0.25	-0.01	0.54	-0.01	0.77	-0.02	0.33	0.01	0.62	0.02	0.35	-0.01	0.79
	SO_2 Min’	0.00	0.98	0.01	0.49	0.00	0.90	0.04	0.06	0.01	0.56	0.01	0.76	0.02	0.35	0.03	0.16
	PM_{10} Min’	0.00	0.95	-0.03	0.19	-0.01	0.78	-0.03	0.16	-0.04	0.10	-0.02	0.37	0.02	0.39	-0.02	0.26
	O_3 Min’	-0.01	0.50	0.04	0.04	-0.01	0.56	0.02	0.46	0.03	0.16	0.04	0.10	0.00	0.83	0.00	0.87
	CO Min’	0.02	0.26	-0.02	0.30	0.01	0.66	-0.02	0.42	-0.05	0.03	-0.01	0.64	-0.03	0.23	-0.02	0.26
	NO Mean	0.02	0.37	-0.08	0.00	-0.03	0.15	-0.03	0.16	-0.07	0.00	-0.09	0.00	0.00	0.89	0.01	0.67
	NO_2 Mean	0.02	0.36	-0.06	0.01	-0.02	0.31	-0.03	0.19	-0.06	0.01	-0.08	0.00	0.00	0.98	0.01	0.56
	NOD Mean	0.02	0.42	-0.08	0.00	-0.03	0.17	-0.03	0.15	-0.07	0.00	-0.09	0.00	0.00	0.89	0.01	0.66
Outdoor air pollutants	SO_2 Mean	-0.01	0.56	-0.04	0.04	-0.04	0.05	-0.01	0.49	-0.05	0.03	-0.06	0.01	-0.01	0.75	-0.04	0.10
	PM_{10} Mean	0.03	0.17	-0.02	0.25	-0.01	0.68	-0.02	0.28	-0.05	0.01	-0.05	0.01	0.01	0.52	-0.01	0.74
	O_3 Mean	-0.01	0.56	0.05	0.01	0.03	0.11	0.03	0.14	0.07	0.00	0.06	0.00	0.00	0.83	0.00	1.00
	CO Mean	-0.03	0.13	-0.10	0.00	-0.04	0.04	-0.05	0.01	-0.11	0.00	-0.11	0.00	-0.07	0.00	-0.04	0.07
	NO Max’	0.03	0.20	-0.08	0.00	-0.01	0.49	-0.02	0.26	-0.05	0.01	-0.09	0.00	-0.01	0.66	0.01	0.56
	NO_2 Max’	0.01	0.54	-0.06	0.00	0.00	0.85	-0.01	0.66	-0.02	0.36	-0.08	0.00	-0.01	0.68	0.01	0.51
	NOD Max’	0.02	0.25	-0.08	0.00	-0.01	0.59	-0.02	0.36	-0.05	0.02	-0.09	0.00	-0.01	0.67	0.01	0.50
	SO_2 Max’	-0.04	0.06	-0.06	0.01	-0.05	0.02	-0.06	0.00	-0.08	0.00	-0.08	0.00	-0.04	0.06	-0.07	0.00
	PM_{10} Max’	0.03	0.11	-0.03	0.18	0.00	0.83	-0.02	0.25	-0.04	0.08	-0.04	0.04	0.01	0.65	-0.02	0.38
	O_3 Max’	-0.01	0.60	0.04	0.04	0.05	0.02	0.05	0.02	0.07	0.00	0.04	0.05	0.02	0.38	0.03	0.21
	CO Max’	-0.03	0.13	-0.12	0.00	-0.05	0.02	-0.07	0.00	-0.10	0.00	-0.13	0.00	-0.06	0.00	-0.05	0.01
	Temp Min’	0.01	0.51	0.02	0.33	0.02	0.28	0.03	0.24	0.03	0.15	0.02	0.25	0.03	0.17	0.03	0.16
	Temp Max’	0.03	0.13	0.02	0.28	0.03	0.17	0.03	0.14	0.03	0.11	0.02	0.30	0.03	0.10	0.03	0.21
Weather	Sun	0.02	0.29	0.00	0.83	0.05	0.03	0.03	0.24	-0.01	0.70	-0.03	0.20	0.00	0.89	0.00	0.95
	Rain	-0.01	0.61	-0.03	0.22	-0.01	0.77	-0.01	0.69	-0.02	0.33	-0.01	0.57	0.02	0.35	-0.01	0.68
	Pressure	0.03	0.18	0.01	0.50	0.03	0.19	0.01	0.55	0.01	0.65	0.01	0.63	0.02	0.38	0.01	0.56
	Wind speed	0.03	0.18	0.00	0.82	-0.02	0.40	-0.01	0.74	0.03	0.23	0.00	0.97	-0.03	0.14	-0.01	0.58
Pollen	Grass	0.05	0.01	0.05	0.02	0.06	0.00	0.05	0.01	0.05	0.02	0.05	0.02	0.05	0.01	0.05	0.01

Table E.57: Trent Region Emergency Consultations Non-asthmatics – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P
	NO Min’	0.06	0.00	0.04	0.04	0.06	0.00	0.07	0.00	0.04	0.05	0.04	0.06	0.09	0.00	0.04	0.04
	NO_2 Min’	0.04	0.08	0.01	0.63	0.01	0.74	0.00	0.93	0.00	0.88	-0.01	0.70	0.02	0.26	0.00	0.99
	NOD Min’	0.05	0.03	0.02	0.31	0.03	0.23	0.03	0.24	0.01	0.67	0.01	0.80	0.04	0.06	0.00	0.83
	SO_2 Min’	-0.01	0.60	0.00	0.97	-0.05	0.03	-0.01	0.55	-0.04	0.07	-0.05	0.03	-0.01	0.69	0.01	0.61
	PM_{10} Min’	0.02	0.28	0.01	0.75	-0.03	0.13	-0.02	0.40	-0.01	0.79	0.00	0.97	0.01	0.65	0.01	0.69
	O_3 Min’	-0.04	0.05	0.01	0.58	-0.01	0.81	-0.01	0.78	0.03	0.22	0.05	0.03	-0.01	0.68	0.00	0.97
	CO Min’	0.00	0.89	-0.03	0.22	-0.03	0.14	-0.02	0.30	-0.03	0.11	-0.03	0.23	-0.05	0.01	-0.05	0.01
	NO Mean	0.05	0.01	-0.04	0.04	0.01	0.78	-0.04	0.10	-0.05	0.01	-0.07	0.00	-0.01	0.70	-0.02	0.43
	NO_2 Mean	0.04	0.05	0.00	0.89	0.02	0.26	-0.03	0.18	-0.04	0.09	-0.06	0.01	0.01	0.74	0.00	0.89
	NOD Mean	0.05	0.02	-0.03	0.17	0.01	0.51	-0.03	0.12	-0.05	0.03	-0.07	0.00	0.00	0.86	-0.01	0.64
Outdoor air pollutants	SO_2 Mean	-0.02	0.42	-0.05	0.03	-0.06	0.01	-0.05	0.02	-0.08	0.00	-0.09	0.00	-0.05	0.01	-0.05	0.03
	PM_{10} Mean	0.05	0.03	0.02	0.31	0.02	0.38	-0.02	0.38	-0.02	0.33	-0.02	0.47	0.02	0.45	0.01	0.66
	O_3 Mean	-0.05	0.02	0.01	0.56	0.01	0.57	0.03	0.19	0.05	0.03	0.06	0.01	0.02	0.43	0.02	0.33
	CO Mean	-0.02	0.32	-0.06	0.01	-0.04	0.04	-0.06	0.01	-0.08	0.00	-0.09	0.00	-0.06	0.00	-0.08	0.00
	NO Max’	0.04	0.04	-0.04	0.05	0.01	0.56	-0.03	0.19	-0.04	0.04	-0.07	0.00	-0.01	0.70	-0.02	0.48
	NO_2 Max’	0.03	0.19	-0.01	0.74	0.04	0.06	-0.03	0.18	-0.02	0.30	-0.07	0.00	0.00	0.82	-0.01	0.81
	NOD Max’	0.04	0.06	-0.04	0.10	0.02	0.39	-0.03	0.19	-0.04	0.07	-0.07	0.00	-0.01	0.80	-0.02	0.46
	SO_2 Max’	-0.04	0.07	-0.03	0.20	-0.06	0.01	-0.06	0.01	-0.08	0.00	-0.08	0.00	-0.06	0.00	-0.04	0.05
	PM_{10} Max’	0.04	0.04	0.04	0.04	0.04	0.04	0.00	0.88	-0.02	0.48	0.00	0.89	0.03	0.16	-0.01	0.70
	O_3 Max’	-0.04	0.05	0.02	0.27	0.05	0.03	0.04	0.05	0.04	0.05	0.04	0.04	0.03	0.23	0.02	0.35
	CO Max’	-0.04	0.09	-0.07	0.00	-0.04	0.09	-0.07	0.00	-0.09	0.00	-0.11	0.00	-0.08	0.00	-0.07	0.00
	Temp Min’	0.02	0.34	0.02	0.40	0.01	0.73	0.01	0.53	0.01	0.78	0.02	0.29	0.02	0.26	0.00	0.89
	Temp Max’	0.01	0.53	0.02	0.27	0.01	0.63	0.02	0.44	0.02	0.37	0.01	0.66	0.01	0.79	0.02	0.34
Weather	Sun	0.00	0.95	0.01	0.77	0.00	0.95	0.03	0.20	0.01	0.53	0.00	0.95	-0.01	0.54	-0.02	0.29
	Rain	-0.02	0.41	-0.01	0.63	-0.02	0.26	-0.03	0.24	-0.05	0.03	-0.05	0.03	-0.03	0.20	-0.01	0.52
	Pressure	0.04	0.07	0.05	0.01	0.05	0.02	0.02	0.38	0.03	0.13	0.01	0.74	0.03	0.16	0.02	0.33
	Wind speed	0.04	0.07	-0.05	0.01	-0.05	0.03	-0.02	0.41	-0.01	0.60	0.00	0.93	-0.01	0.50	0.02	0.38
Pollen	Grass	0.04	0.04	0.05	0.02	0.05	0.01	0.05	0.02	0.04	0.05	0.05	0.02	0.05	0.02	0.04	0.04

Table E.58: Trent Region Emergency Counts Asthmatics – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P
Outdoor air pollutants	NO Min’	0.04	0.09	0.02	0.38	0.04	0.05	0.06	0.01	0.06	0.01	0.06	0.01	0.05	0.03	0.03	0.19
	NO_2 Min’	0.02	0.34	-0.03	0.20	0.01	0.75	0.00	0.95	0.00	0.85	-0.04	0.07	-0.01	0.62	-0.05	0.03
	NOD Min’	0.03	0.18	-0.02	0.48	0.01	0.58	0.01	0.57	0.02	0.45	-0.03	0.23	0.00	0.94	-0.04	0.05
	SO_2 Min’	-0.03	0.15	-0.03	0.15	0.01	0.71	0.02	0.45	-0.01	0.64	-0.03	0.19	-0.01	0.73	-0.02	0.47
	PM_{10} Min’	0.01	0.61	-0.03	0.19	-0.02	0.42	-0.03	0.23	-0.02	0.45	-0.03	0.11	0.01	0.77	-0.04	0.10
	O_3 Min’	-0.01	0.51	0.02	0.28	0.00	0.93	0.01	0.72	-0.02	0.43	0.03	0.19	0.00	0.83	0.04	0.04
	CO Min’	0.02	0.26	0.00	0.93	0.02	0.42	0.02	0.36	0.00	0.98	-0.02	0.29	-0.01	0.76	0.00	0.89
	NO Mean	0.01	0.70	-0.03	0.12	-0.02	0.38	-0.01	0.66	0.00	0.98	-0.04	0.07	0.02	0.32	-0.03	0.11
	NO_2 Mean	0.01	0.61	-0.03	0.21	0.00	0.91	0.00	0.97	0.01	0.72	-0.04	0.05	0.01	0.57	-0.01	0.61
	NOD Mean	0.01	0.78	-0.03	0.13	-0.02	0.44	-0.01	0.78	0.00	0.91	-0.04	0.06	0.02	0.39	-0.03	0.20
	SO_2 Mean	-0.05	0.03	-0.06	0.00	-0.03	0.12	0.00	0.96	-0.02	0.38	-0.07	0.00	-0.03	0.21	-0.03	0.11
	PM_{10} Mean	0.02	0.48	-0.01	0.51	-0.02	0.33	-0.03	0.24	-0.01	0.56	-0.04	0.09	0.01	0.50	-0.01	0.77
	O_3 Mean	0.01	0.70	0.05	0.02	0.03	0.23	0.02	0.35	0.01	0.55	0.05	0.02	0.01	0.73	0.06	0.01
	CO Mean	-0.02	0.34	-0.03	0.11	-0.01	0.54	-0.01	0.76	-0.02	0.39	-0.04	0.04	-0.01	0.58	-0.02	0.40
	NO Max’	0.02	0.33	-0.03	0.18	-0.01	0.70	-0.01	0.54	0.01	0.64	-0.04	0.08	0.02	0.25	-0.04	0.10
	NO_2 Max’	0.02	0.29	-0.02	0.41	0.01	0.53	0.01	0.66	0.01	0.56	-0.03	0.15	0.02	0.48	0.00	0.99
	NOD Max’	0.02	0.31	-0.03	0.19	0.00	0.85	-0.01	0.81	0.01	0.67	-0.04	0.08	0.03	0.21	-0.03	0.17
	SO_2 Max’	-0.04	0.04	-0.07	0.00	-0.05	0.01	-0.04	0.08	-0.03	0.21	-0.09	0.00	-0.05	0.01	-0.06	0.01
	PM_{10} Max’	0.01	0.59	0.00	0.94	0.00	0.84	-0.03	0.22	0.01	0.80	-0.03	0.18	0.03	0.13	0.00	0.87
	O_3 Max’	0.00	0.90	0.06	0.01	0.03	0.11	0.03	0.16	0.02	0.46	0.04	0.08	0.00	0.84	0.06	0.01
	CO Max’	-0.02	0.49	-0.03	0.16	-0.02	0.31	-0.02	0.27	-0.02	0.31	-0.05	0.03	-0.01	0.80	-0.03	0.12
Weather	Temp Min’	-0.02	0.27	-0.02	0.30	-0.03	0.16	-0.03	0.11	-0.02	0.26	-0.03	0.16	-0.05	0.02	-0.05	0.03
	Temp Max’	-0.01	0.52	-0.03	0.12	-0.02	0.47	-0.04	0.06	-0.04	0.07	-0.04	0.07	-0.03	0.22	-0.03	0.12
	Sun	0.01	0.56	-0.03	0.12	-0.02	0.30	0.01	0.61	-0.04	0.04	-0.01	0.64	0.02	0.35	0.03	0.18
	Rain	-0.02	0.26	0.00	0.99	-0.01	0.72	0.00	0.94	0.02	0.31	-0.02	0.43	-0.01	0.50	-0.02	0.33
	Pressure	0.03	0.21	0.02	0.33	0.02	0.42	0.00	0.97	0.00	0.95	0.01	0.57	0.00	0.88	0.00	0.85
	Wind speed	0.03	0.21	0.02	0.47	-0.01	0.76	0.02	0.42	-0.01	0.81	0.02	0.27	0.01	0.67	0.02	0.25
Pollen	Grass	0.06	0.01	0.06	0.01	0.05	0.02	0.06	0.01	0.05	0.02	0.04	0.04	0.05	0.03	0.05	0.03

Table E.59: Trent Region Emergency Counts Non-asthmatics – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P
Outdoor air pollutants	NO Min’	-0.01	0.77	0.01	0.61	0.02	0.36	0.02	0.43	0.01	0.49	0.02	0.46	0.03	0.20	0.01	0.69
	NO_2 Min’	0.02	0.32	0.02	0.43	0.03	0.13	0.04	0.07	0.05	0.03	0.01	0.55	0.02	0.32	-0.01	0.70
	NOD Min’	0.01	0.75	0.02	0.45	0.03	0.16	0.04	0.07	0.04	0.08	0.01	0.67	0.02	0.36	-0.01	0.71
	SO_2 Min’	0.01	0.50	0.01	0.55	0.01	0.65	0.00	0.90	0.00	0.97	-0.01	0.57	-0.01	0.59	0.02	0.33
	PM_{10} Min’	0.00	0.96	-0.02	0.29	-0.03	0.18	-0.02	0.41	0.00	1.00	0.00	0.94	0.02	0.30	0.03	0.22
	O_3 Min’	-0.03	0.15	0.00	0.82	0.00	0.95	0.01	0.81	0.01	0.81	0.02	0.44	-0.03	0.19	0.01	0.60
	CO Min’	0.01	0.74	0.00	0.94	-0.02	0.44	0.00	0.86	-0.02	0.47	-0.03	0.11	-0.04	0.05	-0.05	0.01
	NO Mean	0.03	0.13	-0.04	0.05	-0.04	0.08	-0.03	0.14	-0.02	0.38	-0.02	0.44	0.03	0.22	-0.01	0.53
	NO_2 Mean	0.04	0.06	-0.02	0.48	0.00	1.00	0.00	0.89	0.00	0.94	-0.01	0.67	0.04	0.09	-0.01	0.53
	NOD Mean	0.03	0.11	-0.03	0.11	-0.03	0.24	-0.02	0.35	-0.01	0.57	-0.02	0.45	0.03	0.14	-0.01	0.58
	SO_2 Mean	0.01	0.70	-0.02	0.31	-0.05	0.02	-0.04	0.05	-0.04	0.07	-0.05	0.02	0.00	0.89	-0.01	0.62
	PM_{10} Mean	0.03	0.18	0.00	0.84	-0.01	0.53	0.00	0.93	0.01	0.53	0.03	0.17	0.03	0.11	0.02	0.42
	O_3 Mean	-0.02	0.33	0.02	0.26	0.03	0.18	0.00	0.97	0.01	0.68	0.01	0.49	0.00	0.86	0.02	0.30
	CO Mean	-0.01	0.53	-0.06	0.01	-0.05	0.02	-0.03	0.12	-0.04	0.05	-0.05	0.01	-0.04	0.07	-0.07	0.00
	NO Max’	0.03	0.14	-0.03	0.12	-0.05	0.02	-0.03	0.10	-0.03	0.20	-0.02	0.42	0.03	0.14	-0.01	0.76
	NO_2 Max’	0.02	0.28	-0.01	0.56	-0.02	0.28	-0.02	0.45	0.00	0.82	-0.02	0.42	0.03	0.12	-0.02	0.27
	NOD Max’	0.03	0.14	-0.03	0.20	-0.04	0.04	-0.03	0.14	-0.03	0.19	-0.02	0.40	0.03	0.10	-0.01	0.70
	SO_2 Max’	0.00	0.92	-0.04	0.05	-0.08	0.00	-0.07	0.00	-0.05	0.03	-0.05	0.03	-0.02	0.45	-0.02	0.29
	PM_{10} Max’	0.03	0.13	0.02	0.47	0.02	0.45	0.02	0.40	0.03	0.24	0.03	0.15	0.05	0.03	0.01	0.81
	O_3 Max’	0.00	0.82	0.03	0.20	0.04	0.04	0.00	0.93	0.01	0.67	0.01	0.70	0.01	0.64	0.02	0.47
	CO Max’	-0.03	0.24	-0.05	0.02	-0.05	0.01	-0.05	0.03	-0.06	0.01	-0.06	0.00	-0.03	0.17	-0.06	0.00
Weather	Temp Min’	0.00	0.87	0.01	0.55	0.01	0.61	0.01	0.66	0.01	0.68	0.02	0.28	0.01	0.53	0.00	0.87
	Temp Max’	0.00	0.89	0.00	0.85	0.01	0.79	0.01	0.53	0.02	0.35	0.01	0.51	0.02	0.35	0.01	0.67
	Sun	0.03	0.19	-0.03	0.22	-0.01	0.67	0.01	0.68	0.00	0.92	0.00	0.97	0.04	0.10	0.03	0.21
	Rain	-0.02	0.46	0.01	0.55	0.00	0.83	-0.01	0.80	-0.01	0.76	-0.03	0.19	-0.04	0.07	-0.03	0.24
	Pressure	0.05	0.03	0.03	0.13	0.01	0.52	0.03	0.22	0.01	0.58	0.00	0.90	0.02	0.35	0.03	0.18
	Wind speed	0.05	0.03	-0.05	0.03	-0.04	0.09	-0.02	0.27	0.00	0.99	0.04	0.06	0.02	0.29	0.03	0.23
Pollen	Grass	0.05	0.02	0.05	0.02	0.05	0.02	0.04	0.07	0.04	0.05	0.05	0.03	0.04	0.05	0.04	0.07

Table E.60: Trent Region Out of Hours Counts Asthmatics – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
	Exposure	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P
	NO Min'	0.02	0.43	0.02	0.47	0.05	0.02	0.03	0.18	0.03	0.12	0.03	0.12	0.02	0.39	0.01	0.70
	NO_2 Min'	0.00	0.86	-0.03	0.18	0.01	0.54	0.02	0.33	0.00	0.92	-0.02	0.33	-0.02	0.30	-0.05	0.03
	NOD Min'	0.02	0.44	-0.01	0.62	0.02	0.27	0.02	0.29	0.01	0.74	-0.02	0.37	-0.02	0.44	-0.04	0.08
	SO_2 Min'	-0.02	0.39	-0.03	0.18	0.03	0.22	0.03	0.17	0.01	0.65	0.01	0.54	0.01	0.49	-0.02	0.26
	PM_{10} Min'	-0.01	0.76	-0.01	0.65	0.00	0.94	0.03	0.23	0.05	0.01	0.00	0.98	0.00	0.99	-0.04	0.08
	O_3 Min'	0.02	0.44	0.02	0.39	-0.01	0.56	-0.02	0.31	-0.03	0.20	0.01	0.75	0.01	0.67	0.05	0.02
	CO Min'	0.03	0.17	0.01	0.56	0.02	0.44	0.05	0.02	0.02	0.41	0.00	0.85	0.01	0.53	0.00	0.89
	NO Mean	-0.02	0.36	-0.01	0.66	0.04	0.04	0.06	0.00	0.08	0.00	0.05	0.03	0.02	0.35	-0.04	0.06
	NO_2 Mean	-0.02	0.30	-0.02	0.37	0.04	0.10	0.05	0.01	0.05	0.01	0.03	0.21	0.00	0.94	-0.03	0.21
Outdoor air pollutants	NOD Mean	-0.02	0.28	-0.01	0.54	0.04	0.07	0.06	0.00	0.07	0.00	0.04	0.07	0.01	0.60	-0.04	0.08
	SO_2 Mean	0.00	0.94	-0.03	0.23	0.03	0.15	0.06	0.01	0.06	0.01	0.03	0.21	0.01	0.66	-0.02	0.29
	PM_{10} Mean	-0.02	0.31	-0.02	0.29	0.00	0.82	0.03	0.13	0.05	0.02	0.00	1.00	0.00	0.83	-0.02	0.27
	O_3 Mean	0.03	0.15	0.04	0.05	-0.01	0.52	-0.02	0.31	-0.03	0.15	0.00	1.00	0.01	0.80	0.05	0.02
	CO Mean	0.01	0.64	0.03	0.14	0.06	0.00	0.09	0.00	0.08	0.00	0.05	0.03	0.04	0.04	0.03	0.16
	NO Max'	-0.02	0.30	-0.01	0.65	0.04	0.04	0.06	0.00	0.08	0.00	0.04	0.05	0.03	0.21	-0.04	0.05
	NO_2 Max'	-0.01	0.70	0.00	0.85	0.05	0.02	0.06	0.01	0.06	0.00	0.04	0.07	0.01	0.68	-0.01	0.76
	NOD Max'	-0.02	0.35	-0.01	0.62	0.05	0.02	0.06	0.00	0.08	0.00	0.04	0.06	0.03	0.20	-0.04	0.09
	SO_2 Max'	0.01	0.68	-0.02	0.39	0.02	0.48	0.05	0.02	0.07	0.00	0.02	0.30	0.00	0.85	-0.01	0.67
	PM_{10} Max'	-0.04	0.08	-0.02	0.41	0.03	0.24	0.02	0.30	0.05	0.01	-0.02	0.35	0.01	0.68	-0.01	0.72
	O_3 Max'	0.01	0.49	0.06	0.01	0.00	1.00	-0.01	0.54	-0.03	0.19	0.00	0.86	0.00	0.82	0.05	0.01
	CO Max'	0.02	0.28	0.05	0.01	0.08	0.00	0.09	0.00	0.09	0.00	0.07	0.00	0.06	0.00	0.03	0.20
	Temp Min'	-0.07	0.00	-0.06	0.00	-0.08	0.00	-0.08	0.00	-0.08	0.00	-0.08	0.00	-0.11	0.00	-0.09	0.00
	Temp Max'	-0.06	0.00	-0.07	0.00	-0.06	0.01	-0.09	0.00	-0.08	0.00	-0.09	0.00	-0.09	0.00	-0.09	0.00
Weather	Sun	-0.02	0.38	-0.04	0.04	-0.02	0.39	-0.01	0.61	-0.03	0.15	-0.02	0.28	-0.02	0.33	-0.01	0.79
	Rain	0.01	0.79	-0.01	0.54	-0.02	0.35	-0.01	0.58	0.01	0.60	0.00	0.97	0.03	0.11	0.00	0.99
	Pressure	-0.02	0.44	-0.01	0.67	0.00	0.84	0.01	0.81	0.02	0.44	0.02	0.29	0.00	0.85	-0.01	0.71
	Wind speed	-0.02	0.44	0.04	0.10	0.00	0.83	0.03	0.19	0.01	0.77	0.05	0.04	0.01	0.61	0.03	0.11
Pollen	Grass	0.04	0.09	0.04	0.09	0.03	0.19	0.03	0.11	0.03	0.17	0.02	0.27	0.02	0.33	0.02	0.42

Table E. 61: Trent Region Out of Hours Counts Non-asthmatics – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
	Exposure	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P
	NO Min'	-0.02	0.29	0.02	0.31	0.01	0.60	0.01	0.53	0.03	0.23	0.00	0.99	-0.01	0.66	0.00	0.95
	NO_2 Min'	-0.01	0.73	0.03	0.23	0.03	0.23	0.04	0.05	0.06	0.01	0.00	0.88	-0.03	0.20	-0.02	0.27
	NOD Min'	-0.02	0.46	0.03	0.18	0.02	0.32	0.03	0.11	0.04	0.04	-0.01	0.51	-0.03	0.20	-0.02	0.45
	SO_2 Min'	0.00	0.88	0.02	0.28	0.05	0.02	0.01	0.52	0.02	0.39	0.01	0.66	-0.02	0.31	0.00	0.96
	PM_{10} Min'	0.00	0.85	0.00	0.90	0.01	0.70	-0.01	0.74	0.01	0.59	0.01	0.57	-0.01	0.70	0.02	0.25
	O_3 Min'	0.02	0.47	0.01	0.52	-0.01	0.76	-0.01	0.80	-0.03	0.24	0.03	0.19	-0.01	0.71	0.02	0.30
	CO Min'	0.01	0.52	0.03	0.19	0.00	0.82	0.01	0.80	0.00	0.95	-0.03	0.11	-0.05	0.01	-0.02	0.28
	NO Mean	-0.01	0.71	0.00	0.96	0.03	0.13	0.05	0.03	0.08	0.00	0.03	0.20	0.02	0.29	-0.01	0.55
	NO_2 Mean	0.01	0.53	0.02	0.43	0.04	0.04	0.05	0.02	0.07	0.00	0.03	0.19	0.02	0.41	-0.03	0.13
Outdoor air pollutants	NOD Mean	0.00	0.94	0.01	0.71	0.04	0.09	0.05	0.02	0.07	0.00	0.03	0.21	0.02	0.30	-0.02	0.36
	SO_2 Mean	0.01	0.56	0.02	0.34	0.01	0.69	0.03	0.23	0.02	0.29	0.00	0.97	0.00	0.82	0.02	0.41
	PM_{10} Mean	0.01	0.67	0.01	0.73	0.02	0.39	0.02	0.30	0.04	0.04	0.04	0.07	0.00	0.82	-0.01	0.77
	O_3 Mean	0.02	0.27	0.02	0.42	0.00	0.92	-0.04	0.09	-0.04	0.06	0.00	0.92	0.01	0.62	0.03	0.22
	CO Mean	0.03	0.19	0.03	0.20	0.03	0.18	0.04	0.04	0.06	0.01	0.03	0.16	0.01	0.67	0.00	0.90
	NO Max'	-0.01	0.53	0.00	0.92	0.02	0.44	0.04	0.10	0.07	0.00	0.02	0.29	0.02	0.29	-0.02	0.35
	NO_2 Max'	0.01	0.65	0.02	0.37	0.04	0.09	0.04	0.06	0.08	0.00	0.03	0.10	0.03	0.10	-0.04	0.09
	NOD Max'	-0.01	0.73	0.00	0.83	0.02	0.35	0.04	0.08	0.07	0.00	0.03	0.22	0.03	0.18	-0.02	0.33
	SO_2 Max'	0.03	0.14	0.00	0.82	-0.01	0.61	0.01	0.70	0.04	0.05	0.02	0.30	0.00	0.95	0.00	0.92
	PM_{10} Max'	0.00	0.87	0.02	0.44	0.04	0.06	0.03	0.14	0.05	0.03	0.02	0.31	0.01	0.74	-0.01	0.56
	O_3 Max'	0.05	0.01	0.04	0.09	0.01	0.56	-0.03	0.20	-0.03	0.20	0.00	0.96	0.02	0.40	0.00	0.87
	CO Max'	0.03	0.20	0.03	0.16	0.05	0.03	0.05	0.02	0.06	0.00	0.03	0.13	0.03	0.18	0.00	0.88
	Temp Min'	-0.05	0.03	-0.05	0.03	-0.06	0.00	-0.05	0.02	-0.05	0.03	-0.05	0.01	-0.06	0.01	-0.06	0.00
	Temp Max'	-0.05	0.01	-0.05	0.03	-0.06	0.01	-0.05	0.03	-0.04	0.07	-0.06	0.01	-0.06	0.01	-0.06	0.00
Weather	Sun	-0.01	0.77	-0.04	0.05	-0.02	0.43	-0.01	0.59	-0.01	0.80	-0.02	0.30	-0.01	0.62	0.00	0.97
	Rain	-0.01	0.65	0.02	0.43	0.02	0.42	0.00	0.95	0.01	0.81	-0.01	0.80	0.01	0.58	0.04	0.06
	Pressure	0.01	0.63	0.00	0.97	-0.01	0.51	0.01	0.70	0.00	0.87	-0.02	0.37	-0.01	0.67	0.00	0.92
	Wind speed	0.01	0.63	0.01	0.75	0.00	0.97	0.03	0.21	0.01	0.75	0.06	0.01	0.06	0.00	0.04	0.08
Pollen	Grass	0.01	0.49	0.01	0.81	0.00	0.85	0.00	0.96	0.00	0.99	0.01	0.77	0.00	0.99	-0.01	0.59

Table E. 62: Trent Region All Counts Excess – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P
Outdoor air pollutants	NO Min’	-0.01	0.62	-0.07	0.00	0.02	0.26	0.06	0.00	0.08	0.00	0.10	0.00	0.09	0.00	-0.03	0.14
	NO_2 Min’	0.07	0.00	-0.06	0.01	-0.05	0.03	0.02	0.45	0.04	0.06	0.05	0.03	0.10	0.00	0.02	0.38
	NOD Min’	0.03	0.16	-0.07	0.00	-0.03	0.12	0.04	0.08	0.07	0.00	0.07	0.00	0.09	0.00	-0.01	0.58
	SO_2 Min’	0.06	0.01	-0.02	0.26	-0.06	0.01	-0.03	0.17	-0.05	0.02	-0.03	0.19	0.02	0.42	0.02	0.35
	PM_{10} Min’	0.09	0.00	-0.03	0.21	-0.07	0.00	-0.07	0.00	-0.01	0.57	0.04	0.06	0.08	0.00	0.02	0.44
	O_3 Min’	-0.13	0.00	-0.01	0.53	0.02	0.33	-0.02	0.29	-0.02	0.29	-0.03	0.21	-0.11	0.00	-0.11	0.00
	CO Min’	0.02	0.30	-0.03	0.18	0.02	0.31	0.05	0.02	0.05	0.01	0.04	0.08	0.06	0.01	0.00	0.88
	NO Mean	0.28	0.00	-0.04	0.06	-0.10	0.00	-0.02	0.36	-0.01	0.58	0.01	0.65	0.21	0.00	0.24	0.00
	NO_2 Mean	0.22	0.00	-0.04	0.09	-0.10	0.00	-0.04	0.08	0.00	0.88	0.01	0.75	0.18	0.00	0.18	0.00
	NOD Mean	0.26	0.00	-0.04	0.09	-0.10	0.00	-0.02	0.25	-0.01	0.76	0.01	0.59	0.20	0.00	0.22	0.00
	SO_2 Mean	0.10	0.00	-0.01	0.50	-0.07	0.00	-0.05	0.01	-0.05	0.02	-0.05	0.03	0.02	0.29	0.05	0.02
	PM_{10} Mean	0.16	0.00	-0.02	0.34	-0.09	0.00	-0.07	0.00	-0.02	0.35	0.01	0.62	0.11	0.00	0.10	0.00
	O_3 Mean	-0.18	0.00	0.01	0.57	0.06	0.01	0.00	0.85	-0.02	0.25	-0.03	0.16	-0.16	0.00	-0.16	0.00
	CO Mean	0.16	0.00	0.00	0.91	-0.03	0.20	0.02	0.37	0.02	0.36	0.02	0.43	0.14	0.00	0.14	0.00
	NO Max’	0.27	0.00	-0.02	0.39	-0.08	0.00	-0.02	0.31	-0.01	0.52	0.00	0.96	0.19	0.00	0.23	0.00
	NO_2 Max’	0.21	0.00	-0.04	0.05	-0.11	0.00	-0.05	0.02	-0.02	0.43	-0.02	0.35	0.13	0.00	0.17	0.00
	NOD Max’	0.26	0.00	-0.02	0.43	-0.09	0.00	-0.02	0.28	-0.01	0.58	0.00	0.89	0.18	0.00	0.23	0.00
	SO_2 Max’	0.10	0.00	0.00	0.92	-0.07	0.00	-0.06	0.01	-0.06	0.00	-0.05	0.03	0.04	0.09	0.06	0.00
	PM_{10} Max’	0.14	0.00	-0.01	0.73	-0.09	0.00	-0.06	0.01	0.00	0.93	0.00	0.83	0.08	0.00	0.09	0.00
	O_3 Max’	-0.15	0.00	0.00	0.96	0.04	0.09	-0.02	0.42	-0.04	0.09	-0.06	0.01	-0.15	0.00	-0.13	0.00
	CO Max’	0.19	0.00	0.01	0.63	-0.04	0.07	0.01	0.79	0.01	0.79	0.01	0.60	0.13	0.00	0.16	0.00
Weather	Temp Min’	-0.06	0.00	-0.06	0.00	-0.06	0.00	-0.05	0.02	-0.04	0.10	-0.03	0.21	-0.03	0.15	-0.06	0.01
	Temp Max’	-0.06	0.01	-0.06	0.00	-0.07	0.00	-0.08	0.00	-0.08	0.00	-0.07	0.00	-0.06	0.00	-0.05	0.02
	Sun	-0.01	0.56	-0.04	0.09	-0.03	0.22	-0.05	0.02	-0.08	0.00	-0.06	0.00	-0.04	0.04	-0.01	0.64
	Rain	-0.02	0.44	0.00	0.90	0.00	0.98	0.01	0.51	0.01	0.68	0.02	0.33	0.01	0.68	0.00	0.92
	Pressure	0.01	0.70	0.02	0.33	0.03	0.24	0.01	0.70	0.01	0.79	-0.01	0.76	-0.01	0.68	0.01	0.67
	Wind speed	0.01	0.70	0.01	0.52	0.00	0.95	-0.01	0.59	-0.03	0.16	0.01	0.74	0.02	0.28	0.04	0.08
Pollen	Grass	-0.01	0.62	0.00	0.89	-0.01	0.67	-0.01	0.64	-0.02	0.33	-0.02	0.27	-0.02	0.43	-0.01	0.49

Table E. 63: Trent Region Acute Visits Excess – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P
Outdoor air pollutants	NO Min’	0.00	0.96	-0.01	0.74	0.02	0.42	0.02	0.29	0.04	0.10	0.01	0.62	0.01	0.49	0.01	0.75
	NO_2 Min’	-0.04	0.05	0.00	0.82	-0.03	0.20	-0.03	0.12	-0.02	0.46	-0.01	0.59	0.01	0.63	0.02	0.47
	NOD Min’	-0.03	0.12	-0.01	0.74	-0.03	0.24	-0.02	0.37	0.00	0.96	-0.01	0.66	0.01	0.78	0.01	0.50
	SO_2 Min’	-0.06	0.01	-0.03	0.19	-0.02	0.28	0.00	0.99	-0.01	0.55	-0.04	0.09	0.01	0.68	0.02	0.39
	PM_{10} Min’	0.01	0.64	-0.02	0.33	-0.01	0.61	-0.02	0.44	-0.02	0.30	-0.03	0.17	0.00	0.87	0.04	0.08
	O_3 Min’	0.02	0.25	0.00	0.99	0.02	0.40	0.02	0.32	-0.03	0.22	0.00	0.88	0.00	0.94	0.03	0.12
	CO Min’	-0.02	0.47	-0.03	0.11	-0.01	0.81	-0.01	0.65	0.01	0.69	-0.01	0.77	0.01	0.81	0.03	0.14
	NO Mean	-0.01	0.56	0.02	0.32	-0.01	0.49	-0.02	0.26	0.00	0.96	-0.01	0.65	0.02	0.33	0.01	0.62
	NO_2 Mean	-0.01	0.59	0.01	0.59	-0.01	0.68	-0.04	0.07	0.00	0.89	-0.01	0.59	0.02	0.34	0.03	0.18
	NOD Mean	-0.01	0.51	0.02	0.40	-0.01	0.52	-0.03	0.16	0.00	0.97	-0.01	0.71	0.02	0.25	0.02	0.41
	SO_2 Mean	-0.04	0.07	-0.02	0.46	-0.01	0.64	-0.01	0.71	0.00	0.91	-0.04	0.08	0.01	0.73	0.04	0.10
	PM_{10} Mean	0.00	0.96	-0.01	0.73	-0.01	0.66	-0.02	0.32	-0.01	0.52	-0.02	0.25	0.01	0.72	0.02	0.31
	O_3 Mean	0.04	0.07	0.01	0.75	0.02	0.42	0.02	0.25	0.00	0.93	0.01	0.77	-0.01	0.75	0.01	0.49
	CO Mean	-0.02	0.43	-0.02	0.28	0.01	0.78	-0.03	0.19	0.01	0.76	0.00	0.89	0.02	0.38	0.02	0.39
	NO Max’	-0.01	0.62	0.02	0.42	-0.02	0.46	-0.02	0.43	0.01	0.67	0.00	0.85	0.01	0.52	-0.01	0.49
	NO_2 Max’	0.01	0.75	0.03	0.17	0.00	0.91	-0.02	0.26	0.00	0.98	0.00	0.85	0.03	0.13	0.02	0.31
	NOD Max’	-0.01	0.71	0.02	0.34	-0.01	0.50	-0.02	0.38	0.01	0.71	0.00	0.92	0.02	0.41	-0.01	0.68
	SO_2 Max’	-0.02	0.43	0.01	0.65	0.00	0.86	0.00	0.87	-0.01	0.77	-0.05	0.03	0.02	0.35	0.04	0.07
	PM_{10} Max’	-0.01	0.72	0.01	0.61	0.00	0.84	-0.02	0.27	-0.02	0.45	-0.03	0.22	0.03	0.19	0.01	0.53
	O_3 Max’	0.04	0.04	0.02	0.35	0.04	0.07	0.02	0.25	-0.01	0.73	0.02	0.42	0.01	0.66	0.00	0.94
	CO Max’	-0.02	0.49	-0.01	0.61	-0.01	0.57	-0.02	0.32	0.00	0.83	-0.01	0.78	0.01	0.81	0.00	0.83
Weather	Temp Min’	0.01	0.59	-0.01	0.61	-0.02	0.36	0.00	0.91	0.00	0.84	-0.01	0.68	-0.01	0.53	-0.02	0.46
	Temp Max’	0.01	0.63	-0.01	0.78	-0.01	0.61	-0.02	0.39	0.00	0.95	-0.01	0.62	-0.01	0.66	-0.01	0.78
	Sun	0.00	0.86	0.00	0.84	-0.01	0.54	0.00	0.89	-0.02	0.29	-0.02	0.28	0.02	0.25	0.00	0.99
	Rain	-0.03	0.20	-0.01	0.59	0.03	0.22	0.04	0.07	0.02	0.39	0.01	0.62	0.00	0.94	0.03	0.21
	Pressure	0.00	0.91	0.03	0.21	0.01	0.72	0.00	0.91	0.00	0.97	-0.04	0.07	-0.01	0.76	-0.01	0.65
	Wind speed	0.00	0.91	0.02	0.28	0.01	0.55	0.01	0.60	-0.02	0.34	0.00	0.86	0.01	0.63	0.00	0.90
Pollen	Grass	0.00	0.95	-0.02	0.46	-0.01	0.56	-0.01	0.56	-0.02	0.40	-0.02	0.30	-0.02	0.26	-0.02	0.33

Table E. 64: Trent Region Casualty Counts Excess – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P
Outdoor air pollutants	NO Min’	0.02	0.40	0.02	0.42	-0.02	0.28	0.03	0.21	0.02	0.35	0.02	0.29	0.01	0.66	0.01	0.54
	NO_2 Min’	0.02	0.29	0.01	0.67	0.01	0.64	-0.03	0.23	-0.01	0.67	-0.04	0.09	-0.02	0.37	-0.02	0.37
	NOD Min’	0.03	0.22	0.01	0.52	0.00	0.90	-0.02	0.30	0.00	0.88	-0.03	0.15	-0.01	0.58	-0.02	0.32
	SO_2 Min’	-0.02	0.46	-0.03	0.16	0.00	0.85	-0.01	0.75	-0.01	0.59	-0.03	0.15	-0.03	0.19	-0.03	0.23
	PM_{10} Min’	0.03	0.16	0.02	0.33	-0.01	0.76	-0.02	0.25	-0.03	0.14	-0.01	0.58	-0.02	0.44	-0.01	0.52
	O_3 Min’	0.01	0.50	0.00	0.97	0.00	0.89	0.01	0.63	0.00	0.98	0.04	0.10	0.00	0.91	0.01	0.66
	CO Min’	0.00	0.99	0.04	0.09	0.01	0.52	0.00	0.84	0.00	0.88	0.00	0.91	0.00	0.85	0.02	0.31
	NO Mean	-0.01	0.61	0.01	0.68	0.00	0.91	-0.02	0.40	-0.02	0.48	-0.04	0.09	-0.01	0.52	-0.02	0.32
	NO_2 Mean	0.00	0.98	0.03	0.24	0.01	0.69	-0.01	0.55	0.00	0.97	-0.03	0.16	-0.01	0.58	-0.02	0.46
	NOD Mean	-0.01	0.71	0.02	0.47	0.00	0.92	-0.02	0.43	-0.01	0.68	-0.03	0.12	-0.01	0.50	-0.02	0.34
	SO_2 Mean	-0.05	0.02	-0.02	0.42	-0.02	0.40	-0.01	0.66	-0.02	0.28	-0.03	0.11	-0.05	0.01	-0.02	0.45
	PM_{10} Mean	0.02	0.43	0.03	0.12	0.00	0.97	-0.04	0.05	-0.03	0.14	-0.01	0.78	-0.01	0.61	0.00	0.84
	O_3 Mean	0.01	0.62	-0.01	0.76	0.00	0.82	0.03	0.21	0.02	0.37	0.05	0.03	0.01	0.57	0.03	0.19
	CO Mean	0.00	0.96	0.03	0.12	0.00	0.98	-0.03	0.17	-0.03	0.24	-0.01	0.53	-0.01	0.53	-0.02	0.40
	NO Max’	0.00	0.83	0.01	0.67	0.01	0.66	-0.02	0.28	-0.01	0.72	-0.04	0.07	-0.02	0.45	-0.02	0.25
	NO_2 Max’	0.01	0.60	0.02	0.26	0.03	0.17	-0.01	0.81	0.01	0.81	-0.02	0.33	-0.01	0.76	0.00	0.91
	NOD Max’	0.00	0.98	0.01	0.56	0.01	0.61	-0.02	0.41	0.00	0.98	-0.04	0.10	-0.01	0.59	-0.02	0.29
	SO_2 Max’	-0.05	0.03	-0.01	0.50	-0.02	0.43	-0.04	0.10	-0.03	0.20	-0.04	0.04	-0.05	0.01	-0.04	0.05
	PM_{10} Max’	0.02	0.28	0.04	0.10	0.00	0.87	-0.04	0.04	-0.03	0.22	0.00	0.98	0.00	0.82	0.00	0.92
	O_3 Max’	0.01	0.80	0.00	0.97	0.00	0.96	0.02	0.33	0.02	0.33	0.04	0.07	0.00	0.82	0.02	0.32
	CO Max’	0.00	0.97	0.01	0.59	0.00	0.94	-0.04	0.05	-0.03	0.23	-0.02	0.34	-0.02	0.29	-0.03	0.22
Weather	Temp Min’	0.00	0.84	-0.02	0.34	-0.02	0.41	-0.02	0.44	-0.01	0.76	-0.02	0.44	-0.01	0.77	-0.01	0.65
	Temp Max’	-0.01	0.61	-0.02	0.48	-0.01	0.66	-0.02	0.41	-0.02	0.34	-0.01	0.69	-0.01	0.69	0.00	0.87
	Sun	0.00	0.90	0.01	0.68	-0.02	0.46	0.01	0.74	0.00	0.90	0.02	0.29	-0.02	0.43	-0.01	0.72
	Rain	-0.02	0.38	0.00	0.92	-0.03	0.12	-0.01	0.75	-0.01	0.72	-0.02	0.44	-0.02	0.36	0.02	0.44
	Pressure	0.02	0.41	0.02	0.35	0.02	0.46	-0.01	0.65	0.00	0.91	0.01	0.57	-0.01	0.75	0.00	0.98
	Wind speed	0.02	0.41	0.00	0.91	0.00	0.90	0.01	0.76	-0.01	0.75	-0.01	0.78	0.02	0.35	0.01	0.69
Pollen	Grass	-0.01	0.65	-0.01	0.65	-0.01	0.59	0.00	0.99	-0.01	0.80	0.00	0.95	0.00	0.94	0.00	0.96

Table E. 65: Trent Region Emergency Consultations Excess – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P
Outdoor air pollutants	NO Min’	0.00	0.83	-0.01	0.52	0.01	0.72	-0.01	0.71	0.01	0.78	0.02	0.47	0.00	0.84	0.01	0.52
	NO_2 Min’	-0.02	0.30	-0.03	0.12	-0.03	0.22	-0.01	0.69	-0.02	0.25	0.01	0.77	0.00	0.88	0.00	0.86
	NOD Min’	-0.03	0.24	-0.04	0.09	-0.03	0.16	-0.02	0.35	-0.02	0.40	0.01	0.54	0.00	0.95	0.00	0.89
	SO_2 Min’	0.01	0.63	0.02	0.35	0.03	0.20	0.05	0.02	0.04	0.06	0.04	0.06	0.03	0.24	0.02	0.27
	PM_{10} Min’	-0.02	0.41	-0.02	0.33	0.01	0.53	-0.01	0.54	-0.03	0.20	-0.02	0.48	0.01	0.72	-0.02	0.27
	O_3 Min’	0.01	0.58	0.03	0.19	-0.01	0.67	0.01	0.51	0.00	0.93	-0.01	0.54	0.00	0.94	-0.01	0.75
	CO Min’	0.02	0.39	0.00	0.86	0.03	0.22	0.00	0.89	-0.01	0.58	0.02	0.41	0.01	0.66	0.01	0.53
	NO Mean	-0.01	0.53	-0.04	0.06	-0.03	0.15	0.00	0.92	-0.02	0.35	-0.02	0.28	0.01	0.62	0.02	0.25
	NO_2 Mean	-0.01	0.72	-0.05	0.02	-0.03	0.11	0.00	0.84	-0.02	0.43	-0.02	0.38	0.01	0.79	0.02	0.39
	NOD Mean	-0.01	0.53	-0.05	0.03	-0.03	0.11	0.00	0.86	-0.02	0.33	-0.02	0.32	0.01	0.68	0.02	0.33
	SO_2 Mean	0.00	0.94	-0.01	0.72	0.00	0.94	0.02	0.26	0.02	0.45	0.01	0.57	0.04	0.09	0.01	0.74
	PM_{10} Mean	0.00	0.95	-0.03	0.16	-0.03	0.23	-0.01	0.69	-0.03	0.19	-0.03	0.11	0.01	0.71	0.00	0.84
	O_3 Mean	0.02	0.40	0.04	0.10	0.02	0.37	0.01	0.74	0.03	0.23	0.01	0.51	-0.01	0.58	-0.02	0.44
	CO Mean	-0.01	0.54	-0.04	0.04	-0.01	0.74	-0.01	0.71	-0.03	0.12	-0.03	0.24	-0.01	0.63	0.02	0.30
	NO Max’	0.00	0.99	-0.04	0.05	-0.02	0.31	0.00	0.93	-0.01	0.62	-0.02	0.36	0.00	0.82	0.03	0.22
	NO_2 Max’	-0.01	0.80	-0.05	0.01	-0.02	0.29	0.01	0.61	0.01	0.73	-0.01	0.50	0.00	0.97	0.02	0.30
	NOD Max’	0.00	0.98	-0.05	0.03	-0.02	0.29	0.00	0.93	-0.01	0.70	-0.02	0.34	0.00	0.85	0.03	0.17
	SO_2 Max’	-0.01	0.69	-0.03	0.12	-0.01	0.63	-0.02	0.41	-0.01	0.71	0.00	0.85	0.01	0.58	-0.02	0.31
	PM_{10} Max’	0.01	0.78	-0.05	0.02	-0.03	0.18	-0.02	0.26	-0.02	0.37	-0.03	0.11	0.00	0.92	0.00	0.88
	O_3 Max’	0.01	0.51	0.02	0.36	0.01	0.51	0.01	0.56	0.03	0.13	0.01	0.70	0.00	0.92	0.01	0.72
	CO Max’	0.00	0.88	-0.06	0.01	-0.02	0.31	-0.02	0.45	-0.02	0.27	-0.04	0.08	0.00	0.87	0.01	0.71
Weather	Temp Min’	0.00	0.83	0.00	0.85	0.01	0.62	0.01	0.74	0.01	0.53	0.00	0.98	0.00	0.84	0.02	0.42
	Temp Max’	0.01	0.50	0.00	0.92	0.02	0.42	0.02	0.47	0.01	0.56	0.01	0.80	0.02	0.32	0.01	0.81
	Sun	0.02	0.36	0.00	0.95	0.04	0.07	0.01	0.69	-0.02	0.42	-0.02	0.25	0.01	0.57	0.01	0.56
	Rain	0.00	0.88	-0.02	0.43	0.01	0.51	0.01	0.71	0.01	0.78	0.02	0.44	0.03	0.18	0.00	0.98
	Pressure	0.01	0.73	-0.02	0.46	-0.01	0.76	0.00	0.87	-0.01	0.66	0.01	0.70	0.00	0.92	0.00	0.89
	Wind speed	0.01	0.73	0.04	0.06	0.02	0.44	0.00	0.88	0.03	0.22	-0.01	0.76	-0.03	0.21	-0.02	0.25
Pollen	Grass	0.02	0.37	0.01	0.59	0.02	0.36	0.02	0.44	0.02	0.39	0.02	0.46	0.01	0.49	0.02	0.33

Table E. 66: Trent Region Emergency Counts Excess – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P
Outdoor air pollutants	NO Min’	0.04	0.09	0.01	0.59	0.03	0.15	0.05	0.03	0.04	0.04	0.05	0.03	0.03	0.22	0.02	0.38
	NO_2 Min’	0.00	0.88	-0.03	0.12	-0.01	0.49	-0.03	0.24	-0.03	0.13	-0.04	0.08	-0.03	0.23	-0.04	0.09
	NOD Min’	0.02	0.32	-0.02	0.35	-0.01	0.67	-0.01	0.50	-0.01	0.68	-0.02	0.26	-0.01	0.50	-0.03	0.13
	SO_2 Min’	-0.04	0.08	-0.04	0.07	0.00	0.96	0.01	0.49	0.00	0.89	-0.02	0.29	0.00	0.90	-0.03	0.15
	PM_{10} Min’	0.01	0.72	0.00	0.83	0.00	0.97	-0.01	0.72	-0.01	0.51	-0.02	0.32	-0.01	0.55	-0.05	0.02
	O_3 Min’	0.01	0.66	0.01	0.65	-0.01	0.65	0.00	0.89	-0.03	0.23	0.01	0.77	0.02	0.43	0.04	0.09
	CO Min’	0.01	0.62	0.00	0.83	0.03	0.14	0.02	0.48	0.01	0.76	0.00	0.82	0.02	0.43	0.03	0.23
	NO Mean	-0.01	0.52	0.00	0.88	0.01	0.53	0.01	0.49	0.01	0.51	-0.01	0.63	0.00	0.93	-0.02	0.29
	NO_2 Mean	-0.01	0.53	-0.01	0.71	0.00	0.95	0.00	0.95	0.01	0.77	-0.02	0.37	-0.01	0.49	0.00	0.83
	NOD Mean	-0.02	0.46	0.00	0.95	0.01	0.81	0.01	0.68	0.01	0.57	-0.01	0.57	0.00	0.83	-0.02	0.39
	SO_2 Mean	-0.04	0.09	-0.04	0.09	0.01	0.78	0.03	0.22	0.01	0.53	-0.03	0.23	-0.03	0.22	-0.03	0.12
	PM_{10} Mean	0.00	0.95	0.00	0.92	-0.01	0.68	-0.02	0.39	-0.02	0.42	-0.04	0.06	-0.02	0.46	-0.02	0.27
	O_3 Mean	0.02	0.28	0.02	0.30	0.00	0.88	0.01	0.53	0.00	0.93	0.02	0.29	0.00	0.82	0.04	0.10
	CO Mean	-0.01	0.63	0.01	0.75	0.03	0.21	0.02	0.48	0.01	0.60	0.00	0.95	0.01	0.58	0.02	0.41
	NO Max’	0.00	0.88	0.00	0.90	0.03	0.19	0.01	0.59	0.03	0.19	-0.01	0.65	0.00	0.90	-0.03	0.19
	NO_2 Max’	0.01	0.78	0.00	0.97	0.03	0.22	0.02	0.32	0.02	0.41	-0.01	0.70	-0.01	0.63	0.01	0.57
	NOD Max’	0.00	0.91	0.00	0.99	0.03	0.20	0.02	0.46	0.03	0.19	-0.01	0.60	0.00	0.91	-0.02	0.31
	SO_2 Max’	-0.03	0.16	-0.03	0.21	0.01	0.79	0.01	0.60	0.01	0.68	-0.04	0.06	-0.04	0.08	-0.04	0.05
	PM_{10} Max’	-0.01	0.71	-0.01	0.77	-0.01	0.52	-0.03	0.13	-0.01	0.70	-0.04	0.07	0.00	0.93	-0.01	0.70
	O_3 Max’	0.00	0.97	0.03	0.20	0.00	0.98	0.02	0.33	0.00	0.87	0.02	0.32	-0.01	0.59	0.04	0.06
	CO Max’	0.00	0.87	0.01	0.68	0.02	0.33	0.01	0.78	0.02	0.32	0.00	0.83	0.01	0.54	0.00	0.91
Weather	Temp Min’	-0.02	0.27	-0.03	0.20	-0.03	0.14	-0.04	0.08	-0.03	0.19	-0.04	0.06	-0.05	0.02	-0.04	0.09
	Temp Max’	-0.01	0.49	-0.03	0.13	-0.02	0.49	-0.05	0.04	-0.05	0.02	-0.04	0.04	-0.03	0.12	-0.04	0.10
	Sun	-0.01	0.60	-0.01	0.69	-0.02	0.41	0.00	0.98	-0.04	0.09	-0.01	0.73	-0.01	0.81	0.00	0.86
	Rain	-0.02	0.42	-0.01	0.57	-0.01	0.64	0.00	0.88	0.02	0.39	0.01	0.69	0.02	0.33	0.01	0.81
	Pressure	0.00	0.95	0.01	0.75	0.01	0.59	-0.01	0.50	0.00	0.94	0.01	0.57	-0.01	0.51	-0.02	0.31
	Wind speed	0.00	0.95	0.04	0.08	0.01	0.60	0.02	0.28	-0.01	0.77	-0.01	0.63	0.00	0.88	0.01	0.63
Pollen	Grass	0.02	0.47	0.01	0.53	0.01	0.64	0.02	0.32	0.01	0.52	0.01	0.77	0.01	0.64	0.01	0.56

Table E.67: Trent Region Out of Hours Counts Excess – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P
Outdoor air pollutants	NO Min’	0.03	0.20	0.00	0.89	0.04	0.06	0.02	0.33	0.02	0.26	0.03	0.12	0.02	0.26	0.01	0.57
	NO_2 Min’	0.01	0.66	-0.03	0.13	0.00	0.89	0.00	0.94	-0.03	0.18	-0.02	0.45	-0.01	0.81	-0.02	0.25
	NOD Min’	0.02	0.26	-0.02	0.36	0.01	0.50	0.01	0.72	-0.02	0.46	-0.01	0.68	0.00	0.92	-0.02	0.37
	SO_2 Min’	-0.02	0.48	-0.04	0.09	0.00	0.94	0.02	0.37	0.00	0.99	0.00	0.93	0.02	0.32	-0.03	0.21
	PM_{10} Min’	-0.01	0.68	0.00	0.83	0.00	0.88	0.03	0.21	0.03	0.11	0.00	0.94	0.00	0.89	-0.05	0.04
	O_3 Min’	0.00	0.87	0.00	0.88	-0.02	0.35	-0.03	0.24	-0.01	0.50	-0.02	0.47	0.01	0.79	0.03	0.21
	CO Min’	0.02	0.37	0.00	0.98	0.02	0.25	0.04	0.07	0.01	0.54	0.02	0.42	0.04	0.07	0.02	0.29
	NO Mean	-0.02	0.47	0.00	0.88	0.03	0.20	0.04	0.09	0.03	0.22	0.03	0.20	0.01	0.75	-0.03	0.24
	NO_2 Mean	-0.03	0.24	-0.02	0.36	0.01	0.59	0.02	0.29	0.00	0.83	0.01	0.78	-0.01	0.63	0.00	0.83
	NOD Mean	-0.02	0.34	-0.01	0.66	0.02	0.33	0.03	0.14	0.02	0.39	0.02	0.36	0.00	0.97	-0.02	0.37
	SO_2 Mean	0.00	0.84	-0.03	0.23	0.03	0.13	0.04	0.07	0.04	0.09	0.02	0.40	0.00	0.82	-0.04	0.09
	PM_{10} Mean	-0.03	0.23	-0.02	0.29	0.00	0.90	0.02	0.44	0.02	0.42	-0.02	0.26	0.00	0.90	-0.02	0.48
	O_3 Mean	0.01	0.61	0.02	0.41	-0.02	0.29	-0.01	0.61	-0.01	0.50	-0.01	0.76	-0.01	0.61	0.02	0.27
	CO Mean	-0.01	0.77	0.02	0.38	0.04	0.05	0.05	0.01	0.03	0.11	0.03	0.20	0.03	0.11	0.03	0.14
	NO Max’	-0.02	0.43	0.00	0.94	0.04	0.09	0.04	0.07	0.03	0.12	0.03	0.22	0.01	0.59	-0.02	0.28
	NO_2 Max’	-0.02	0.46	-0.01	0.65	0.03	0.24	0.03	0.18	0.01	0.69	0.01	0.68	-0.01	0.54	0.01	0.62
	NOD Max’	-0.02	0.39	-0.01	0.75	0.04	0.09	0.04	0.07	0.03	0.18	0.02	0.33	0.01	0.69	-0.02	0.40
	SO_2 Max’	-0.01	0.59	-0.01	0.51	0.03	0.16	0.04	0.04	0.04	0.10	0.00	0.93	-0.01	0.78	-0.01	0.51
	PM_{10} Max’	-0.04	0.08	-0.02	0.26	0.00	0.99	0.00	0.88	0.02	0.31	-0.03	0.12	0.00	0.98	0.00	0.98
	O_3 Max’	-0.02	0.35	0.02	0.37	-0.02	0.39	-0.01	0.75	-0.02	0.35	-0.01	0.71	-0.03	0.22	0.04	0.07
	CO Max’	0.00	0.98	0.03	0.12	0.04	0.04	0.05	0.01	0.05	0.03	0.04	0.06	0.04	0.06	0.02	0.30
Weather	Temp Min’	-0.03	0.13	-0.03	0.24	-0.03	0.19	-0.04	0.05	-0.04	0.06	-0.04	0.07	-0.06	0.01	-0.04	0.05
	Temp Max’	-0.03	0.24	-0.03	0.12	-0.02	0.35	-0.05	0.02	-0.06	0.01	-0.05	0.02	-0.04	0.05	-0.04	0.05
	Sun	-0.02	0.31	-0.02	0.30	-0.02	0.44	-0.02	0.47	-0.04	0.10	-0.01	0.69	-0.02	0.43	-0.01	0.66
	Rain	0.01	0.63	-0.02	0.40	-0.02	0.46	-0.01	0.77	0.02	0.39	0.00	0.82	0.02	0.32	-0.02	0.35
	Pressure	-0.03	0.24	-0.01	0.67	0.01	0.69	-0.01	0.70	0.01	0.75	0.03	0.24	0.01	0.77	-0.01	0.65
	Wind speed	-0.03	0.24	0.02	0.34	-0.01	0.60	0.01	0.81	0.00	0.88	0.00	0.93	-0.03	0.22	0.00	0.88
Pollen	Grass	0.02	0.27	0.03	0.20	0.02	0.31	0.03	0.20	0.02	0.26	0.02	0.43	0.02	0.41	0.02	0.32

E3.3. Sheffield Correlation coefficients and P-values

Table E. 68: Sheffield All Counts Asthmatics – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P
Outdoor air pollutants	NO Min’	0.01	0.75	0.01	0.50	0.04	0.06	0.05	0.02	0.03	0.23	0.02	0.30	0.05	0.02	0.02	0.36
	NO_2 Min’	0.00	0.98	0.00	0.90	0.04	0.08	0.06	0.00	0.04	0.10	0.03	0.22	0.05	0.03	0.04	0.04
	NOD Min’	0.00	0.85	0.00	0.88	0.05	0.02	0.07	0.00	0.03	0.19	0.03	0.24	0.05	0.02	0.04	0.09
	SO_2 Min’	0.00	0.93	-0.01	0.76	0.00	0.82	0.03	0.14	0.04	0.04	0.04	0.08	0.01	0.64	0.04	0.10
	PM_{10} Min’	-0.07	0.00	-0.05	0.03	-0.03	0.11	0.01	0.77	0.01	0.50	-0.02	0.38	-0.02	0.34	-0.02	0.41
	O_3 Min’	-0.04	0.07	-0.02	0.44	-0.07	0.00	-0.10	0.00	-0.05	0.02	-0.05	0.02	-0.06	0.01	-0.08	0.00
	CO Min’	0.03	0.15	0.03	0.23	0.02	0.26	0.03	0.14	0.01	0.52	0.03	0.19	0.03	0.23	0.02	0.26
	NO Mean	-0.04	0.08	-0.02	0.29	0.03	0.18	0.02	0.33	0.04	0.05	0.03	0.10	0.02	0.39	0.01	0.79
	NO_2 Mean	-0.03	0.12	-0.03	0.21	0.02	0.27	0.04	0.07	0.04	0.09	0.02	0.38	0.00	0.91	-0.01	0.72
	NOD Mean	-0.03	0.11	-0.02	0.32	0.03	0.15	0.03	0.14	0.04	0.04	0.03	0.15	0.01	0.52	0.00	0.84
	SO_2 Mean	-0.08	0.00	-0.06	0.00	-0.03	0.19	0.00	0.89	0.00	0.83	-0.03	0.24	-0.02	0.25	-0.05	0.02
	PM_{10} Mean	-0.08	0.00	-0.05	0.02	-0.02	0.29	0.00	0.89	0.02	0.36	-0.02	0.43	-0.03	0.19	-0.03	0.13
	O_3 Mean	-0.04	0.06	-0.04	0.08	-0.09	0.00	-0.09	0.00	-0.09	0.00	-0.09	0.00	-0.08	0.00	-0.08	0.00
	CO Mean	-0.04	0.04	-0.04	0.10	-0.02	0.38	-0.01	0.67	0.01	0.62	0.02	0.33	0.01	0.69	-0.01	0.71
	NO Max’	-0.02	0.39	-0.02	0.41	0.03	0.16	0.02	0.44	0.04	0.04	0.04	0.05	0.04	0.09	0.02	0.33
	NO_2 Max’	-0.06	0.00	-0.05	0.01	-0.01	0.71	0.00	0.97	0.01	0.61	0.00	0.89	-0.02	0.47	-0.04	0.10
	NOD Max’	-0.02	0.26	-0.02	0.29	0.03	0.24	0.01	0.50	0.04	0.06	0.04	0.08	0.02	0.25	0.01	0.59
	SO_2 Max’	-0.10	0.00	-0.08	0.00	-0.06	0.01	-0.02	0.25	-0.03	0.24	-0.03	0.14	-0.04	0.07	-0.08	0.00
	PM_{10} Max’	-0.07	0.00	-0.03	0.16	-0.02	0.46	0.00	0.92	0.02	0.35	0.00	0.88	0.00	0.92	-0.02	0.32
	O_3 Max’	-0.05	0.01	-0.06	0.01	-0.09	0.00	-0.10	0.00	-0.10	0.00	-0.10	0.00	-0.09	0.00	-0.11	0.00
	CO Max’	-0.04	0.04	-0.03	0.14	-0.02	0.34	-0.02	0.42	0.01	0.60	0.01	0.75	-0.01	0.64	-0.02	0.48
Weather	Temp Min’	0.06	0.01	0.06	0.00	0.06	0.01	0.04	0.10	0.04	0.06	0.04	0.08	0.04	0.08	0.05	0.01
	Temp Max’	0.03	0.21	0.03	0.19	0.03	0.14	0.02	0.34	0.03	0.18	0.04	0.08	0.03	0.14	0.03	0.20
	Sun	-0.05	0.02	-0.04	0.09	-0.04	0.06	-0.05	0.02	-0.02	0.32	-0.02	0.27	0.01	0.76	-0.03	0.18
	Rain	0.00	0.92	-0.03	0.11	-0.03	0.17	-0.02	0.26	0.00	0.91	0.00	0.86	-0.01	0.54	0.01	0.79
	Pressure	0.01	0.54	0.04	0.08	0.04	0.05	0.04	0.08	0.03	0.12	0.03	0.17	0.02	0.38	0.02	0.35
	Wind speed	0.01	0.54	-0.03	0.15	-0.03	0.17	-0.03	0.19	-0.04	0.04	-0.04	0.05	-0.03	0.17	-0.05	0.02
Pollen	Grass	0.02	0.31	0.02	0.35	0.02	0.40	0.02	0.40	0.02	0.43	0.02	0.44	0.02	0.38	0.03	0.23

Table E. 69: Sheffield All Counts Non-asthmatics – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P
Outdoor air pollutants	NO Min’	-0.02	0.32	-0.01	0.59	0.00	0.89	-0.01	0.69	-0.01	0.62	0.01	0.80	0.02	0.32	0.00	0.84
	NO_2 Min’	-0.02	0.44	-0.03	0.16	0.00	0.84	0.00	0.84	-0.02	0.47	-0.01	0.49	0.00	0.88	0.00	0.84
	NOD Min’	-0.02	0.43	-0.03	0.21	0.00	0.82	0.00	0.84	-0.02	0.35	0.00	0.85	0.00	0.87	0.00	0.97
	SO_2 Min’	0.00	0.91	0.02	0.36	0.02	0.43	0.02	0.47	0.00	0.94	0.01	0.73	-0.03	0.18	0.03	0.19
	PM_{10} Min’	0.00	0.84	-0.02	0.46	0.00	0.98	0.02	0.40	-0.02	0.27	-0.03	0.12	0.00	0.82	0.01	0.74
	O_3 Min’	0.00	0.83	0.01	0.63	0.00	0.83	-0.01	0.80	0.02	0.32	-0.01	0.70	-0.02	0.25	-0.02	0.29
	CO Min’	-0.01	0.57	-0.01	0.58	0.01	0.76	0.02	0.40	0.02	0.39	0.00	0.99	0.04	0.05	0.02	0.27
	NO Mean	-0.02	0.26	-0.05	0.02	-0.03	0.16	-0.03	0.21	-0.05	0.04	-0.03	0.14	0.00	0.82	0.00	0.92
	NO_2 Mean	0.00	0.98	-0.03	0.17	-0.01	0.74	-0.02	0.26	-0.03	0.12	-0.03	0.14	0.00	0.86	0.01	0.53
	NOD Mean	-0.02	0.46	-0.04	0.05	-0.02	0.32	-0.03	0.19	-0.04	0.06	-0.03	0.12	0.00	0.91	0.01	0.81
	SO_2 Mean	-0.03	0.13	-0.01	0.73	-0.01	0.57	-0.03	0.18	-0.04	0.10	-0.02	0.25	0.00	0.94	-0.01	0.74
	PM_{10} Mean	0.01	0.71	-0.02	0.47	-0.01	0.78	-0.01	0.61	-0.02	0.42	-0.02	0.32	-0.02	0.46	0.01	0.62
	O_3 Mean	0.02	0.34	0.03	0.24	0.02	0.45	0.01	0.52	0.03	0.12	0.03	0.22	0.00	0.83	-0.01	0.50
	CO Mean	-0.04	0.04	-0.06	0.01	-0.04	0.07	-0.02	0.46	-0.05	0.02	-0.06	0.00	-0.02	0.39	-0.01	0.68
	NO Max’	-0.01	0.67	-0.04	0.09	-0.02	0.25	-0.02	0.48	-0.04	0.09	-0.02	0.27	0.00	0.99	0.01	0.75
	NO_2 Max’	0.01	0.75	-0.03	0.12	-0.01	0.56	-0.04	0.09	-0.04	0.08	-0.03	0.10	-0.01	0.64	0.00	0.92
	NOD Max’	-0.01	0.73	-0.04	0.08	-0.03	0.24	-0.02	0.44	-0.04	0.10	-0.03	0.22	0.00	0.87	0.01	0.72
	SO_2 Max’	-0.03	0.18	-0.01	0.62	-0.04	0.04	-0.04	0.04	-0.05	0.01	-0.03	0.11	0.00	0.88	-0.03	0.20
	PM_{10} Max’	0.02	0.34	-0.01	0.51	-0.01	0.81	0.00	0.93	-0.02	0.34	-0.01	0.70	0.00	0.91	0.03	0.18
	O_3 Max’	0.02	0.34	0.02	0.37	0.02	0.39	0.01	0.50	0.04	0.10	0.03	0.15	0.02	0.34	-0.01	0.72
	CO Max’	-0.04	0.05	-0.06	0.01	-0.05	0.03	-0.05	0.03	-0.06	0.00	-0.06	0.01	-0.03	0.24	-0.02	0.42
Weather	Temp Min’	0.01	0.58	0.02	0.39	0.03	0.15	0.02	0.37	0.01	0.77	0.01	0.71	0.02	0.32	0.02	0.37
	Temp Max’	0.01	0.64	0.02	0.32	0.03	0.18	0.04	0.09	0.02	0.36	0.02	0.39	0.01	0.66	0.02	0.26
	Sun	-0.01	0.70	0.02	0.45	0.01	0.70	0.05	0.02	0.02	0.34	0.00	0.82	-0.01	0.81	0.03	0.16
	Rain	-0.02	0.33	-0.05	0.02	-0.03	0.18	-0.01	0.72	-0.03	0.16	-0.01	0.60	-0.01	0.71	-0.01	0.81
	Pressure	0.03	0.22	0.03	0.12	0.02	0.48	0.02	0.44	0.02	0.34	0.03	0.15	0.01	0.80	0.00	0.92
	Wind speed	0.03	0.22	0.02	0.46	0.02	0.39	-0.03	0.19	0.02	0.36	0.01	0.58	-0.01	0.69	-0.03	0.24
Pollen	Grass	0.01	0.55	0.01	0.59	0.01	0.65	0.02	0.45	0.02	0.41	0.00	0.87	0.01	0.68	0.00	0.95

Table E.70: Sheffield Admissions Asthmatics – correlation coefficients and P-values by lag day per exposure.

Exposure		Lag0 r_s	Lag0 P	Lag1 r_s	Lag1 P	Lag2 r_s	Lag2 P	Lag3 r_s	Lag3 P	Lag4 r_s	Lag4 P	Lag5 r_s	Lag5 P	Lag6 r_s	Lag6 P	Lag7 r_s	Lag7 P
Outdoor air pollutants	NO Min'	0.01	0.56	0.00	0.83	0.00	0.90	0.02	0.26	-0.01	0.51	-0.01	0.56	0.01	0.70	0.00	0.93
	NO_2 Min'	0.00	0.84	-0.02	0.41	-0.01	0.73	0.03	0.23	0.02	0.35	0.00	0.85	0.02	0.29	0.00	0.91
	NOD Min'	0.00	0.95	-0.02	0.46	0.00	0.95	0.03	0.17	0.01	0.53	0.00	0.93	0.02	0.36	0.00	0.92
	SO_2 Min'	0.03	0.20	0.00	1.00	-0.01	0.81	0.03	0.20	0.03	0.16	0.03	0.21	0.03	0.20	0.03	0.24
	PM_{10} Min'	-0.02	0.46	-0.02	0.40	-0.02	0.31	0.01	0.81	0.02	0.35	0.00	0.99	0.01	0.59	0.00	0.90
	O_3 Min'	-0.03	0.16	0.00	0.97	-0.01	0.70	-0.03	0.19	-0.02	0.27	-0.03	0.22	-0.02	0.30	-0.02	0.26
	CO Min'	0.02	0.26	0.01	0.72	-0.02	0.28	0.01	0.79	-0.01	0.63	-0.02	0.48	-0.01	0.65	-0.01	0.63
	NO Mean	0.00	0.89	-0.03	0.17	0.01	0.80	0.00	0.87	0.03	0.14	0.02	0.27	0.02	0.32	0.00	0.97
	NO_2 Mean	-0.02	0.37	-0.03	0.12	0.00	0.92	0.02	0.48	0.02	0.25	0.01	0.75	0.01	0.79	-0.02	0.27
	NOD Mean	0.00	0.87	-0.03	0.17	0.01	0.80	0.00	0.83	0.03	0.16	0.02	0.42	0.01	0.51	-0.01	0.78
	SO_2 Mean	-0.04	0.10	-0.04	0.09	-0.02	0.29	0.00	0.93	0.02	0.34	0.00	0.93	0.00	0.83	-0.03	0.12
	PM_{10} Mean	-0.03	0.12	-0.04	0.04	-0.03	0.23	0.01	0.68	0.03	0.24	-0.01	0.80	-0.01	0.59	-0.01	0.58
	O_3 Mean	-0.05	0.01	-0.02	0.41	-0.03	0.14	-0.04	0.07	-0.05	0.01	-0.05	0.02	-0.05	0.02	-0.04	0.06
	CO Mean	-0.02	0.48	-0.02	0.28	-0.02	0.38	-0.01	0.60	-0.01	0.76	0.01	0.59	0.01	0.74	-0.02	0.40
	NO Max'	0.00	0.89	-0.02	0.34	0.01	0.81	-0.02	0.47	0.03	0.15	0.02	0.27	0.02	0.29	0.01	0.64
	NO_2 Max'	-0.05	0.03	-0.06	0.01	-0.01	0.55	-0.03	0.15	0.00	0.99	-0.01	0.75	-0.01	0.61	-0.02	0.26
	NOD Max'	-0.01	0.73	-0.03	0.23	0.00	0.98	-0.02	0.32	0.03	0.21	0.02	0.41	0.01	0.49	0.00	0.92
	SO_2 Max'	-0.04	0.06	-0.04	0.05	-0.04	0.05	-0.01	0.52	0.01	0.57	-0.01	0.49	-0.01	0.50	-0.04	0.04
	PM_{10} Max'	-0.03	0.15	-0.02	0.35	-0.03	0.22	0.00	0.98	0.02	0.34	0.00	0.87	-0.01	0.71	-0.01	0.67
	O_3 Max'	-0.06	0.00	-0.05	0.01	-0.03	0.13	-0.06	0.01	-0.07	0.00	-0.06	0.00	-0.07	0.00	-0.05	0.02
	CO Max'	-0.01	0.67	-0.01	0.72	-0.01	0.63	-0.02	0.45	0.01	0.80	0.00	0.92	-0.01	0.68	-0.02	0.29
Weather	Temp Min'	0.07	0.00	0.08	0.00	0.07	0.00	0.07	0.00	0.07	0.00	0.06	0.00	0.07	0.00	0.07	0.00
	Temp Max'	0.03	0.21	0.05	0.01	0.05	0.04	0.04	0.05	0.05	0.02	0.07	0.00	0.07	0.00	0.06	0.01
	Sun	-0.02	0.26	0.00	0.86	-0.03	0.20	-0.03	0.16	0.00	0.90	0.01	0.69	0.03	0.21	0.00	0.94
	Rain	0.01	0.75	-0.02	0.40	-0.01	0.55	0.00	0.98	-0.01	0.75	0.02	0.30	0.00	0.99	-0.04	0.06
	Pressure	-0.02	0.33	0.01	0.72	0.01	0.65	0.02	0.48	0.01	0.68	0.01	0.50	0.01	0.69	0.01	0.82
	Wind speed	-0.02	0.33	-0.01	0.60	-0.03	0.12	0.00	0.84	-0.02	0.32	-0.02	0.46	0.00	0.86	-0.01	0.72
Pollen	Grass	0.03	0.11	0.03	0.16	0.03	0.12	0.03	0.18	0.03	0.15	0.03	0.11	0.03	0.16	0.04	0.06

Table E.71: Sheffield Admissions Non-asthmatics – correlation coefficients and P-values by lag day per exposure.

Exposure		Lag0 r_s	Lag0 P	Lag1 r_s	Lag1 P	Lag2 r_s	Lag2 P	Lag3 r_s	Lag3 P	Lag4 r_s	Lag4 P	Lag5 r_s	Lag5 P	Lag6 r_s	Lag6 P	Lag7 r_s	Lag7 P
Outdoor air pollutants	NO Min'	-0.02	0.30	-0.02	0.41	0.00	1.00	-0.02	0.40	-0.01	0.49	-0.03	0.24	-0.02	0.43	-0.01	0.76
	NO_2 Min'	-0.01	0.71	-0.02	0.36	0.02	0.25	0.00	0.99	-0.01	0.72	-0.02	0.34	0.00	0.98	0.00	0.89
	NOD Min'	-0.01	0.61	-0.03	0.23	0.02	0.34	0.00	0.93	-0.01	0.71	-0.02	0.26	0.00	0.84	0.00	0.93
	SO_2 Min'	-0.04	0.09	-0.02	0.43	-0.01	0.52	0.00	0.94	-0.02	0.47	-0.02	0.27	-0.02	0.41	-0.02	0.47
	PM_{10} Min'	0.04	0.07	-0.01	0.59	0.03	0.12	0.04	0.05	0.00	0.84	0.00	0.90	0.01	0.50	0.03	0.14
	O_3 Min'	0.00	0.88	0.02	0.27	-0.01	0.58	0.02	0.33	0.02	0.34	0.01	0.56	-0.02	0.31	-0.02	0.35
	CO Min'	-0.01	0.53	0.00	0.88	-0.01	0.77	-0.01	0.76	0.02	0.41	-0.01	0.64	0.02	0.42	0.01	0.67
	NO Mean	0.02	0.46	-0.02	0.36	0.01	0.79	-0.03	0.22	-0.02	0.29	-0.01	0.74	0.02	0.37	0.02	0.39
	NO_2 Mean	0.03	0.13	-0.01	0.73	0.02	0.29	-0.01	0.55	-0.01	0.60	0.00	0.89	0.02	0.42	0.03	0.23
	NOD Mean	0.02	0.32	-0.01	0.49	0.01	0.55	-0.02	0.27	-0.02	0.39	-0.01	0.80	0.02	0.41	0.02	0.32
	SO_2 Mean	0.01	0.74	-0.01	0.64	0.02	0.46	-0.01	0.69	-0.01	0.66	-0.01	0.71	0.02	0.30	0.00	0.82
	PM_{10} Mean	0.04	0.08	0.01	0.78	0.03	0.21	0.00	0.96	0.01	0.68	0.02	0.40	0.01	0.73	0.03	0.17
	O_3 Mean	-0.01	0.60	0.01	0.67	-0.01	0.64	0.02	0.34	0.02	0.35	0.03	0.20	0.01	0.81	-0.01	0.80
	CO Mean	0.00	0.93	-0.01	0.67	0.00	0.91	0.01	0.75	-0.01	0.49	-0.01	0.55	0.02	0.38	0.02	0.45
	NO Max'	0.02	0.42	-0.01	0.78	0.00	0.95	-0.03	0.14	-0.02	0.29	0.00	0.87	0.03	0.16	0.02	0.32
	NO_2 Max'	0.03	0.17	-0.01	0.74	0.01	0.65	-0.02	0.36	-0.02	0.44	0.01	0.81	0.02	0.43	0.03	0.14
	NOD Max'	0.02	0.44	-0.01	0.68	0.00	0.98	-0.03	0.20	-0.02	0.38	0.00	0.92	0.03	0.24	0.03	0.23
	SO_2 Max'	0.02	0.25	0.01	0.52	0.01	0.71	-0.01	0.55	-0.01	0.60	0.01	0.77	0.02	0.30	0.01	0.65
	PM_{10} Max'	0.03	0.13	0.01	0.81	0.02	0.27	0.00	0.92	0.00	0.97	0.03	0.24	0.00	0.86	0.03	0.20
	O_3 Max'	-0.03	0.21	0.02	0.41	-0.01	0.68	0.01	0.53	0.02	0.31	0.04	0.07	0.03	0.18	0.00	0.97
	CO Max'	0.00	0.85	-0.01	0.74	0.00	0.91	-0.02	0.45	-0.01	0.59	0.00	0.86	0.02	0.42	0.02	0.29
Weather	Temp Min'	0.00	0.82	0.01	0.75	0.02	0.33	0.02	0.27	0.02	0.26	0.02	0.45	0.03	0.16	0.04	0.08
	Temp Max'	0.00	0.82	0.01	0.75	0.02	0.46	0.03	0.18	0.02	0.41	0.02	0.43	0.01	0.63	0.02	0.30
	Sun	0.00	0.94	0.01	0.53	0.01	0.61	0.04	0.04	0.00	0.97	0.01	0.77	-0.01	0.72	0.00	0.97
	Rain	-0.02	0.25	-0.06	0.01	-0.01	0.57	0.00	0.87	0.02	0.48	-0.01	0.59	-0.02	0.48	0.01	0.74
	Pressure	0.04	0.09	0.02	0.32	0.03	0.18	0.02	0.37	0.01	0.77	0.01	0.61	-0.01	0.57	0.00	0.91
	Wind speed	0.04	0.09	0.01	0.74	-0.01	0.58	-0.02	0.43	0.01	0.49	0.01	0.65	0.02	0.35	-0.02	0.36
Pollen	Grass	-0.04	0.08	-0.03	0.11	-0.04	0.08	-0.03	0.18	-0.03	0.16	-0.04	0.08	-0.03	0.17	-0.03	0.13

Table E.72: Sheffield A&E Counts Asthmatics – correlation coefficients and P-values by lag day per exposure.

Exposure		Lag0 r_s	Lag0 P	Lag1 r_s	Lag1 P	Lag2 r_s	Lag2 P	Lag3 r_s	Lag3 P	Lag4 r_s	Lag4 P	Lag5 r_s	Lag5 P	Lag6 r_s	Lag6 P	Lag7 r_s	Lag7 P
Outdoor air pollutants	NO Min’	0.01	0.71	0.00	0.96	0.05	0.02	0.05	0.03	0.03	0.11	0.03	0.20	0.04	0.10	0.02	0.27
	NO_2 Min’	-0.01	0.66	-0.01	0.80	0.05	0.03	0.05	0.03	0.02	0.31	0.02	0.36	0.02	0.37	0.04	0.09
	NOD Min’	0.00	0.89	-0.01	0.73	0.06	0.01	0.05	0.01	0.01	0.57	0.02	0.35	0.02	0.31	0.03	0.16
	SO_2 Min’	-0.02	0.40	-0.01	0.58	-0.01	0.75	0.02	0.44	0.04	0.05	0.03	0.22	-0.01	0.61	0.02	0.25
	PM_{10} Min’	-0.09	0.00	-0.07	0.00	-0.04	0.07	0.00	0.99	0.00	0.83	-0.04	0.04	-0.05	0.02	-0.05	0.03
	O_3 Min’	-0.04	0.10	-0.02	0.32	-0.08	0.00	-0.09	0.00	-0.05	0.03	-0.07	0.00	-0.05	0.03	-0.08	0.00
	CO Min’	0.02	0.46	0.03	0.23	0.04	0.05	0.04	0.05	0.02	0.27	0.04	0.08	0.03	0.18	0.02	0.42
	NO Mean	-0.05	0.02	-0.02	0.43	0.03	0.12	0.01	0.62	0.03	0.23	0.03	0.18	-0.01	0.53	0.00	0.94
	NO_2 Mean	-0.05	0.03	-0.02	0.26	0.03	0.16	0.03	0.21	0.02	0.26	0.02	0.47	-0.02	0.34	-0.01	0.68
	NOD Mean	-0.05	0.02	-0.02	0.44	0.04	0.09	0.02	0.33	0.03	0.20	0.03	0.20	-0.01	0.51	0.00	0.98
	SO_2 Mean	-0.09	0.00	-0.07	0.00	-0.04	0.09	-0.01	0.61	-0.02	0.28	-0.03	0.15	-0.06	0.01	-0.06	0.01
	PM_{10} Mean	-0.10	0.00	-0.06	0.01	-0.02	0.34	-0.02	0.47	-0.01	0.77	-0.03	0.21	-0.06	0.01	-0.06	0.01
	O_3 Mean	-0.03	0.17	-0.04	0.04	-0.10	0.00	-0.09	0.00	-0.07	0.00	-0.09	0.00	-0.06	0.01	-0.08	0.00
	CO Mean	-0.06	0.01	-0.04	0.08	-0.02	0.40	-0.02	0.49	0.00	0.98	0.01	0.57	-0.02	0.45	-0.01	0.56
	NO Max’	-0.03	0.12	-0.01	0.59	0.03	0.11	0.01	0.50	0.03	0.16	0.05	0.04	0.01	0.66	0.02	0.38
	NO_2 Max’	-0.07	0.00	-0.05	0.04	-0.01	0.68	0.00	0.93	0.00	0.83	0.00	0.90	-0.03	0.15	-0.04	0.10
	NOD Max’	-0.04	0.08	-0.01	0.49	0.03	0.17	0.01	0.49	0.02	0.26	0.04	0.04	0.00	0.98	0.01	0.60
	SO_2 Max’	-0.11	0.00	-0.09	0.00	-0.06	0.00	-0.04	0.09	-0.05	0.04	-0.04	0.05	-0.07	0.00	-0.08	0.00
	PM_{10} Max’	-0.08	0.00	-0.04	0.09	-0.01	0.74	0.00	0.90	0.00	0.88	-0.01	0.71	-0.02	0.27	-0.04	0.06
	O_3 Max’	-0.05	0.03	-0.06	0.00	-0.11	0.00	-0.10	0.00	-0.09	0.00	-0.10	0.00	-0.07	0.00	-0.10	0.00
	CO Max’	-0.06	0.01	-0.04	0.05	-0.03	0.19	-0.03	0.24	0.00	0.89	0.00	0.88	-0.03	0.11	-0.02	0.26
Weather	Temp Min’	0.03	0.17	0.04	0.09	0.03	0.11	0.01	0.50	0.02	0.40	0.02	0.47	0.02	0.45	0.03	0.16
	Temp Max’	0.01	0.74	0.00	0.85	0.01	0.59	0.00	0.92	0.00	0.99	0.01	0.76	0.00	0.98	0.01	0.72
	Sun	-0.07	0.00	-0.04	0.07	-0.04	0.06	-0.06	0.01	-0.02	0.39	-0.05	0.02	-0.01	0.49	-0.04	0.08
	Rain	0.00	0.94	-0.04	0.06	-0.03	0.19	-0.02	0.31	0.00	0.97	0.01	0.58	0.01	0.68	0.02	0.33
	Pressure	0.01	0.62	0.02	0.28	0.05	0.03	0.04	0.05	0.03	0.20	0.03	0.24	0.00	0.95	0.00	0.95
	Wind speed	0.01	0.62	-0.02	0.40	-0.02	0.35	-0.03	0.20	-0.03	0.17	-0.04	0.04	-0.02	0.36	-0.05	0.03
Pollen	Grass	0.01	0.75	0.00	0.85	0.00	0.93	0.00	0.91	0.00	0.95	0.00	0.99	0.00	0.87	0.01	0.70

Table E.73: Sheffield A&E Counts Non-asthmatics – correlation coefficients and P-values by lag day per exposure.

Exposure		Lag0 r_s	Lag0 P	Lag1 r_s	Lag1 P	Lag2 r_s	Lag2 P	Lag3 r_s	Lag3 P	Lag4 r_s	Lag4 P	Lag5 r_s	Lag5 P	Lag6 r_s	Lag6 P	Lag7 r_s	Lag7 P
Outdoor air pollutants	NO Min’	-0.03	0.16	-0.01	0.56	0.00	0.85	0.00	0.88	-0.01	0.68	0.02	0.44	0.04	0.07	0.00	0.84
	NO_2 Min’	0.00	0.89	-0.01	0.59	-0.02	0.28	-0.01	0.76	0.00	0.88	-0.02	0.40	0.01	0.58	0.01	0.54
	NOD Min’	-0.01	0.74	-0.02	0.47	-0.03	0.24	-0.01	0.71	0.00	0.86	-0.01	0.70	0.01	0.54	0.01	0.65
	SO_2 Min’	-0.01	0.69	-0.02	0.39	-0.05	0.02	0.00	0.84	-0.03	0.14	0.00	0.87	0.00	0.96	0.01	0.79
	PM_{10} Min’	-0.01	0.57	-0.04	0.09	-0.02	0.37	-0.05	0.03	-0.03	0.13	0.00	0.91	-0.01	0.53	-0.04	0.06
	O_3 Min’	-0.01	0.64	0.01	0.70	0.00	0.91	0.00	0.92	-0.01	0.72	-0.02	0.44	-0.04	0.09	-0.04	0.10
	CO Min’	0.01	0.72	0.00	0.85	0.00	0.97	0.00	0.82	0.01	0.75	0.02	0.26	0.04	0.06	0.02	0.31
	NO Mean	-0.03	0.16	-0.05	0.01	-0.07	0.00	-0.06	0.01	-0.04	0.04	-0.06	0.00	-0.03	0.17	-0.04	0.09
	NO_2 Mean	-0.02	0.39	-0.04	0.09	-0.06	0.01	-0.05	0.03	-0.03	0.21	-0.05	0.03	-0.02	0.29	-0.02	0.27
	NOD Mean	-0.02	0.25	-0.05	0.03	-0.07	0.00	-0.05	0.01	-0.04	0.09	-0.06	0.01	-0.03	0.20	-0.03	0.16
	SO_2 Mean	-0.05	0.01	-0.06	0.01	-0.07	0.00	-0.06	0.00	-0.06	0.00	-0.07	0.00	-0.05	0.03	-0.03	0.15
	PM_{10} Mean	0.00	0.91	-0.03	0.11	-0.04	0.04	-0.05	0.02	0.00	0.88	-0.01	0.76	-0.01	0.79	-0.02	0.25
	O_3 Mean	-0.01	0.53	0.01	0.70	0.02	0.31	0.01	0.62	-0.01	0.53	0.01	0.49	-0.01	0.56	-0.02	0.44
	CO Mean	-0.05	0.02	-0.04	0.04	-0.08	0.00	-0.08	0.00	-0.06	0.00	-0.06	0.01	-0.04	0.09	-0.04	0.05
	NO Max’	-0.02	0.32	-0.05	0.01	-0.07	0.00	-0.04	0.04	-0.03	0.20	-0.05	0.03	-0.02	0.43	-0.03	0.19
	NO_2 Max’	-0.04	0.08	-0.06	0.01	-0.08	0.00	-0.06	0.00	-0.04	0.06	-0.06	0.00	-0.03	0.13	-0.04	0.06
	NOD Max’	-0.02	0.33	-0.06	0.01	-0.07	0.00	-0.05	0.04	-0.03	0.17	-0.05	0.02	-0.02	0.36	-0.03	0.21
	SO_2 Max’	-0.08	0.00	-0.05	0.01	-0.07	0.00	-0.09	0.00	-0.06	0.00	-0.10	0.00	-0.06	0.00	-0.07	0.00
	PM_{10} Max’	0.01	0.49	-0.01	0.52	-0.04	0.09	-0.05	0.04	-0.01	0.74	-0.02	0.28	0.02	0.32	-0.01	0.61
	O_3 Max’	-0.03	0.21	-0.01	0.81	0.01	0.72	0.00	0.95	-0.02	0.36	0.00	0.92	-0.02	0.36	-0.03	0.21
	CO Max’	-0.07	0.00	-0.08	0.00	-0.10	0.00	-0.09	0.00	-0.08	0.00	-0.09	0.00	-0.03	0.11	-0.04	0.04
Weather	Temp Min’	0.05	0.04	0.04	0.04	0.04	0.08	0.03	0.13	0.03	0.22	0.01	0.53	0.03	0.19	0.04	0.08
	Temp Max’	0.03	0.22	0.03	0.12	0.04	0.09	0.03	0.23	0.03	0.20	0.02	0.31	0.02	0.40	0.03	0.23
	Sun	0.01	0.57	0.00	0.95	0.00	0.96	0.01	0.53	0.02	0.39	0.01	0.69	0.00	0.86	0.02	0.27
	Rain	-0.02	0.47	-0.04	0.09	-0.04	0.06	-0.02	0.37	-0.03	0.12	-0.03	0.12	-0.01	0.76	-0.03	0.22
	Pressure	0.01	0.57	0.03	0.21	0.03	0.13	0.05	0.03	0.05	0.01	0.04	0.10	0.02	0.27	0.02	0.46
	Wind speed	0.01	0.57	-0.03	0.15	-0.01	0.59	-0.04	0.09	-0.03	0.14	-0.02	0.27	-0.04	0.06	-0.04	0.04
Pollen	Grass	0.05	0.03	0.05	0.03	0.06	0.01	0.06	0.00	0.04	0.04	0.05	0.02	0.04	0.06	0.05	0.03

Table E.74: Sheffield All Counts Excess – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P
Outdoor air pollutants	NO Min'	0.02	0.42	0.02	0.45	0.03	0.13	0.05	0.02	0.03	0.17	0.01	0.71	0.02	0.29	0.01	0.71
	NO_2 Min'	0.01	0.54	0.01	0.51	0.03	0.23	0.05	0.03	0.04	0.07	0.03	0.15	0.03	0.24	0.02	0.29
	NOD Min'	0.01	0.49	0.01	0.59	0.03	0.13	0.05	0.01	0.04	0.07	0.02	0.33	0.03	0.18	0.02	0.31
	SO_2 Min'	0.01	0.80	-0.01	0.69	-0.01	0.51	0.01	0.76	0.04	0.09	0.03	0.14	0.03	0.18	0.01	0.67
	PM_{10} Min'	-0.05	0.03	-0.02	0.27	-0.02	0.42	-0.01	0.50	0.03	0.14	0.02	0.48	-0.01	0.65	-0.02	0.28
	O_3 Min'	-0.02	0.37	-0.02	0.42	-0.06	0.01	-0.06	0.00	-0.06	0.01	-0.03	0.15	-0.02	0.40	-0.03	0.19
	CO Min'	0.04	0.10	0.02	0.26	0.02	0.47	0.01	0.67	0.00	0.89	0.02	0.27	-0.01	0.59	0.00	0.92
	NO Mean	-0.01	0.52	0.02	0.37	0.05	0.03	0.03	0.11	0.06	0.00	0.05	0.03	0.01	0.77	-0.01	0.65
	NO_2 Mean	-0.03	0.19	0.00	0.96	0.03	0.20	0.05	0.03	0.05	0.01	0.04	0.06	-0.01	0.71	-0.02	0.27
	NOD Mean	-0.02	0.41	0.01	0.51	0.04	0.05	0.04	0.04	0.06	0.00	0.05	0.03	0.00	0.90	-0.01	0.58
	SO_2 Mean	-0.03	0.13	-0.03	0.11	0.00	0.83	0.02	0.30	0.03	0.13	0.01	0.70	-0.01	0.51	-0.03	0.13
	PM_{10} Mean	-0.06	0.00	-0.02	0.25	-0.01	0.76	0.01	0.77	0.03	0.13	0.01	0.74	-0.01	0.70	-0.04	0.05
	O_3 Mean	-0.04	0.06	-0.04	0.04	-0.08	0.00	-0.08	0.00	-0.08	0.00	-0.08	0.00	-0.04	0.04	-0.04	0.08
	CO Mean	0.00	0.91	0.02	0.38	0.02	0.39	0.00	0.94	0.05	0.03	0.06	0.00	0.02	0.43	-0.01	0.77
	NO Max'	-0.01	0.55	0.01	0.62	0.04	0.06	0.02	0.33	0.06	0.01	0.05	0.03	0.02	0.37	0.00	0.94
	NO_2 Max'	-0.05	0.02	-0.01	0.55	0.01	0.63	0.02	0.26	0.04	0.08	0.03	0.16	-0.01	0.79	-0.03	0.14
	NOD Max'	-0.02	0.44	0.01	0.68	0.04	0.07	0.02	0.37	0.05	0.01	0.05	0.03	0.02	0.49	-0.01	0.73
	SO_2 Max'	-0.05	0.01	-0.05	0.02	0.00	0.82	0.02	0.43	0.03	0.13	0.01	0.70	-0.02	0.31	-0.04	0.08
	PM_{10} Max'	-0.06	0.00	-0.01	0.57	0.00	0.82	0.00	0.86	0.04	0.10	0.01	0.67	0.01	0.59	-0.04	0.05
	O_3 Max'	-0.05	0.01	-0.05	0.01	-0.09	0.00	-0.08	0.00	-0.09	0.00	-0.09	0.00	-0.07	0.00	-0.06	0.00
	CO Max'	0.00	0.86	0.02	0.32	0.02	0.36	0.02	0.38	0.05	0.01	0.05	0.02	0.01	0.72	0.00	0.87
Weather	Temp Min'	0.04	0.08	0.04	0.08	0.03	0.24	0.01	0.49	0.03	0.16	0.02	0.31	0.01	0.53	0.03	0.15
	Temp Max'	0.01	0.53	0.01	0.63	0.01	0.73	-0.01	0.69	0.01	0.67	0.01	0.50	0.02	0.37	0.01	0.66
	Sun	-0.04	0.07	-0.04	0.08	-0.03	0.13	-0.07	0.00	-0.03	0.14	-0.02	0.33	0.01	0.55	-0.03	0.16
	Rain	0.02	0.37	0.02	0.41	0.00	0.88	-0.01	0.49	0.02	0.29	0.01	0.71	-0.01	0.79	0.01	0.62
	Pressure	-0.01	0.70	0.00	0.92	0.02	0.28	0.02	0.45	0.01	0.56	0.00	0.99	0.01	0.71	0.02	0.47
	Wind speed	-0.01	0.70	-0.03	0.11	-0.04	0.06	0.00	0.95	-0.05	0.03	-0.04	0.04	-0.01	0.54	-0.01	0.59
Pollen	Grass	0.00	0.93	0.00	0.97	0.00	0.94	0.00	0.88	0.00	0.83	0.00	0.82	0.00	0.95	0.01	0.60

Table E.75: Sheffield Admissions Excess – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P
Outdoor air pollutants	NO Min'	0.02	0.34	0.01	0.73	0.00	0.91	0.03	0.13	0.00	0.87	0.00	0.92	0.02	0.38	0.01	0.75
	NO_2 Min'	0.00	0.95	0.00	0.99	-0.02	0.30	0.02	0.35	0.02	0.40	0.01	0.51	0.02	0.42	0.00	0.96
	NOD Min'	0.00	0.83	0.01	0.76	-0.01	0.50	0.02	0.26	0.01	0.50	0.01	0.51	0.02	0.42	0.00	0.85
	SO_2 Min'	0.04	0.04	0.01	0.66	0.01	0.70	0.02	0.31	0.03	0.15	0.04	0.10	0.03	0.20	0.03	0.19
	PM_{10} Min'	-0.04	0.08	0.00	0.83	-0.04	0.06	-0.03	0.15	0.02	0.44	0.00	0.94	0.00	0.93	-0.02	0.28
	O_3 Min'	-0.02	0.35	-0.01	0.57	0.00	0.93	-0.03	0.12	-0.03	0.15	-0.02	0.26	0.00	0.87	0.00	0.94
	CO Min'	0.02	0.26	0.00	0.83	-0.01	0.53	0.01	0.66	-0.02	0.39	0.00	0.90	-0.02	0.45	-0.02	0.45
	NO Mean	-0.01	0.64	-0.01	0.67	0.00	0.96	0.02	0.33	0.04	0.09	0.02	0.41	0.00	0.91	-0.01	0.54
	NO_2 Mean	-0.04	0.09	-0.02	0.35	-0.02	0.45	0.02	0.26	0.03	0.22	0.01	0.77	-0.01	0.79	-0.04	0.09
	NOD Mean	-0.02	0.41	-0.01	0.56	0.00	0.85	0.02	0.26	0.03	0.12	0.01	0.54	0.00	0.98	-0.02	0.35
	SO_2 Mean	-0.03	0.15	-0.02	0.36	-0.03	0.18	0.01	0.78	0.02	0.32	0.00	0.82	-0.02	0.40	-0.03	0.17
	PM_{10} Mean	-0.05	0.02	-0.04	0.10	-0.04	0.09	0.00	0.82	0.01	0.56	-0.02	0.43	-0.01	0.57	-0.03	0.13
	O_3 Mean	-0.03	0.18	-0.02	0.46	-0.01	0.49	-0.04	0.04	-0.05	0.03	-0.05	0.02	-0.04	0.08	-0.02	0.31
	CO Mean	-0.01	0.52	-0.01	0.54	-0.01	0.54	-0.01	0.63	0.01	0.76	0.02	0.44	0.00	0.84	-0.03	0.23
	NO Max'	-0.01	0.64	-0.01	0.54	0.00	0.86	0.02	0.48	0.04	0.09	0.01	0.54	0.00	0.87	-0.01	0.62
	NO_2 Max'	-0.05	0.01	-0.04	0.09	-0.01	0.52	0.00	0.89	0.01	0.54	-0.01	0.75	-0.02	0.47	-0.04	0.06
	NOD Max'	-0.02	0.44	-0.01	0.50	0.00	0.96	0.01	0.69	0.03	0.14	0.01	0.66	0.00	0.82	-0.02	0.38
	SO_2 Max'	-0.05	0.04	-0.04	0.06	-0.04	0.08	0.00	0.94	0.02	0.37	-0.01	0.58	-0.02	0.28	-0.04	0.07
	PM_{10} Max'	-0.05	0.04	-0.02	0.38	-0.03	0.12	0.00	0.96	0.02	0.48	-0.02	0.47	-0.01	0.82	-0.03	0.23
	O_3 Max'	-0.02	0.31	-0.05	0.02	-0.02	0.43	-0.05	0.01	-0.06	0.01	-0.07	0.00	-0.07	0.00	-0.03	0.12
	CO Max'	-0.01	0.67	0.00	0.83	-0.01	0.78	0.00	0.97	0.01	0.57	0.00	0.84	-0.02	0.48	-0.03	0.15
Weather	Temp Min'	0.05	0.02	0.05	0.01	0.03	0.12	0.03	0.21	0.03	0.16	0.03	0.19	0.02	0.28	0.02	0.27
	Temp Max'	0.01	0.52	0.03	0.14	0.02	0.36	0.01	0.68	0.02	0.27	0.03	0.12	0.04	0.08	0.02	0.32
	Sun	-0.02	0.37	-0.01	0.49	-0.03	0.21	-0.05	0.02	0.00	0.93	0.01	0.80	0.02	0.25	-0.01	0.81
	Rain	0.02	0.37	0.03	0.23	-0.01	0.72	-0.01	0.78	-0.02	0.39	0.02	0.36	0.01	0.69	-0.03	0.17
	Pressure	-0.04	0.08	-0.01	0.66	-0.01	0.51	0.00	0.91	0.00	0.93	0.00	0.95	0.01	0.49	0.00	0.88
	Wind speed	-0.04	0.08	-0.01	0.55	-0.01	0.55	0.01	0.56	-0.03	0.18	-0.02	0.39	-0.02	0.46	0.01	0.70
Pollen	Grass	0.04	0.04	0.04	0.07	0.04	0.04	0.03	0.11	0.04	0.08	0.05	0.03	0.04	0.08	0.05	0.03

Table E. 76: Sheffield A&E Counts Excess – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P
Outdoor air pollutants	NO Min’	0.03	0.17	0.02	0.45	0.04	0.08	0.04	0.06	0.04	0.06	0.01	0.66	-0.01	0.79	0.01	0.68
	NO_2 Min’	-0.01	0.79	0.00	0.89	0.05	0.03	0.04	0.09	0.02	0.44	0.02	0.26	-0.01	0.72	0.02	0.46
	NOD Min’	0.01	0.76	0.00	0.82	0.05	0.01	0.05	0.03	0.02	0.42	0.02	0.43	-0.01	0.79	0.01	0.57
	SO_2 Min’	-0.01	0.81	0.00	0.92	0.03	0.22	0.02	0.36	0.06	0.01	0.02	0.34	-0.01	0.59	0.01	0.50
	PM_{10} Min’	-0.05	0.02	-0.02	0.28	-0.02	0.41	0.03	0.12	0.02	0.36	-0.03	0.19	-0.04	0.07	0.00	0.87
	O_3 Min’	-0.02	0.32	-0.03	0.21	-0.06	0.01	-0.07	0.00	-0.03	0.14	-0.04	0.06	0.00	0.89	-0.03	0.19
	CO Min’	0.02	0.40	0.01	0.52	0.03	0.15	0.03	0.14	0.02	0.34	0.01	0.70	-0.01	0.66	0.00	0.91
	NO Mean	-0.02	0.45	0.03	0.22	0.07	0.00	0.05	0.02	0.05	0.01	0.07	0.00	0.00	0.82	0.02	0.38
	NO_2 Mean	-0.02	0.31	0.01	0.78	0.06	0.01	0.05	0.01	0.04	0.07	0.05	0.03	-0.01	0.74	0.00	0.93
	NOD Mean	-0.02	0.39	0.02	0.31	0.07	0.00	0.05	0.01	0.05	0.02	0.06	0.00	0.00	0.93	0.01	0.53
	SO_2 Mean	-0.02	0.39	-0.01	0.58	0.02	0.40	0.04	0.06	0.03	0.15	0.03	0.19	-0.02	0.47	-0.02	0.33
	PM_{10} Mean	-0.06	0.00	-0.02	0.32	0.02	0.48	0.03	0.24	0.00	0.85	-0.02	0.48	-0.04	0.04	-0.03	0.16
	O_3 Mean	-0.01	0.57	-0.04	0.05	-0.09	0.00	-0.07	0.00	-0.05	0.03	-0.08	0.00	-0.03	0.24	-0.04	0.06
	CO Mean	0.00	0.91	0.00	0.82	0.04	0.06	0.04	0.05	0.05	0.03	0.06	0.01	0.01	0.63	0.02	0.40
	NO Max’	-0.01	0.69	0.03	0.19	0.07	0.00	0.04	0.04	0.05	0.03	0.07	0.00	0.02	0.44	0.03	0.19
	NO_2 Max’	-0.03	0.20	0.01	0.78	0.05	0.03	0.05	0.02	0.03	0.18	0.05	0.03	0.00	0.99	0.00	0.86
	NOD Max’	-0.01	0.56	0.03	0.20	0.07	0.00	0.05	0.03	0.04	0.04	0.07	0.00	0.01	0.55	0.02	0.30
	SO_2 Max’	-0.02	0.31	-0.03	0.15	0.01	0.82	0.04	0.08	0.01	0.56	0.04	0.06	-0.01	0.56	-0.01	0.57
	PM_{10} Max’	-0.06	0.00	-0.02	0.32	0.02	0.41	0.03	0.19	0.01	0.79	0.01	0.69	-0.03	0.14	-0.03	0.21
	O_3 Max’	-0.02	0.33	-0.05	0.03	-0.08	0.00	-0.07	0.00	-0.05	0.01	-0.07	0.00	-0.03	0.12	-0.05	0.02
	CO Max’	0.01	0.73	0.02	0.27	0.05	0.02	0.05	0.04	0.06	0.01	0.07	0.00	0.00	0.91	0.01	0.71
Weather	Temp Min’	-0.01	0.71	0.00	0.93	-0.01	0.81	-0.01	0.63	0.00	0.88	0.00	0.96	-0.01	0.66	0.00	0.83
	Temp Max’	-0.01	0.57	-0.02	0.35	-0.02	0.35	-0.02	0.38	-0.02	0.38	-0.01	0.73	-0.01	0.56	-0.01	0.51
	Sun	-0.07	0.00	-0.02	0.25	-0.03	0.13	-0.05	0.01	-0.03	0.16	-0.04	0.05	-0.02	0.46	-0.05	0.03
	Rain	0.01	0.53	0.00	0.94	0.01	0.80	0.01	0.77	0.03	0.11	0.04	0.05	0.01	0.58	0.04	0.08
	Pressure	0.00	0.82	0.00	0.82	0.02	0.42	0.00	0.95	-0.02	0.41	-0.01	0.57	-0.03	0.15	-0.02	0.34
	Wind speed	0.00	0.82	0.00	0.83	-0.01	0.73	0.01	0.64	0.00	0.91	-0.01	0.50	0.02	0.43	0.00	0.88
Pollen	Grass	-0.03	0.21	-0.03	0.23	-0.03	0.12	-0.04	0.08	-0.03	0.24	-0.03	0.14	-0.02	0.27	-0.02	0.25

E3.4. Scotland Correlation coefficients and P-values

Table E. 77: Scotland All Counts Asthmatics – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P
Outdoor air pollutants	NO Min’	0.05	0.01	0.00	0.85	0.02	0.48	0.03	0.19	0.02	0.25	0.03	0.23	0.04	0.05	0.03	0.23
	NO_2 Min’	0.02	0.27	-0.02	0.26	0.01	0.60	0.04	0.09	0.01	0.51	0.00	0.99	0.03	0.21	0.01	0.80
	NOD Min’	0.03	0.12	-0.03	0.24	-0.02	0.38	0.02	0.46	0.02	0.48	0.01	0.66	0.04	0.07	0.02	0.36
	SO_2 Min’	0.04	0.06	0.00	0.89	0.00	0.90	-0.02	0.25	-0.05	0.03	-0.01	0.49	0.04	0.06	0.05	0.01
	PM_{10} Min’	0.01	0.81	-0.03	0.14	-0.02	0.44	0.03	0.22	0.03	0.23	0.02	0.39	0.03	0.13	0.00	0.89
	O_3 Min’	-0.06	0.00	-0.03	0.16	0.00	0.96	-0.02	0.46	-0.03	0.17	-0.03	0.16	-0.05	0.02	-0.08	0.00
	CO Min’	0.02	0.36	0.02	0.25	0.03	0.14	0.06	0.00	0.04	0.07	0.05	0.03	0.03	0.16	0.02	0.28
	NO Mean	0.22	0.00	0.03	0.16	-0.05	0.02	-0.03	0.20	-0.06	0.01	-0.01	0.56	0.15	0.00	0.21	0.00
	NO_2 Mean	0.22	0.00	0.03	0.16	-0.05	0.02	-0.03	0.20	-0.06	0.01	-0.01	0.56	0.15	0.00	0.21	0.00
	NOD Mean	0.20	0.00	0.02	0.30	-0.07	0.00	-0.03	0.13	-0.05	0.01	-0.01	0.70	0.15	0.00	0.20	0.00
	SO_2 Mean	0.06	0.00	0.02	0.35	-0.03	0.15	-0.03	0.15	-0.06	0.00	-0.05	0.03	0.02	0.45	0.06	0.01
	PM_{10} Mean	0.08	0.00	0.03	0.13	0.00	0.98	-0.01	0.68	0.00	0.86	0.02	0.35	0.09	0.00	0.08	0.00
	O_3 Mean	-0.09	0.00	-0.02	0.38	0.01	0.51	-0.01	0.60	-0.04	0.05	-0.05	0.02	-0.09	0.00	-0.10	0.00
	CO Mean	0.08	0.00	0.04	0.09	0.00	0.83	0.04	0.05	0.04	0.04	0.05	0.03	0.07	0.00	0.08	0.00
	NO Max’	0.19	0.00	0.03	0.11	-0.03	0.11	-0.02	0.25	-0.06	0.00	-0.02	0.27	0.13	0.00	0.18	0.00
	NO_2 Max’	0.14	0.00	0.04	0.07	-0.01	0.78	0.00	0.97	-0.03	0.12	-0.01	0.72	0.10	0.00	0.15	0.00
	NOD Max’	0.19	0.00	0.03	0.13	-0.05	0.01	-0.03	0.16	-0.06	0.01	-0.01	0.49	0.13	0.00	0.18	0.00
	SO_2 Max’	0.07	0.00	0.04	0.04	-0.03	0.15	-0.03	0.14	-0.07	0.00	-0.04	0.04	0.02	0.38	0.07	0.00
	PM_{10} Max’	0.06	0.00	0.05	0.02	0.00	0.90	0.01	0.81	0.02	0.45	0.04	0.10	0.05	0.01	0.06	0.01
	O_3 Max’	-0.04	0.04	-0.02	0.30	-0.01	0.65	-0.02	0.29	-0.05	0.03	-0.04	0.04	-0.05	0.01	-0.06	0.01
	CO Max’	0.13	0.00	0.05	0.01	-0.01	0.73	0.02	0.42	0.01	0.49	0.04	0.07	0.12	0.00	0.13	0.00
Weather	Temp Min’	-0.08	0.00	-0.09	0.00	-0.09	0.00	-0.10	0.00	-0.10	0.00	-0.08	0.00	-0.10	0.00	-0.08	0.00
	Temp Max’	-0.08	0.00	-0.08	0.00	-0.09	0.00	-0.10	0.00	-0.12	0.00	-0.12	0.00	-0.12	0.00	-0.09	0.00
	Sun	-0.02	0.48	-0.02	0.41	-0.03	0.15	-0.04	0.05	-0.04	0.08	-0.03	0.18	-0.03	0.17	-0.03	0.19
	Rain	0.01	0.58	-0.01	0.76	-0.01	0.57	-0.01	0.63	-0.01	0.65	0.01	0.53	0.02	0.33	0.00	0.96
	Pressure	-0.01	0.49	0.01	0.80	0.02	0.36	0.02	0.25	0.01	0.64	-0.01	0.74	-0.03	0.24	-0.03	0.13
	Wind speed	0.06	0.00	0.01	0.74	0.00	0.93	0.00	0.90	0.01	0.54	0.04	0.04	0.05	0.02	0.04	0.06
Pollen	Grass	-0.10	0.00	-0.07	0.00	-0.09	0.00	-0.12	0.00	-0.14	0.00	-0.13	0.00	-0.13	0.00	-0.12	0.00
	Birch	-0.02	0.43	-0.02	0.29	-0.02	0.37	0.01	0.67	0.00	0.95	-0.01	0.75	0.01	0.63	0.01	0.78
	Oak	0.01	0.54	0.04	0.07	-0.03	0.20	-0.05	0.02	-0.03	0.20	-0.05	0.02	-0.01	0.49	0.01	0.61
	Nettle	-0.09	0.00	-0.08	0.00	-0.10	0.00	-0.13	0.00	-0.15	0.00	-0.14	0.00	-0.13	0.00	-0.12	0.00

Table E. 78: Scotland All Counts Non-asthmatics – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P
Outdoor air pollutants	NO Min’	0.01	0.56	-0.04	0.06	0.00	0.89	0.01	0.71	0.01	0.64	0.01	0.64	0.03	0.23	0.01	0.58
	NO_2 Min’	0.04	0.10	-0.01	0.60	0.02	0.45	0.02	0.37	0.02	0.39	0.02	0.44	0.05	0.03	0.01	0.72
	NOD Min’	0.05	0.03	-0.01	0.56	-0.02	0.46	0.01	0.69	0.03	0.16	0.03	0.16	0.06	0.01	0.02	0.41
	SO_2 Min’	0.05	0.03	0.01	0.51	-0.01	0.60	-0.02	0.26	-0.04	0.05	-0.03	0.17	0.04	0.10	0.03	0.14
	PM_{10} Min’	0.04	0.07	-0.02	0.32	0.00	0.82	0.03	0.20	0.04	0.10	0.04	0.06	0.04	0.06	0.01	0.55
	O_3 Min’	-0.05	0.02	0.00	0.88	0.01	0.73	0.02	0.43	0.00	0.98	0.01	0.69	-0.02	0.43	-0.05	0.02
	CO Min’	0.01	0.57	-0.01	0.50	0.02	0.30	0.04	0.05	0.03	0.14	0.02	0.30	0.02	0.44	-0.01	0.49
	NO Mean	0.22	0.00	0.02	0.44	-0.07	0.00	-0.04	0.05	-0.05	0.01	-0.03	0.17	0.14	0.00	0.20	0.00
	NO_2 Mean	0.22	0.00	0.02	0.44	-0.07	0.00	-0.04	0.05	-0.05	0.01	-0.03	0.17	0.14	0.00	0.20	0.00
	NOD Mean	0.21	0.00	0.02	0.39	-0.08	0.00	-0.04	0.07	-0.03	0.12	-0.02	0.46	0.14	0.00	0.18	0.00
	SO_2 Mean	0.07	0.00	0.03	0.20	-0.03	0.11	-0.02	0.28	-0.06	0.01	-0.05	0.03	0.03	0.13	0.06	0.00
	PM_{10} Mean	0.12	0.00	0.05	0.02	0.01	0.70	-0.02	0.36	0.00	0.92	0.04	0.05	0.09	0.00	0.08	0.00
	O_3 Mean	-0.06	0.00	0.02	0.32	0.04	0.06	0.03	0.16	0.00	0.88	0.00	0.94	-0.04	0.06	-0.06	0.01
	CO Mean	0.07	0.00	0.02	0.39	-0.02	0.28	0.03	0.22	0.05	0.03	0.03	0.11	0.05	0.01	0.06	0.01
	NO Max’	0.19	0.00	0.03	0.21	-0.05	0.01	-0.04	0.04	-0.06	0.00	-0.04	0.05	0.11	0.00	0.18	0.00
	NO_2 Max’	0.15	0.00	0.04	0.08	-0.01	0.51	-0.02	0.39	-0.03	0.20	-0.01	0.53	0.09	0.00	0.15	0.00
	NOD Max’	0.19	0.00	0.03	0.14	-0.07	0.00	-0.04	0.05	-0.04	0.05	-0.03	0.22	0.12	0.00	0.18	0.00
	SO_2 Max’	0.09	0.00	0.06	0.01	-0.03	0.15	-0.02	0.28	-0.05	0.03	-0.04	0.09	0.04	0.09	0.08	0.00
	PM_{10} Max’	0.09	0.00	0.06	0.01	0.01	0.61	-0.02	0.48	0.03	0.11	0.04	0.05	0.05	0.02	0.07	0.00
	O_3 Max’	-0.02	0.34	0.02	0.39	0.02	0.32	0.01	0.51	0.00	0.99	0.00	0.86	-0.01	0.60	-0.02	0.44
	CO Max’	0.12	0.00	0.04	0.05	-0.03	0.16	-0.01	0.70	0.02	0.38	0.02	0.34	0.10	0.00	0.11	0.00
Weather	Temp Min’	-0.08	0.00	-0.09	0.00	-0.08	0.00	-0.10	0.00	-0.10	0.00	-0.10	0.00	-0.11	0.00	-0.10	0.00
	Temp Max’	-0.07	0.00	-0.07	0.00	-0.08	0.00	-0.09	0.00	-0.11	0.00	-0.11	0.00	-0.11	0.00	-0.09	0.00
	Sun	0.01	0.73	0.02	0.39	-0.02	0.30	-0.03	0.16	-0.02	0.40	0.01	0.55	-0.01	0.59	0.01	0.56
	Rain	-0.02	0.45	-0.01	0.79	-0.01	0.55	0.01	0.76	-0.01	0.78	0.00	0.84	0.00	0.82	-0.01	0.59
	Pressure	0.00	0.98	0.01	0.64	0.01	0.79	-0.01	0.81	0.01	0.75	0.01	0.80	-0.01	0.54	-0.02	0.28
	Wind speed	0.05	0.02	0.00	0.94	0.01	0.65	0.03	0.21	0.01	0.57	0.04	0.05	0.05	0.01	0.03	0.10
Pollen	Grass	-0.06	0.00	-0.03	0.22	-0.05	0.02	-0.09	0.00	-0.10	0.00	-0.09	0.00	-0.10	0.00	-0.09	0.00
	Birch	0.02	0.28	0.01	0.54	0.01	0.56	0.06	0.01	0.05	0.03	0.04	0.05	0.04	0.06	0.04	0.05
	Oak	0.06	0.00	0.10	0.00	0.02	0.45	-0.01	0.66	0.02	0.48	0.00	0.96	0.01	0.81	0.05	0.02
	Nettle	-0.07	0.00	-0.03	0.16	-0.07	0.00	-0.11	0.00	-0.11	0.00	-0.11	0.00	-0.11	0.00	-0.09	0.00

Table E. 79: Scotland Acute Visits Asthmatics – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P
Outdoor air pollutants	NO Min'	0.02	0.29	0.02	0.39	0.04	0.09	0.00	0.97	0.02	0.25	0.01	0.78	0.05	0.01	0.04	0.08
	NO_2 Min'	0.03	0.16	0.02	0.46	0.03	0.23	-0.01	0.76	0.01	0.64	0.03	0.20	0.04	0.05	0.03	0.12
	NOD Min'	0.04	0.09	0.02	0.25	0.03	0.20	0.00	0.99	0.01	0.69	0.04	0.08	0.04	0.07	0.04	0.04
	SO_2 Min'	0.02	0.39	0.04	0.10	0.00	0.93	-0.01	0.62	0.00	0.84	-0.01	0.61	0.00	0.92	0.00	0.95
	PM_{10} Min'	0.00	0.99	-0.06	0.01	-0.03	0.10	-0.03	0.24	-0.04	0.06	-0.03	0.18	-0.04	0.06	-0.04	0.04
	O_3 Min'	-0.05	0.01	-0.05	0.01	-0.02	0.30	-0.03	0.20	-0.04	0.07	-0.04	0.08	-0.05	0.02	-0.09	0.00
	CO Min'	0.02	0.38	0.01	0.50	0.02	0.44	0.00	0.88	0.00	0.85	0.01	0.71	0.00	0.99	0.01	0.70
	NO Mean	0.11	0.00	0.04	0.07	0.04	0.10	0.00	0.98	0.00	0.83	0.03	0.14	0.11	0.00	0.12	0.00
	NO_2 Mean	0.10	0.00	0.05	0.02	0.04	0.06	0.01	0.80	-0.01	0.76	0.02	0.27	0.08	0.00	0.10	0.00
	NOD Mean	0.11	0.00	0.05	0.03	0.04	0.05	0.01	0.66	-0.01	0.65	0.03	0.12	0.09	0.00	0.12	0.00
	SO_2 Mean	0.03	0.11	0.05	0.02	0.03	0.23	0.02	0.29	-0.02	0.35	-0.01	0.78	0.00	0.95	0.02	0.43
	PM_{10} Mean	0.02	0.35	-0.03	0.13	-0.04	0.06	-0.03	0.11	-0.07	0.00	-0.06	0.01	-0.02	0.48	0.02	0.41
	O_3 Mean	-0.08	0.00	-0.07	0.00	-0.05	0.02	-0.05	0.03	-0.07	0.00	-0.07	0.00	-0.09	0.00	-0.12	0.00
	CO Mean	0.09	0.00	0.07	0.00	0.06	0.00	0.05	0.02	0.02	0.32	0.05	0.02	0.07	0.00	0.06	0.00
	NO Max'	0.10	0.00	0.05	0.02	0.04	0.06	0.00	0.91	0.01	0.70	0.03	0.23	0.09	0.00	0.11	0.00
	NO_2 Max'	0.08	0.00	0.05	0.02	0.05	0.02	0.01	0.60	0.00	0.97	0.02	0.27	0.08	0.00	0.10	0.00
	NOD Max'	0.10	0.00	0.05	0.01	0.05	0.03	0.00	0.82	0.00	0.86	0.03	0.12	0.09	0.00	0.12	0.00
	SO_2 Max'	0.02	0.29	0.06	0.01	0.03	0.23	0.03	0.21	-0.03	0.15	-0.01	0.68	0.00	0.96	0.01	0.61
	PM_{10} Max'	0.03	0.19	0.00	0.90	0.04	0.10	0.00	0.97	-0.05	0.02	-0.03	0.13	-0.02	0.37	0.03	0.20
	O_3 Max'	-0.06	0.00	-0.07	0.00	-0.05	0.02	-0.05	0.02	-0.07	0.00	-0.07	0.00	-0.09	0.00	-0.10	0.00
	CO Max'	0.08	0.00	0.08	0.00	0.08	0.00	0.05	0.02	0.02	0.43	0.05	0.02	0.10	0.00	0.08	0.00
Weather	Temp Min'	-0.11	0.00	-0.10	0.00	-0.10	0.00	-0.10	0.00	-0.12	0.00	-0.11	0.00	-0.10	0.00	-0.09	0.00
	Temp Max'	-0.10	0.00	-0.09	0.00	-0.09	0.00	-0.10	0.00	-0.12	0.00	-0.11	0.00	-0.11	0.00	-0.10	0.00
	Sun	-0.03	0.17	-0.02	0.30	-0.03	0.19	-0.03	0.14	-0.04	0.06	-0.03	0.21	-0.02	0.33	-0.05	0.02
	Rain	0.03	0.22	-0.01	0.76	0.00	0.83	0.00	0.85	0.00	0.90	0.02	0.37	0.00	0.87	0.03	0.21
	Pressure	-0.05	0.02	-0.05	0.03	-0.04	0.09	-0.02	0.30	-0.03	0.20	-0.02	0.34	-0.04	0.10	-0.05	0.02
	Wind speed	-0.01	0.50	-0.01	0.75	-0.01	0.57	0.02	0.29	0.05	0.01	0.03	0.22	0.03	0.23	0.00	0.86
Pollen	Grass	-0.05	0.02	-0.03	0.16	-0.04	0.05	-0.06	0.01	-0.06	0.01	-0.05	0.03	-0.04	0.04	-0.06	0.01
	Birch	-0.04	0.08	-0.04	0.06	-0.04	0.09	-0.05	0.03	-0.04	0.07	-0.03	0.12	-0.03	0.17	-0.04	0.05
	Oak	-0.03	0.16	-0.01	0.80	-0.02	0.28	-0.05	0.03	-0.04	0.04	-0.04	0.06	-0.02	0.44	-0.05	0.02
	Nettle	-0.04	0.07	-0.02	0.28	-0.04	0.09	-0.05	0.01	-0.05	0.02	-0.05	0.02	-0.05	0.02	-0.04	0.05

Table E. 80: Scotland Acute Visits Non-asthmatics – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P
Outdoor air pollutants	NO Min'	0.04	0.08	-0.01	0.69	0.01	0.74	0.00	1.00	0.02	0.29	0.02	0.27	0.02	0.30	0.02	0.43
	NO_2 Min'	0.06	0.00	0.01	0.72	0.00	0.97	0.00	0.96	0.02	0.46	-0.02	0.41	0.03	0.19	0.01	0.49
	NOD Min'	0.05	0.03	0.00	0.83	-0.02	0.33	0.02	0.34	0.01	0.59	0.01	0.74	0.02	0.34	-0.01	0.72
	SO_2 Min'	0.03	0.16	0.02	0.28	0.01	0.77	0.02	0.33	-0.01	0.67	0.01	0.52	0.05	0.01	0.00	0.83
	PM_{10} Min'	-0.01	0.63	-0.03	0.16	-0.05	0.03	-0.02	0.39	-0.04	0.04	0.00	0.89	-0.04	0.07	-0.04	0.07
	O_3 Min'	-0.07	0.00	-0.04	0.09	-0.03	0.12	-0.05	0.01	-0.06	0.01	-0.05	0.02	-0.09	0.00	-0.07	0.00
	CO Min'	-0.02	0.41	-0.04	0.04	-0.03	0.20	-0.03	0.14	-0.02	0.34	-0.03	0.15	-0.03	0.11	-0.07	0.00
	NO Mean	0.10	0.00	0.02	0.35	-0.04	0.08	-0.03	0.16	-0.01	0.65	0.00	0.98	0.08	0.00	0.07	0.00
	NO_2 Mean	0.09	0.00	0.02	0.30	-0.02	0.27	-0.02	0.40	0.00	0.84	0.00	0.82	0.06	0.00	0.05	0.01
	NOD Mean	0.08	0.00	0.01	0.59	-0.05	0.03	0.00	0.96	-0.01	0.52	0.01	0.61	0.07	0.00	0.05	0.02
	SO_2 Mean	0.04	0.07	0.02	0.41	0.00	0.83	0.00	0.92	0.01	0.62	0.02	0.46	0.04	0.04	0.00	0.89
	PM_{10} Mean	0.03	0.16	-0.01	0.55	-0.04	0.04	-0.04	0.10	-0.06	0.00	-0.03	0.19	0.00	0.87	-0.01	0.57
	O_3 Mean	-0.09	0.00	-0.05	0.03	-0.05	0.03	-0.07	0.00	-0.08	0.00	-0.08	0.00	-0.12	0.00	-0.09	0.00
	CO Mean	0.05	0.01	0.00	0.93	0.00	0.97	0.00	0.89	0.00	0.84	0.01	0.51	0.03	0.13	0.00	0.89
	NO Max'	0.09	0.00	0.02	0.29	-0.04	0.04	-0.03	0.18	-0.02	0.42	-0.01	0.77	0.07	0.00	0.07	0.00
	NO_2 Max'	0.07	0.00	0.02	0.29	-0.02	0.32	-0.01	0.57	-0.01	0.50	-0.01	0.62	0.06	0.01	0.07	0.00
	NOD Max'	0.07	0.00	0.02	0.49	-0.05	0.01	0.00	0.95	-0.02	0.25	0.01	0.74	0.06	0.01	0.05	0.02
	SO_2 Max'	0.04	0.04	0.02	0.43	0.00	0.93	0.00	0.94	0.01	0.53	0.03	0.23	0.04	0.04	-0.01	0.49
	PM_{10} Max'	0.02	0.46	-0.02	0.47	0.00	0.96	-0.01	0.58	-0.03	0.23	-0.01	0.55	0.01	0.76	-0.01	0.77
	O_3 Max'	-0.08	0.00	-0.06	0.01	-0.06	0.01	-0.08	0.00	-0.08	0.00	-0.08	0.00	-0.11	0.00	-0.07	0.00
	CO Max'	0.05	0.02	0.02	0.34	-0.01	0.80	0.01	0.61	0.00	0.89	0.02	0.32	0.07	0.00	0.03	0.19
Weather	Temp Min'	-0.05	0.01	-0.07	0.00	-0.06	0.01	-0.08	0.00	-0.09	0.00	-0.07	0.00	-0.07	0.00	-0.05	0.01
	Temp Max'	-0.06	0.00	-0.08	0.00	-0.07	0.00	-0.09	0.00	-0.09	0.00	-0.10	0.00	-0.08	0.00	-0.06	0.01
	Sun	-0.06	0.01	-0.04	0.08	-0.02	0.48	-0.04	0.06	-0.02	0.47	-0.03	0.18	-0.03	0.11	0.00	0.98
	Rain	-0.02	0.29	0.00	0.90	0.01	0.65	0.03	0.20	-0.01	0.77	0.01	0.76	-0.02	0.35	-0.02	0.48
	Pressure	0.03	0.18	0.01	0.68	-0.03	0.13	-0.02	0.29	-0.03	0.14	-0.04	0.07	-0.04	0.08	-0.04	0.04
	Wind speed	0.02	0.36	0.03	0.21	0.04	0.08	0.03	0.23	0.02	0.47	0.04	0.06	0.02	0.46	0.04	0.09
Pollen	Grass	-0.01	0.73	0.00	0.89	0.00	0.82	-0.03	0.23	-0.01	0.51	-0.02	0.34	-0.01	0.55	0.00	0.93
	Birch	0.00	0.92	0.01	0.77	-0.01	0.49	-0.02	0.47	-0.02	0.35	-0.03	0.18	-0.02	0.26	-0.02	0.28
	Oak	0.00	0.83	0.01	0.73	-0.03	0.18	-0.03	0.16	-0.04	0.04	-0.02	0.29	0.00	0.86	-0.04	0.07
	Nettle	0.00	0.88	0.00	0.89	0.01	0.74	-0.01	0.54	-0.02	0.37	-0.02	0.45	-0.01	0.73	0.01	0.63

Table E. 81: Scotland Casualty Counts Asthmatics – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P
Outdoor air pollutants	NO Min’	-0.10	0.00	-0.13	0.00	-0.13	0.00	-0.09	0.00	-0.11	0.00	-0.11	0.00	-0.12	0.00	-0.13	0.00
	NO_2 Min’	0.07	0.00	0.05	0.03	0.03	0.16	0.08	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.07	0.00
	NOD Min’	0.08	0.00	0.05	0.01	0.03	0.11	0.07	0.00	0.09	0.00	0.10	0.00	0.09	0.00	0.07	0.00
	SO_2 Min’	-0.09	0.00	-0.11	0.00	-0.10	0.00	-0.08	0.00	-0.06	0.00	-0.07	0.00	-0.06	0.01	-0.06	0.00
	PM_{10} Min’	0.11	0.00	0.13	0.00	0.11	0.00	0.13	0.00	0.14	0.00	0.11	0.00	0.14	0.00	0.13	0.00
	O_3 Min’	0.22	0.00	0.24	0.00	0.24	0.00	0.24	0.00	0.20	0.00	0.20	0.00	0.24	0.00	0.23	0.00
	CO Min’	0.01	0.54	0.05	0.04	0.02	0.43	0.03	0.11	0.02	0.33	0.04	0.07	0.02	0.40	0.03	0.13
	NO Mean	0.01	0.71	-0.01	0.49	-0.02	0.39	-0.02	0.47	-0.01	0.77	-0.01	0.57	0.00	0.87	0.02	0.29
	NO_2 Mean	0.02	0.38	0.00	0.93	0.00	0.95	0.02	0.48	0.03	0.23	0.02	0.29	0.03	0.24	0.05	0.03
	NOD Mean	0.05	0.04	0.02	0.26	0.02	0.46	0.02	0.30	0.05	0.04	0.04	0.05	0.04	0.05	0.07	0.00
	SO_2 Mean	-0.06	0.00	-0.07	0.00	-0.06	0.01	-0.05	0.02	-0.05	0.03	-0.04	0.06	-0.03	0.11	-0.03	0.10
	PM_{10} Mean	0.07	0.00	0.07	0.00	0.06	0.01	0.08	0.00	0.05	0.03	0.04	0.04	0.07	0.00	0.06	0.00
	O_3 Mean	0.30	0.00	0.30	0.00	0.31	0.00	0.32	0.00	0.27	0.00	0.27	0.00	0.30	0.00	0.31	0.00
	CO Mean	-0.10	0.00	-0.09	0.00	-0.11	0.00	-0.08	0.00	-0.08	0.00	-0.07	0.00	-0.08	0.00	-0.07	0.00
	NO Max’	0.00	0.84	0.00	0.93	-0.01	0.54	0.00	0.87	0.00	0.94	-0.02	0.44	0.00	0.86	0.02	0.45
	NO_2 Max’	0.01	0.76	0.00	0.91	-0.01	0.72	0.01	0.49	0.01	0.53	0.00	0.94	0.00	0.92	0.03	0.19
	NOD Max’	0.03	0.11	0.03	0.15	0.01	0.56	0.02	0.31	0.03	0.16	0.02	0.25	0.03	0.19	0.05	0.03
	SO_2 Max’	-0.03	0.22	-0.03	0.17	-0.03	0.15	-0.03	0.21	-0.04	0.10	-0.03	0.12	-0.02	0.45	-0.01	0.57
	PM_{10} Max’	0.02	0.27	0.03	0.18	0.00	0.95	0.01	0.51	-0.02	0.41	0.01	0.69	-0.01	0.79	0.01	0.64
	O_3 Max’	0.33	0.00	0.34	0.00	0.34	0.00	0.35	0.00	0.31	0.00	0.31	0.00	0.34	0.00	0.35	0.00
	CO Max’	-0.10	0.00	-0.11	0.00	-0.12	0.00	-0.09	0.00	-0.09	0.00	-0.10	0.00	-0.09	0.00	-0.08	0.00
Weather	Temp Min’	0.08	0.00	0.07	0.00	0.09	0.00	0.09	0.00	0.08	0.00	0.10	0.00	0.09	0.00	0.10	0.00
	Temp Max’	0.10	0.00	0.11	0.00	0.10	0.00	0.11	0.00	0.11	0.00	0.12	0.00	0.11	0.00	0.12	0.00
	Sun	0.06	0.01	0.06	0.00	0.05	0.02	0.03	0.16	0.03	0.11	0.04	0.05	0.05	0.02	0.05	0.02
	Rain	0.01	0.65	-0.01	0.51	0.01	0.49	0.00	0.84	0.00	0.93	-0.01	0.69	0.01	0.57	-0.03	0.13
	Pressure	0.07	0.00	0.06	0.01	0.04	0.06	0.04	0.04	0.05	0.02	0.06	0.01	0.05	0.02	0.05	0.02
	Wind speed	-0.02	0.39	-0.01	0.54	-0.03	0.19	-0.02	0.25	-0.06	0.01	-0.05	0.02	-0.03	0.17	-0.04	0.05
Pollen	Grass	0.01	0.73	0.01	0.54	0.02	0.48	0.00	0.93	0.00	1.00	0.01	0.57	0.02	0.45	0.01	0.63
	Birch	0.03	0.19	0.01	0.60	0.01	0.79	0.04	0.05	0.05	0.03	0.04	0.10	0.05	0.02	0.04	0.09
	Oak	0.05	0.01	0.04	0.05	0.06	0.00	0.04	0.04	0.03	0.18	0.03	0.17	0.03	0.16	0.04	0.06
	Nettle	0.01	0.64	0.01	0.69	0.00	1.00	-0.01	0.66	0.00	0.94	0.01	0.54	0.01	0.62	0.00	0.87

Table E. 82: Scotland Casualty Counts Non-asthmatics – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P
Outdoor air pollutants	NO Min’	-0.09	0.00	-0.10	0.00	-0.07	0.00	-0.12	0.00	-0.11	0.00	-0.10	0.00	-0.07	0.00	-0.08	0.00
	NO_2 Min’	0.05	0.02	0.07	0.00	0.07	0.00	0.05	0.02	0.10	0.00	0.08	0.00	0.08	0.00	0.07	0.00
	NOD Min’	0.06	0.00	0.06	0.00	0.07	0.00	0.06	0.00	0.10	0.00	0.08	0.00	0.09	0.00	0.07	0.00
	SO_2 Min’	-0.05	0.01	-0.08	0.00	-0.06	0.01	-0.07	0.00	-0.06	0.01	-0.07	0.00	-0.07	0.00	-0.04	0.05
	PM_{10} Min’	0.12	0.00	0.14	0.00	0.11	0.00	0.12	0.00	0.12	0.00	0.13	0.00	0.10	0.00	0.11	0.00
	O_3 Min’	0.17	0.00	0.21	0.00	0.17	0.00	0.21	0.00	0.19	0.00	0.20	0.00	0.19	0.00	0.20	0.00
	CO Min’	-0.01	0.65	-0.02	0.42	-0.01	0.73	0.00	0.91	0.02	0.44	-0.02	0.31	0.00	0.82	0.01	0.49
	NO Mean	0.02	0.29	0.00	0.90	-0.03	0.16	-0.02	0.38	0.02	0.47	0.01	0.69	0.01	0.51	0.03	0.17
	NO_2 Mean	0.02	0.25	0.02	0.37	0.00	0.85	0.01	0.49	0.05	0.03	0.03	0.13	0.03	0.16	0.04	0.09
	NOD Mean	0.06	0.01	0.03	0.12	0.01	0.51	0.04	0.07	0.05	0.02	0.04	0.05	0.05	0.02	0.06	0.01
	SO_2 Mean	-0.03	0.20	-0.07	0.00	-0.04	0.06	-0.04	0.05	-0.03	0.13	-0.05	0.02	-0.04	0.09	-0.01	0.58
	PM_{10} Mean	0.06	0.00	0.06	0.01	0.05	0.02	0.05	0.02	0.07	0.00	0.07	0.00	0.05	0.02	0.06	0.00
	O_3 Mean	0.23	0.00	0.26	0.00	0.25	0.00	0.27	0.00	0.26	0.00	0.25	0.00	0.24	0.00	0.25	0.00
	CO Mean	-0.09	0.00	-0.09	0.00	-0.12	0.00	-0.09	0.00	-0.05	0.02	-0.07	0.00	-0.09	0.00	-0.05	0.02
	NO Max’	0.02	0.28	0.02	0.41	-0.02	0.33	-0.01	0.76	0.02	0.45	0.01	0.58	0.01	0.69	0.03	0.11
	NO_2 Max’	0.01	0.53	0.01	0.54	-0.01	0.61	0.01	0.59	0.03	0.17	0.02	0.38	0.00	0.98	0.02	0.25
	NOD Max’	0.05	0.02	0.04	0.08	0.01	0.67	0.04	0.08	0.04	0.08	0.03	0.11	0.03	0.13	0.06	0.01
	SO_2 Max’	0.00	0.98	-0.04	0.05	-0.02	0.40	-0.01	0.59	-0.01	0.79	-0.02	0.42	0.00	0.94	0.02	0.45
	PM_{10} Max’	0.03	0.12	0.01	0.72	0.01	0.81	0.02	0.45	0.03	0.17	0.03	0.12	0.00	0.82	0.01	0.77
	O_3 Max’	0.26	0.00	0.30	0.00	0.28	0.00	0.30	0.00	0.30	0.00	0.29	0.00	0.28	0.00	0.29	0.00
	CO Max’	-0.09	0.00	-0.08	0.00	-0.13	0.00	-0.11	0.00	-0.07	0.00	-0.07	0.00	-0.08	0.00	-0.06	0.00
Weather	Temp Min’	0.09	0.00	0.08	0.00	0.11	0.00	0.09	0.00	0.09	0.00	0.08	0.00	0.09	0.00	0.07	0.00
	Temp Max’	0.12	0.00	0.12	0.00	0.10	0.00	0.10	0.00	0.12	0.00	0.12	0.00	0.11	0.00	0.11	0.00
	Sun	0.06	0.01	0.05	0.01	0.02	0.28	-0.01	0.80	0.06	0.01	0.05	0.03	0.03	0.16	0.09	0.00
	Rain	-0.03	0.23	-0.03	0.12	0.02	0.35	0.01	0.74	-0.01	0.50	0.00	0.94	-0.01	0.60	-0.02	0.34
	Pressure	0.05	0.01	0.05	0.02	0.04	0.08	0.05	0.03	0.06	0.01	0.05	0.02	0.04	0.05	0.05	0.02
	Wind speed	0.00	0.83	-0.03	0.20	-0.02	0.43	-0.04	0.05	-0.05	0.02	-0.03	0.17	-0.04	0.06	-0.05	0.01
Pollen	Grass	0.03	0.12	0.03	0.16	0.02	0.31	0.01	0.54	0.00	0.88	0.02	0.25	0.03	0.17	0.03	0.24
	Birch	0.06	0.01	0.06	0.00	0.06	0.01	0.08	0.00	0.07	0.00	0.07	0.00	0.07	0.00	0.07	0.00
	Oak	0.08	0.00	0.07	0.00	0.08	0.00	0.07	0.00	0.05	0.02	0.07	0.00	0.07	0.00	0.07	0.00
	Nettle	0.02	0.29	0.01	0.52	0.00	0.93	-0.01	0.81	-0.01	0.52	0.01	0.64	0.02	0.36	0.00	0.97

Table E. 83: Scotland Emergency Consultations Asthmatics – correlation coefficients and P-values by lag day per exposure.

Exposure		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
		r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P
Outdoor air pollutants	NO Min’	-0.05	0.01	-0.07	0.00	-0.05	0.03	-0.05	0.01	-0.04	0.05	-0.06	0.00	-0.04	0.04	-0.06	0.01
	NO_2 Min’	0.14	0.00	0.12	0.00	0.12	0.00	0.13	0.00	0.12	0.00	0.08	0.00	0.11	0.00	0.11	0.00
	NOD Min’	0.14	0.00	0.12	0.00	0.13	0.00	0.13	0.00	0.12	0.00	0.09	0.00	0.11	0.00	0.13	0.00
	SO_2 Min’	-0.05	0.01	-0.07	0.00	-0.08	0.00	-0.10	0.00	-0.10	0.00	-0.07	0.00	-0.06	0.00	-0.04	0.10
	PM_{10} Min’	0.17	0.00	0.12	0.00	0.10	0.00	0.11	0.00	0.12	0.00	0.14	0.00	0.16	0.00	0.15	0.00
	O_3 Min’	0.18	0.00	0.20	0.00	0.23	0.00	0.22	0.00	0.24	0.00	0.24	0.00	0.22	0.00	0.19	0.00
	CO Min’	0.04	0.04	0.05	0.02	0.05	0.02	0.06	0.01	0.03	0.13	0.05	0.02	0.06	0.01	0.06	0.01
	NO Mean	0.14	0.00	0.05	0.01	0.00	0.83	0.03	0.16	0.02	0.30	0.01	0.64	0.08	0.00	0.13	0.00
	NO_2 Mean	0.16	0.00	0.10	0.00	0.06	0.01	0.07	0.00	0.06	0.01	0.05	0.03	0.11	0.00	0.14	0.00
	NOD Mean	0.19	0.00	0.11	0.00	0.06	0.01	0.08	0.00	0.06	0.00	0.06	0.00	0.12	0.00	0.17	0.00
	SO_2 Mean	0.01	0.50	-0.03	0.17	-0.06	0.01	-0.04	0.06	-0.05	0.02	-0.06	0.00	-0.03	0.20	0.01	0.56
	PM_{10} Mean	0.12	0.00	0.08	0.00	0.02	0.29	0.02	0.29	0.03	0.15	0.05	0.02	0.11	0.00	0.11	0.00
	O_3 Mean	0.24	0.00	0.27	0.00	0.29	0.00	0.28	0.00	0.28	0.00	0.29	0.00	0.27	0.00	0.24	0.00
	CO Mean	-0.02	0.30	-0.04	0.08	-0.07	0.00	-0.04	0.07	-0.02	0.28	-0.03	0.11	-0.03	0.21	-0.03	0.19
	NO Max’	0.13	0.00	0.06	0.01	0.01	0.70	0.03	0.14	0.01	0.59	0.00	0.97	0.06	0.00	0.11	0.00
	NO_2 Max’	0.13	0.00	0.07	0.00	0.04	0.04	0.07	0.00	0.03	0.15	0.03	0.22	0.08	0.00	0.11	0.00
	NOD Max’	0.17	0.00	0.09	0.00	0.04	0.04	0.07	0.00	0.04	0.06	0.04	0.06	0.10	0.00	0.14	0.00
	SO_2 Max’	0.04	0.05	0.00	0.91	-0.04	0.08	-0.03	0.23	-0.03	0.17	-0.05	0.02	-0.02	0.35	0.03	0.13
	PM_{10} Max’	0.04	0.08	0.04	0.10	-0.03	0.11	-0.01	0.66	0.02	0.38	0.01	0.54	0.04	0.06	0.05	0.02
	O_3 Max’	0.29	0.00	0.29	0.00	0.31	0.00	0.31	0.00	0.31	0.00	0.32	0.00	0.32	0.00	0.30	0.00
	CO Max’	-0.01	0.69	-0.03	0.14	-0.07	0.00	-0.06	0.01	-0.04	0.06	-0.05	0.01	-0.03	0.13	-0.03	0.19
Weather	Temp Min’	-0.05	0.03	-0.06	0.01	-0.07	0.00	-0.06	0.01	-0.08	0.00	-0.05	0.02	-0.06	0.01	-0.04	0.05
	Temp Max’	-0.05	0.03	-0.05	0.02	-0.06	0.01	-0.04	0.04	-0.05	0.01	-0.06	0.01	-0.06	0.00	-0.05	0.03
	Sun	-0.03	0.11	-0.02	0.32	-0.02	0.31	0.00	0.95	0.00	0.99	-0.02	0.25	-0.04	0.06	-0.01	0.54
	Rain	0.02	0.34	0.01	0.73	0.00	0.91	0.01	0.60	0.00	0.87	0.00	0.85	0.05	0.03	0.01	0.81
	Pressure	0.02	0.44	0.04	0.05	0.05	0.01	0.06	0.00	0.06	0.01	0.04	0.10	0.04	0.08	0.03	0.25
	Wind speed	0.03	0.20	0.00	0.88	0.00	0.93	0.01	0.64	0.01	0.66	0.02	0.48	0.03	0.22	0.03	0.14
Pollen	Grass	-0.08	0.00	-0.06	0.00	-0.07	0.00	-0.09	0.00	-0.10	0.00	-0.09	0.00	-0.09	0.00	-0.10	0.00
	Birch	0.02	0.29	0.01	0.72	0.01	0.49	0.05	0.03	0.04	0.04	0.04	0.07	0.05	0.03	0.04	0.07
	Oak	0.03	0.17	0.04	0.05	0.02	0.41	0.00	0.99	0.00	0.87	-0.01	0.78	0.00	0.84	0.00	0.84
	Nettle	-0.09	0.00	-0.07	0.00	-0.10	0.00	-0.11	0.00	-0.11	0.00	-0.08	0.00	-0.09	0.00	-0.10	0.00

Table E. 84: Scotland Emergency Consultations Non-asthmatics – correlation coefficients and P-values by lag day per exposure.

Exposure		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
		r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P
Outdoor air pollutants	NO Min’	0.00	0.91	-0.03	0.17	-0.03	0.17	-0.03	0.18	-0.05	0.02	-0.07	0.00	-0.05	0.01	-0.02	0.29
	NO_2 Min’	0.12	0.00	0.11	0.00	0.11	0.00	0.10	0.00	0.06	0.00	0.04	0.04	0.08	0.00	0.08	0.00
	NOD Min’	0.13	0.00	0.12	0.00	0.11	0.00	0.09	0.00	0.06	0.00	0.06	0.00	0.10	0.00	0.10	0.00
	SO_2 Min’	-0.05	0.03	-0.05	0.02	-0.07	0.00	-0.10	0.00	-0.08	0.00	-0.09	0.00	-0.07	0.00	-0.04	0.04
	PM_{10} Min’	0.13	0.00	0.11	0.00	0.09	0.00	0.10	0.00	0.12	0.00	0.13	0.00	0.14	0.00	0.14	0.00
	O_3 Min’	0.17	0.00	0.15	0.00	0.21	0.00	0.21	0.00	0.20	0.00	0.22	0.00	0.21	0.00	0.19	0.00
	CO Min’	0.05	0.01	0.04	0.08	0.04	0.04	0.07	0.00	0.05	0.03	0.05	0.03	0.08	0.00	0.02	0.38
	NO Mean	0.13	0.00	0.06	0.01	0.03	0.22	0.01	0.68	0.00	0.92	-0.02	0.37	0.03	0.14	0.09	0.00
	NO_2 Mean	0.14	0.00	0.08	0.00	0.06	0.00	0.05	0.03	0.03	0.12	0.02	0.32	0.07	0.00	0.09	0.00
	NOD Mean	0.17	0.00	0.10	0.00	0.07	0.00	0.05	0.03	0.03	0.13	0.03	0.13	0.09	0.00	0.13	0.00
	SO_2 Mean	0.03	0.13	-0.01	0.78	-0.02	0.26	-0.06	0.01	-0.03	0.13	-0.06	0.01	-0.01	0.59	0.01	0.50
	PM_{10} Mean	0.11	0.00	0.06	0.00	0.03	0.17	0.02	0.31	0.04	0.10	0.05	0.02	0.07	0.00	0.08	0.00
	O_3 Mean	0.21	0.00	0.22	0.00	0.27	0.00	0.26	0.00	0.24	0.00	0.27	0.00	0.25	0.00	0.22	0.00
	CO Mean	-0.01	0.74	-0.02	0.32	-0.04	0.07	-0.05	0.03	-0.04	0.05	-0.03	0.12	-0.02	0.39	-0.03	0.11
	NO Max’	0.11	0.00	0.05	0.03	0.03	0.19	0.01	0.55	0.00	0.93	-0.02	0.25	0.02	0.48	0.08	0.00
	NO_2 Max’	0.12	0.00	0.05	0.02	0.05	0.03	0.05	0.02	0.02	0.27	0.01	0.80	0.04	0.06	0.07	0.00
	NOD Max’	0.14	0.00	0.08	0.00	0.05	0.01	0.04	0.06	0.02	0.30	0.01	0.56	0.06	0.01	0.11	0.00
	SO_2 Max’	0.06	0.01	0.01	0.54	-0.01	0.52	-0.05	0.03	-0.01	0.57	-0.01	0.56	0.00	0.99	0.04	0.04
	PM_{10} Max’	0.04	0.10	0.02	0.25	-0.01	0.58	0.00	0.94	0.03	0.18	0.00	0.92	0.01	0.53	0.04	0.05
	O_3 Max’	0.26	0.00	0.25	0.00	0.30	0.00	0.28	0.00	0.27	0.00	0.29	0.00	0.28	0.00	0.27	0.00
	CO Max’	0.00	0.98	-0.03	0.15	-0.05	0.02	-0.07	0.00	-0.08	0.00	-0.06	0.01	-0.04	0.04	-0.03	0.15
Weather	Temp Min’	-0.03	0.21	-0.03	0.14	-0.03	0.21	-0.02	0.43	-0.04	0.07	-0.02	0.39	-0.02	0.37	-0.02	0.29
	Temp Max’	-0.02	0.35	-0.02	0.36	-0.02	0.30	-0.04	0.08	-0.04	0.08	-0.03	0.11	-0.03	0.19	-0.02	0.42
	Sun	-0.04	0.10	-0.01	0.50	-0.01	0.65	-0.04	0.04	-0.03	0.13	-0.01	0.60	-0.03	0.13	-0.04	0.09
	Rain	0.00	0.98	-0.01	0.50	-0.03	0.24	0.02	0.39	0.01	0.64	-0.01	0.55	0.03	0.12	0.03	0.23
	Pressure	0.05	0.01	0.04	0.07	0.02	0.43	0.03	0.24	0.04	0.09	0.03	0.12	0.03	0.19	0.03	0.15
	Wind speed	-0.02	0.41	-0.01	0.57	-0.03	0.19	0.00	0.86	-0.01	0.68	0.01	0.73	0.02	0.37	0.03	0.23
Pollen	Grass	-0.07	0.00	-0.06	0.00	-0.04	0.08	-0.05	0.02	-0.07	0.00	-0.04	0.04	-0.06	0.00	-0.08	0.00
	Birch	0.04	0.09	0.02	0.30	0.04	0.07	0.05	0.02	0.05	0.02	0.06	0.00	0.05	0.03	0.04	0.09
	Oak	0.00	0.89	0.02	0.38	0.01	0.78	-0.01	0.67	0.02	0.40	-0.01	0.80	0.00	0.91	0.03	0.18
	Nettle	-0.06	0.00	-0.05	0.01	-0.05	0.02	-0.06	0.01	-0.08	0.00	-0.05	0.01	-0.08	0.00	-0.07	0.00

Table E. 85: Scotland Emergency Counts Asthmatics – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P
Outdoor air pollutants	NO Min'	-0.06	0.00	-0.07	0.00	-0.05	0.01	-0.08	0.00	-0.06	0.01	-0.06	0.00	-0.08	0.00	-0.10	0.00
	NO_2 Min'	0.13	0.00	0.11	0.00	0.13	0.00	0.13	0.00	0.11	0.00	0.12	0.00	0.12	0.00	0.12	0.00
	NOD Min'	0.13	0.00	0.12	0.00	0.14	0.00	0.13	0.00	0.10	0.00	0.13	0.00	0.12	0.00	0.12	0.00
	SO_2 Min'	-0.06	0.00	-0.09	0.00	-0.07	0.00	-0.07	0.00	-0.07	0.00	-0.03	0.13	-0.04	0.07	-0.05	0.02
	PM_{10} Min'	0.15	0.00	0.14	0.00	0.12	0.00	0.12	0.00	0.13	0.00	0.12	0.00	0.16	0.00	0.12	0.00
	O_3 Min'	0.18	0.00	0.19	0.00	0.19	0.00	0.18	0.00	0.18	0.00	0.17	0.00	0.19	0.00	0.19	0.00
	CO Min'	0.07	0.00	0.08	0.00	0.06	0.00	0.07	0.00	0.04	0.07	0.08	0.00	0.07	0.00	0.06	0.00
	NO Mean	0.07	0.00	0.02	0.38	0.05	0.01	0.06	0.00	0.06	0.01	0.07	0.00	0.06	0.00	0.05	0.02
	NO_2 Mean	0.11	0.00	0.06	0.00	0.09	0.00	0.09	0.00	0.08	0.00	0.10	0.00	0.11	0.00	0.09	0.00
	NOD Mean	0.12	0.00	0.08	0.00	0.11	0.00	0.11	0.00	0.10	0.00	0.12	0.00	0.13	0.00	0.11	0.00
	SO_2 Mean	0.00	0.90	-0.04	0.10	0.00	0.98	-0.01	0.56	-0.02	0.43	0.01	0.74	0.01	0.71	0.00	0.99
	PM_{10} Mean	0.11	0.00	0.09	0.00	0.07	0.00	0.06	0.01	0.07	0.00	0.06	0.01	0.10	0.00	0.10	0.00
	O_3 Mean	0.25	0.00	0.23	0.00	0.23	0.00	0.22	0.00	0.22	0.00	0.22	0.00	0.24	0.00	0.24	0.00
	CO Mean	0.00	0.87	-0.03	0.12	-0.02	0.35	0.00	0.93	-0.02	0.40	0.00	0.93	0.01	0.76	-0.03	0.20
	NO Max'	0.07	0.00	0.02	0.28	0.05	0.02	0.06	0.01	0.05	0.02	0.06	0.01	0.06	0.00	0.05	0.02
	NO_2 Max'	0.09	0.00	0.04	0.06	0.07	0.00	0.09	0.00	0.06	0.01	0.08	0.00	0.09	0.00	0.08	0.00
	NOD Max'	0.10	0.00	0.06	0.01	0.09	0.00	0.10	0.00	0.08	0.00	0.10	0.00	0.11	0.00	0.09	0.00
	SO_2 Max'	0.02	0.45	-0.01	0.51	0.01	0.58	0.01	0.66	-0.01	0.77	0.02	0.49	0.02	0.33	0.01	0.69
	PM_{10} Max'	0.04	0.04	0.06	0.00	0.03	0.21	0.01	0.49	0.02	0.41	0.02	0.30	0.05	0.03	0.05	0.03
	O_3 Max'	0.27	0.00	0.26	0.00	0.25	0.00	0.26	0.00	0.25	0.00	0.25	0.00	0.28	0.00	0.27	0.00
	CO Max'	-0.02	0.38	-0.05	0.01	-0.03	0.15	-0.02	0.44	-0.02	0.45	-0.02	0.38	0.00	0.95	-0.04	0.07
Weather	Temp Min'	-0.06	0.00	-0.06	0.00	-0.06	0.01	-0.06	0.01	-0.08	0.00	-0.06	0.00	-0.05	0.01	-0.05	0.02
	Temp Max'	-0.05	0.02	-0.07	0.00	-0.06	0.00	-0.05	0.02	-0.06	0.01	-0.06	0.01	-0.04	0.05	-0.05	0.04
	Sun	-0.01	0.60	-0.03	0.20	-0.03	0.22	-0.01	0.51	-0.02	0.32	-0.02	0.47	0.00	0.84	-0.02	0.26
	Rain	0.03	0.19	0.01	0.57	0.02	0.26	0.00	0.88	0.01	0.79	0.01	0.67	0.03	0.12	-0.01	0.70
	Pressure	0.02	0.33	0.03	0.21	0.04	0.06	0.06	0.01	0.05	0.02	0.03	0.11	0.05	0.03	0.04	0.04
	Wind speed	-0.01	0.81	0.03	0.23	0.03	0.19	0.02	0.47	0.00	0.83	-0.01	0.64	-0.01	0.55	-0.02	0.46
Pollen	Grass	-0.09	0.00	-0.10	0.00	-0.11	0.00	-0.11	0.00	-0.11	0.00	-0.11	0.00	-0.09	0.00	-0.11	0.00
	Birch	0.00	0.96	-0.01	0.56	-0.01	0.58	0.01	0.50	0.02	0.45	0.03	0.22	0.03	0.11	0.02	0.37
	Oak	0.03	0.11	0.01	0.78	0.01	0.57	0.01	0.53	0.01	0.77	-0.01	0.60	0.02	0.36	0.01	0.68
	Nettle	-0.10	0.00	-0.12	0.00	-0.14	0.00	-0.14	0.00	-0.11	0.00	-0.11	0.00	-0.11	0.00	-0.11	0.00

Table E. 86: Scotland Emergency Counts Non-asthmatics – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P
Outdoor air pollutants	NO Min'	-0.05	0.01	-0.07	0.00	-0.02	0.48	-0.07	0.00	-0.08	0.00	-0.07	0.00	-0.06	0.01	-0.05	0.02
	NO_2 Min'	0.12	0.00	0.11	0.00	0.13	0.00	0.09	0.00	0.11	0.00	0.09	0.00	0.10	0.00	0.07	0.00
	NOD Min'	0.12	0.00	0.10	0.00	0.11	0.00	0.09	0.00	0.10	0.00	0.09	0.00	0.11	0.00	0.08	0.00
	SO_2 Min'	-0.06	0.00	-0.08	0.00	-0.04	0.07	-0.05	0.01	-0.04	0.05	-0.05	0.03	-0.05	0.02	-0.06	0.00
	PM_{10} Min'	0.13	0.00	0.13	0.00	0.15	0.00	0.13	0.00	0.13	0.00	0.14	0.00	0.10	0.00	0.12	0.00
	O_3 Min'	0.14	0.00	0.18	0.00	0.17	0.00	0.19	0.00	0.15	0.00	0.16	0.00	0.18	0.00	0.16	0.00
	CO Min'	0.04	0.05	0.00	0.87	0.02	0.33	0.03	0.12	0.04	0.05	-0.01	0.64	0.01	0.64	0.00	0.85
	NO Mean	0.05	0.02	0.01	0.70	0.01	0.54	0.01	0.69	0.05	0.02	0.03	0.11	0.03	0.12	0.03	0.11
	NO_2 Mean	0.08	0.00	0.05	0.03	0.07	0.00	0.06	0.00	0.09	0.00	0.07	0.00	0.07	0.00	0.05	0.03
	NOD Mean	0.09	0.00	0.05	0.01	0.05	0.01	0.08	0.00	0.09	0.00	0.08	0.00	0.08	0.00	0.06	0.00
	SO_2 Mean	0.00	0.99	-0.04	0.07	0.00	0.95	-0.03	0.24	0.00	0.97	-0.02	0.31	0.00	0.96	-0.02	0.34
	PM_{10} Mean	0.10	0.00	0.07	0.00	0.07	0.00	0.07	0.00	0.09	0.00	0.08	0.00	0.05	0.02	0.05	0.01
	O_3 Mean	0.20	0.00	0.23	0.00	0.24	0.00	0.22	0.00	0.20	0.00	0.21	0.00	0.22	0.00	0.22	0.00
	CO Mean	-0.02	0.33	-0.04	0.04	-0.07	0.00	-0.06	0.01	-0.01	0.55	-0.05	0.04	-0.06	0.01	-0.04	0.06
	NO Max'	0.05	0.02	0.01	0.51	0.01	0.56	0.02	0.48	0.05	0.02	0.03	0.11	0.03	0.22	0.03	0.17
	NO_2 Max'	0.07	0.00	0.03	0.11	0.05	0.02	0.06	0.01	0.06	0.00	0.05	0.02	0.04	0.09	0.04	0.04
	NOD Max'	0.08	0.00	0.05	0.03	0.03	0.12	0.07	0.00	0.07	0.00	0.06	0.00	0.06	0.01	0.05	0.01
	SO_2 Max'	0.02	0.33	-0.02	0.30	0.02	0.42	0.00	0.85	0.03	0.21	0.02	0.28	0.03	0.18	0.00	0.93
	PM_{10} Max'	0.04	0.05	0.02	0.29	0.02	0.36	0.02	0.27	0.05	0.02	0.06	0.01	0.01	0.81	0.01	0.61
	O_3 Max'	0.22	0.00	0.25	0.00	0.26	0.00	0.25	0.00	0.24	0.00	0.24	0.00	0.25	0.00	0.24	0.00
	CO Max'	-0.03	0.12	-0.05	0.02	-0.08	0.00	-0.08	0.00	-0.03	0.20	-0.05	0.01	-0.06	0.00	-0.05	0.02
Weather	Temp Min'	-0.03	0.24	-0.02	0.35	0.00	0.83	-0.01	0.65	-0.04	0.09	-0.04	0.09	-0.04	0.08	-0.05	0.03
	Temp Max'	0.00	0.86	-0.02	0.33	-0.03	0.22	-0.04	0.08	-0.03	0.21	-0.03	0.15	-0.03	0.20	-0.03	0.24
	Sun	-0.02	0.36	-0.01	0.56	-0.01	0.69	-0.07	0.00	-0.01	0.74	0.01	0.81	-0.02	0.33	0.02	0.47
	Rain	-0.02	0.26	-0.01	0.64	0.01	0.78	0.03	0.19	0.00	0.84	-0.02	0.31	-0.01	0.51	-0.03	0.21
	Pressure	0.07	0.00	0.06	0.01	0.02	0.39	0.04	0.07	0.05	0.03	0.04	0.07	0.04	0.05	0.03	0.16
	Wind speed	-0.01	0.68	0.00	0.93	0.02	0.27	0.02	0.48	-0.01	0.57	0.00	0.89	-0.02	0.38	-0.01	0.59
Pollen	Grass	-0.04	0.10	-0.06	0.01	-0.04	0.08	-0.06	0.01	-0.05	0.01	-0.04	0.05	-0.04	0.06	-0.04	0.05
	Birch	0.07	0.00	0.05	0.01	0.06	0.01	0.06	0.00	0.07	0.00	0.07	0.00	0.06	0.01	0.07	0.00
	Oak	0.06	0.00	0.05	0.03	0.05	0.01	0.05	0.02	0.05	0.03	0.04	0.08	0.06	0.01	0.05	0.02
	Nettle	-0.06	0.01	-0.07	0.00	-0.06	0.01	-0.07	0.00	-0.07	0.00	-0.06	0.01	-0.06	0.00	-0.07	0.00

Table E. 87: Scotland Out of Hours Counts Asthmatics – correlation coefficients and P-values by lag day per exposure.

Exposure		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
		r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P
Outdoor air pollutants	NO Min’	0.00	0.97	0.03	0.23	0.01	0.52	-0.02	0.43	0.01	0.61	0.01	0.56	-0.05	0.02	-0.03	0.18
	NO_2 Min’	0.03	0.17	0.04	0.04	0.07	0.00	0.04	0.05	0.03	0.18	0.06	0.01	0.01	0.66	0.02	0.30
	NOD Min’	0.02	0.38	0.05	0.04	0.07	0.00	0.05	0.03	0.01	0.49	0.06	0.01	0.01	0.68	0.02	0.40
	SO_2 Min’	-0.01	0.56	-0.01	0.60	0.01	0.72	0.01	0.76	0.01	0.73	0.04	0.04	0.00	0.90	-0.01	0.81
	PM_{10} Min’	0.02	0.39	0.03	0.13	0.05	0.02	0.03	0.22	0.03	0.18	0.03	0.23	0.04	0.10	0.01	0.68
	O_3 Min’	0.00	0.90	-0.01	0.66	-0.03	0.18	-0.03	0.12	-0.03	0.16	-0.06	0.01	-0.01	0.80	0.00	0.90
	CO Min’	0.06	0.01	0.05	0.03	0.03	0.20	0.02	0.45	0.03	0.14	0.05	0.02	0.03	0.12	0.02	0.30
	NO Mean	-0.04	0.06	0.00	0.87	0.09	0.00	0.08	0.00	0.08	0.00	0.10	0.00	-0.01	0.80	-0.06	0.00
	NO_2 Mean	-0.01	0.67	0.01	0.53	0.08	0.00	0.07	0.00	0.07	0.00	0.10	0.00	0.02	0.31	-0.02	0.25
	NOD Mean	-0.03	0.13	0.01	0.60	0.10	0.00	0.09	0.00	0.08	0.00	0.11	0.00	0.03	0.24	-0.04	0.07
	SO_2 Mean	0.01	0.49	0.00	0.83	0.05	0.03	0.02	0.27	0.05	0.02	0.09	0.00	0.03	0.11	0.01	0.57
	PM_{10} Mean	0.01	0.74	0.01	0.57	0.05	0.02	0.04	0.09	0.07	0.00	0.05	0.02	0.02	0.36	0.03	0.20
	O_3 Mean	0.01	0.78	-0.03	0.15	-0.06	0.00	-0.06	0.00	-0.04	0.05	-0.06	0.00	0.00	0.89	0.00	0.96
	CO Mean	0.05	0.03	0.01	0.57	0.06	0.01	0.05	0.01	0.05	0.02	0.07	0.00	0.05	0.01	0.01	0.71
	NO Max’	-0.03	0.20	-0.01	0.61	0.08	0.00	0.07	0.00	0.08	0.00	0.10	0.00	0.02	0.48	-0.05	0.02
	NO_2 Max’	-0.01	0.76	0.00	0.88	0.06	0.00	0.06	0.01	0.06	0.00	0.09	0.00	0.04	0.08	-0.02	0.36
	NOD Max’	-0.03	0.18	-0.01	0.72	0.08	0.00	0.08	0.00	0.07	0.00	0.10	0.00	0.04	0.06	-0.04	0.09
	SO_2 Max’	0.00	0.97	-0.02	0.26	0.04	0.08	0.03	0.11	0.05	0.02	0.09	0.00	0.04	0.09	0.00	0.90
	PM_{10} Max’	0.00	0.84	0.04	0.08	0.05	0.01	0.01	0.60	0.05	0.03	0.03	0.11	0.04	0.06	0.03	0.19
	O_3 Max’	-0.01	0.53	-0.03	0.17	-0.06	0.01	-0.04	0.04	-0.03	0.14	-0.06	0.01	0.00	0.99	-0.01	0.59
	CO Max’	0.02	0.38	-0.01	0.81	0.06	0.01	0.05	0.01	0.08	0.00	0.07	0.00	0.05	0.02	-0.01	0.80
Weather	Temp Min’	-0.05	0.03	-0.05	0.03	-0.05	0.03	-0.04	0.08	-0.05	0.01	-0.05	0.01	-0.04	0.05	-0.05	0.02
	Temp Max’	-0.05	0.02	-0.07	0.00	-0.07	0.00	-0.05	0.01	-0.06	0.01	-0.05	0.02	-0.02	0.29	-0.05	0.01
	Sun	0.01	0.79	-0.05	0.02	-0.03	0.14	-0.03	0.22	-0.03	0.22	-0.02	0.34	0.01	0.68	-0.05	0.02
	Rain	0.00	0.85	0.03	0.19	0.03	0.20	0.00	0.89	0.02	0.45	0.01	0.74	-0.01	0.69	0.02	0.37
	Pressure	-0.01	0.73	0.00	0.93	0.02	0.37	0.02	0.32	0.01	0.57	0.00	0.91	0.01	0.67	0.02	0.32
	Wind speed	0.00	0.98	0.04	0.10	0.04	0.10	0.02	0.35	0.01	0.77	-0.03	0.12	-0.05	0.02	-0.03	0.19
Pollen	Grass	-0.07	0.00	-0.10	0.00	-0.09	0.00	-0.08	0.00	-0.05	0.01	-0.08	0.00	-0.05	0.01	-0.07	0.00
	Birch	-0.03	0.15	-0.03	0.20	-0.02	0.26	-0.03	0.14	-0.03	0.13	-0.01	0.51	-0.02	0.37	-0.02	0.28
	Oak	0.00	0.83	-0.05	0.01	-0.02	0.35	0.02	0.42	0.01	0.55	-0.01	0.53	0.02	0.37	0.00	0.95
	Nettle	-0.07	0.00	-0.11	0.00	-0.11	0.00	-0.09	0.00	-0.06	0.01	-0.09	0.00	-0.08	0.00	-0.08	0.00

Table E. 88: Scotland Out of Hours Counts Non-asthmatics – correlation coefficients and P-values by lag day per exposure.

Exposure		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
		r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P
Outdoor air pollutants	NO Min’	-0.04	0.06	-0.01	0.81	0.05	0.02	0.00	0.85	-0.01	0.54	0.00	0.95	-0.02	0.30	0.00	0.91
	NO_2 Min’	0.01	0.61	0.03	0.13	0.07	0.00	0.02	0.29	0.03	0.11	0.04	0.07	-0.01	0.70	0.00	0.91
	NOD Min’	0.01	0.62	0.02	0.32	0.05	0.01	0.02	0.32	0.04	0.06	0.03	0.19	0.00	0.82	0.00	0.83
	SO_2 Min’	-0.03	0.12	-0.01	0.60	0.03	0.19	0.06	0.01	0.05	0.03	0.05	0.01	0.01	0.81	-0.01	0.57
	PM_{10} Min’	0.00	0.87	0.03	0.15	0.08	0.00	0.05	0.01	0.04	0.08	0.04	0.06	-0.01	0.52	0.02	0.44
	O_3 Min’	-0.01	0.68	0.01	0.68	0.00	0.93	-0.01	0.64	-0.05	0.03	-0.06	0.00	0.02	0.26	-0.01	0.57
	CO Min’	0.04	0.04	0.01	0.55	0.01	0.55	0.01	0.49	0.03	0.19	-0.01	0.61	-0.04	0.10	0.00	0.93
	NO Mean	-0.07	0.00	-0.03	0.13	0.05	0.03	0.03	0.14	0.06	0.00	0.06	0.00	-0.03	0.12	-0.08	0.00
	NO_2 Mean	-0.03	0.13	-0.01	0.78	0.07	0.00	0.05	0.01	0.07	0.00	0.08	0.00	-0.01	0.51	-0.05	0.03
	NOD Mean	-0.04	0.05	-0.02	0.34	0.05	0.02	0.05	0.02	0.08	0.00	0.07	0.00	-0.02	0.43	-0.07	0.00
	SO_2 Mean	-0.02	0.34	0.01	0.77	0.06	0.01	0.05	0.02	0.06	0.00	0.07	0.00	0.02	0.35	-0.02	0.30
	PM_{10} Mean	0.00	0.85	0.02	0.42	0.05	0.01	0.08	0.00	0.07	0.00	0.06	0.00	-0.02	0.35	-0.01	0.53
	O_3 Mean	0.01	0.58	0.01	0.62	-0.01	0.78	-0.02	0.29	-0.05	0.04	-0.05	0.02	0.03	0.21	0.02	0.38
	CO Mean	0.02	0.40	0.02	0.37	0.02	0.32	0.02	0.31	0.05	0.02	0.02	0.43	-0.01	0.52	0.01	0.66
	NO Max’	-0.05	0.01	-0.03	0.20	0.04	0.06	0.02	0.30	0.05	0.01	0.06	0.00	-0.02	0.43	-0.08	0.00
	NO_2 Max’	-0.02	0.33	0.00	0.98	0.07	0.00	0.04	0.04	0.05	0.02	0.08	0.00	0.00	0.97	-0.03	0.23
	NOD Max’	-0.03	0.16	-0.02	0.34	0.04	0.08	0.04	0.06	0.07	0.00	0.06	0.00	0.00	0.90	-0.07	0.00
	SO_2 Max’	-0.03	0.14	-0.01	0.72	0.04	0.04	0.04	0.05	0.06	0.01	0.08	0.00	0.02	0.33	-0.05	0.03
	PM_{10} Max’	-0.02	0.43	0.02	0.36	0.03	0.19	0.04	0.06	0.04	0.04	0.07	0.00	0.00	0.94	-0.01	0.71
	O_3 Max’	-0.01	0.50	0.00	0.82	-0.01	0.76	-0.01	0.53	-0.03	0.18	-0.04	0.08	0.02	0.38	-0.01	0.59
	CO Max’	0.00	0.89	0.01	0.76	0.02	0.39	0.01	0.62	0.07	0.00	0.01	0.57	-0.02	0.31	-0.01	0.49
Weather	Temp Min’	-0.07	0.00	-0.05	0.02	-0.05	0.01	-0.04	0.07	-0.07	0.00	-0.07	0.00	-0.08	0.00	-0.07	0.00
	Temp Max’	-0.06	0.00	-0.08	0.00	-0.07	0.00	-0.08	0.00	-0.07	0.00	-0.08	0.00	-0.07	0.00	-0.08	0.00
	Sun	-0.04	0.05	-0.03	0.15	-0.01	0.64	-0.07	0.00	-0.03	0.15	-0.01	0.53	-0.01	0.61	-0.02	0.37
	Rain	0.01	0.52	0.01	0.58	0.02	0.45	0.04	0.06	0.01	0.57	-0.02	0.36	-0.02	0.28	-0.03	0.12
	Pressure	-0.01	0.65	0.00	0.94	-0.02	0.39	-0.01	0.72	0.00	0.95	0.01	0.55	0.03	0.19	0.01	0.51
	Wind speed	-0.01	0.63	0.01	0.55	0.04	0.04	0.04	0.07	0.01	0.61	0.00	0.97	-0.02	0.37	0.00	0.86
Pollen	Grass	-0.04	0.05	-0.07	0.00	-0.04	0.04	-0.06	0.01	-0.04	0.04	-0.05	0.02	-0.03	0.15	-0.03	0.15
	Birch	0.03	0.23	0.02	0.34	0.03	0.14	0.01	0.68	0.03	0.11	0.03	0.21	0.02	0.37	0.03	0.11
	Oak	0.02	0.25	-0.01	0.61	0.02	0.48	0.03	0.16	0.02	0.33	0.01	0.57	0.04	0.09	0.01	0.71
	Nettle	-0.07	0.00	-0.08	0.00	-0.06	0.00	-0.06	0.01	-0.05	0.04	-0.05	0.01	-0.05	0.02	-0.06	0.00

Table E. 89: Scotland All Counts Excess – correlation coefficients and P-values by lag day per exposure.

Exposure		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
		r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P
Outdoor air pollutants	NO Min’	0.06	0.01	0.00	0.95	0.00	0.90	0.02	0.47	0.02	0.38	0.03	0.18	0.05	0.02	0.02	0.26
	NO_2 Min’	0.01	0.54	-0.03	0.13	0.00	0.91	0.03	0.18	0.00	0.91	-0.01	0.59	0.03	0.24	0.01	0.80
	NOD Min’	0.02	0.43	-0.03	0.14	-0.03	0.24	0.00	0.84	0.00	0.93	-0.01	0.65	0.04	0.08	0.02	0.42
	SO_2 Min’	0.04	0.08	0.00	0.94	0.00	0.98	-0.03	0.22	-0.05	0.03	0.00	0.83	0.04	0.07	0.06	0.00
	PM_{10} Min’	-0.02	0.46	-0.05	0.03	-0.03	0.13	0.02	0.45	0.01	0.79	0.00	0.99	0.03	0.16	0.00	0.89
	O_3 Min’	-0.05	0.01	-0.03	0.16	0.00	0.88	-0.02	0.46	-0.02	0.31	-0.03	0.23	-0.05	0.01	-0.08	0.00
	CO Min’	0.01	0.73	0.02	0.31	0.03	0.17	0.05	0.02	0.04	0.10	0.04	0.05	0.03	0.17	0.02	0.31
	NO Mean	0.21	0.00	0.03	0.17	-0.05	0.01	-0.05	0.03	-0.08	0.00	-0.03	0.17	0.14	0.00	0.20	0.00
	NO_2 Mean	0.21	0.00	0.03	0.17	-0.05	0.01	-0.05	0.03	-0.08	0.00	-0.03	0.17	0.14	0.00	0.20	0.00
	NOD Mean	0.19	0.00	0.02	0.37	-0.07	0.00	-0.05	0.02	-0.08	0.00	-0.03	0.11	0.13	0.00	0.19	0.00
	SO_2 Mean	0.06	0.01	0.01	0.54	-0.02	0.29	-0.03	0.15	-0.06	0.00	-0.05	0.03	0.01	0.71	0.06	0.01
	PM_{10} Mean	0.05	0.03	0.01	0.81	-0.02	0.29	-0.01	0.49	-0.02	0.45	-0.01	0.76	0.08	0.00	0.07	0.00
	O_3 Mean	-0.08	0.00	-0.03	0.24	0.02	0.43	-0.01	0.69	-0.03	0.12	-0.04	0.05	-0.09	0.00	-0.11	0.00
	CO Mean	0.08	0.00	0.02	0.34	-0.01	0.63	0.02	0.25	0.02	0.31	0.03	0.14	0.07	0.00	0.07	0.00
	NO Max’	0.19	0.00	0.03	0.16	-0.03	0.11	-0.04	0.10	-0.07	0.00	-0.04	0.08	0.12	0.00	0.17	0.00
	NO_2 Max’	0.13	0.00	0.03	0.21	-0.02	0.41	-0.01	0.53	-0.05	0.02	-0.03	0.11	0.09	0.00	0.13	0.00
	NOD Max’	0.18	0.00	0.03	0.23	-0.05	0.02	-0.04	0.04	-0.08	0.00	-0.04	0.07	0.12	0.00	0.17	0.00
	SO_2 Max’	0.06	0.00	0.03	0.19	-0.03	0.24	-0.04	0.09	-0.07	0.00	-0.05	0.01	0.00	0.93	0.06	0.00
	PM_{10} Max’	0.04	0.08	0.02	0.30	-0.02	0.35	0.00	0.95	-0.02	0.48	0.01	0.69	0.04	0.05	0.04	0.06
	O_3 Max’	-0.04	0.06	-0.03	0.22	-0.01	0.71	-0.02	0.33	-0.04	0.04	-0.04	0.04	-0.06	0.01	-0.07	0.00
	CO Max’	0.12	0.00	0.04	0.08	-0.01	0.56	0.00	0.88	-0.01	0.65	0.02	0.29	0.11	0.00	0.11	0.00
Weather	Temp Min’	-0.03	0.13	-0.04	0.05	-0.05	0.04	-0.05	0.01	-0.05	0.02	-0.03	0.17	-0.04	0.04	-0.03	0.23
	Temp Max’	-0.04	0.05	-0.04	0.10	-0.05	0.03	-0.06	0.00	-0.07	0.00	-0.07	0.00	-0.06	0.00	-0.04	0.07
	Sun	-0.01	0.54	-0.02	0.45	-0.02	0.29	-0.03	0.10	-0.04	0.06	-0.04	0.06	-0.03	0.24	-0.03	0.14
	Rain	0.02	0.39	-0.02	0.46	-0.01	0.69	-0.01	0.75	0.00	0.89	0.02	0.27	0.02	0.27	0.00	0.85
	Pressure	-0.02	0.31	0.00	0.83	0.02	0.48	0.03	0.12	0.01	0.57	-0.01	0.66	-0.03	0.23	-0.03	0.22
	Wind speed	0.05	0.03	0.00	0.97	-0.01	0.58	-0.02	0.32	0.00	0.99	0.03	0.11	0.04	0.05	0.03	0.12
Pollen	Grass	-0.08	0.00	-0.04	0.04	-0.06	0.00	-0.09	0.00	-0.10	0.00	-0.10	0.00	-0.10	0.00	-0.08	0.00
	Birch	-0.04	0.09	-0.05	0.03	-0.04	0.06	-0.02	0.26	-0.03	0.15	-0.04	0.04	-0.02	0.38	-0.02	0.31
	Oak	-0.01	0.57	0.02	0.45	-0.04	0.06	-0.06	0.00	-0.05	0.03	-0.06	0.00	-0.03	0.15	-0.01	0.75
	Nettle	-0.06	0.01	-0.05	0.03	-0.06	0.00	-0.09	0.00	-0.11	0.00	-0.10	0.00	-0.09	0.00	-0.07	0.00

Table E. 90: Scotland Acute Visits Excess – correlation coefficients and P-values by lag day per exposure.

Exposure		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
		r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P
Outdoor air pollutants	NO Min’	0.00	0.98	0.02	0.32	0.02	0.26	0.00	0.95	0.00	0.84	-0.01	0.68	0.03	0.19	0.02	0.37
	NO_2 Min’	0.00	0.90	0.01	0.77	0.02	0.46	-0.01	0.74	0.00	1.00	0.03	0.12	0.02	0.40	0.01	0.60
	NOD Min’	0.01	0.79	0.02	0.37	0.04	0.06	-0.02	0.31	0.00	0.98	0.03	0.24	0.03	0.23	0.04	0.09
	SO_2 Min’	-0.01	0.70	0.01	0.62	0.00	0.88	-0.02	0.35	0.00	0.85	-0.01	0.51	-0.04	0.08	0.00	0.90
	PM_{10} Min’	0.01	0.76	-0.04	0.09	0.00	0.82	-0.02	0.47	-0.02	0.39	-0.03	0.10	0.00	0.90	-0.02	0.44
	O_3 Min’	-0.01	0.70	-0.02	0.29	0.00	0.97	0.01	0.71	0.00	0.88	-0.01	0.67	0.00	0.93	-0.05	0.03
	CO Min’	0.03	0.23	0.03	0.13	0.03	0.12	0.02	0.40	0.01	0.52	0.03	0.22	0.01	0.54	0.05	0.03
	NO Mean	0.04	0.04	0.02	0.32	0.04	0.04	0.01	0.59	0.01	0.78	0.03	0.17	0.05	0.04	0.06	0.01
	NO_2 Mean	0.04	0.06	0.03	0.17	0.04	0.07	0.01	0.62	-0.01	0.81	0.03	0.21	0.03	0.16	0.05	0.02
	NOD Mean	0.05	0.02	0.03	0.14	0.06	0.00	0.00	0.88	0.00	0.86	0.03	0.24	0.04	0.04	0.07	0.00
	SO_2 Mean	0.00	0.93	0.03	0.17	0.03	0.12	0.02	0.38	-0.03	0.16	-0.01	0.56	-0.04	0.09	0.01	0.51
	PM_{10} Mean	0.00	0.90	-0.02	0.29	-0.01	0.51	-0.02	0.44	-0.04	0.10	-0.04	0.07	-0.01	0.57	0.02	0.25
	O_3 Mean	-0.02	0.33	-0.03	0.17	-0.02	0.37	0.00	0.97	-0.01	0.49	-0.02	0.43	-0.01	0.49	-0.06	0.01
	CO Mean	0.04	0.05	0.06	0.01	0.06	0.00	0.04	0.06	0.02	0.42	0.03	0.12	0.03	0.11	0.05	0.01
	NO Max’	0.04	0.08	0.03	0.15	0.05	0.03	0.01	0.63	0.01	0.52	0.03	0.17	0.04	0.09	0.05	0.03
	NO_2 Max’	0.04	0.09	0.03	0.12	0.04	0.04	0.01	0.50	0.01	0.74	0.03	0.18	0.03	0.19	0.05	0.04
	NOD Max’	0.04	0.05	0.04	0.08	0.07	0.00	0.00	0.83	0.01	0.72	0.03	0.21	0.04	0.04	0.07	0.00
	SO_2 Max’	-0.01	0.65	0.04	0.08	0.03	0.14	0.02	0.25	-0.04	0.05	-0.02	0.38	-0.04	0.10	0.02	0.47
	PM_{10} Max’	0.02	0.31	0.01	0.55	0.04	0.08	0.00	0.96	-0.03	0.18	-0.02	0.28	-0.03	0.23	0.02	0.26
	O_3 Max’	-0.01	0.56	-0.02	0.31	-0.01	0.51	0.00	0.85	-0.01	0.50	-0.02	0.40	-0.02	0.35	-0.05	0.01
	CO Max’	0.04	0.07	0.06	0.01	0.07	0.00	0.04	0.08	0.01	0.50	0.03	0.19	0.04	0.09	0.05	0.03
Weather	Temp Min’	-0.06	0.00	-0.05	0.03	-0.06	0.01	-0.04	0.05	-0.05	0.02	-0.06	0.01	-0.04	0.05	-0.04	0.05
	Temp Max’	-0.05	0.01	-0.04	0.10	-0.04	0.08	-0.04	0.08	-0.05	0.01	-0.05	0.03	-0.05	0.03	-0.05	0.01
	Sun	0.00	0.98	0.00	0.90	-0.01	0.53	-0.01	0.79	-0.04	0.10	-0.01	0.62	0.00	0.97	-0.05	0.02
	Rain	0.04	0.05	0.00	0.98	-0.01	0.53	-0.01	0.64	0.00	0.92	0.01	0.73	0.03	0.22	0.04	0.06
	Pressure	-0.07	0.00	-0.05	0.01	-0.02	0.34	-0.02	0.42	-0.01	0.62	0.01	0.74	-0.01	0.60	-0.02	0.39
	Wind speed	-0.01	0.53	-0.01	0.53	-0.03	0.16	0.01	0.79	0.04	0.06	0.00	0.84	0.02	0.39	-0.02	0.41
Pollen	Grass	-0.03	0.11	-0.03	0.21	-0.04	0.08	-0.03	0.13	-0.04	0.06	-0.03	0.20	-0.03	0.21	-0.05	0.03
	Birch	-0.03	0.18	-0.04	0.08	-0.02	0.27	-0.03	0.14	-0.02	0.30	-0.01	0.54	-0.01	0.54	-0.03	0.23
	Oak	-0.03	0.16	-0.01	0.57	0.00	0.90	-0.02	0.31	-0.02	0.36	-0.02	0.28	-0.01	0.61	-0.02	0.40
	Nettle	-0.03	0.15	-0.02	0.41	-0.03	0.13	-0.04	0.08	-0.03	0.19	-0.03	0.16	-0.04	0.10	-0.04	0.06

Table E. 91: Scotland Casualty Counts Excess – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P
Outdoor air pollutants	NO Min’	-0.02	0.35	-0.04	0.04	-0.05	0.01	0.01	0.51	-0.02	0.30	-0.02	0.37	-0.06	0.01	-0.05	0.02
	NO_2 Min’	0.03	0.24	-0.01	0.65	-0.03	0.24	0.04	0.04	-0.01	0.77	0.03	0.19	0.02	0.35	0.00	0.92
	NOD Min’	0.02	0.28	0.00	1.00	-0.03	0.24	0.03	0.21	0.00	0.90	0.03	0.11	0.01	0.53	0.01	0.81
	SO_2 Min’	-0.04	0.06	-0.05	0.03	-0.05	0.03	-0.01	0.63	-0.01	0.52	0.01	0.71	0.01	0.75	-0.02	0.35
	PM_{10} Min’	0.01	0.74	0.01	0.51	0.02	0.42	0.04	0.08	0.03	0.12	0.00	0.90	0.06	0.01	0.03	0.21
	O_3 Min’	0.07	0.00	0.06	0.01	0.09	0.00	0.06	0.00	0.03	0.21	0.02	0.35	0.08	0.00	0.07	0.00
	CO Min’	0.02	0.37	0.06	0.01	0.01	0.64	0.03	0.18	0.00	0.82	0.07	0.00	0.01	0.73	0.02	0.48
	NO Mean	-0.01	0.64	-0.02	0.34	-0.01	0.75	0.00	0.99	-0.02	0.48	-0.01	0.74	-0.02	0.43	-0.01	0.51
	NO_2 Mean	0.00	0.97	-0.02	0.33	-0.01	0.68	0.00	0.83	-0.01	0.57	0.01	0.67	0.00	0.91	0.00	0.92
	NOD Mean	0.00	0.87	-0.01	0.74	-0.01	0.77	-0.01	0.79	0.01	0.73	0.01	0.50	0.00	0.96	0.01	0.76
	SO_2 Mean	-0.04	0.06	-0.02	0.45	-0.02	0.32	0.00	0.87	-0.02	0.34	0.02	0.40	0.00	0.95	-0.03	0.22
	PM_{10} Mean	0.01	0.73	0.01	0.73	0.01	0.54	0.03	0.13	0.00	0.85	0.00	0.87	0.03	0.22	0.01	0.65
	O_3 Mean	0.10	0.00	0.08	0.00	0.09	0.00	0.09	0.00	0.05	0.03	0.05	0.02	0.09	0.00	0.09	0.00
	CO Mean	-0.03	0.20	-0.01	0.79	-0.01	0.55	-0.01	0.79	-0.04	0.07	-0.01	0.76	-0.01	0.76	-0.03	0.20
	NO Max’	-0.02	0.44	-0.02	0.37	-0.01	0.67	0.00	0.97	-0.02	0.37	-0.01	0.55	-0.01	0.55	-0.02	0.28
	NO_2 Max’	0.00	0.88	-0.01	0.52	-0.01	0.81	0.00	0.99	-0.01	0.50	0.00	0.91	0.01	0.74	0.00	0.97
	NOD Max’	-0.01	0.67	-0.01	0.76	-0.01	0.72	-0.01	0.66	0.00	0.84	0.01	0.74	0.00	0.91	-0.01	0.64
	SO_2 Max’	-0.03	0.19	0.00	1.00	-0.02	0.38	-0.01	0.75	-0.03	0.12	0.00	0.97	-0.02	0.47	-0.03	0.15
	PM_{10} Max’	-0.01	0.69	0.02	0.41	-0.01	0.81	0.00	0.86	-0.03	0.14	-0.01	0.62	0.00	0.93	0.00	0.98
	O_3 Max’	0.11	0.00	0.08	0.00	0.09	0.00	0.09	0.00	0.05	0.01	0.06	0.00	0.10	0.00	0.10	0.00
	CO Max’	-0.03	0.16	-0.03	0.13	-0.02	0.38	0.00	0.84	-0.04	0.08	-0.02	0.42	-0.02	0.27	-0.03	0.15
Weather	Temp Min’	0.00	0.86	0.00	0.88	0.01	0.79	0.00	0.84	0.00	0.94	0.01	0.53	0.01	0.72	0.03	0.14
	Temp Max’	0.00	0.94	0.01	0.78	0.00	0.85	0.01	0.80	0.01	0.70	0.01	0.78	0.00	0.83	0.01	0.72
	Sun	0.00	0.88	0.01	0.53	0.02	0.45	0.02	0.28	-0.02	0.47	-0.01	0.56	0.02	0.41	-0.02	0.31
	Rain	0.02	0.34	0.00	0.97	0.00	0.89	-0.01	0.57	0.01	0.78	0.00	0.96	0.02	0.48	-0.02	0.46
	Pressure	0.03	0.17	0.02	0.43	0.01	0.72	0.00	0.91	0.00	0.94	0.02	0.46	0.02	0.44	0.00	0.86
	Wind speed	-0.01	0.50	0.02	0.40	0.00	0.83	0.02	0.34	0.00	0.98	-0.03	0.20	0.01	0.70	0.01	0.57
Pollen	Grass	-0.02	0.34	-0.02	0.46	-0.01	0.64	-0.02	0.48	0.00	0.85	-0.01	0.60	-0.01	0.64	-0.01	0.61
	Birch	-0.02	0.41	-0.04	0.04	-0.04	0.07	-0.02	0.39	-0.01	0.64	-0.02	0.30	-0.01	0.50	-0.03	0.12
	Oak	-0.01	0.69	-0.01	0.50	-0.01	0.69	-0.02	0.39	-0.02	0.45	-0.03	0.13	-0.03	0.16	-0.02	0.43
	Nettle	-0.01	0.57	-0.01	0.73	-0.01	0.73	-0.01	0.56	0.01	0.78	0.00	0.93	-0.01	0.76	0.00	0.85

Table E. 92: Scotland Emergency Consultations Excess – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P
Outdoor air pollutants	NO Min’	-0.06	0.00	-0.07	0.00	-0.03	0.15	-0.04	0.07	-0.01	0.50	-0.01	0.81	0.00	0.99	-0.05	0.03
	NO_2 Min’	0.05	0.01	0.04	0.07	0.05	0.02	0.07	0.00	0.06	0.00	0.06	0.01	0.06	0.01	0.06	0.01
	NOD Min’	0.05	0.01	0.03	0.12	0.06	0.01	0.07	0.00	0.07	0.00	0.06	0.01	0.05	0.02	0.06	0.01
	SO_2 Min’	-0.03	0.13	-0.04	0.09	-0.03	0.15	-0.03	0.15	-0.03	0.12	0.00	0.96	-0.01	0.72	0.00	0.84
	PM_{10} Min’	0.09	0.00	0.05	0.01	0.04	0.05	0.05	0.01	0.05	0.02	0.05	0.01	0.06	0.00	0.06	0.01
	O_3 Min’	0.08	0.00	0.11	0.00	0.10	0.00	0.08	0.00	0.11	0.00	0.09	0.00	0.08	0.00	0.07	0.00
	CO Min’	0.01	0.62	0.03	0.23	0.03	0.18	0.02	0.44	0.01	0.49	0.03	0.21	0.01	0.51	0.05	0.02
	NO Mean	0.06	0.01	0.00	0.99	-0.02	0.35	0.03	0.20	0.02	0.38	0.03	0.11	0.07	0.00	0.07	0.00
	NO_2 Mean	0.07	0.00	0.03	0.13	0.01	0.62	0.04	0.04	0.03	0.19	0.04	0.06	0.06	0.00	0.08	0.00
	NOD Mean	0.09	0.00	0.03	0.20	0.01	0.68	0.05	0.02	0.03	0.13	0.05	0.02	0.07	0.00	0.08	0.00
	SO_2 Mean	-0.01	0.59	-0.03	0.21	-0.04	0.06	-0.01	0.77	-0.02	0.29	-0.02	0.27	-0.02	0.48	0.00	0.82
	PM_{10} Mean	0.06	0.00	0.04	0.06	0.00	0.92	0.02	0.47	0.02	0.44	0.02	0.42	0.07	0.00	0.07	0.00
	O_3 Mean	0.11	0.00	0.14	0.00	0.12	0.00	0.12	0.00	0.12	0.00	0.11	0.00	0.10	0.00	0.10	0.00
	CO Mean	-0.02	0.48	-0.03	0.15	-0.04	0.07	0.00	0.96	0.01	0.67	-0.01	0.81	-0.01	0.76	-0.01	0.77
	NO Max’	0.05	0.02	0.01	0.76	-0.02	0.35	0.03	0.19	0.01	0.81	0.03	0.17	0.06	0.01	0.06	0.00
	NO_2 Max’	0.07	0.00	0.02	0.25	0.00	0.86	0.03	0.12	0.01	0.62	0.03	0.11	0.06	0.01	0.06	0.00
	NOD Max’	0.07	0.00	0.02	0.29	0.00	0.93	0.05	0.03	0.02	0.42	0.04	0.04	0.06	0.00	0.07	0.00
	SO_2 Max’	0.00	0.88	-0.01	0.53	-0.04	0.09	0.00	0.97	-0.02	0.29	-0.04	0.06	-0.02	0.38	0.00	0.86
	PM_{10} Max’	0.02	0.32	0.02	0.31	-0.04	0.08	0.00	0.97	0.00	0.88	0.01	0.52	0.05	0.02	0.02	0.32
	O_3 Max’	0.13	0.00	0.14	0.00	0.11	0.00	0.13	0.00	0.13	0.00	0.13	0.00	0.13	0.00	0.12	0.00
	CO Max’	-0.01	0.79	-0.02	0.39	-0.03	0.11	0.00	0.91	0.02	0.48	-0.01	0.57	0.00	0.89	-0.01	0.61
Weather	Temp Min’	-0.03	0.12	-0.05	0.03	-0.06	0.01	-0.05	0.02	-0.06	0.00	-0.05	0.03	-0.04	0.04	-0.02	0.38
	Temp Max’	-0.04	0.07	-0.05	0.02	-0.05	0.02	-0.03	0.17	-0.04	0.07	-0.04	0.07	-0.05	0.02	-0.04	0.07
	Sun	-0.02	0.30	-0.02	0.36	-0.02	0.48	0.02	0.38	0.01	0.76	-0.01	0.53	-0.03	0.14	0.00	0.84
	Rain	0.01	0.65	0.02	0.47	0.01	0.54	0.00	0.94	0.00	0.98	0.02	0.25	0.02	0.29	-0.01	0.58
	Pressure	-0.02	0.37	0.01	0.51	0.04	0.05	0.05	0.02	0.04	0.05	0.02	0.36	0.02	0.30	0.00	0.88
	Wind speed	0.04	0.08	0.02	0.28	0.02	0.32	0.01	0.55	0.01	0.55	0.01	0.79	0.01	0.54	0.02	0.38
Pollen	Grass	-0.05	0.01	-0.04	0.09	-0.06	0.01	-0.08	0.00	-0.08	0.00	-0.08	0.00	-0.07	0.00	-0.07	0.00
	Birch	-0.01	0.72	-0.01	0.68	-0.01	0.57	0.02	0.42	0.00	0.92	0.00	0.83	0.01	0.55	0.01	0.60
	Oak	0.03	0.19	0.02	0.38	0.00	0.89	0.01	0.81	-0.01	0.65	-0.01	0.69	0.00	0.91	-0.02	0.38
	Nettle	-0.06	0.00	-0.05	0.03	-0.08	0.00	-0.08	0.00	-0.07	0.00	-0.06	0.00	-0.06	0.01	-0.07	0.00

Table E. 93: Scotland Emergency Counts Excess – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P
Outdoor air pollutants	NO Min’	-0.03	0.13	-0.02	0.26	-0.04	0.05	-0.03	0.15	-0.01	0.68	-0.02	0.37	-0.04	0.04	-0.07	0.00
	NO_2 Min’	0.05	0.04	0.03	0.13	0.03	0.15	0.07	0.00	0.03	0.22	0.05	0.01	0.04	0.05	0.05	0.03
	NOD Min’	0.04	0.04	0.05	0.04	0.05	0.02	0.06	0.01	0.03	0.18	0.06	0.00	0.04	0.08	0.05	0.01
	SO_2 Min’	-0.02	0.28	-0.04	0.04	-0.04	0.08	-0.04	0.04	-0.03	0.11	0.00	0.93	-0.01	0.65	-0.01	0.57
	PM_{10} Min’	0.07	0.00	0.04	0.04	0.02	0.35	0.04	0.10	0.04	0.05	0.01	0.60	0.08	0.00	0.04	0.09
	O_3 Min’	0.08	0.00	0.06	0.00	0.08	0.00	0.05	0.02	0.07	0.00	0.05	0.01	0.06	0.01	0.08	0.00
	CO Min’	0.02	0.32	0.07	0.00	0.04	0.07	0.03	0.12	0.01	0.71	0.07	0.00	0.05	0.03	0.05	0.02
	NO Mean	0.03	0.13	0.00	0.93	0.03	0.18	0.05	0.03	0.02	0.43	0.04	0.09	0.03	0.15	0.02	0.48
	NO_2 Mean	0.05	0.02	0.02	0.41	0.03	0.11	0.04	0.04	0.01	0.54	0.05	0.03	0.05	0.02	0.04	0.04
	NOD Mean	0.05	0.02	0.03	0.22	0.06	0.01	0.05	0.02	0.03	0.15	0.06	0.00	0.06	0.00	0.06	0.01
	SO_2 Mean	-0.01	0.73	-0.01	0.51	0.00	0.98	0.00	0.82	-0.01	0.49	0.02	0.31	0.01	0.80	0.01	0.80
	PM_{10} Mean	0.04	0.08	0.03	0.17	0.02	0.31	0.01	0.75	0.01	0.69	-0.01	0.70	0.06	0.00	0.06	0.01
	O_3 Mean	0.10	0.00	0.08	0.00	0.07	0.00	0.07	0.00	0.07	0.00	0.07	0.00	0.08	0.00	0.09	0.00
	CO Mean	0.00	0.97	-0.01	0.63	0.02	0.33	0.03	0.16	-0.01	0.52	0.02	0.43	0.03	0.17	-0.01	0.66
	NO Max’	0.03	0.23	0.00	0.88	0.02	0.27	0.04	0.05	0.01	0.61	0.03	0.22	0.03	0.13	0.01	0.54
	NO_2 Max’	0.04	0.06	0.01	0.79	0.02	0.35	0.04	0.08	0.01	0.53	0.04	0.07	0.05	0.01	0.03	0.19
	NOD Max’	0.04	0.08	0.02	0.45	0.05	0.04	0.05	0.03	0.02	0.26	0.05	0.02	0.06	0.00	0.04	0.06
	SO_2 Max’	0.00	0.96	0.00	0.93	0.00	0.92	0.01	0.58	-0.02	0.28	0.00	0.99	0.00	0.88	0.00	0.92
	PM_{10} Max’	0.01	0.51	0.05	0.04	0.01	0.60	0.00	0.84	-0.01	0.51	-0.03	0.21	0.04	0.07	0.03	0.19
	O_3 Max’	0.12	0.00	0.09	0.00	0.07	0.00	0.08	0.00	0.08	0.00	0.08	0.00	0.10	0.00	0.11	0.00
	CO Max’	0.00	0.97	-0.03	0.20	0.02	0.47	0.03	0.17	0.00	0.91	0.01	0.70	0.02	0.27	-0.01	0.53
Weather	Temp Min’	-0.04	0.07	-0.04	0.07	-0.04	0.04	-0.04	0.09	-0.04	0.04	-0.03	0.18	-0.02	0.38	0.00	0.84
	Temp Max’	-0.04	0.08	-0.05	0.02	-0.04	0.05	-0.02	0.36	-0.03	0.14	-0.03	0.21	-0.02	0.36	-0.03	0.20
	Sun	0.00	0.90	-0.02	0.33	-0.02	0.27	0.03	0.20	-0.02	0.42	-0.02	0.29	0.00	0.90	-0.04	0.08
	Rain	0.04	0.05	0.02	0.47	0.01	0.57	-0.02	0.45	0.01	0.78	0.03	0.16	0.04	0.07	0.01	0.54
	Pressure	-0.02	0.29	-0.01	0.53	0.03	0.16	0.03	0.12	0.01	0.49	0.01	0.67	0.01	0.57	0.02	0.48
	Wind speed	0.00	0.92	0.03	0.22	0.02	0.42	0.01	0.54	0.02	0.46	-0.02	0.47	0.01	0.79	0.00	0.99
Pollen	Grass	-0.06	0.01	-0.06	0.01	-0.08	0.00	-0.07	0.00	-0.06	0.01	-0.07	0.00	-0.05	0.01	-0.07	0.00
	Birch	-0.05	0.03	-0.06	0.01	-0.05	0.01	-0.03	0.18	-0.04	0.08	-0.03	0.20	-0.01	0.65	-0.04	0.08
	Oak	0.00	0.85	-0.02	0.29	-0.02	0.41	-0.02	0.37	-0.02	0.28	-0.03	0.15	-0.02	0.47	-0.02	0.28
	Nettle	-0.05	0.01	-0.06	0.00	-0.09	0.00	-0.08	0.00	-0.05	0.02	-0.06	0.01	-0.06	0.01	-0.05	0.01

Table E. 94: Scotland Out of Hours Counts Excess – correlation coefficients and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P
Outdoor air pollutants	NO Min’	0.02	0.36	0.03	0.17	-0.01	0.59	-0.02	0.38	0.02	0.46	0.01	0.81	-0.04	0.09	-0.05	0.02
	NO_2 Min’	0.01	0.68	0.03	0.24	0.02	0.44	0.02	0.25	0.00	0.88	0.02	0.25	0.00	0.82	0.01	0.77
	NOD Min’	0.01	0.75	0.03	0.15	0.03	0.23	0.03	0.11	-0.01	0.64	0.03	0.12	0.00	0.90	0.01	0.67
	SO_2 Min’	0.01	0.74	-0.01	0.61	-0.01	0.50	-0.04	0.07	-0.03	0.18	0.00	0.91	-0.02	0.32	-0.01	0.65
	PM_{10} Min’	0.02	0.29	0.01	0.64	-0.01	0.77	0.00	0.92	0.01	0.79	0.00	0.87	0.04	0.04	0.00	0.93
	O_3 Min’	0.01	0.59	-0.01	0.59	-0.02	0.29	-0.02	0.30	0.00	0.98	-0.01	0.60	-0.01	0.50	0.02	0.33
	CO Min’	0.01	0.64	0.04	0.10	0.02	0.37	0.00	0.87	0.01	0.78	0.04	0.04	0.05	0.02	0.02	0.28
	NO Mean	0.01	0.55	0.02	0.45	0.05	0.02	0.05	0.03	0.03	0.15	0.05	0.03	0.01	0.79	-0.03	0.13
	NO_2 Mean	0.01	0.51	0.02	0.45	0.03	0.11	0.02	0.31	0.01	0.59	0.04	0.09	0.02	0.48	-0.01	0.52
	NOD Mean	0.01	0.66	0.02	0.30	0.06	0.01	0.05	0.03	0.02	0.37	0.05	0.01	0.02	0.40	-0.01	0.70
	SO_2 Mean	0.02	0.27	-0.01	0.63	0.00	0.92	-0.02	0.47	0.00	0.87	0.03	0.22	0.01	0.60	0.01	0.55
	PM_{10} Mean	0.01	0.60	0.01	0.59	0.01	0.49	-0.02	0.43	0.01	0.52	0.00	0.84	0.03	0.13	0.03	0.12
	O_3 Mean	0.01	0.81	-0.03	0.17	-0.05	0.02	-0.04	0.07	-0.01	0.63	-0.02	0.35	-0.01	0.60	0.00	0.93
	CO Mean	0.03	0.16	-0.01	0.81	0.04	0.08	0.03	0.11	0.00	0.86	0.04	0.07	0.05	0.03	0.00	0.87
	NO Max’	0.02	0.36	0.01	0.72	0.05	0.03	0.04	0.07	0.03	0.14	0.04	0.04	0.01	0.51	-0.02	0.35
	NO_2 Max’	0.01	0.57	-0.01	0.75	0.02	0.33	0.01	0.52	0.01	0.55	0.03	0.16	0.02	0.31	-0.02	0.39
	NOD Max’	0.01	0.65	0.00	0.83	0.05	0.02	0.04	0.06	0.02	0.29	0.05	0.02	0.03	0.24	0.00	0.89
	SO_2 Max’	0.02	0.36	-0.01	0.56	0.01	0.76	0.00	0.98	0.01	0.62	0.02	0.37	0.01	0.50	0.02	0.47
	PM_{10} Max’	0.02	0.38	0.03	0.24	0.03	0.15	-0.02	0.32	0.01	0.65	-0.02	0.35	0.04	0.06	0.03	0.12
	O_3 Max’	0.01	0.81	-0.02	0.29	-0.05	0.03	-0.03	0.21	-0.01	0.59	-0.02	0.32	0.00	0.83	0.01	0.63
	CO Max’	0.02	0.38	-0.01	0.57	0.03	0.11	0.04	0.05	0.02	0.33	0.04	0.05	0.05	0.03	0.00	0.87
Weather	Temp Min’	0.00	0.94	0.00	0.94	0.00	0.92	0.00	0.90	0.00	0.98	0.00	0.95	0.01	0.49	0.01	0.79
	Temp Max’	0.00	0.99	-0.02	0.48	-0.01	0.64	0.00	0.83	0.00	0.89	0.01	0.76	0.03	0.18	0.00	0.98
	Sun	0.03	0.23	-0.03	0.21	-0.03	0.16	0.02	0.33	0.01	0.80	-0.01	0.71	0.02	0.40	-0.04	0.09
	Rain	0.00	0.83	0.02	0.40	0.02	0.38	-0.03	0.20	0.01	0.62	0.02	0.30	0.01	0.67	0.04	0.05
	Pressure	0.00	0.86	-0.01	0.73	0.03	0.16	0.03	0.16	0.01	0.61	-0.01	0.65	-0.01	0.54	0.01	0.65
	Wind speed	0.00	0.89	0.02	0.40	0.00	0.90	-0.01	0.73	0.00	0.94	-0.03	0.21	-0.02	0.28	-0.02	0.37
Pollen	Grass	-0.03	0.19	-0.04	0.07	-0.06	0.01	-0.03	0.19	-0.02	0.41	-0.04	0.09	-0.02	0.34	-0.04	0.04
	Birch	-0.04	0.05	-0.04	0.10	-0.04	0.08	-0.03	0.14	-0.05	0.03	-0.03	0.18	-0.02	0.33	-0.04	0.07
	Oak	-0.01	0.59	-0.03	0.12	-0.03	0.21	0.00	0.96	-0.01	0.79	-0.02	0.37	0.00	0.95	-0.01	0.77
	Nettle	-0.02	0.30	-0.05	0.02	-0.06	0.01	-0.04	0.07	-0.03	0.22	-0.05	0.03	-0.04	0.08	-0.04	0.10

Appendix F

Multiple Regressions

F1. Comparative Analyses for Multiple Regression

F1.1. Null Model with Daily Counts as the dependent Exposure

England and Wales

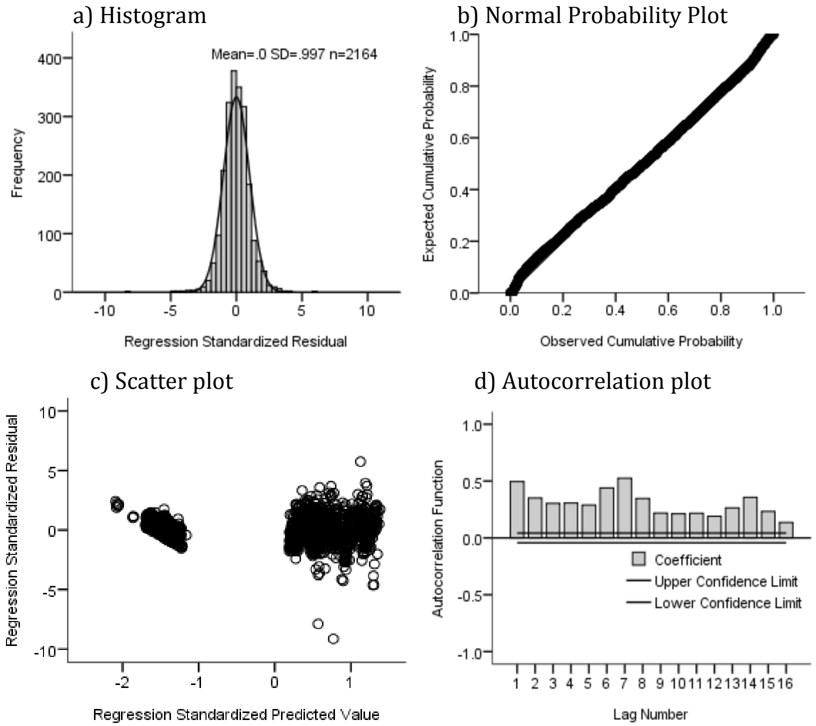


Figure F1. 1: England and Wales All Counts Asthmatics - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

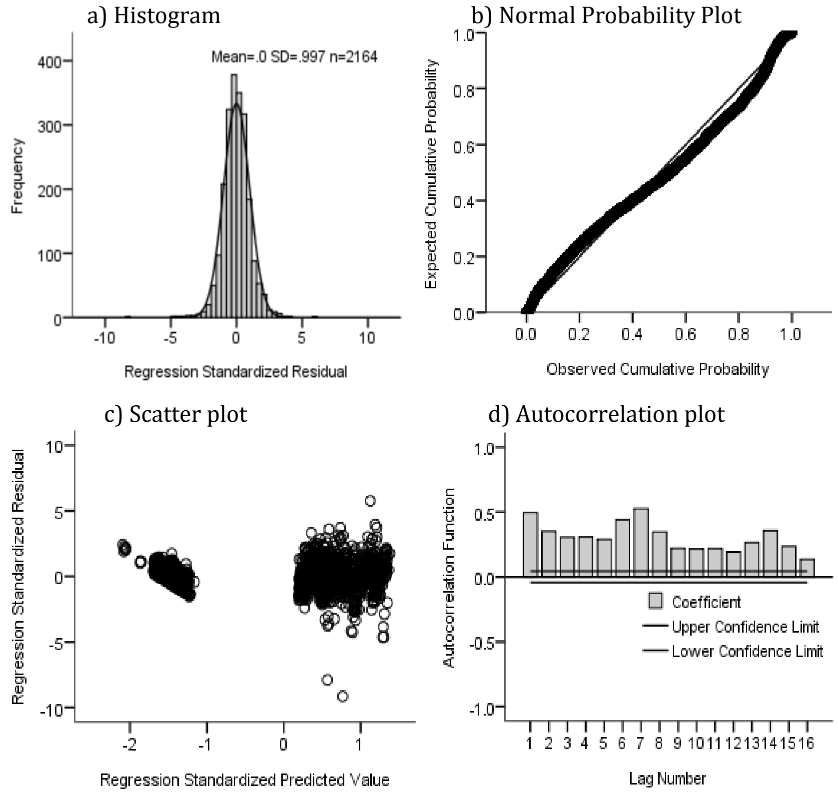


Figure F1. 2: England and Wales All Counts Non-asthmatics - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

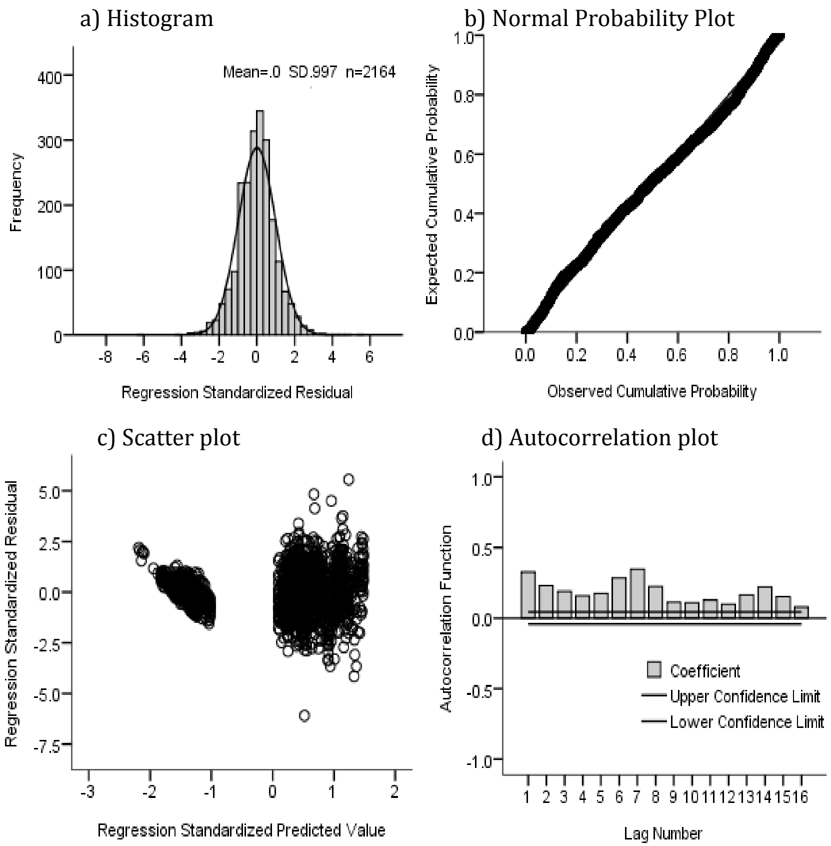


Figure F1. 3: England and Wales All Counts Excess - linear regression null model, a) Histogram, b) P plot, c) Scatter plot and d) Autocorrelation plot.

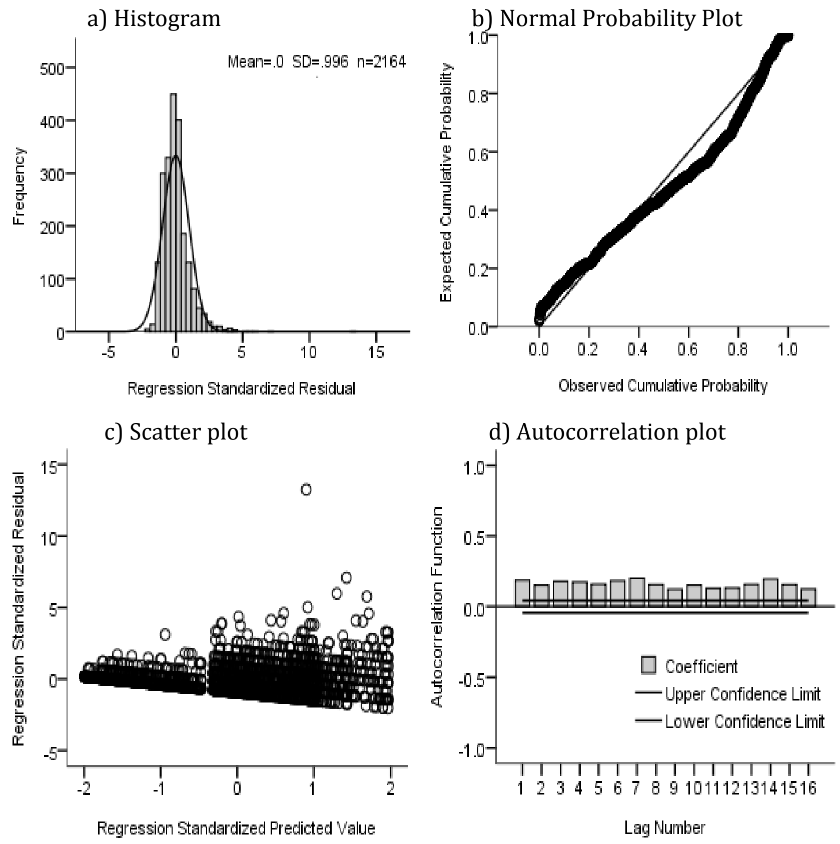


Figure F1.4: England and Wales Acute Visits Asthmatics - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

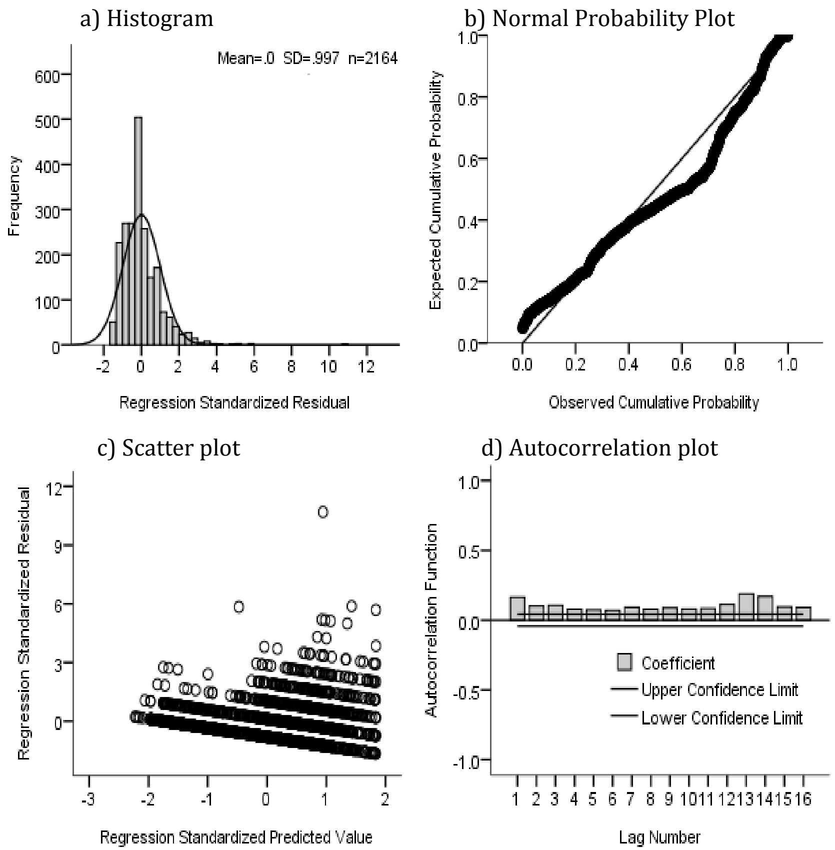


Figure F1. 5: England and Wales Acute Visits Non-asthmatics - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

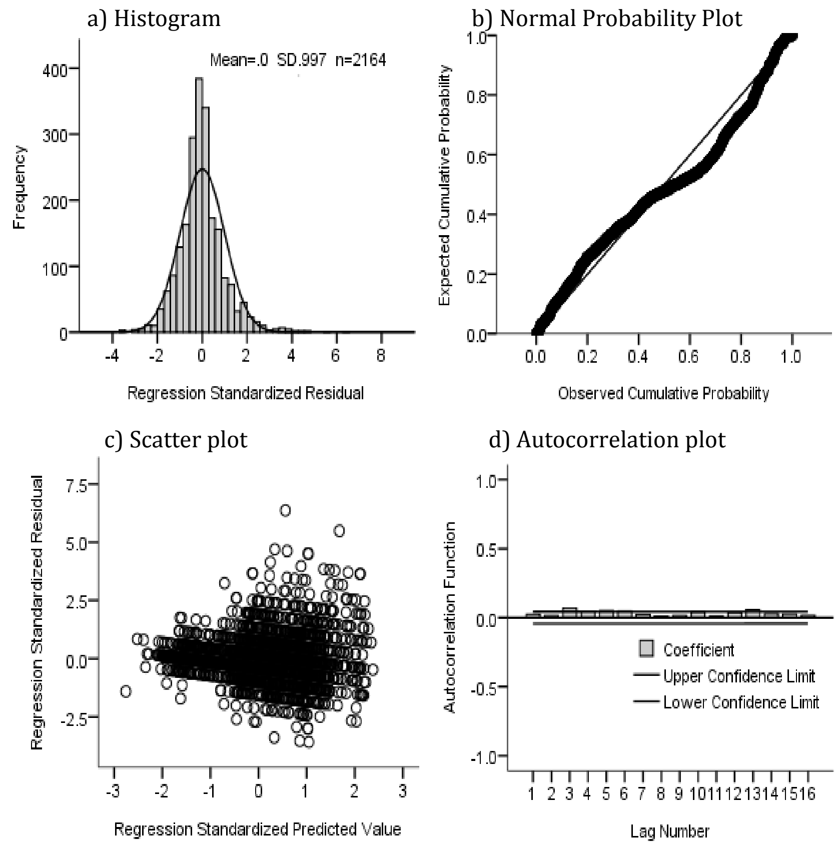


Figure F1. 6: England and Wales Acute Visits Excess - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

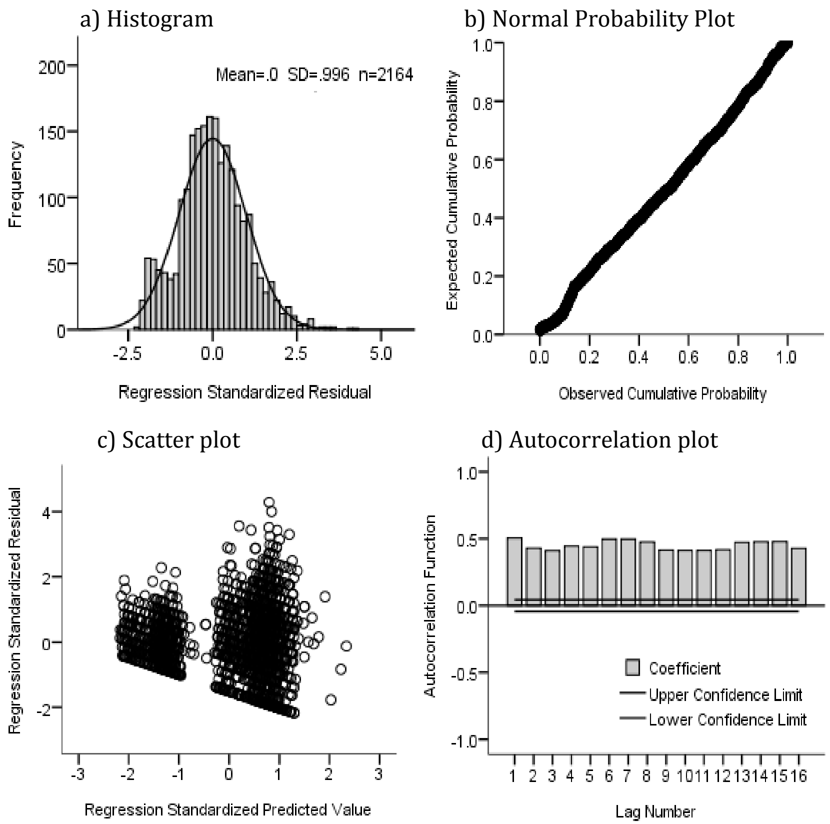


Figure F1. 7: England and Wales Casualty Counts Asthmatics - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

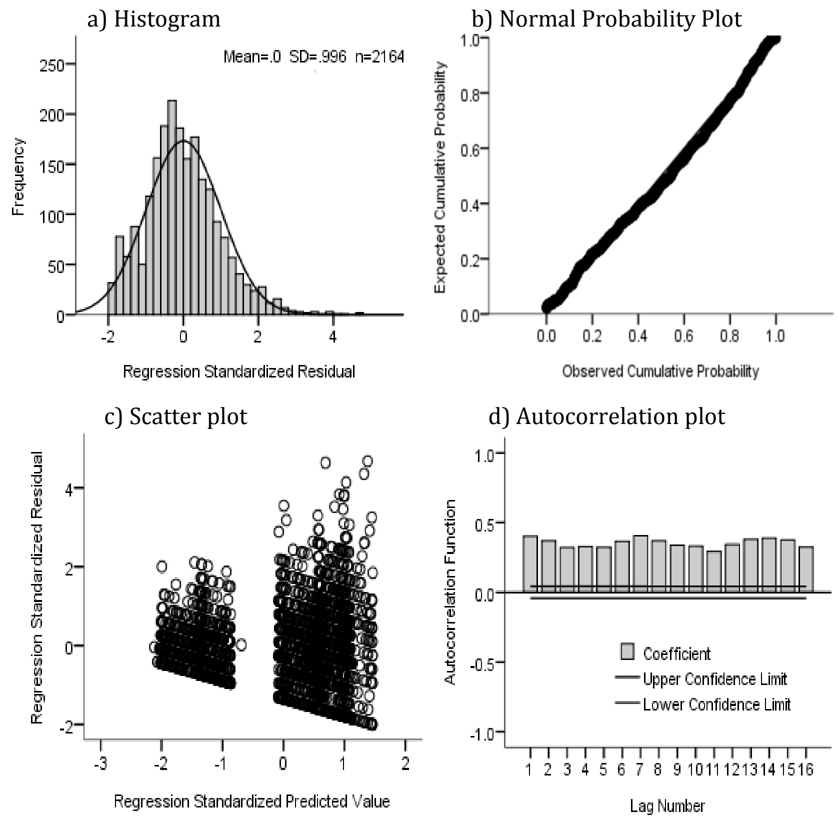


Figure F1. 8: England and Wales Casualty Counts Non-asthmatics - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

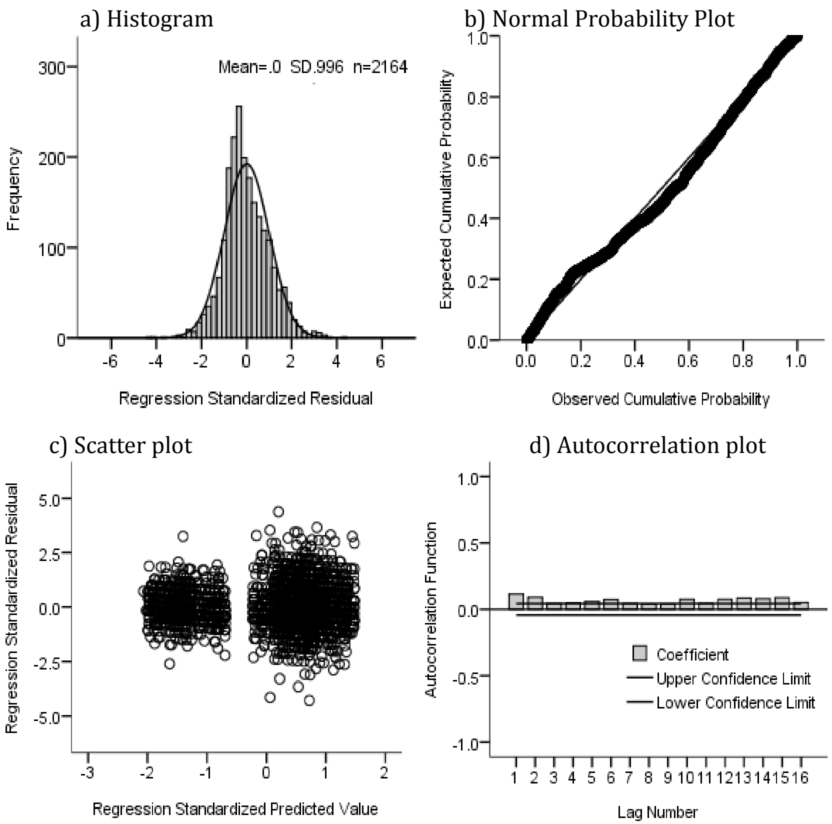


Figure F1. 9: England and Wales Casualty Counts Excess - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

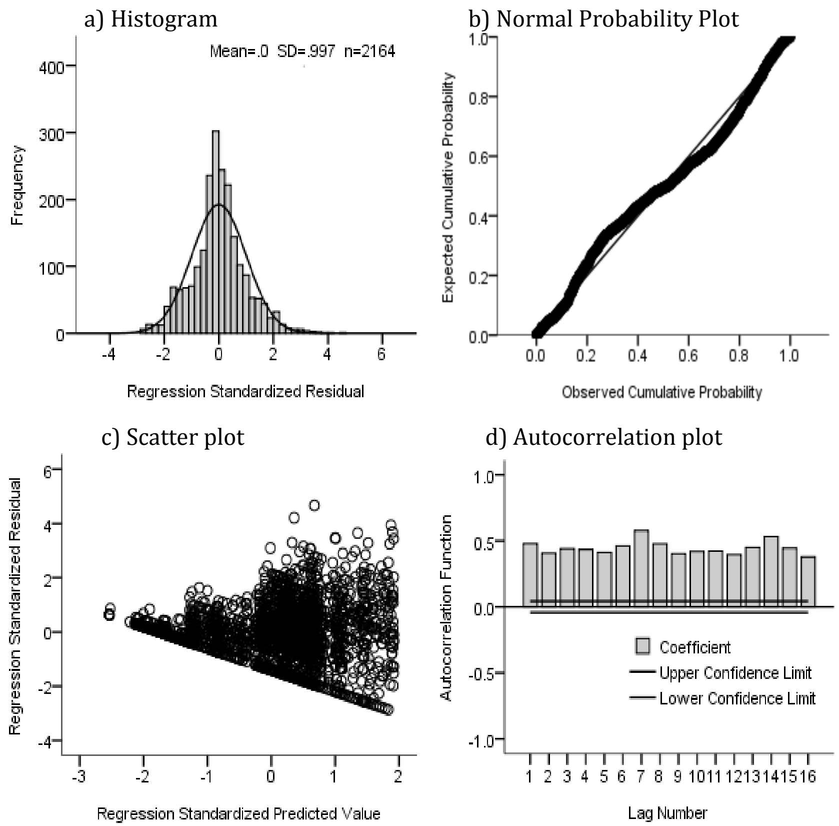


Figure F1. 10: England and Wales Emergency Consultations Asthmatics - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

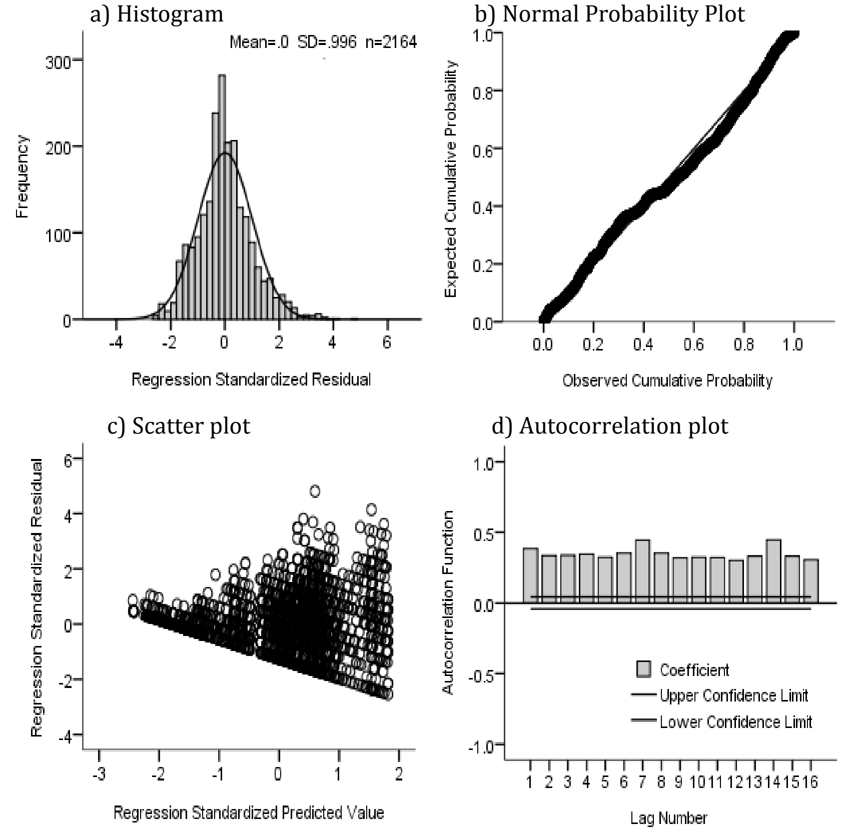


Figure F1. 11: England and Wales Emergency Consultations Non-asthmatics - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

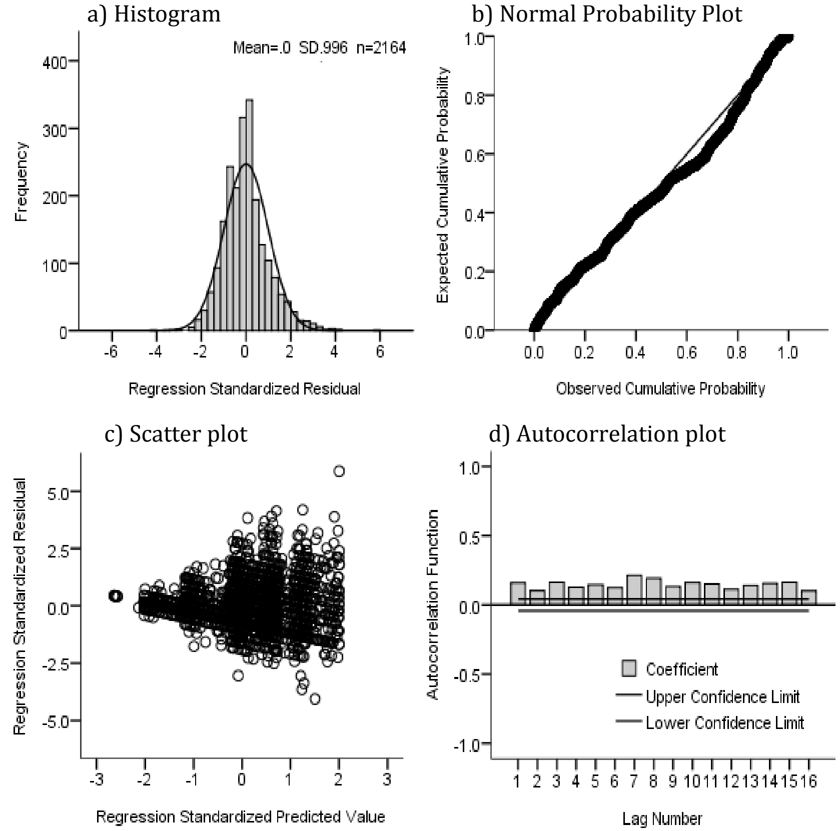


Figure F1. 12: England and Wales Emergency Consultations Excess - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

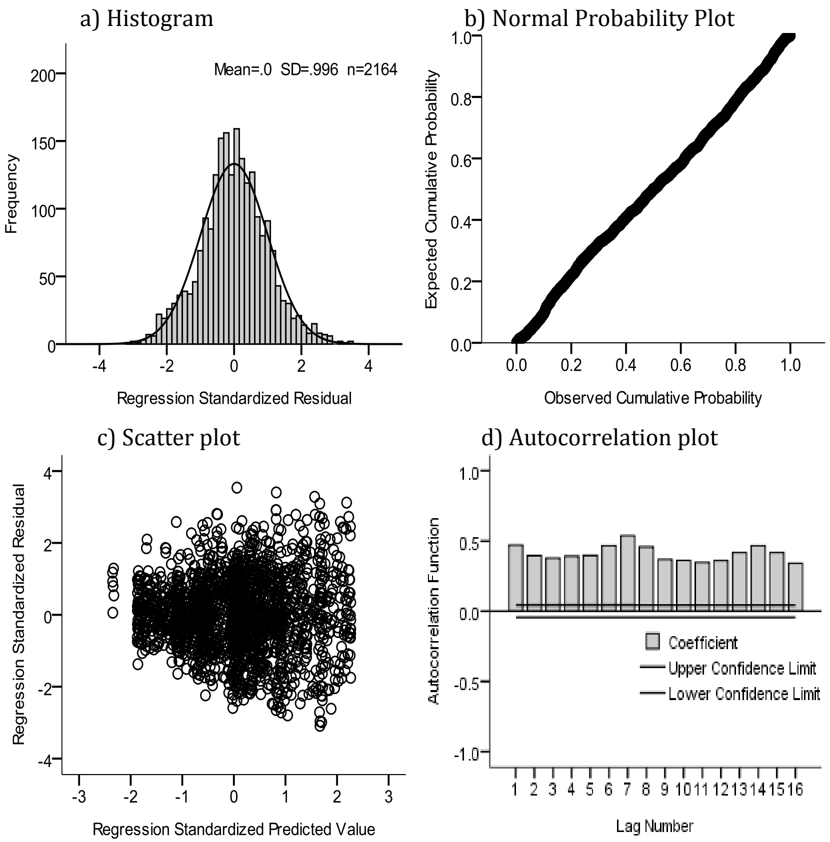


Figure F1. 13: England and Wales Emergency Counts Asthmatics - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

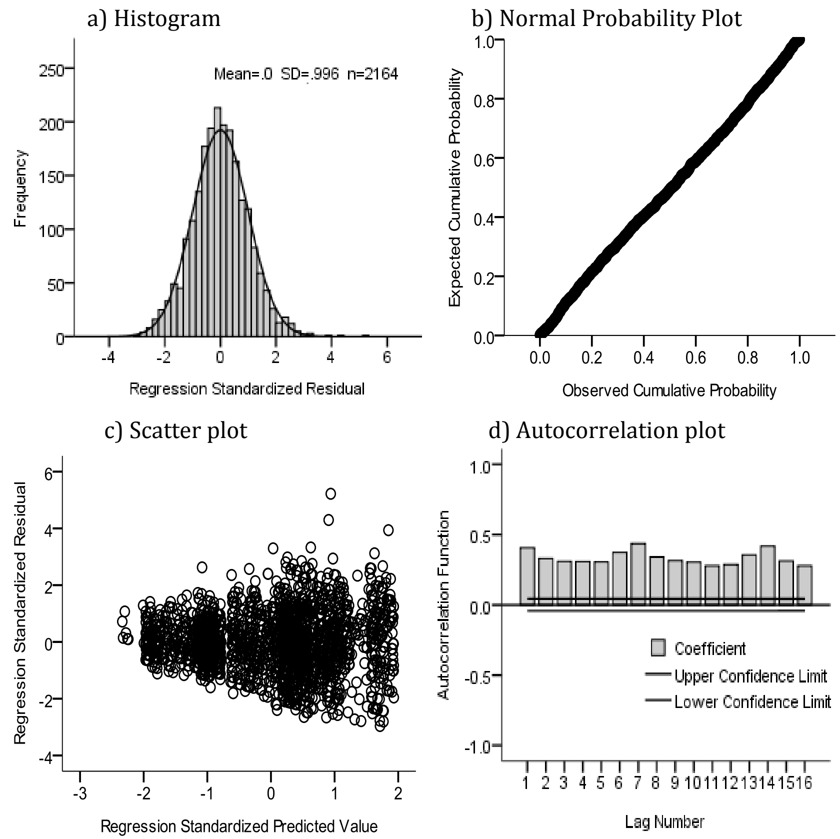


Figure F1. 14: England and Wales Emergency Counts Non-asthmatics - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

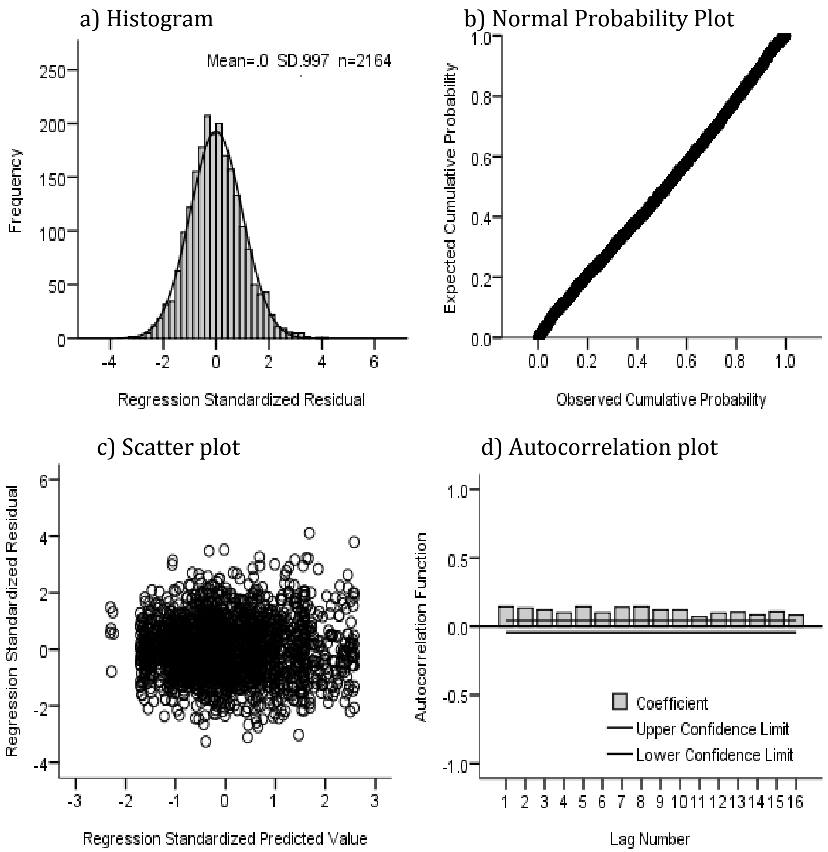


Figure F1. 15: England and Wales Emergency Counts Excess - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

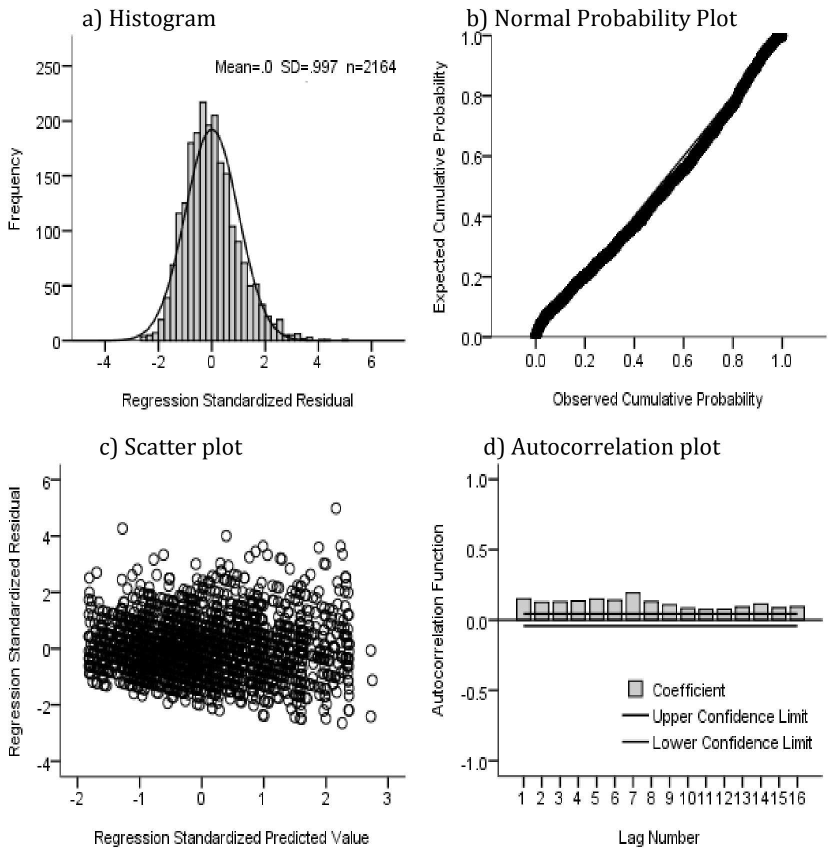


Figure F1. 16: England and Wales Out of Hours Counts Asthmatics - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

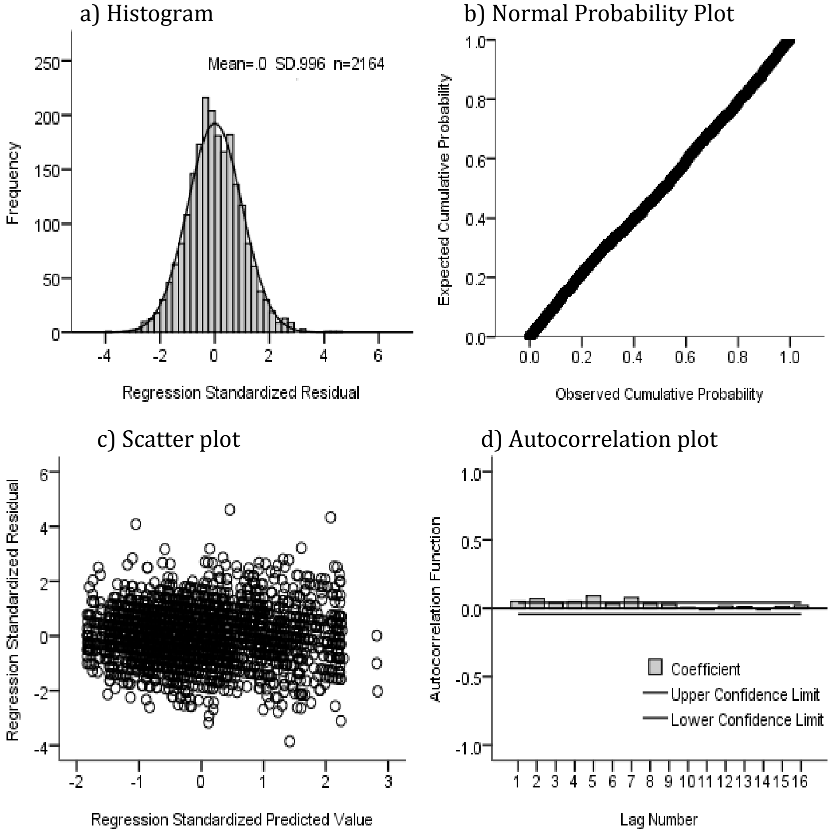


Figure F1. 17: England and Wales Out of Hours Counts Excess - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

For England and Wales, with the majority of the medical contacts (bar Acute Visits) three out of the four assumptions of the linear regression satisfied: the histograms; scatter plots and normality probability plot met the regression criteria. However, there was high autocorrelation of the residuals in all models. The autocorrelation pattern did not change with the addition of environmental exposures. Autocorrelation was slightly improved with daily excess rather than daily counts for asthmatics and non-asthmatics.

Trent Region

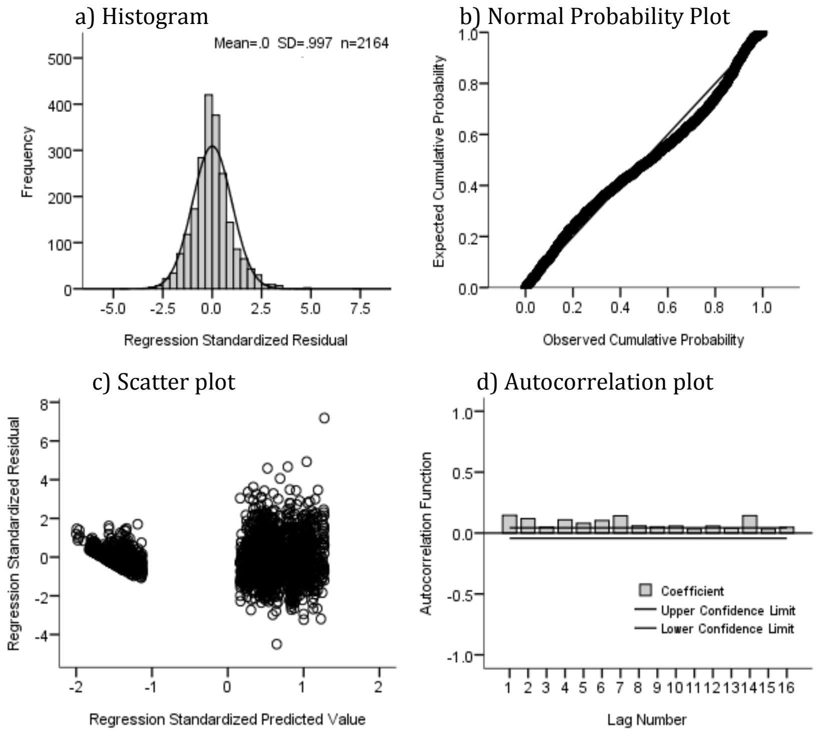


Figure F1. 18: Trent Region All Counts Asthmatics - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

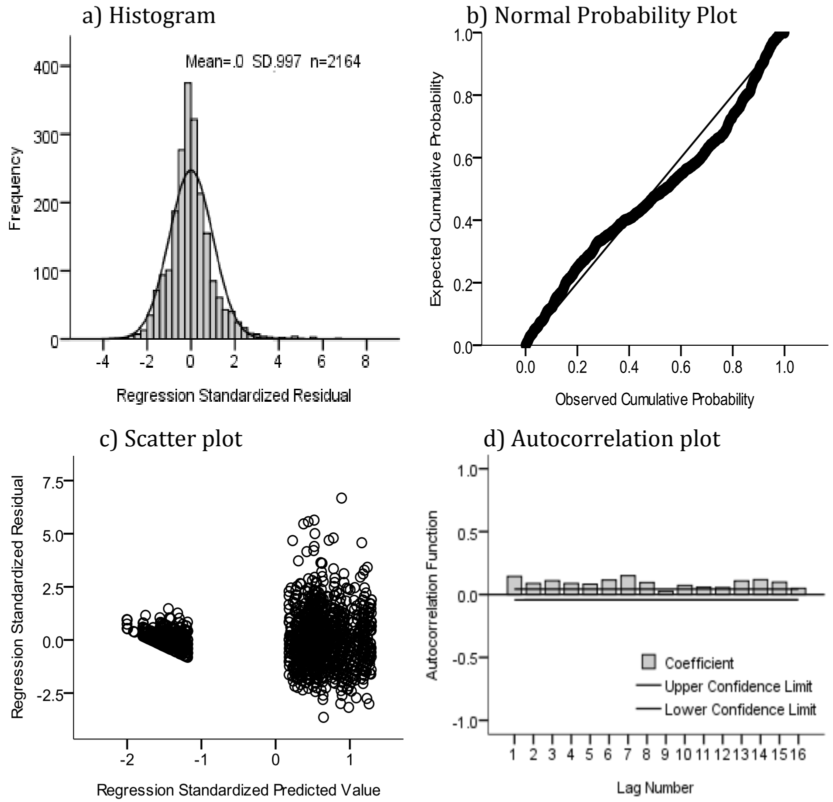


Figure F1. 19: Trent Region All Counts Non-asthmatics - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

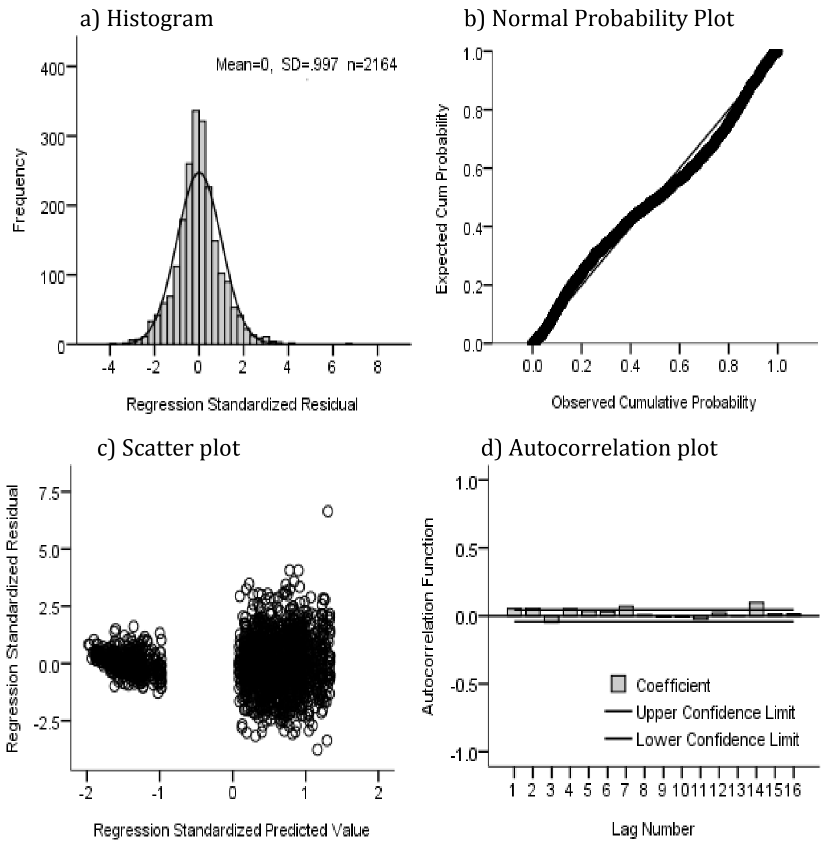


Figure F1. 20: Trent Region All Counts Excess - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

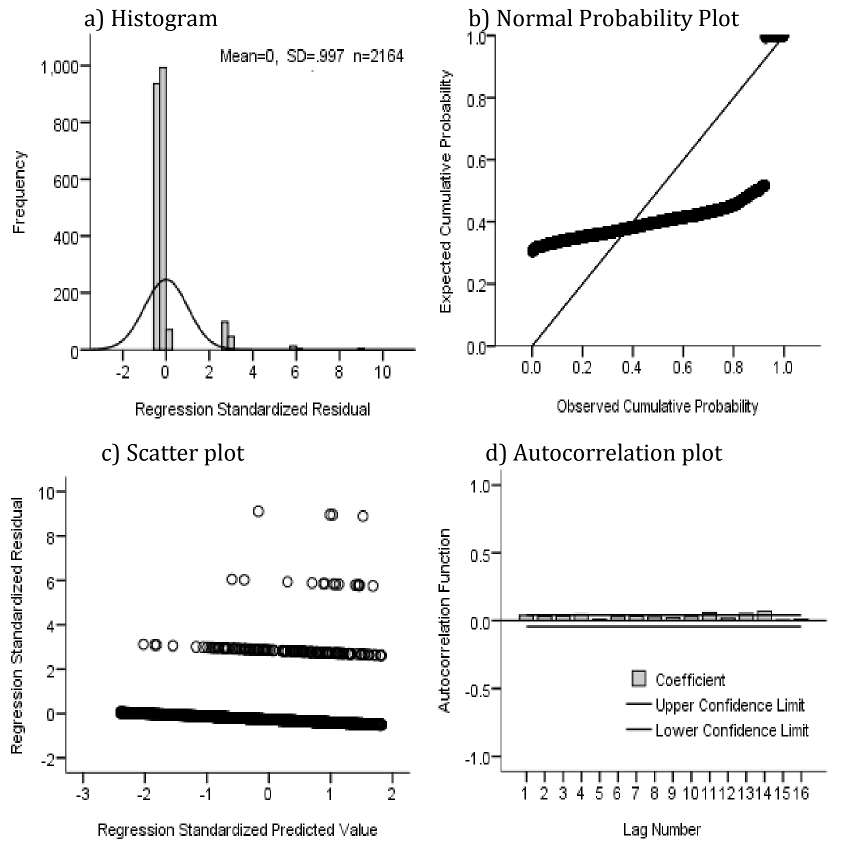


Figure F1. 21: Trent Region Acute Visits Asthmatics - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

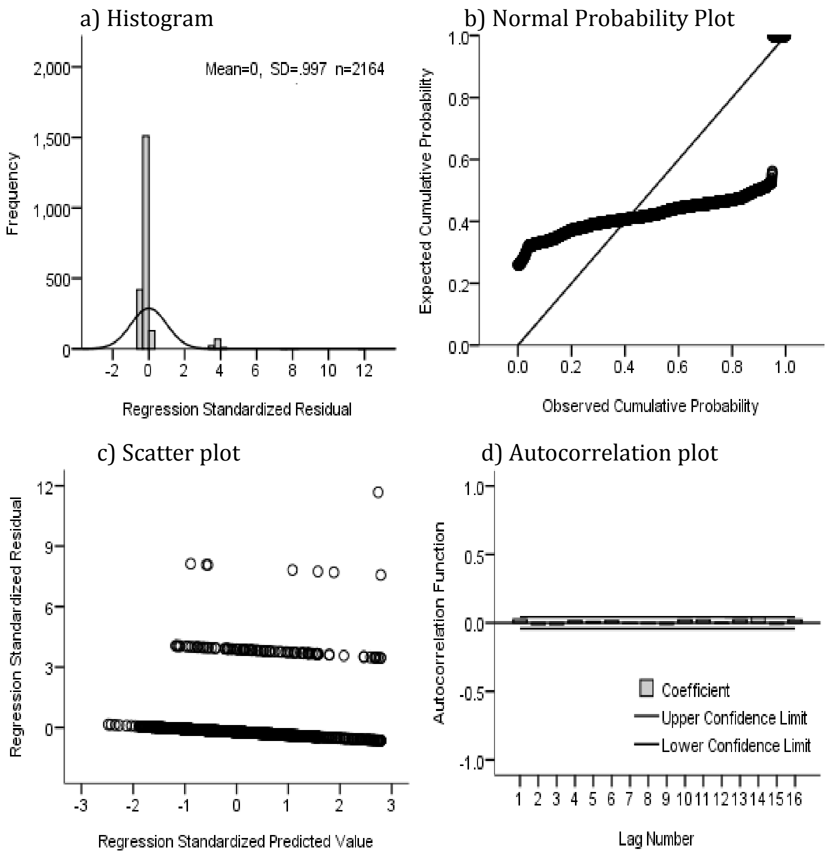


Figure F1.22: Trent Region Acute Visits Non-asthmatics - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

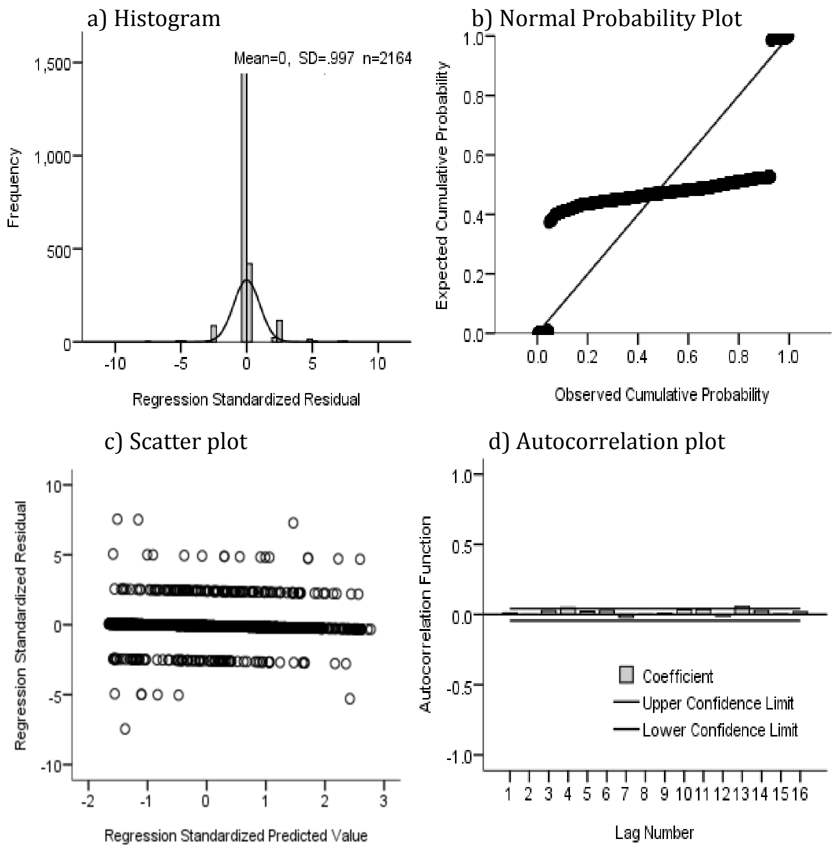


Figure F1.23: Trent Region Acute Visits Excess - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

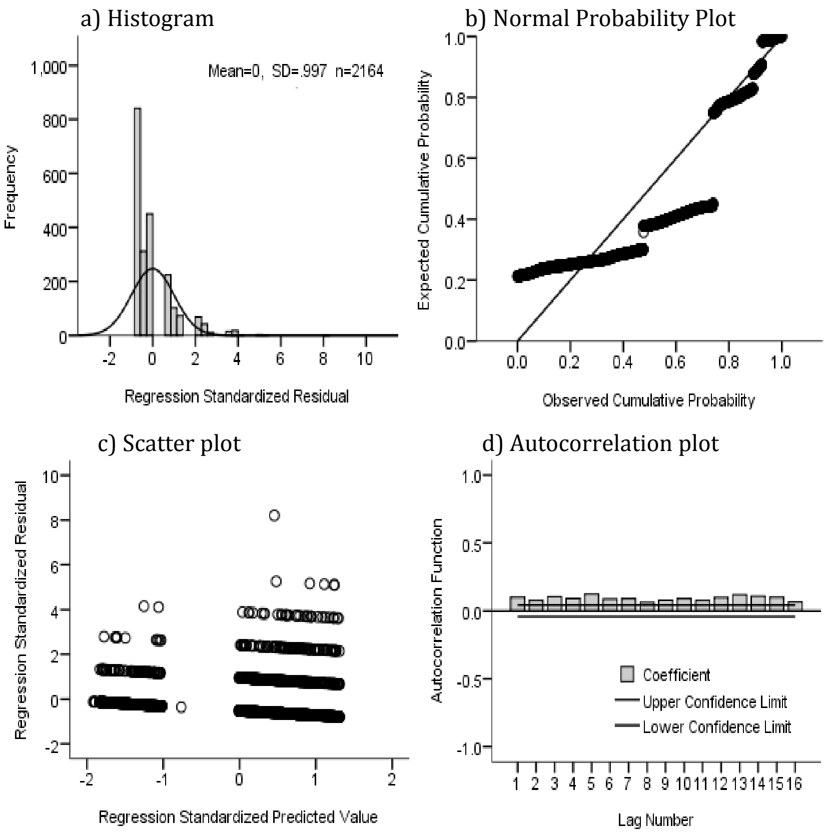


Figure F1.24: Trent Region Casualty Counts Asthmatics - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

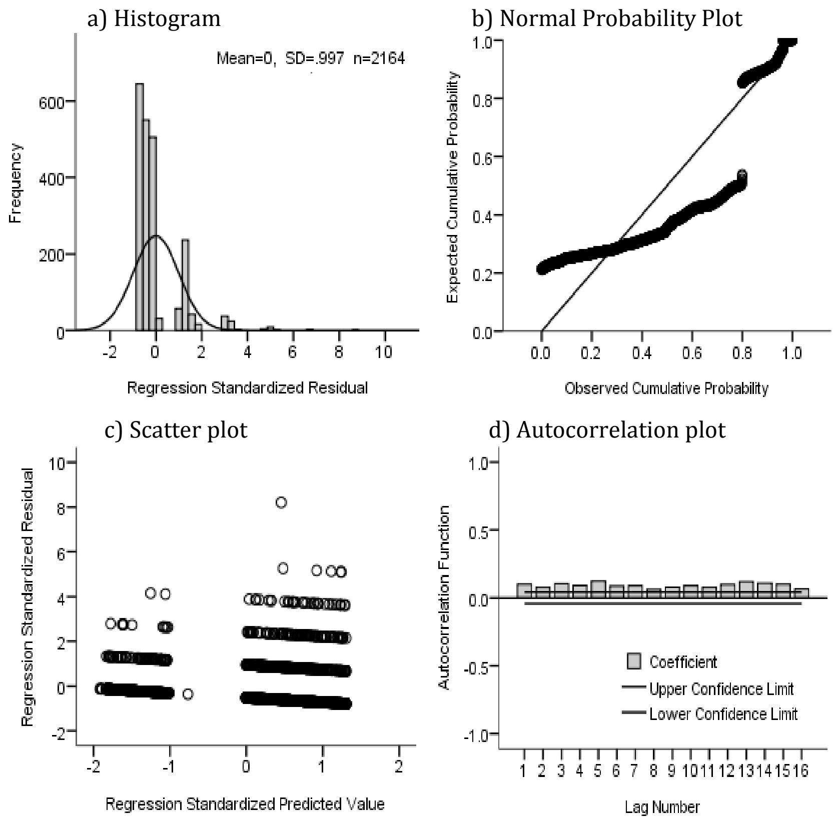


Figure F1. 25: Trent Region Casualty Counts Non-asthmatics - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

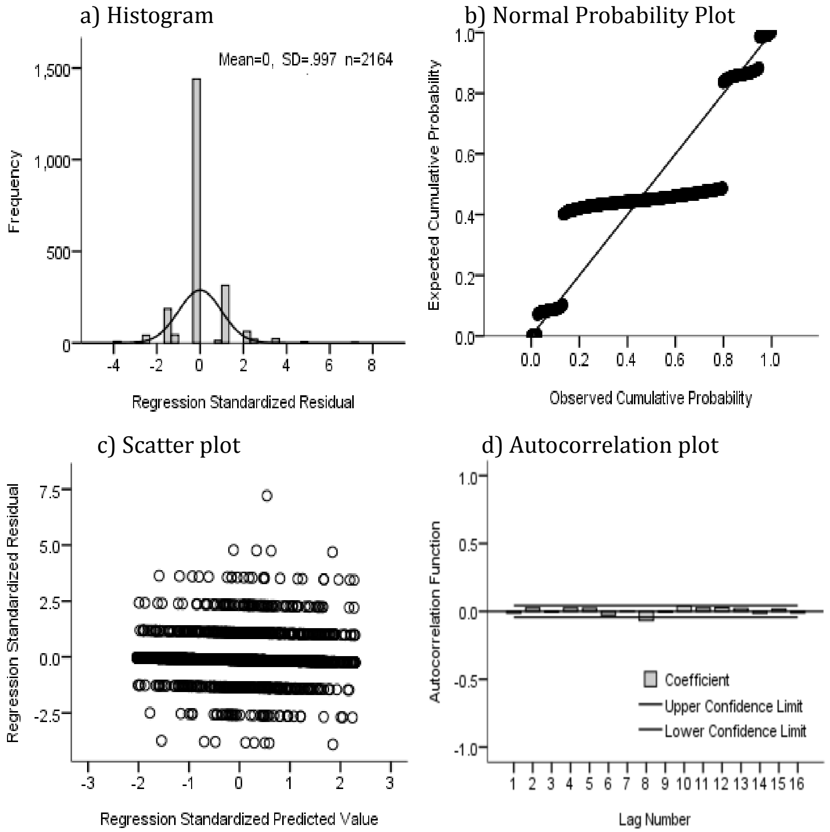


Figure F1.26: Trent Region Casualty Counts Excess - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

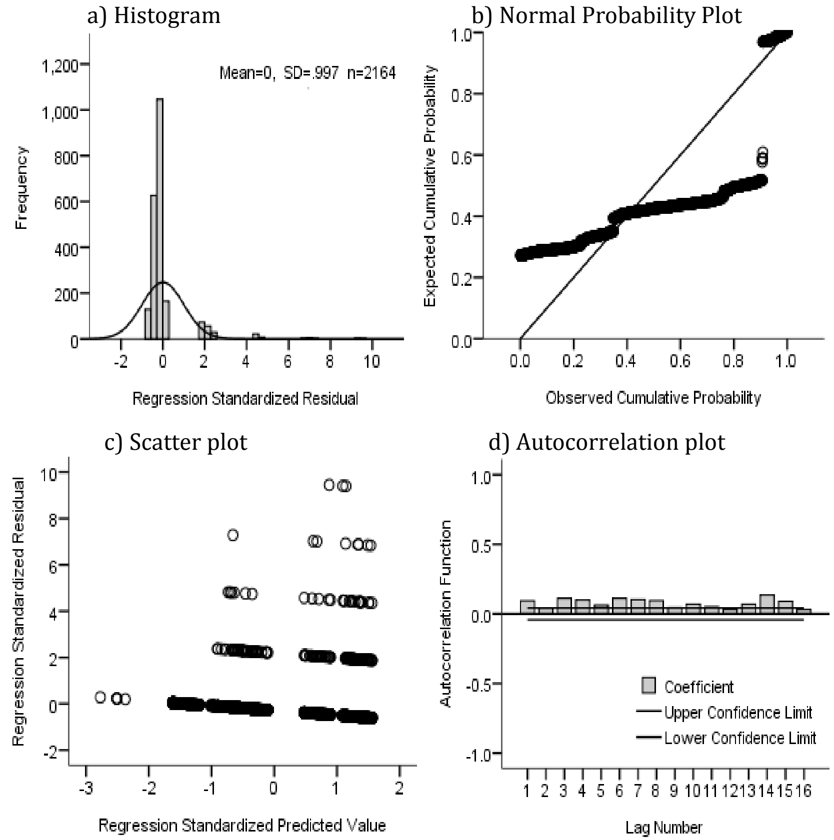


Figure F1.27: Trent Region Emergency Consultations Asthmatics - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

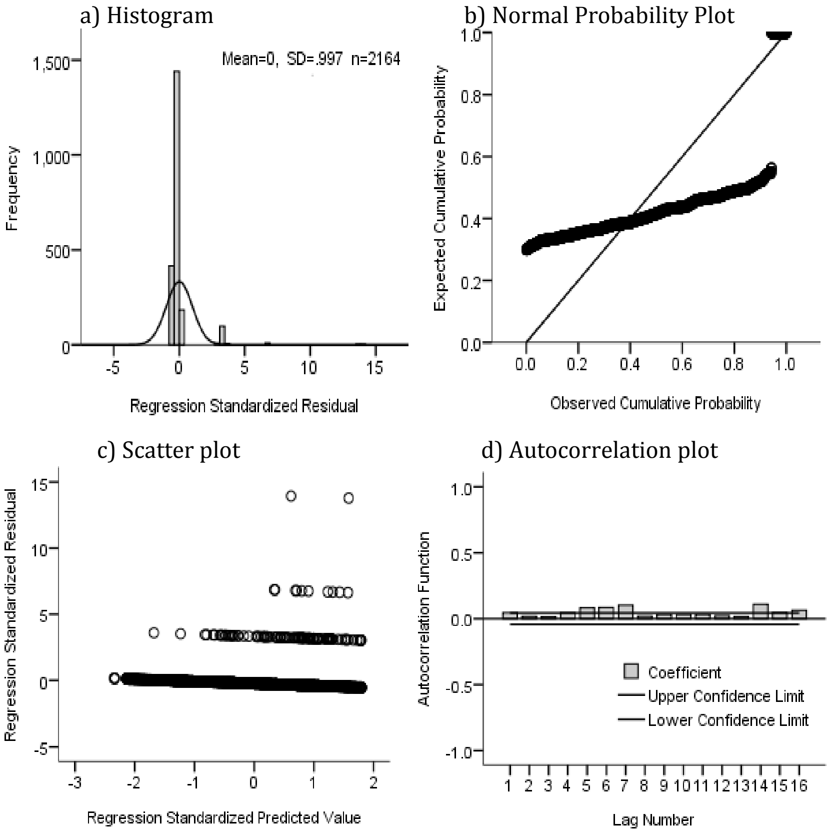


Figure F1.28: Trent Region Emergency Consultations Non-asthmatics - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

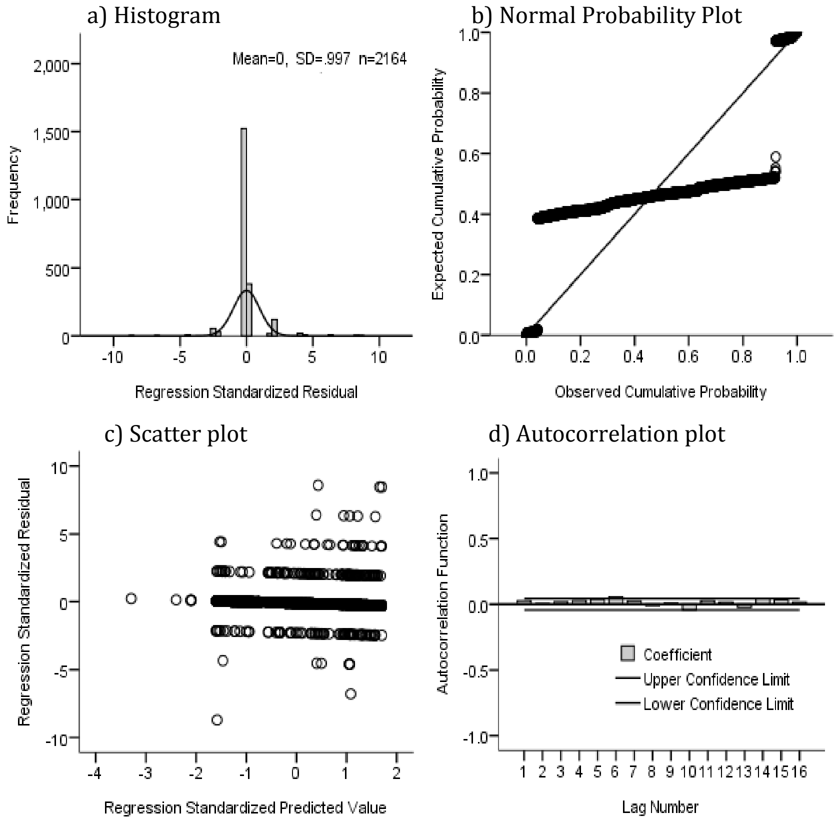


Figure F1.29: Trent Region Emergency Consultations Excess - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

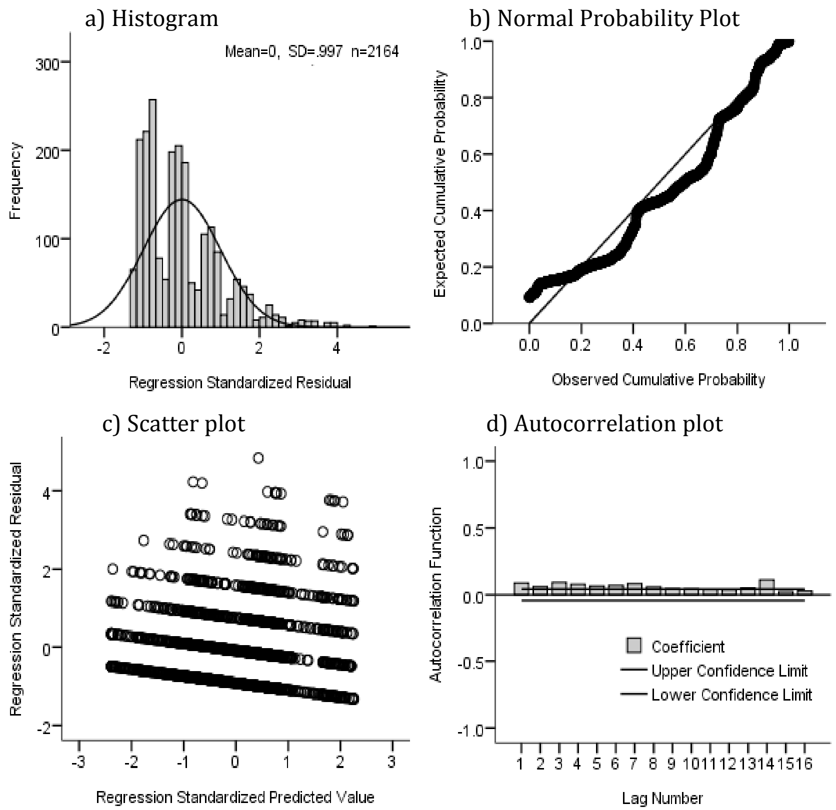


Figure F1.30: Trent Region Emergency Counts Asthmatics - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

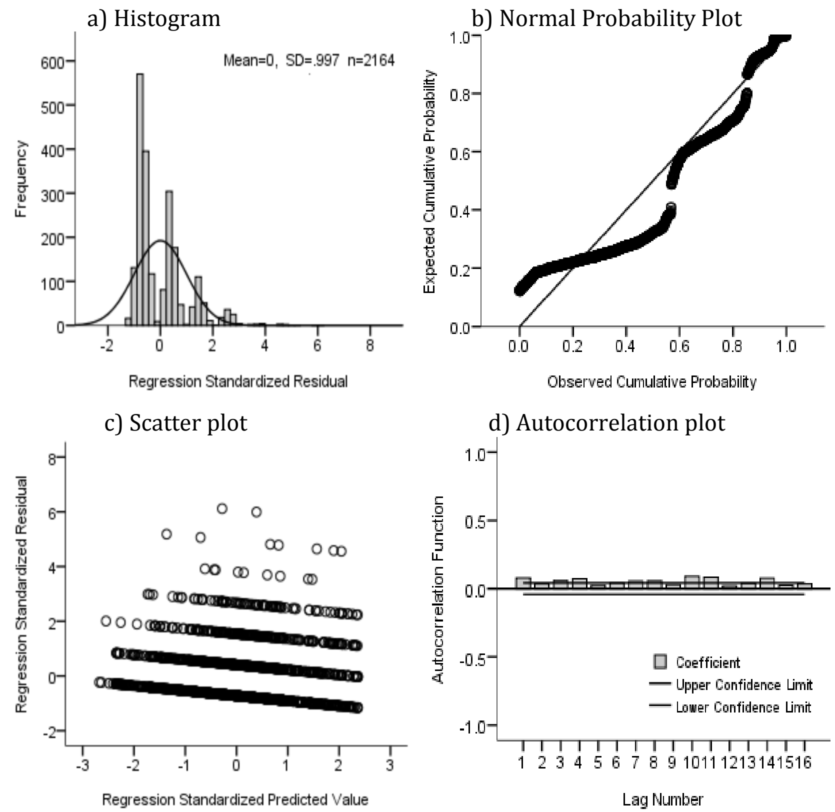


Figure F1.31: Trent Region Emergency Counts Non-asthmatics - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

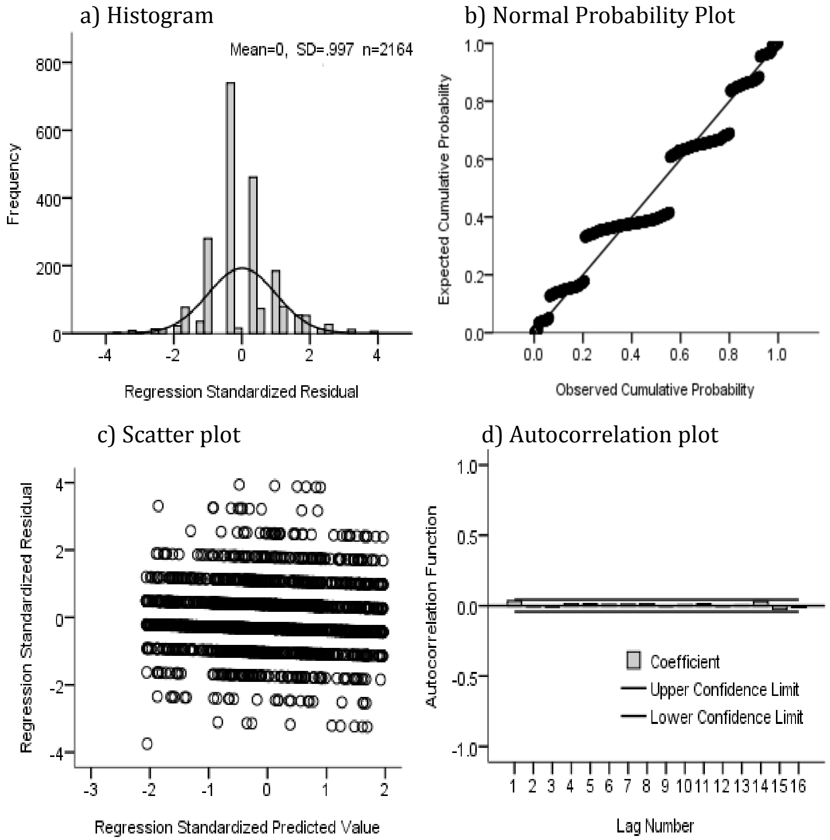


Figure F1.32. Trent Region Emergency Counts Excess - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

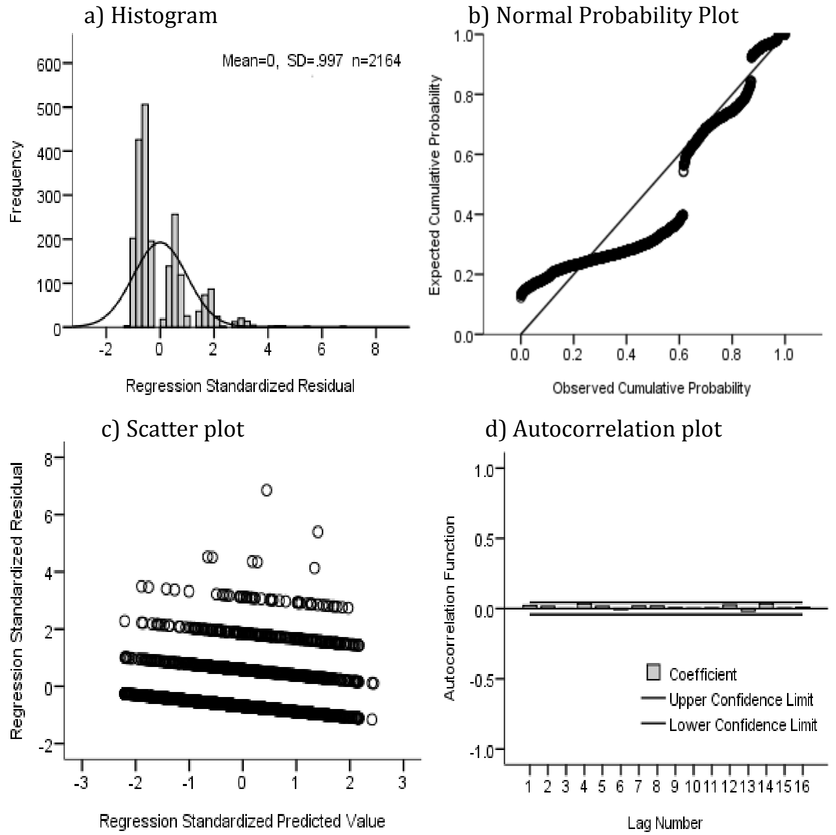


Figure F1.33: Trent Region Out of Hours Counts Asthmatics - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

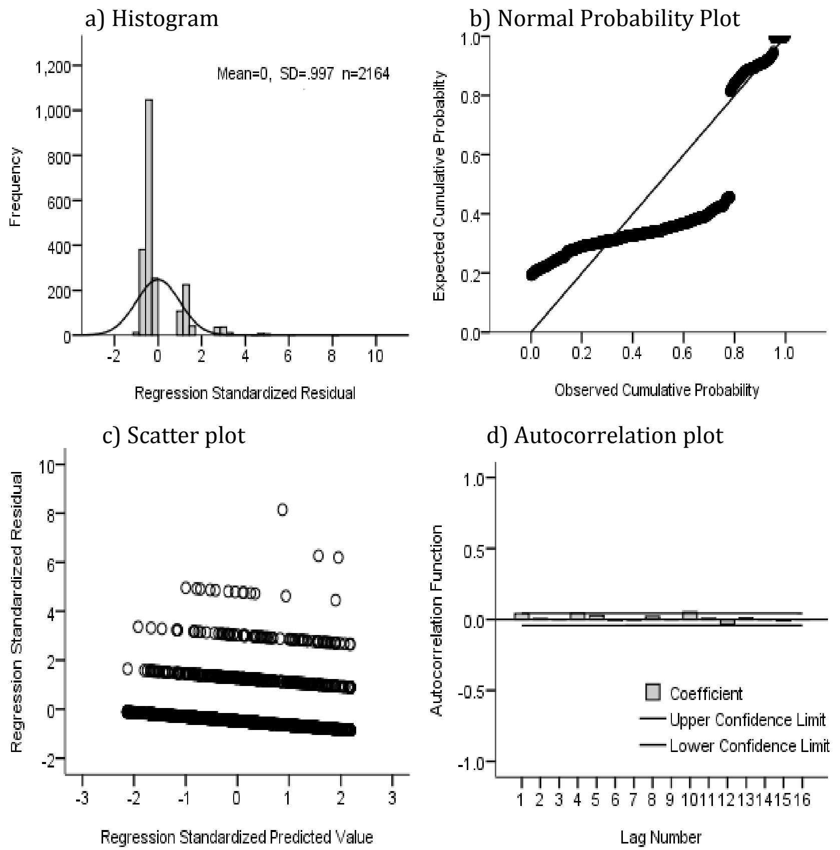


Figure F1.34: Trent Region Out of Hours Counts Non-asthmatics - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

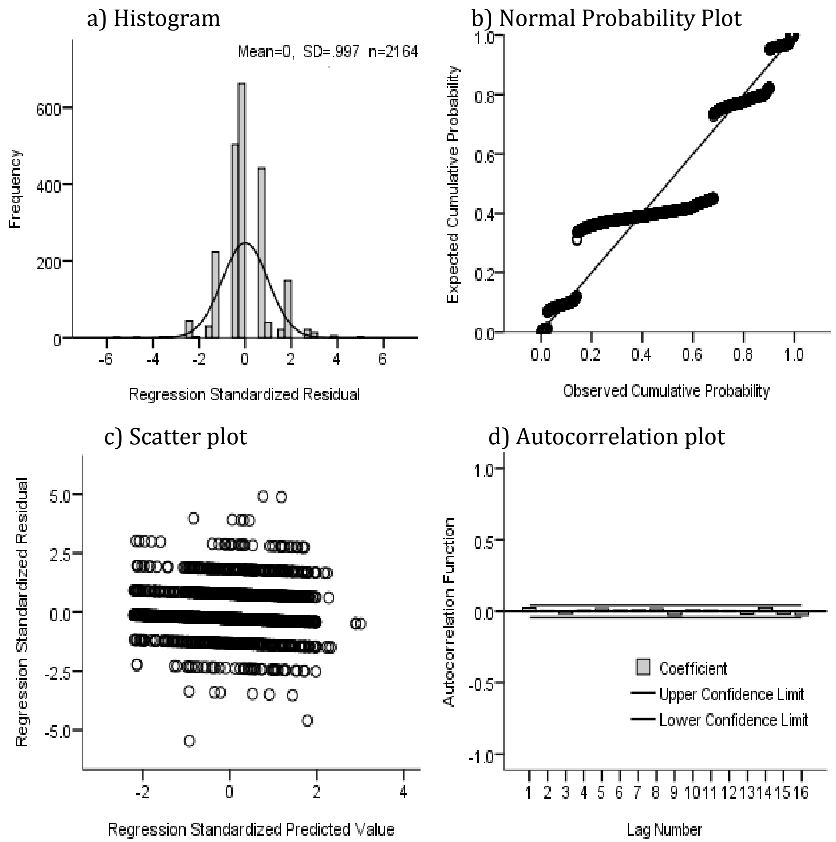


Figure F1.35: Trent Region Out of Hours Counts Excess - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

For the Trent Region All Counts: histograms and scatter plots sufficiently met regression criteria. However, there was slight deviation in the Normality Probability Plots and slight presence of autocorrelation. In reference to the other types of medical contacts, assumptions were only partly satisfied. As not all the assumptions of the multiple regressions were fulfilled, further comparative analysis was conducted.

Scotland

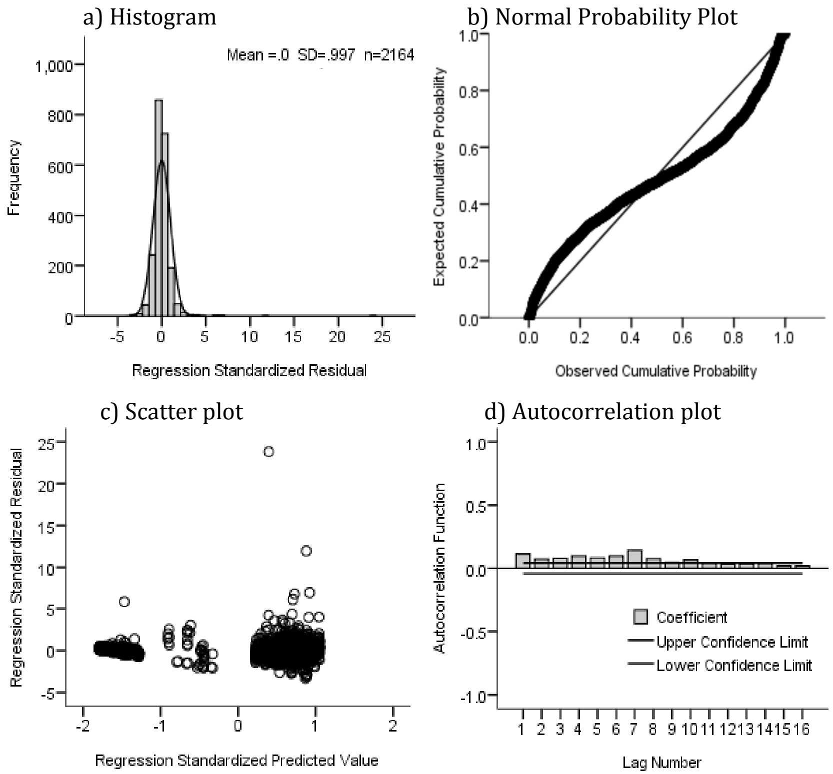


Figure F1. 36: Scotland All Counts Asthmatics - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

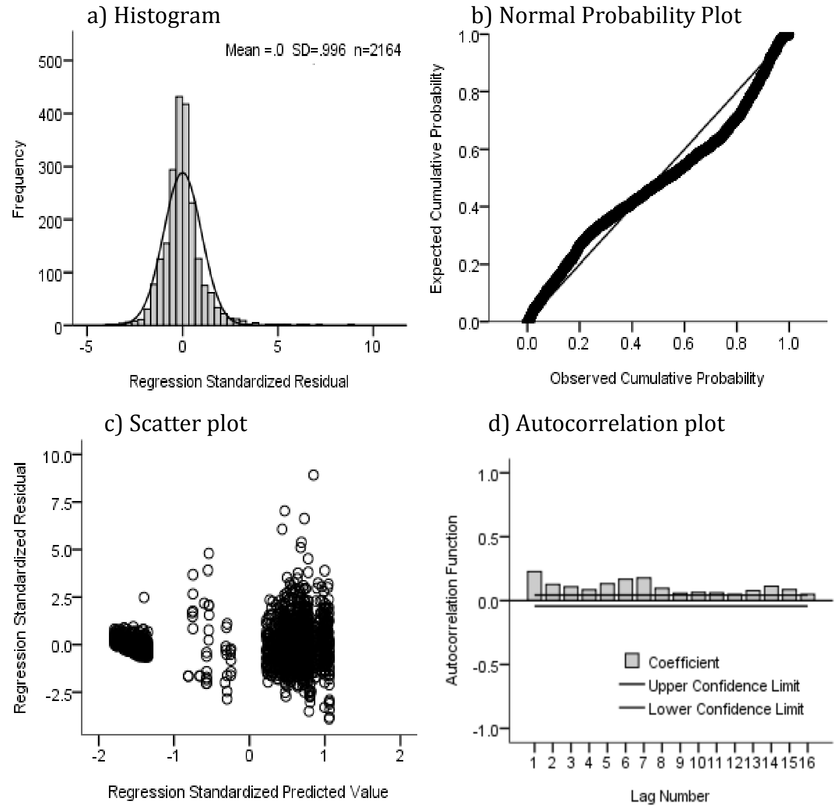


Figure F1. 37: Scotland All Counts Non-asthmatics - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

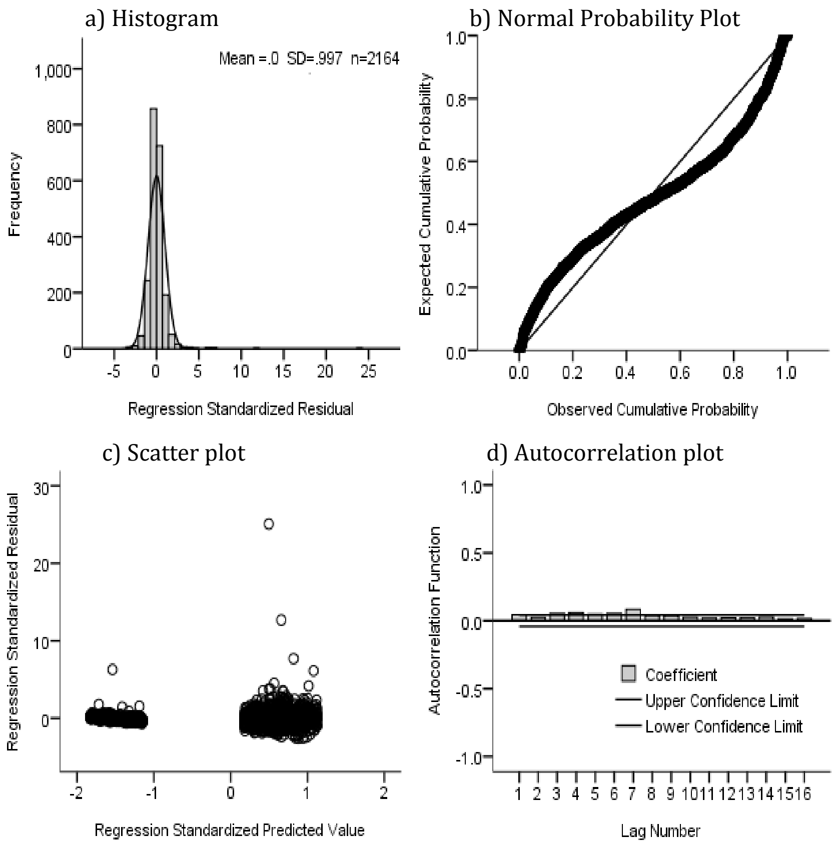


Figure F1. 38: Scotland All Counts Excess - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

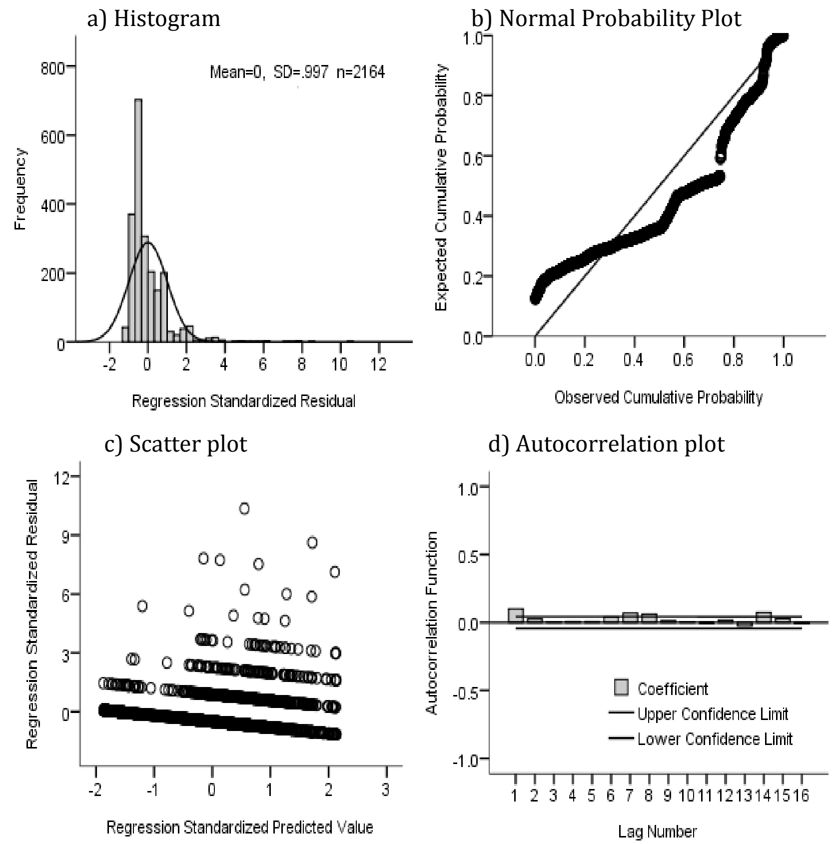


Figure F1. 39: Scotland Acute Visits Asthmatics - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

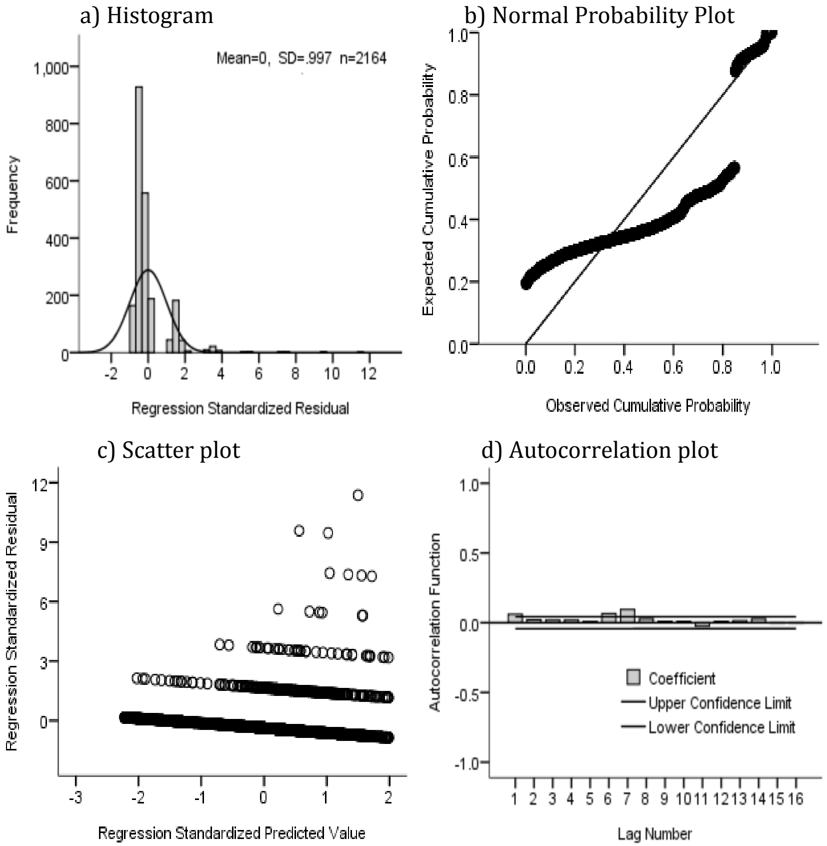


Figure F1.40: Scotland Acute Visits Non-asthmatics - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

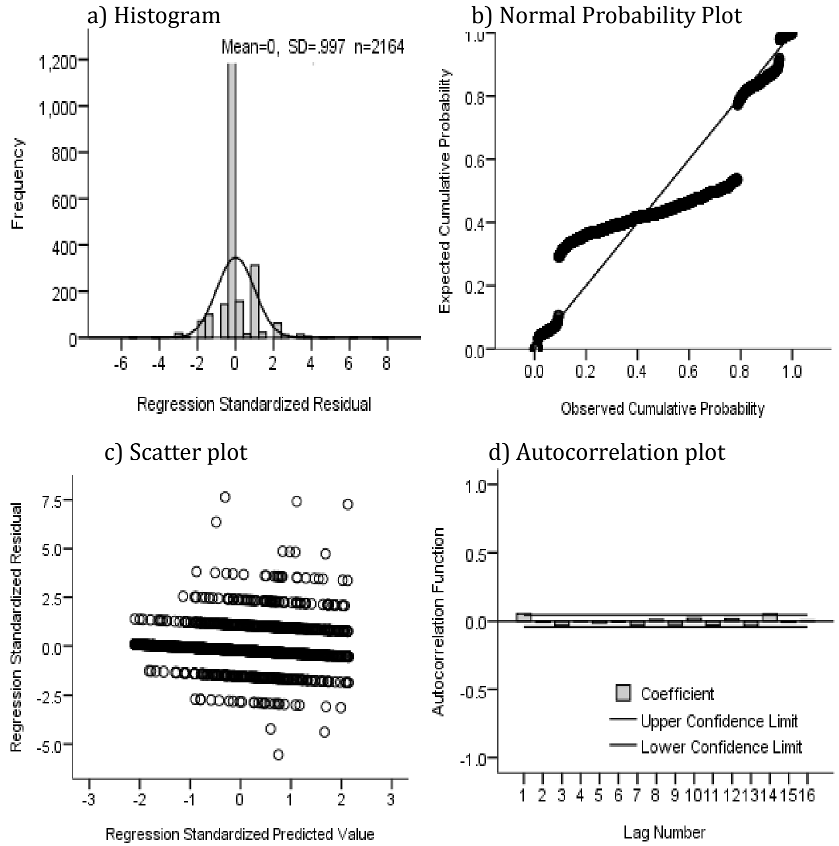


Figure F1.41: Scotland Acute Visits Excess - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

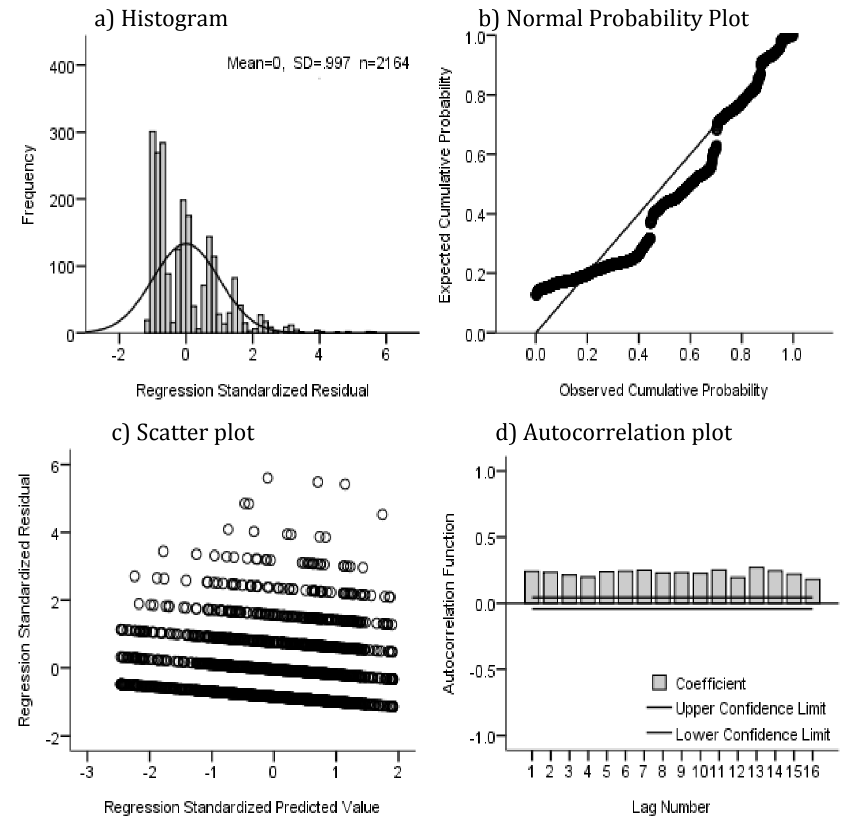


Figure F1.42: Scotland Casualty Counts Asthmatics - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

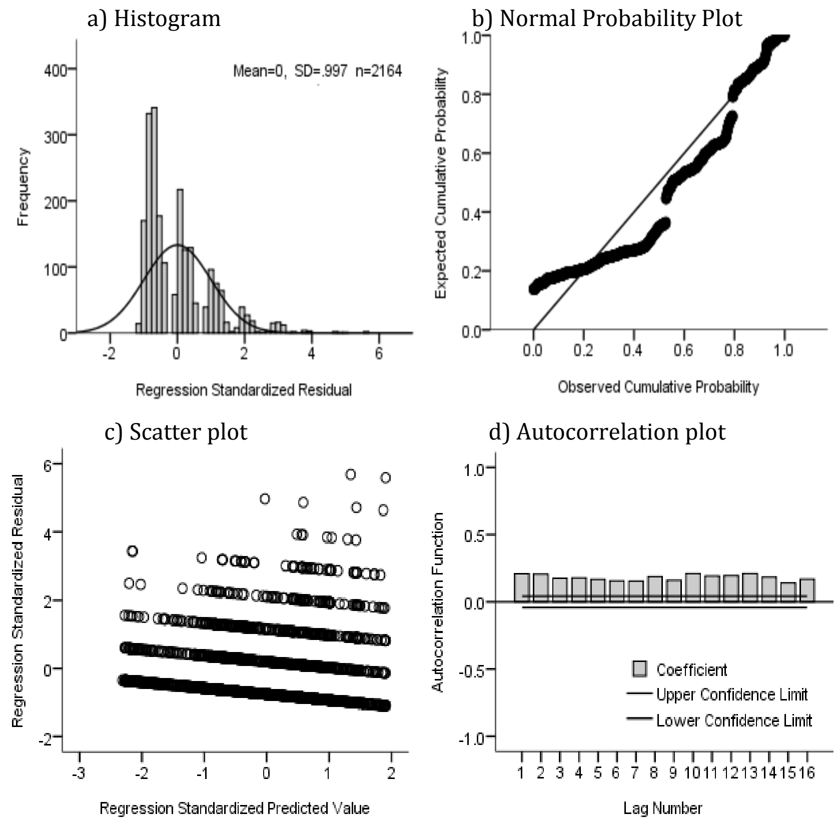


Figure F1.43: Scotland Casualty Counts Non-asthmatics - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

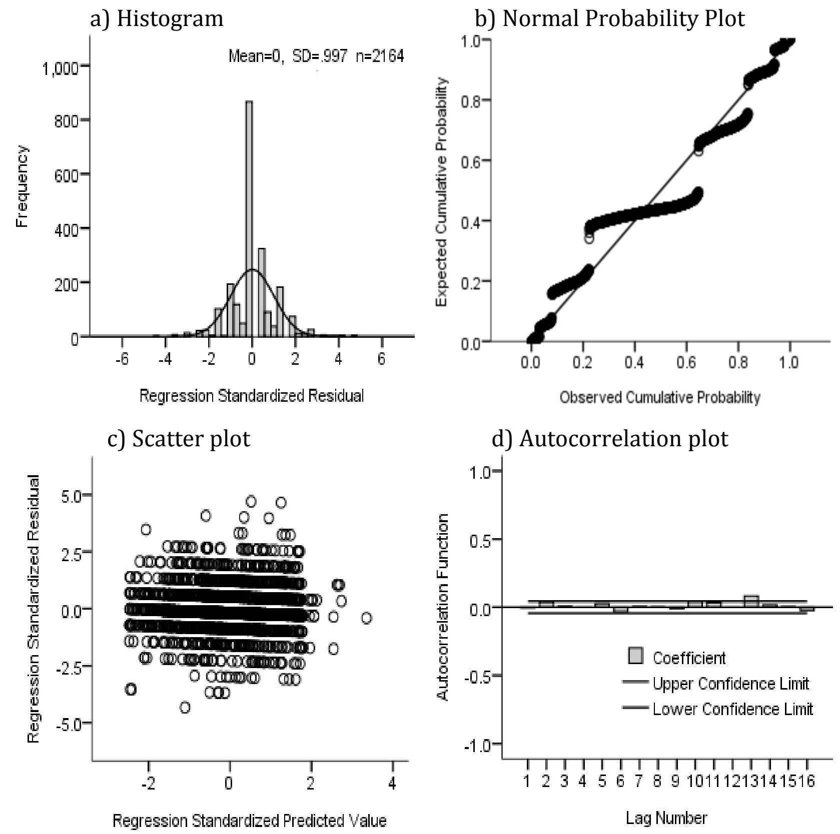


Figure F1.44: Scotland Casualty Counts Excess - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

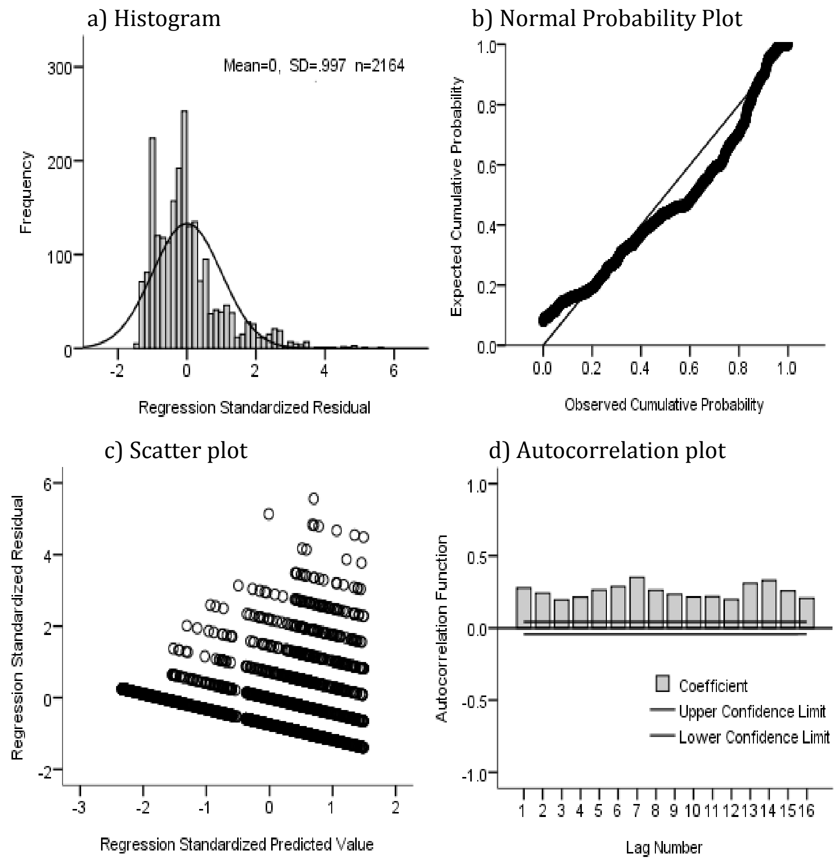


Figure F1.45: Scotland Emergency Consultations Asthmatics - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

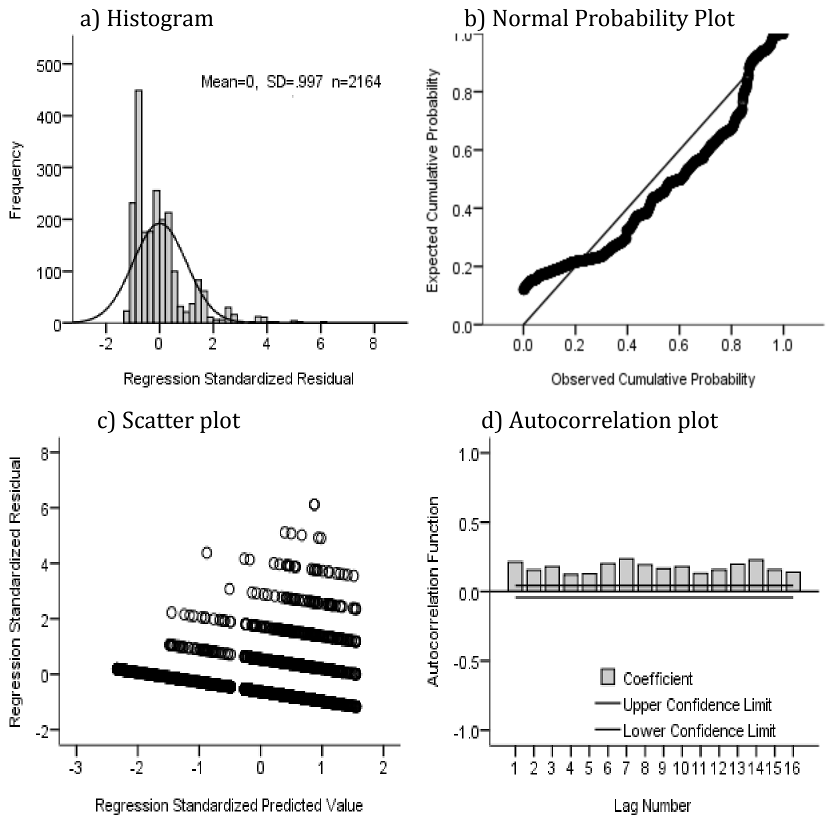


Figure F1.46: Scotland Emergency Consultations Non-asthmatics - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

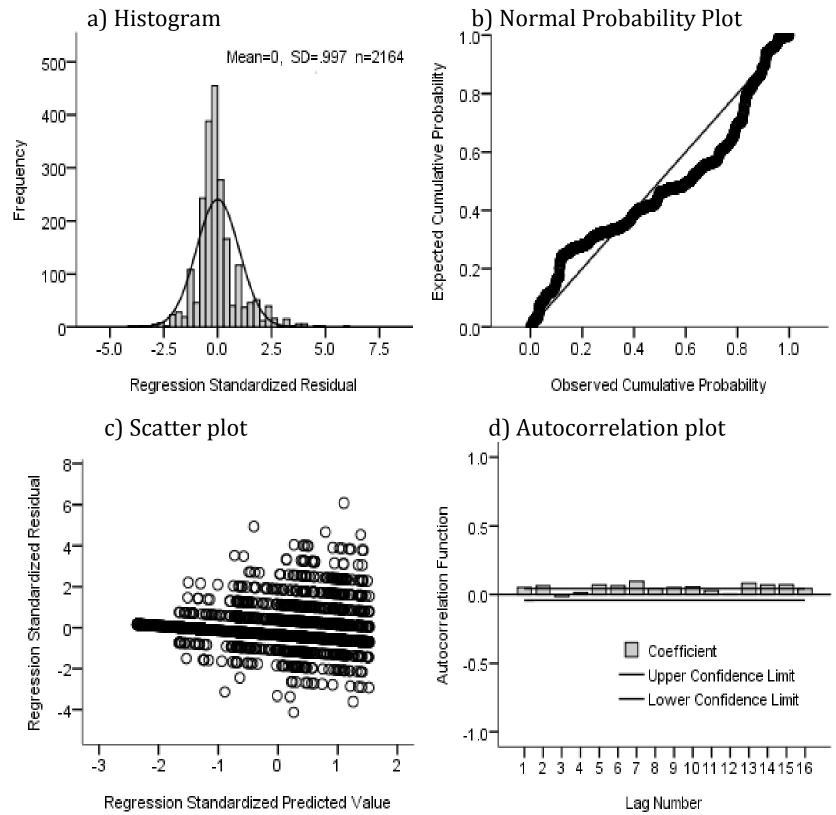


Figure F1.47: Scotland Emergency Consultations Excess - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

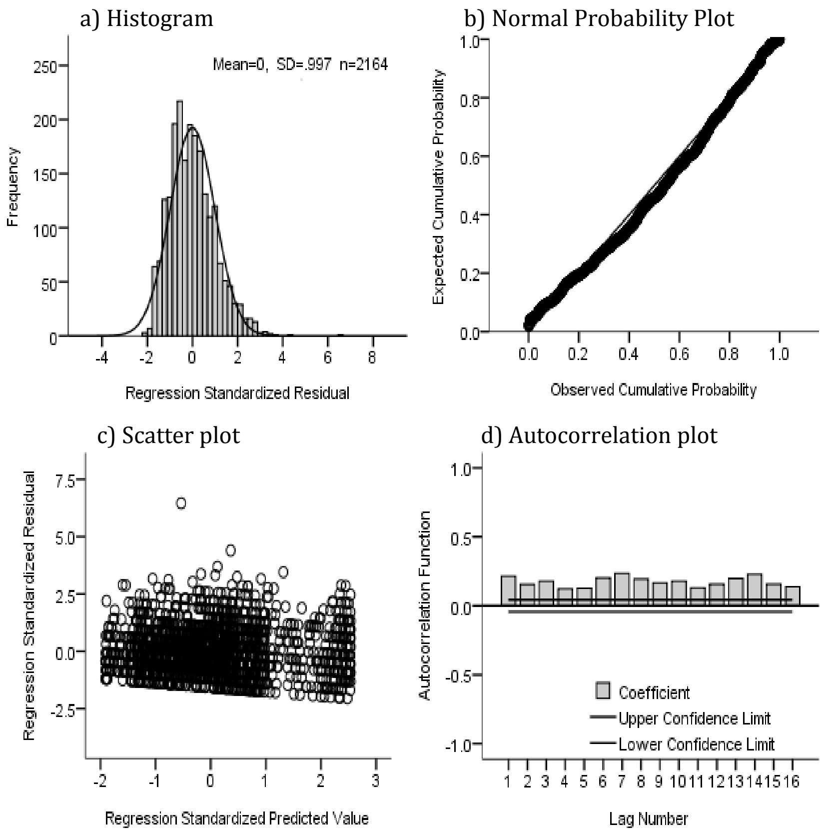


Figure F1.48: Scotland Emergency Counts Asthmatics - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

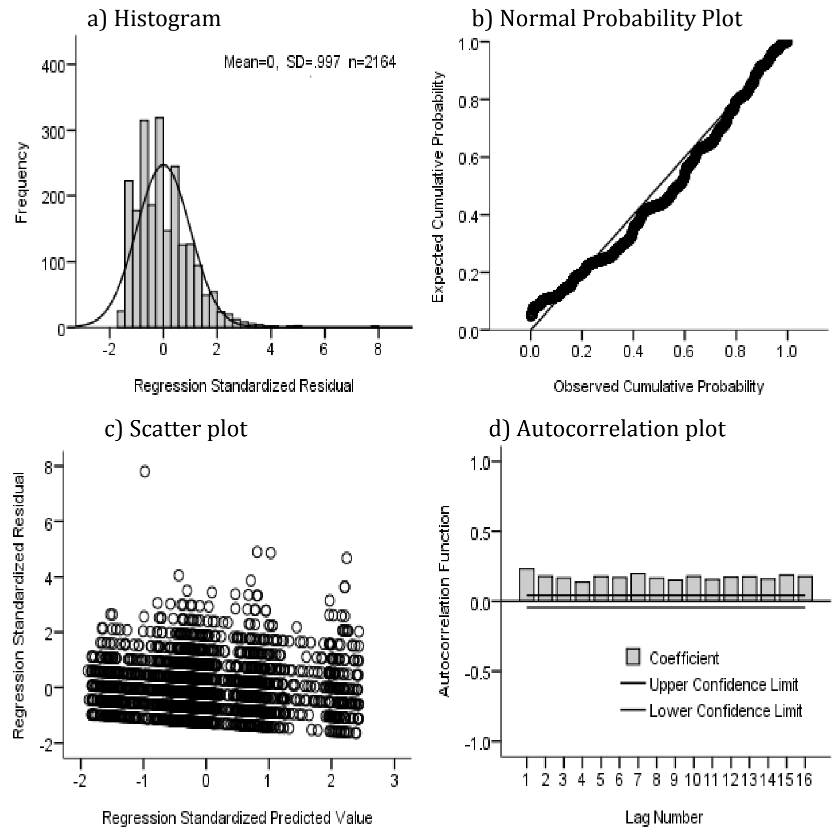


Figure F1.49: Scotland Emergency Counts Non-asthmatics - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

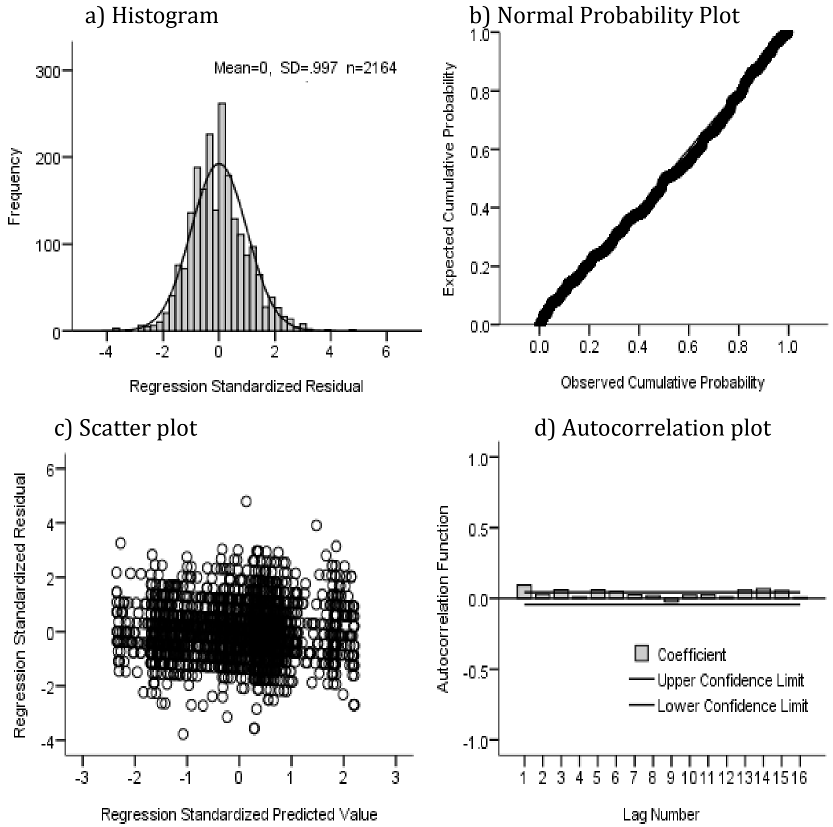


Figure F1.50: Scotland Emergency Counts Excess - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

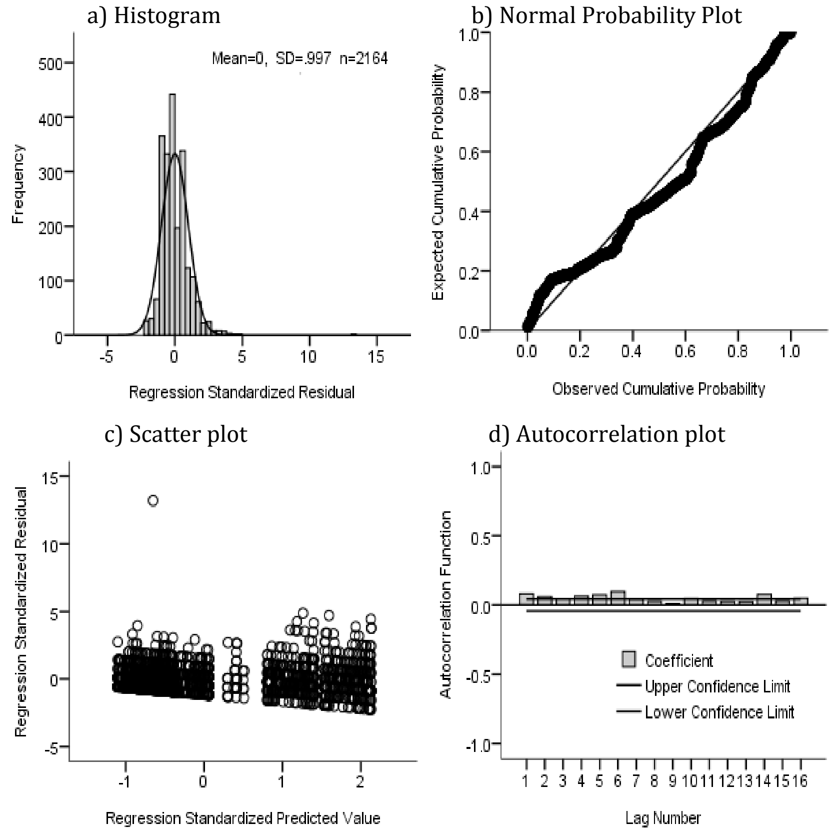


Figure F1.51: Scotland Out of Hours Counts Asthmatics - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

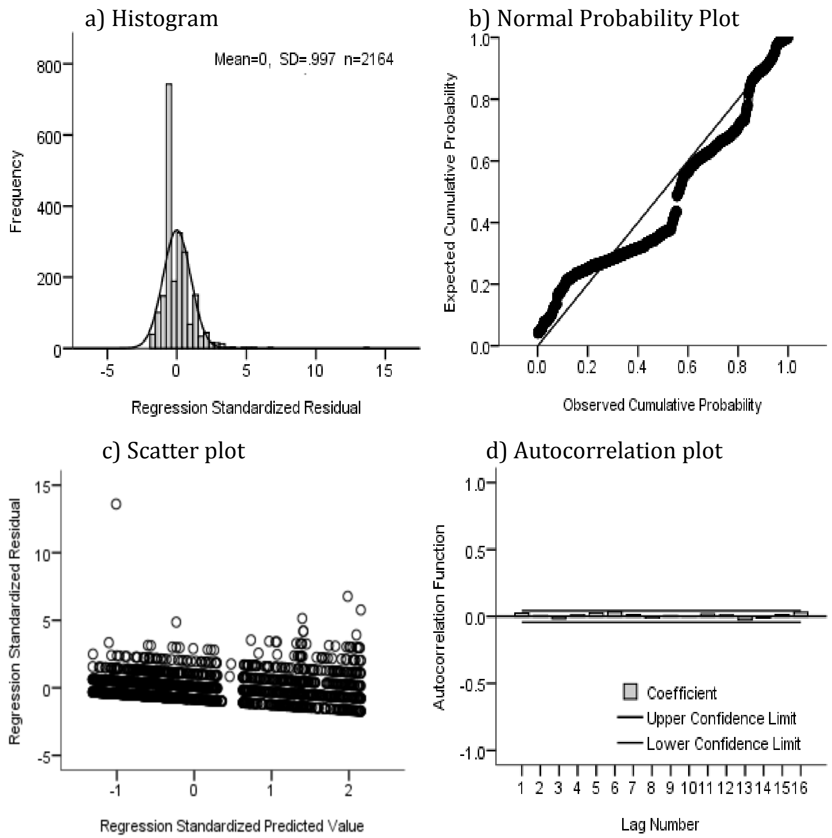


Figure F1.52: Scotland Out of Hours Counts Non-asthmatics - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

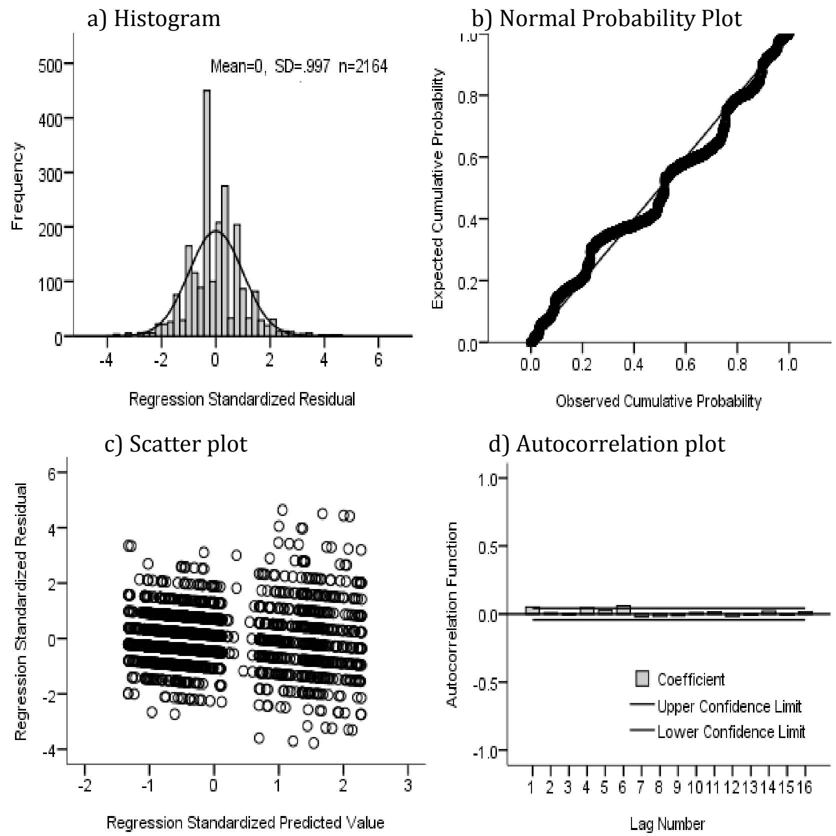


Figure F1.53: Scotland Out of Hours Counts Excess - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

For Scotland All Counts: the histograms, autocorrelation and scatter plots sufficiently met the assumptions. For other types of medical contacts, assumptions were only partly fulfilled.

F1.2. Comparative Analysis using Raw Daily Counts: Including Environmental Exposures lagged by Seven day versus Fourteen days (All Counts only)

England and Wales: F-test and coefficient histograms

a) Seven days b) Fourteen days

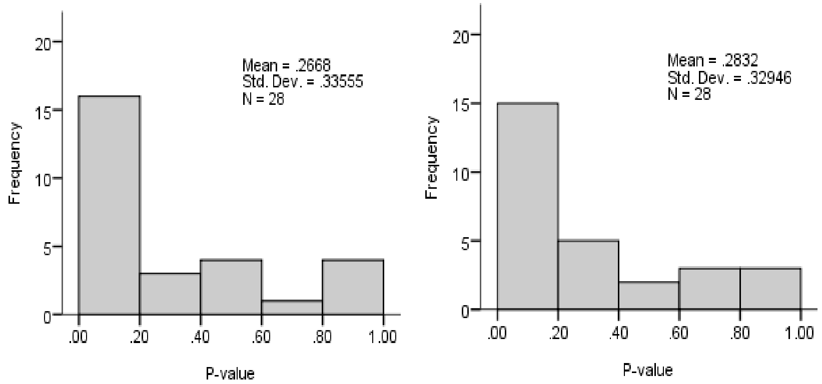


Figure F1. 54: England and Wales All Counts asthmatics - distribution of F-test P-values, null model versus model including environmental exposures lagged by a) Seven days and b) Fourteen days.

a) Seven days b) Fourteen days

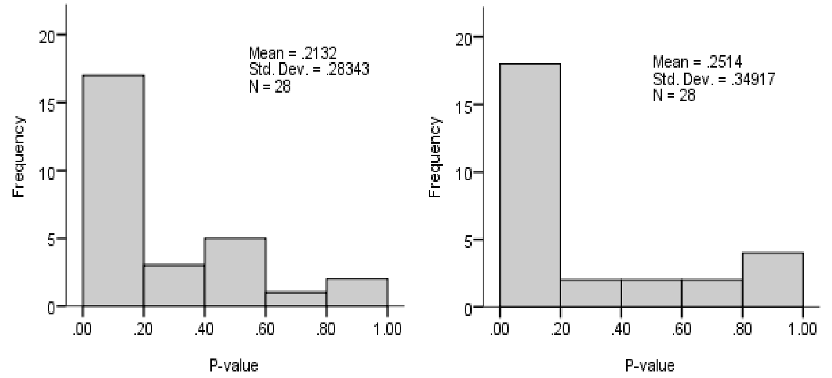


Figure F1.55: England and Wales All Counts Non-asthmatics - distribution of F-test P-values, null model versus model including environmental exposures lagged by a) Seven days and b) Fourteen days.

a) Seven days b) Fourteen days

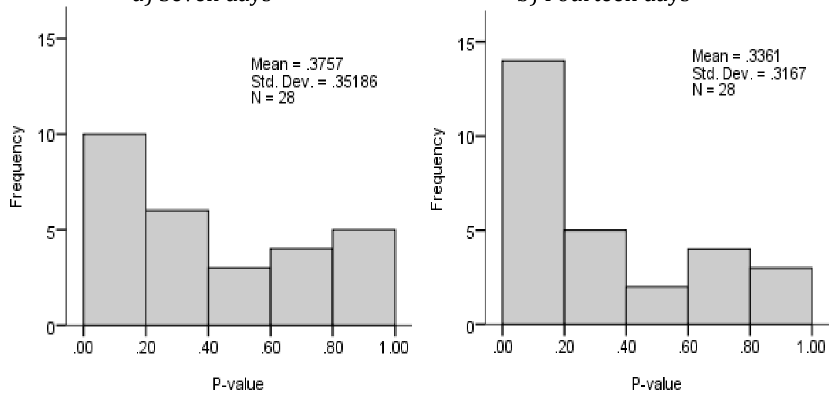


Figure F1.56: England and Wales All Counts Excess- distribution of F-test P-values, null model versus model including environmental exposures lagged by a) Seven days and b) Fourteen days.

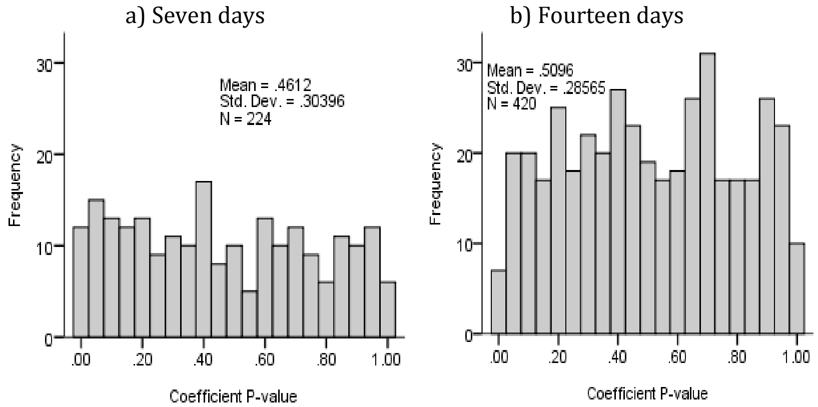


Figure F1.57: England and Wales All Counts Asthmatics - distribution of coefficient P-values, model including environmental exposures lagged by a) Seven days and b) Fourteen days.

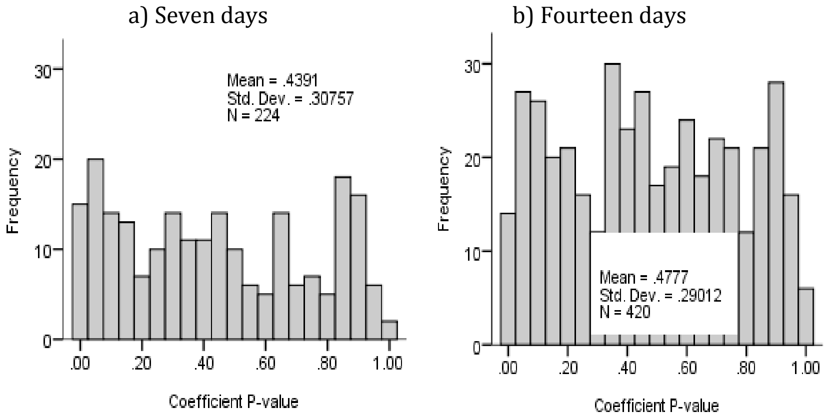


Figure F1.58: England and Wales All Counts Non-asthmatics - distribution of coefficient P-values, model including environmental exposures lagged by a) Seven days and b) Fourteen days.

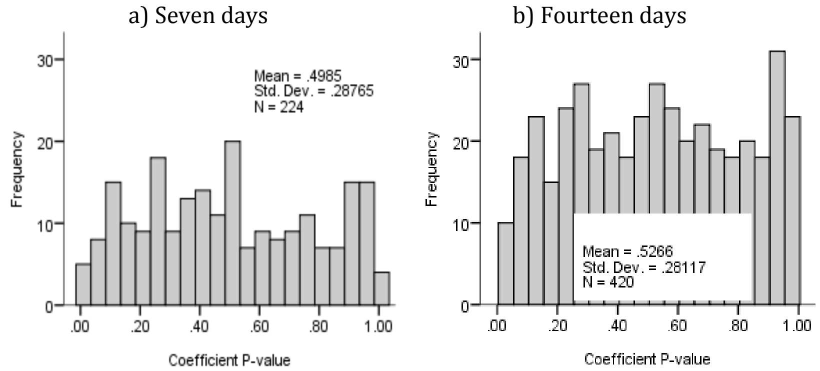


Figure F1.59: England and Wales All Counts Excess - distribution of coefficient P-values, model including environmental exposures lagged by a) Seven days and b) Fourteen days.

Table F. 1: England and Wales All Counts - F-test model and coefficient P-values with seven environmental lag terms or model with fourteen environmental lag terms.

Coefficient or F-test	Asthmatics, Non-asthmatics or Excess	Model 1. no lag bank holiday	0.5 - Model 1	Model 2. with lag bank holiday	0.5 - Model 2	Model 1-2
F-test mean P-values	**Asthmatics**	0.27	0.23	0.28	0.22	-0.01
	Non-	0.21	0.29	0.25	0.25	-0.04
	Excess	0.38	0.12	0.34	0.16	0.04
Coefficient mean P-values	**Asthmatics**	0.46	0.04	0.51	-0.01	-0.05
	Non-	0.44	0.06	0.48	0.02	-0.04
	Excess	0.50	0.00	0.53	-0.03	-0.03

Trent Region: F-test and coefficient histograms

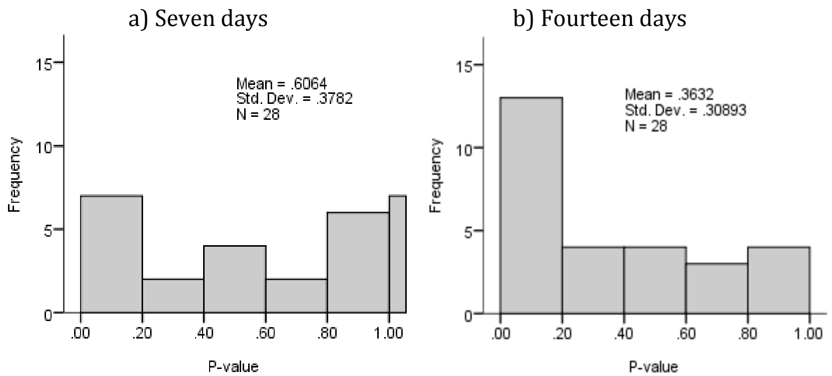


Figure F1. 60: Trent Region All Counts Asthmatics - distribution of F-test P-values, null model versus model including environmental Exposures lagged by a) Seven days and b) Fourteen days.

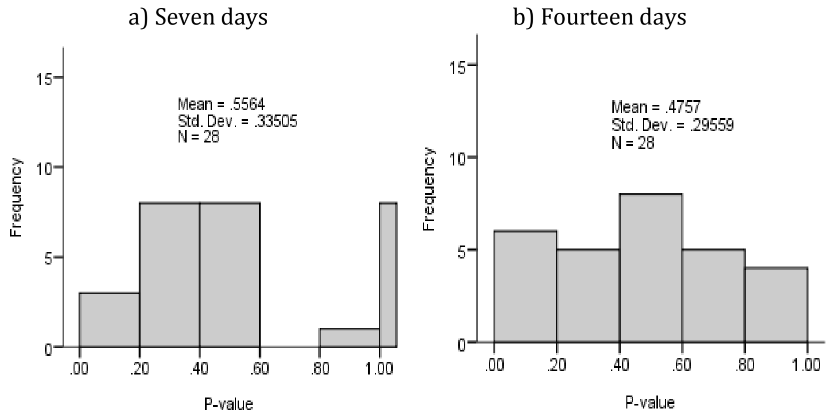


Figure F1.61: Trent Region All Counts Non-asthmatics - distribution of F-test P-values, null model versus model including environmental exposures lagged by a) Seven days and b) Fourteen days.

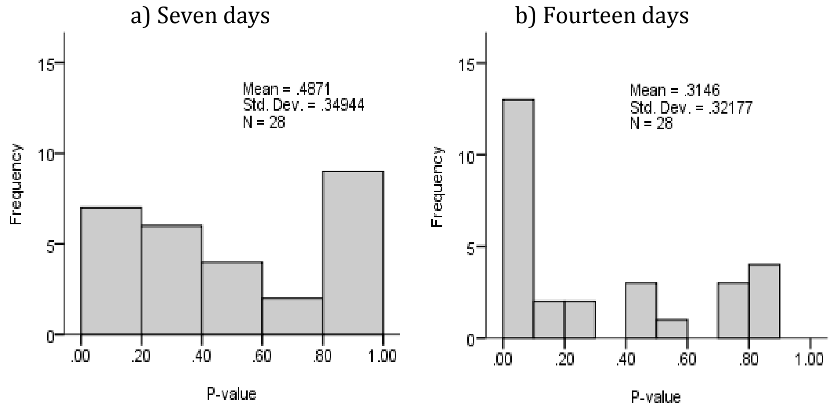


Figure F1.62: Trent Region All Counts Excess - distribution of F-test P-values: null model versus model including environmental exposures lagged by a) Seven days and b) Fourteen days.

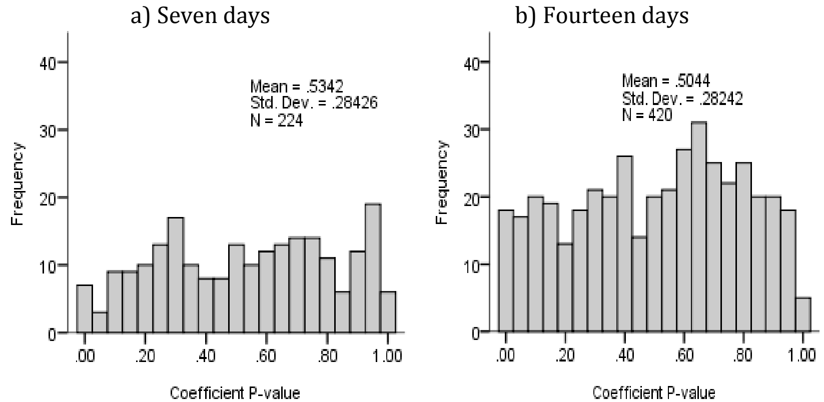


Figure F1.63: Trent Region All Counts Asthmatics - distribution of coefficient P-values, model including environmental Exposures lagged by a) Seven days and b) Fourteen days.

a) Seven days b) Fourteen days

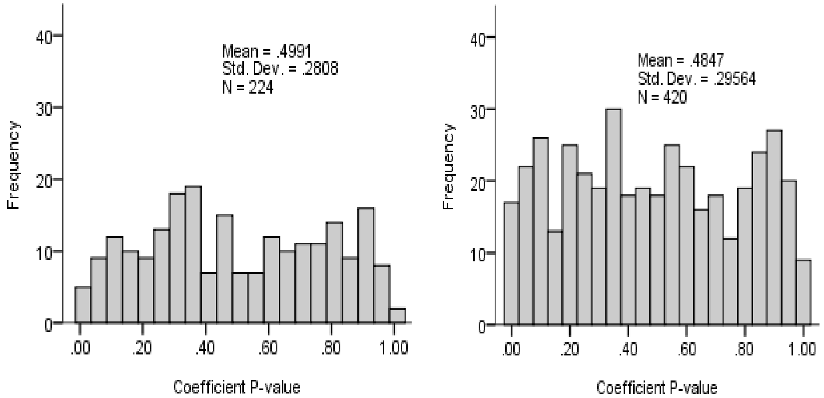


Figure F1.64: Trent Region All Counts Non-asthmatics - distribution of coefficient P-values, model including environmental exposures lagged by a) Seven days and b) Fourteen days.

a) Seven days b) Fourteen days

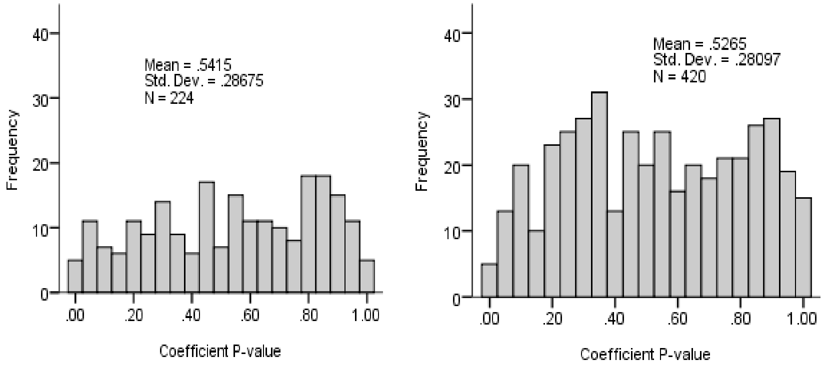


Figure F1.65: Trent Region All Counts Excess - distribution of coefficient P-values, model including environmental exposures lagged by a) Seven days and b) Fourteen days.

Table F. 2: Trent Region All Counts - F-test model and coefficient P-values with seven environmental lag terms or model with fourteen environmental lag terms.

Coefficient or F-test	Asthmatics, Non-asthmatics or Excess	Model 1. 7 days	0.5 - Model 1	Model 2. 14 days	0.5 - Model 2	Model 1-2
F-test mean P-values	Asthmatics	0.61	-0.11	0.36	0.14	0.24
	Non-asthmatics	0.56	-0.06	0.48	0.02	0.08
	Excess	0.49	0.01	0.31	0.19	0.17
Coefficient mean P-values	Asthmatics	0.53	-0.03	0.50	0.00	0.03
	Non-asthmatics	0.50	0.00	0.48	0.02	0.01
	Excess	0.54	-0.04	0.53	-0.03	0.02

Scotland: F-test and coefficient histograms

a) Seven days b) Fourteen days

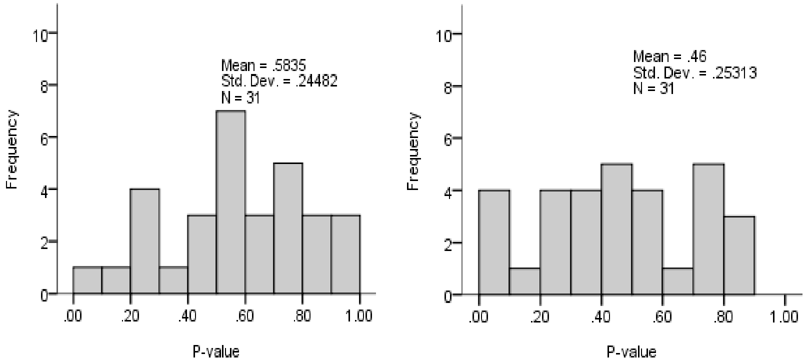


Figure F1. 66: Scotland All Counts Asthmatics - distribution of F-test P-values, null model versus model including environmental exposures lagged by a) Seven days and b) Fourteen days.

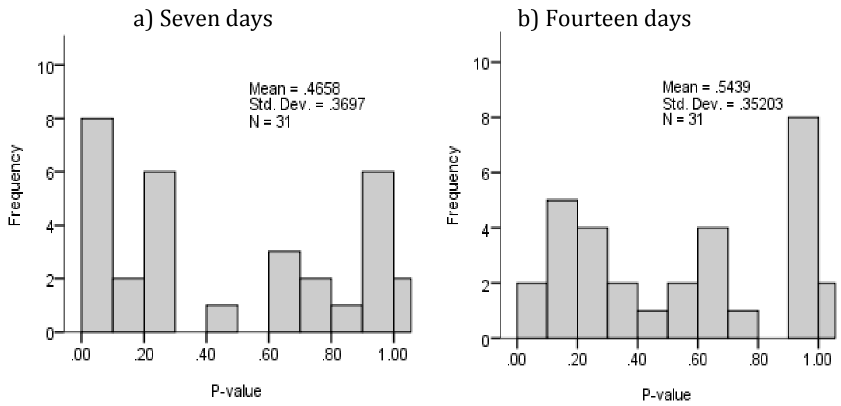


Figure F1.67: Scotland All Counts Non-asthmatics - distribution of F-test P-values Non-asthmatics, null model versus model including environmental exposures lagged by a) Seven days and b) Fourteen days.

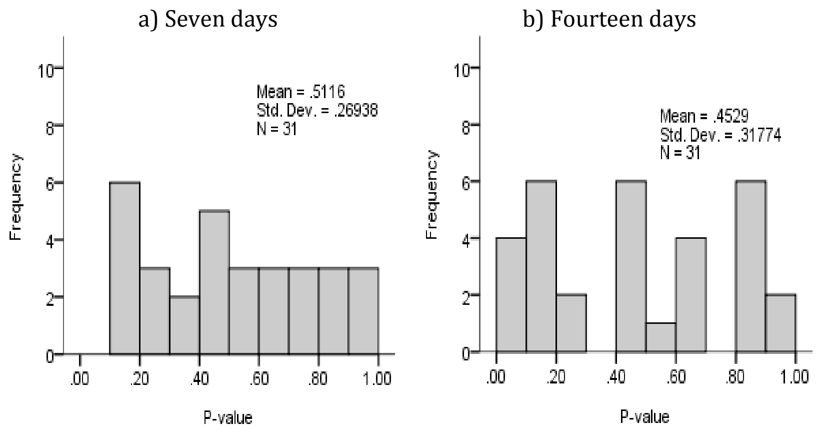


Figure F1.68: Scotland All Counts Excess - distribution of F-test P-values, null model versus model including environmental exposures lagged by a) Seven days and b) Fourteen days.

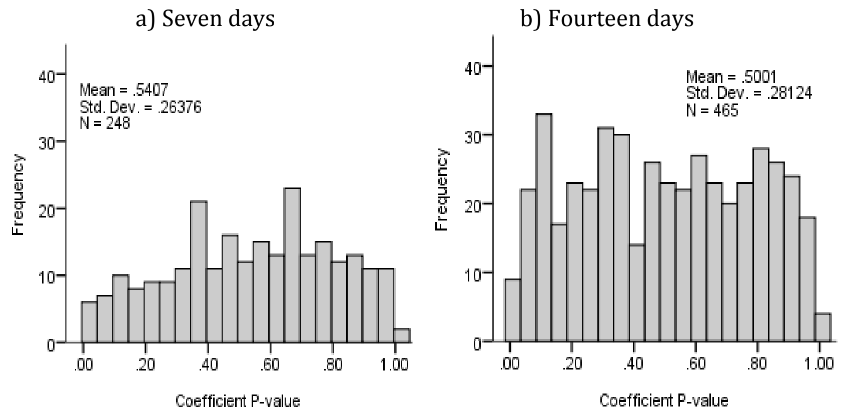


Figure F1.69: Scotland All Counts Non-asthmatics - distribution of coefficient P-values, model including environmental exposures lagged by a) Seven days and b) Fourteen days.

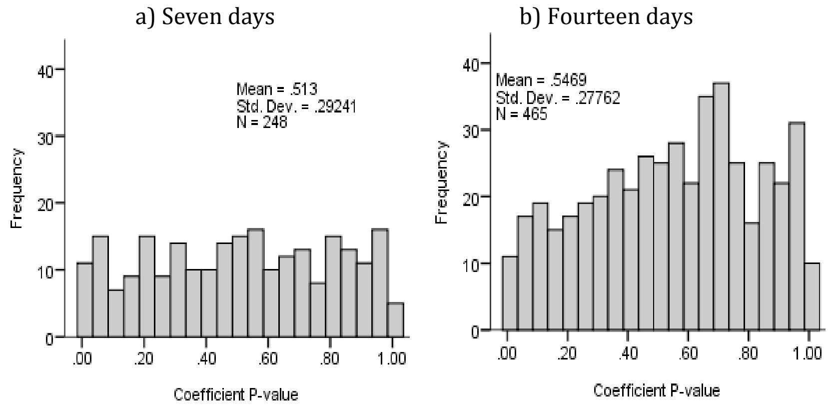


Figure F1.70: Scotland All Counts Excess - distribution of coefficient P-values, model including environmental exposures lagged by a) Seven days and b) Fourteen days.

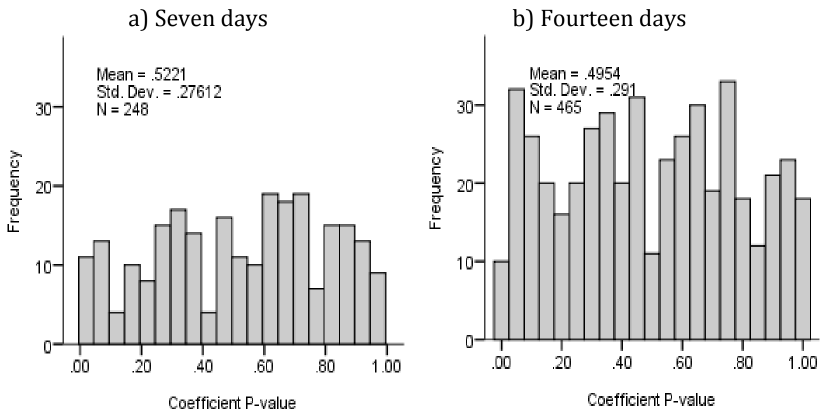


Figure F1.71: Scotland All Counts - distribution of coefficient P-values, model including environmental exposures lagged by a) Seven days and b) Fourteen days.

Table F. 3: Scotland All Counts - F-test model and coefficient P-values with seven environmental lag terms or model with fourteen environmental lag terms.

Coefficient or F-test	Asthmatics, Non-asthmatics or Excess	Model 1. 7 days	0.5 - Model 1	Model 2. 14 days	0.5 - Model 2	Model 1-2
F-test mean P-values	Asthmatics	0.58	-0.08	0.46	0.04	0.12
	Non-asthmatics	0.47	0.03	0.54	-0.04	-0.08
	Excess	0.51	-0.01	0.45	0.05	0.06
Coefficient mean P-values	Asthmatics	0.54	-0.04	0.50	0.00	0.04
	Non-asthmatics	0.51	-0.01	0.55	-0.05	-0.03
	Excess	0.52	-0.02	0.50	0.00	0.03

F1.3. Comparative Analysis using First Order Difference: Model with or without lagged bank holiday as covariate (All Counts only)

Comparison of Results between Model 1 (Model with environmental triggers lagged by Seven days) and Model 2 (Model including lagged bank holiday as covariate and environmental triggers lagged by Seven days).

England and Wales First Order Difference

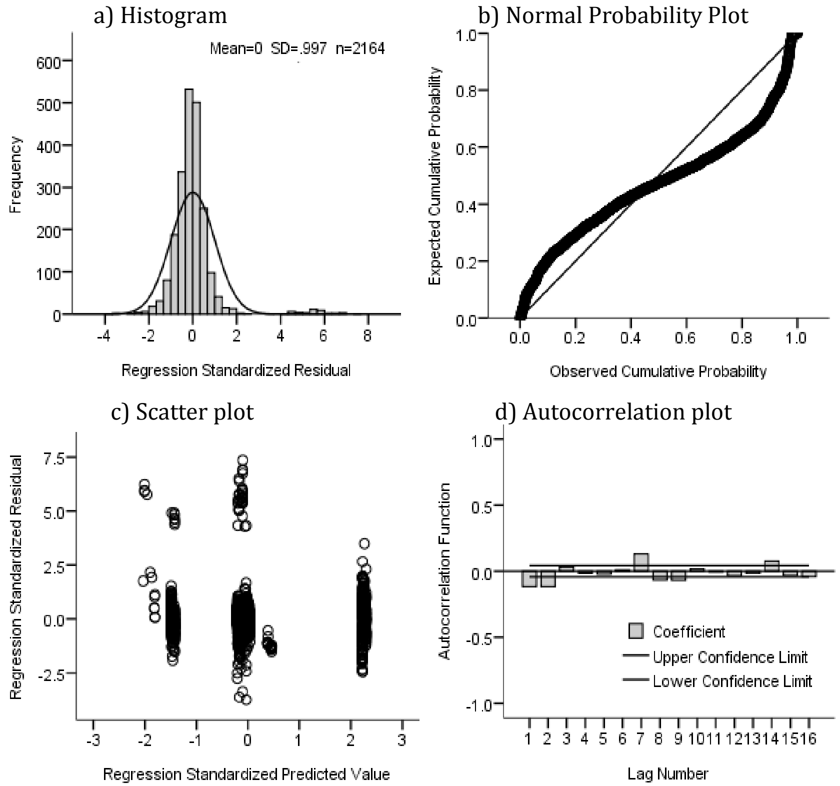


Figure F1. 72: England and Wales All Counts first order difference Asthmatics - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

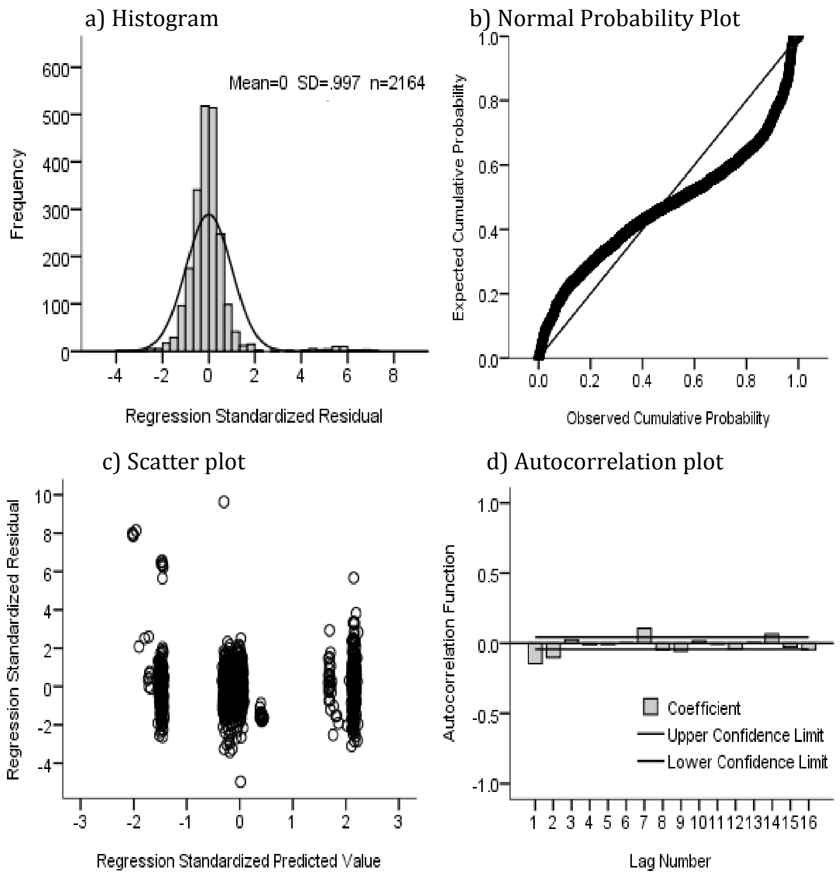


Figure F1. 73: England and Wales All Counts first order difference Non-asthmatics - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

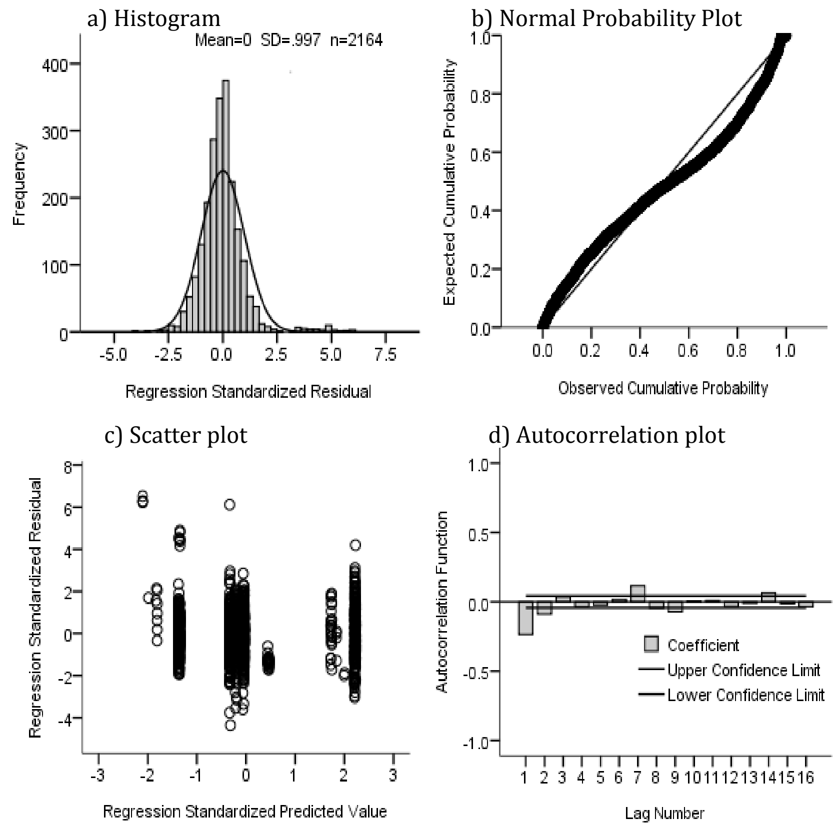


Figure F1. 74: England and Wales All Counts first order difference Excess - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

The autocorrelation seen in the original raw counts has been reduced. However, there was deviation present in the Normal probability plots and outliers in the histograms. In an attempt to normalise the histogram and normality probability plot, outlying residuals (>=-2 and <=2) were investigated.

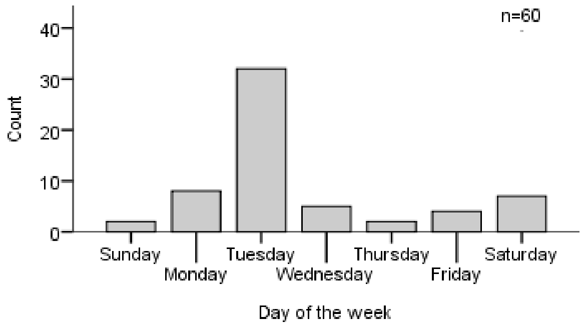


Figure F1. 75: England and Wales All Counts Asthmatics - outlying residuals, day of the week frequencies.

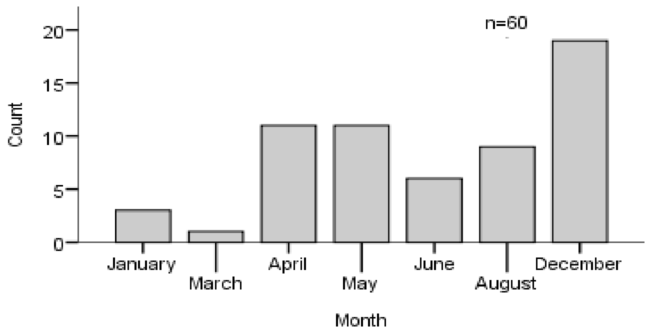


Figure F1. 76: England and Wales All Counts - outlying residuals, month of the year frequencies.

Lagged bank holiday was added to the model in an attempt to account for the high number of outlying residuals on Tuesday, April, May and December (Figure F1.75 and F1.76). Lagged bank holiday was defined as a day after bank holiday but it must not land on a day that was already bank holiday thus there were no double lagged bank holidays. For example, for Christmas and the Scottish New Year, two bank holidays were followed by only one lagged bank holiday.

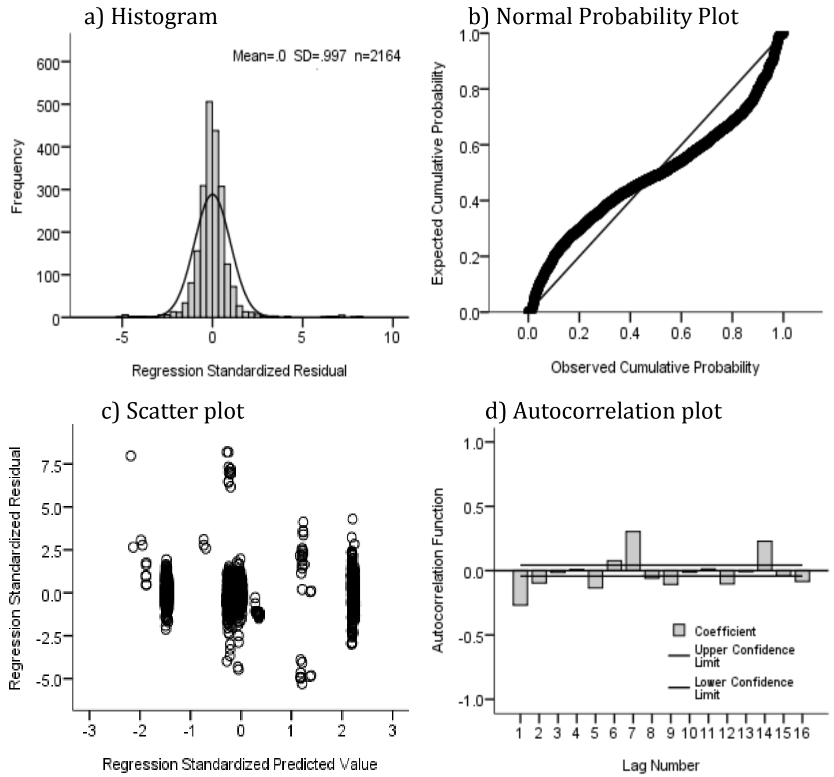


Figure F1. 77: England and Wales All Counts first order difference Asthmatics - linear regression null model + lag bank holiday a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

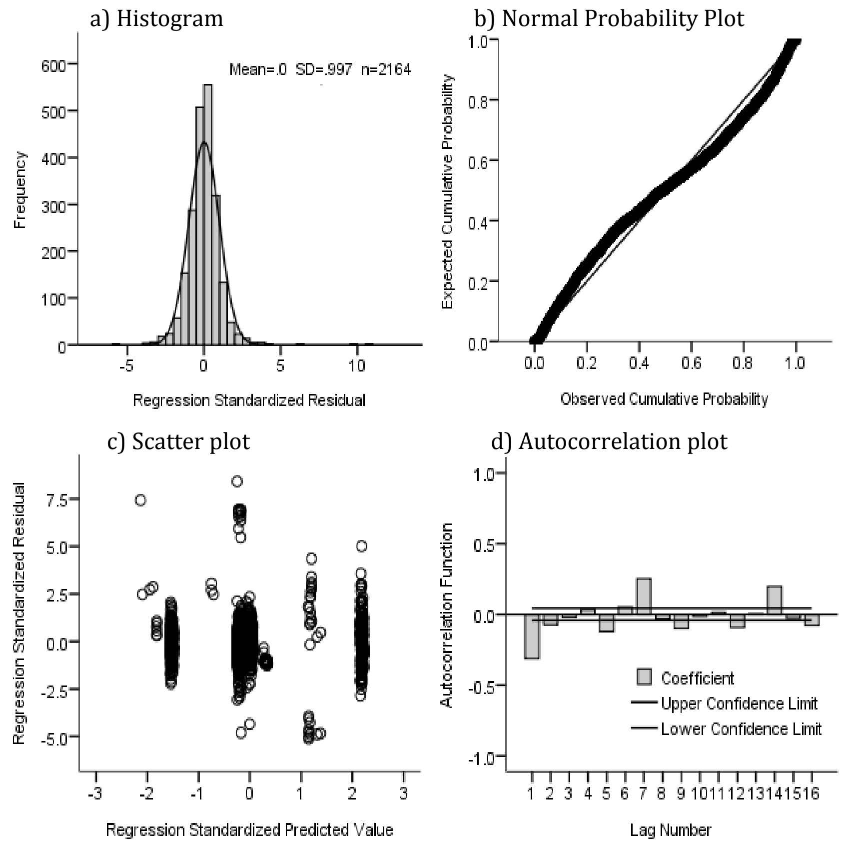


Figure F1. 78: England and Wales All Counts first order difference Non-asthmatics - linear regression null model + lag bank holiday a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

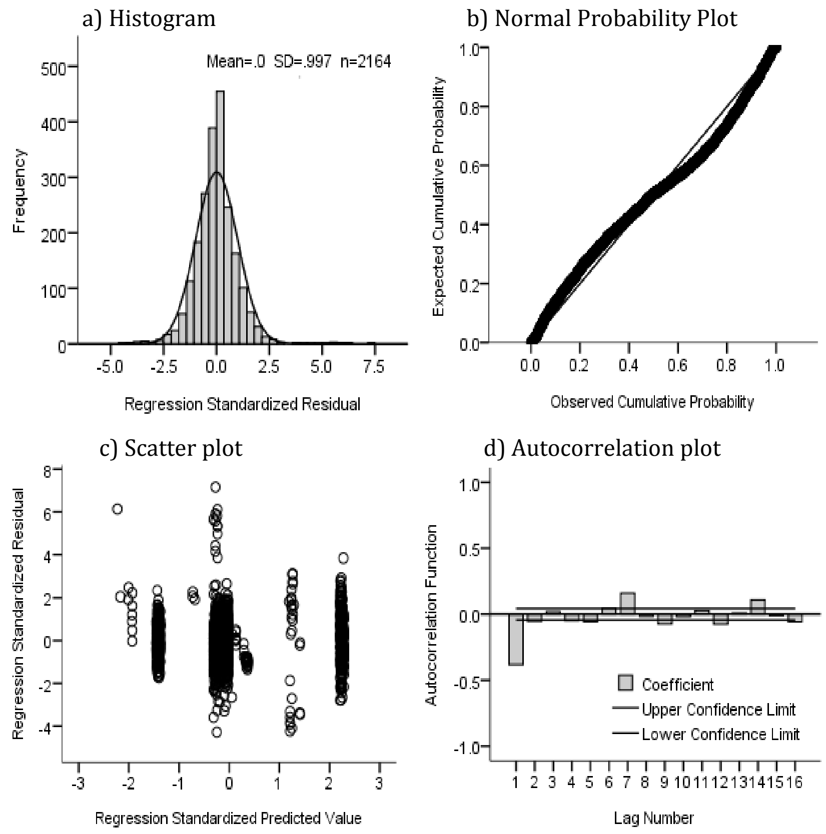


Figure F1. 79: England and Wales All Counts first order difference Excess - linear regression null model + lag bank holiday a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

Table F. 4: England and Wales All Counts - F-test comparing null model to null model with lagged bank holiday as covariate.

1st Order Difference: Asthmatics, Non-asthmatics or Excess	All Counts Asthmatics	All Counts Non-asthmatics	All Counts Excess
RSS1	28637761.50	7810750.87	10592701.84
RSS2	15026698.50	4448674.56	7149000.90
df1	11	11	11
df2	12	12	12
n	2163	2163	2163
F- value	1948.36	1625.61	1036.15
P-value	<0.001	<0.001	<0.001

F-test (Table F.4) shows that including lag bank holiday can improve the fit of the model.

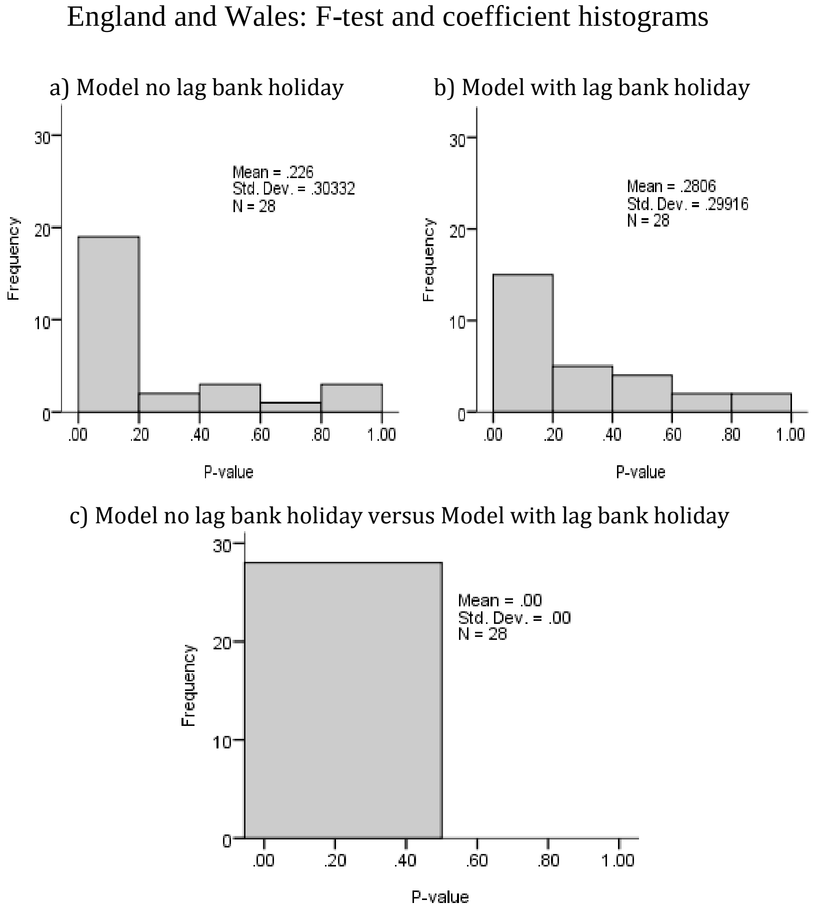


Figure F1. 80: England and Wales All Counts Asthmatics - distribution of F-test P-values model including environmental exposures lagged by seven days a) model without lag bank holiday added as covariate, b) Model with lag bank holiday as covariate and c) Model no lag bank holiday versus Model with lag bank holiday.

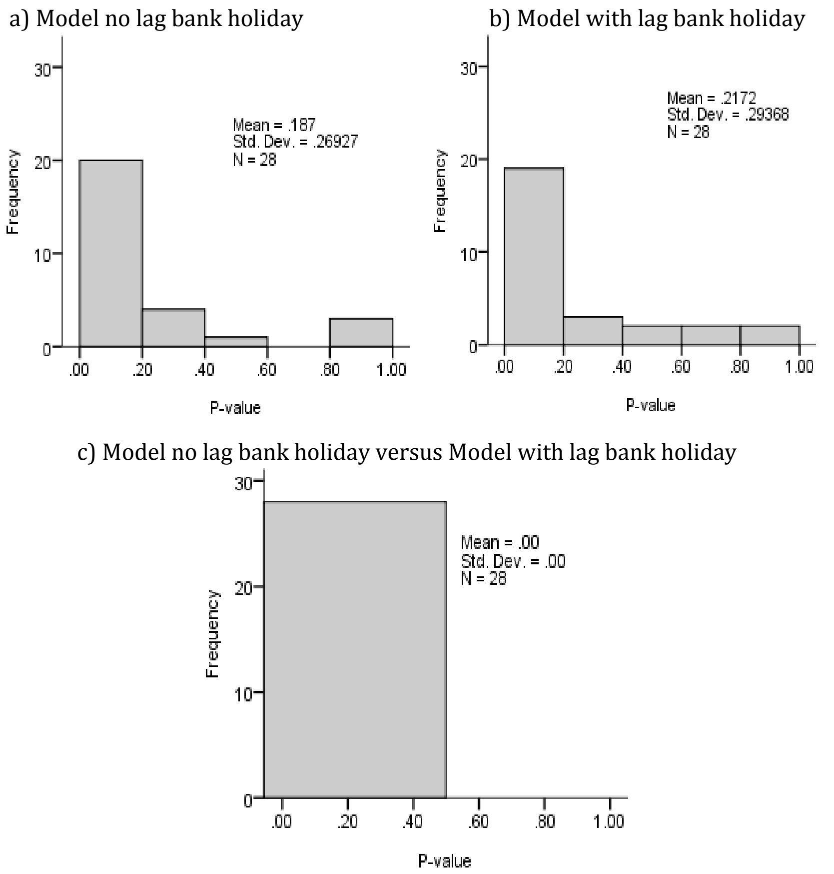


Figure F1. 81: England and Wales All Counts Non-asthmatics - distribution of F-test P-values model including environmental exposures lagged by seven days a) Model without lag bank holiday added as covariate, b) Model with lag bank holiday as covariate and c) Model no lag bank holiday versus Model with lag bank holiday.

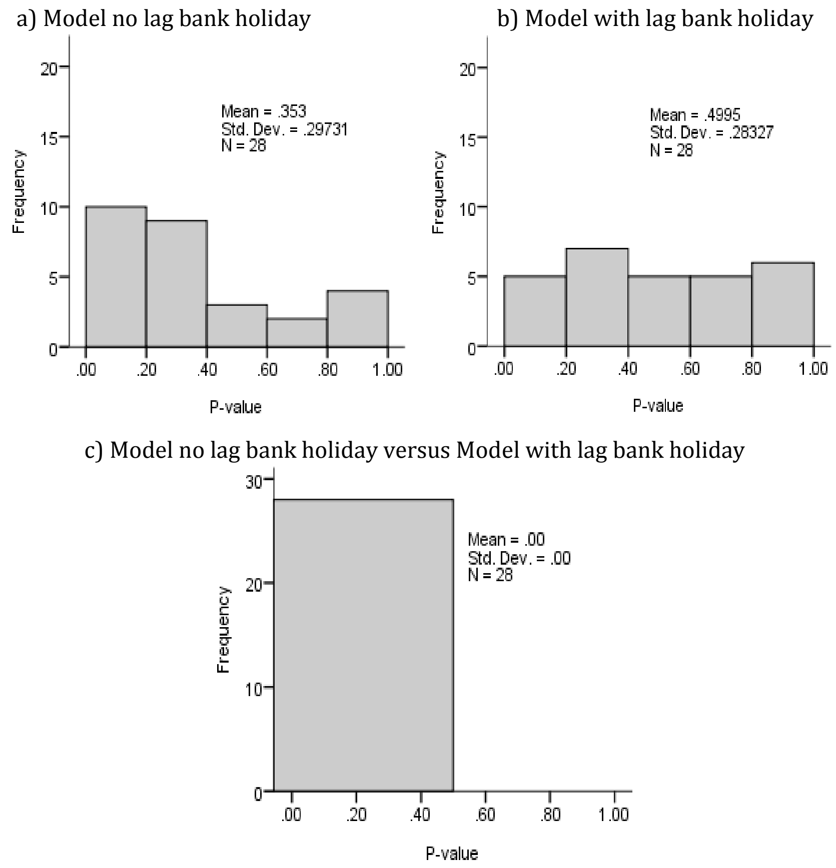


Figure F1. 82: England and Wales All Counts Excess - distribution of F-test P-values model including environmental exposures lagged by seven days a) Model without lag bank holiday added as covariate, b) Model with lag bank holiday as covariate and c) Model no lag bank holiday versus Model with lag bank holiday.

a) Model no lag bank holiday b) Model with lag bank holiday

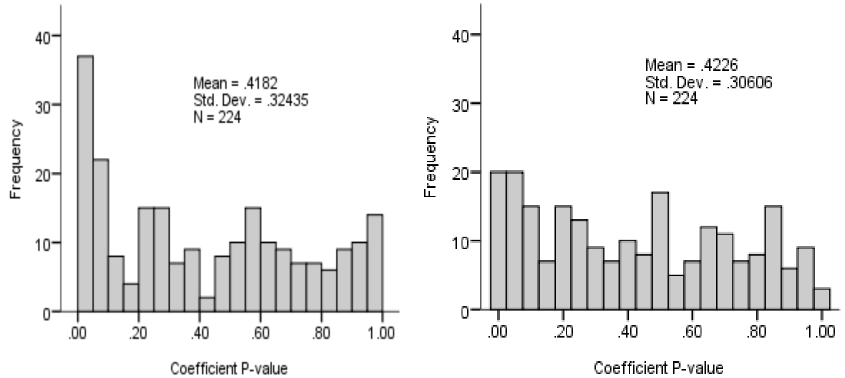


Figure F1. 83: England and Wales All Counts Asthmatics - distribution of coefficient P-values model including environmental exposures lagged by seven days a) Model without lag bank holiday added as covariate and b) Model with lag bank holiday as covariate.

a) Model no lag bank holiday b) Model with lag bank holiday

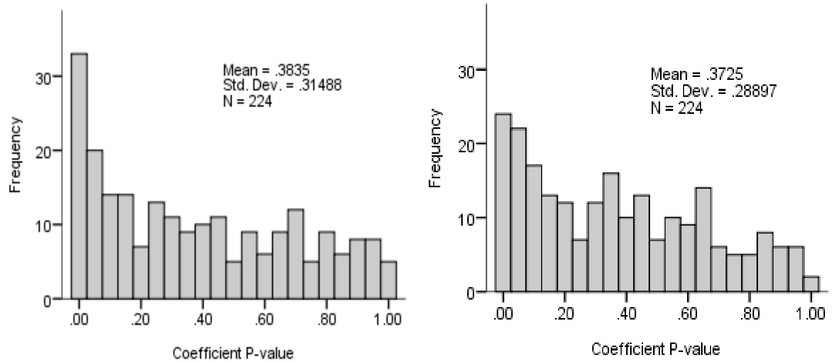


Figure F1. 84: England and Wales All Counts Non-asthmatics - distribution of coefficient P-values model including environmental exposures lagged by seven days a) model without lag bank holiday added as covariate and b) Model with lag bank holiday as covariate.

a) Model no lag bank holiday b) Model with lag bank holiday

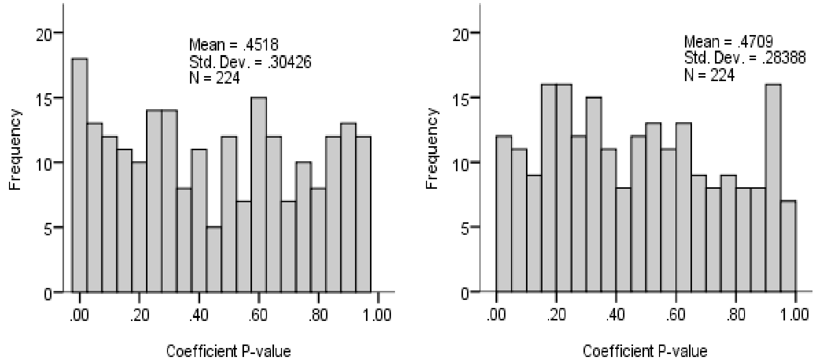


Figure F1. 85: England and Wales All Counts Excess - distribution of coefficient P-values model including environmental exposures lagged by seven days a) Model without lag bank holiday added as covariate and b) Model with lag bank holiday as covariate.

Table F. 5: England and Wales All Counts - F-test model and coefficient P-values with or without lag bank holiday

Coefficient or F-test	Asthmatics, Non-asthmatics or Excess	Model 1: no lag bank holiday	0.5 -Model 1	Model 2: with lag bank holiday	0.5 - Model 2	Model 1-2
F-test mean P-values	Asthmatics	0.23	0.27	0.28	0.22	-0.05
	Non-asthmatics	0.19	0.31	0.22	0.28	-0.03
	Excess	0.35	0.15	0.50	0.00	-0.15
Point-est mean P-values	Asthmatics	0.42	0.08	0.42	0.08	0
	Non-asthmatics	0.38	0.12	0.37	0.13	0.01
	Excess	0.45	0.05	0.47	0.03	-0.02

Trent Region First Order Difference

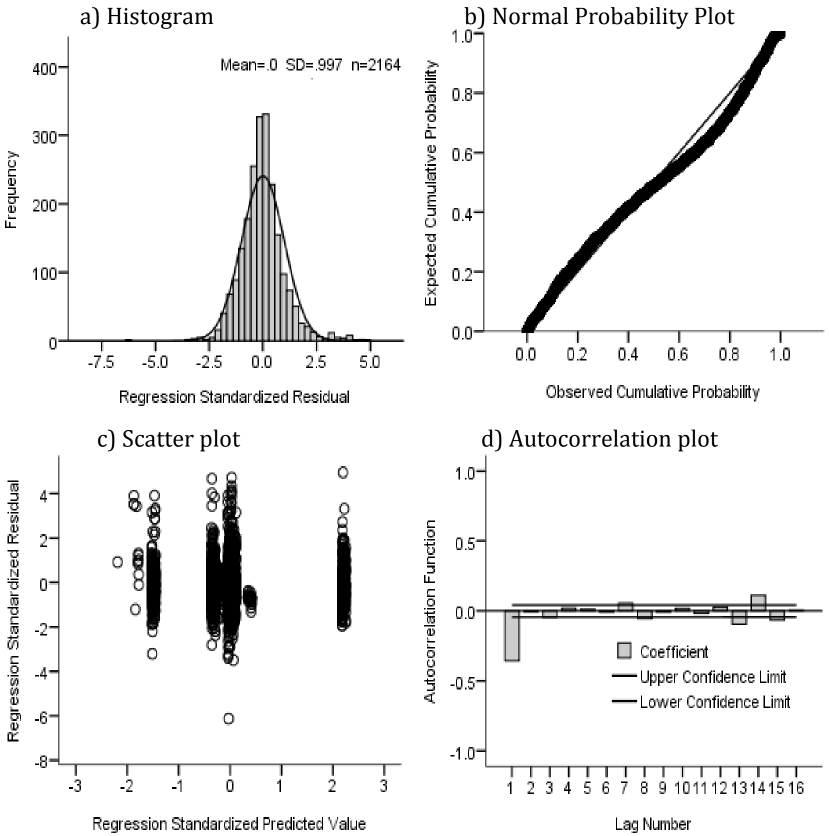


Figure F1. 86: Trent Region All Counts first order difference Asthmatics - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

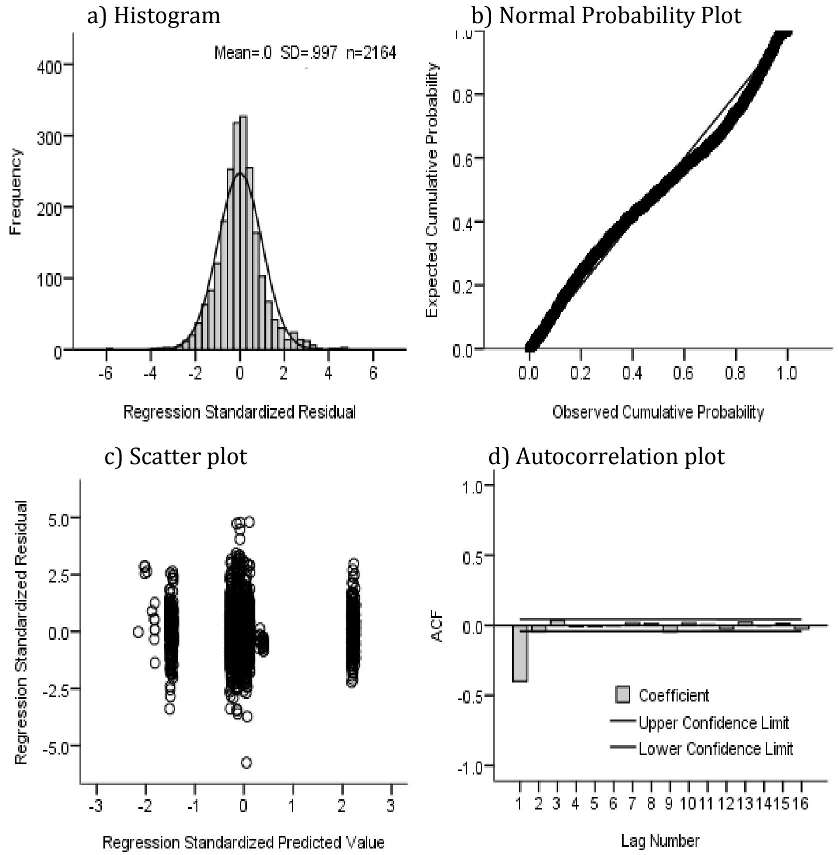


Figure F1. 87: Trent Region All Counts first order difference Non-asthmatics - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

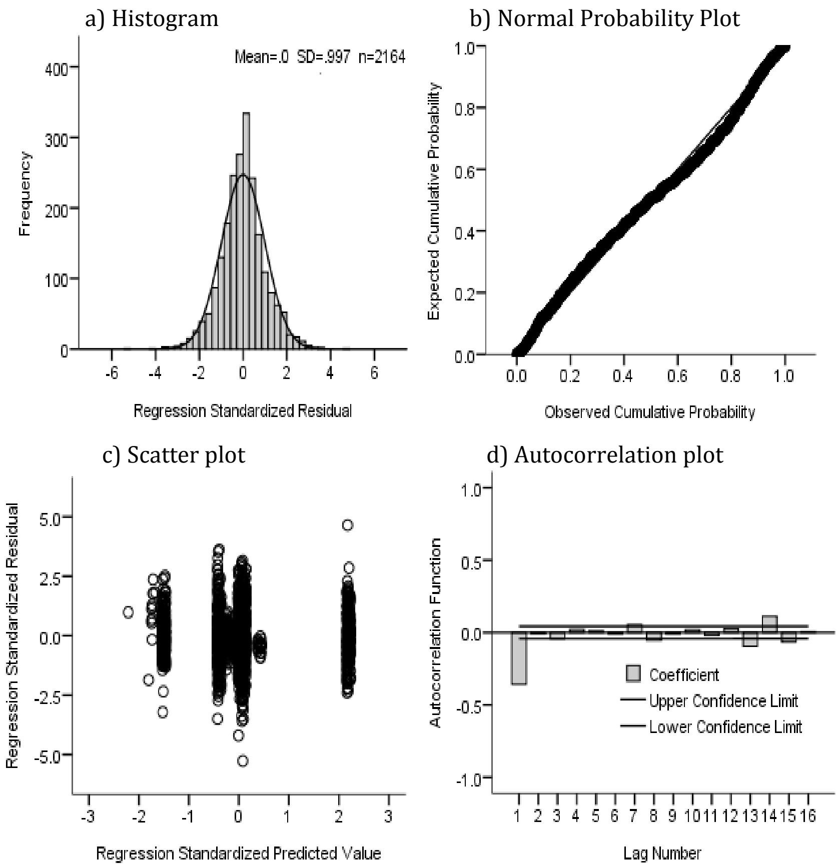


Figure F1. 88: Trent Region All Counts first order difference Excess - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

For the Trent Region, Figures F1.86 to F1.88 show fairly normal distributions for asthmatics, non-asthmatics and excess with very few outliers. There was slight deviation in the Normal probability plots and slight autocorrelation in the first order. The outlying residuals were removed to see whether the assumptions could be improved.

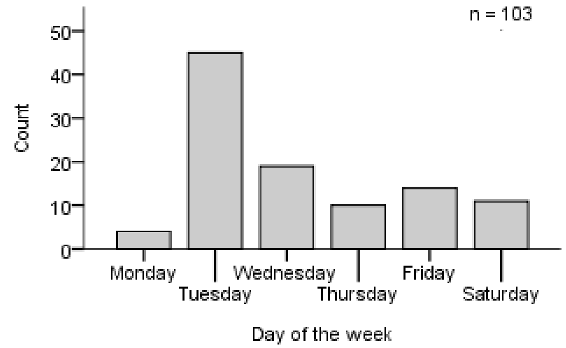


Figure F1. 89: Trent Region All Counts - outlying residuals, day of the week frequencies.

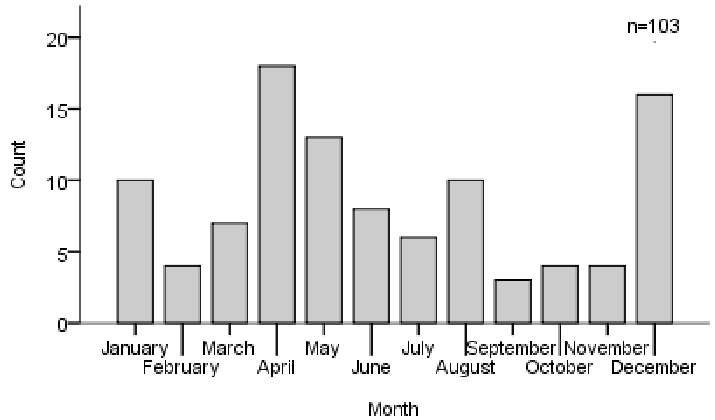


Figure F1. 90: Trent Region All Counts - outlying residuals, month of the year frequencies.

Lag bank holiday added as covariate.

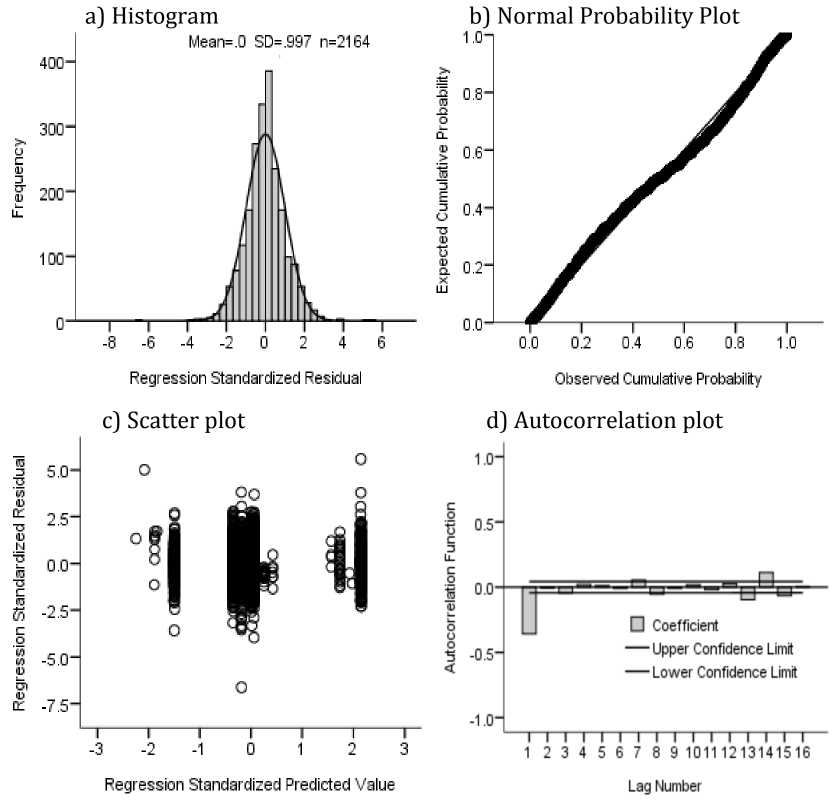


Figure F1. 91: Trent Region All Counts first order difference Asthmatics - linear regression null model + lag bank holiday a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

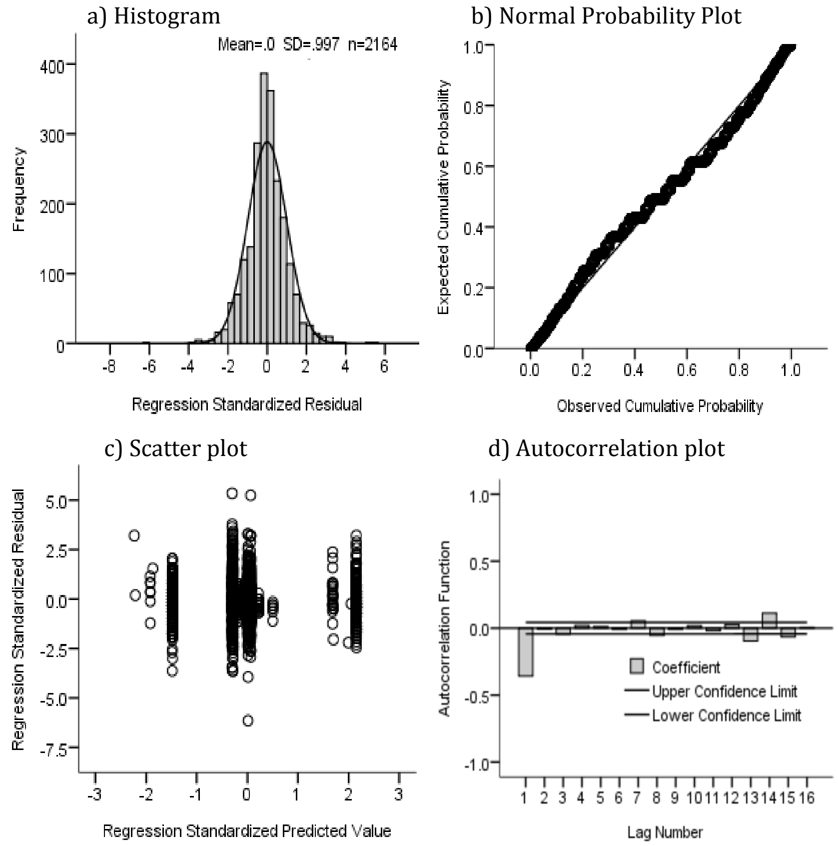


Figure F1. 92: Trent Region All Counts first order difference Non-asthmatics - linear regression null model + lag bank holiday a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

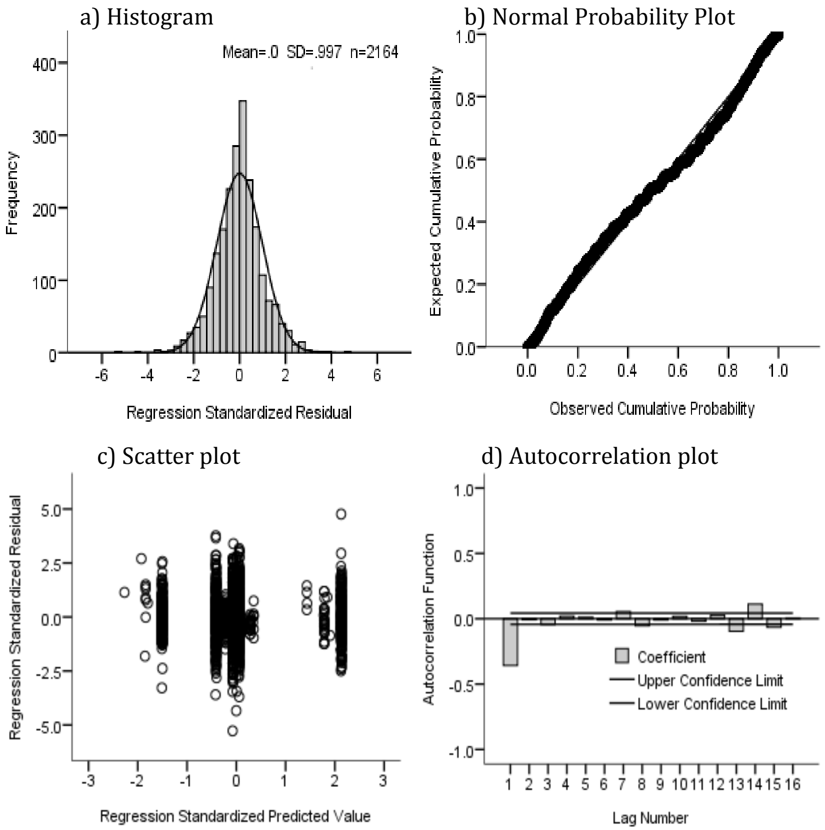


Figure F1. 93: Trent Region All Counts first order difference Excess - linear regression null model + lag bank holiday a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

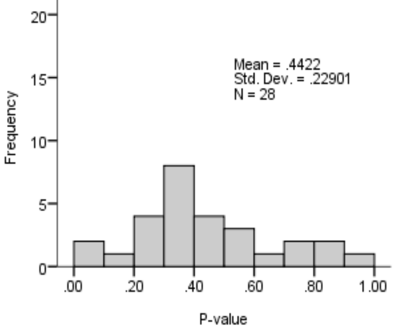
Table F. 6: Trent Region All Counts - F-test comparing null model to null model with lagged bank holiday as covariate.

1st Order Difference: Asthmatics, Non-asthmatics or Excess	All Counts Asthmatics	All Counts Non-asthmatics	All Counts Excess
RSS1	246018.54	101690.32	224447.19
RSS2	203285.91	90234.3	214509.91
df1	11	11	11
df2	12	12	12
N	2163	2163	2163
F-value	452.16	273.09	99.65
P-value	0	0	0

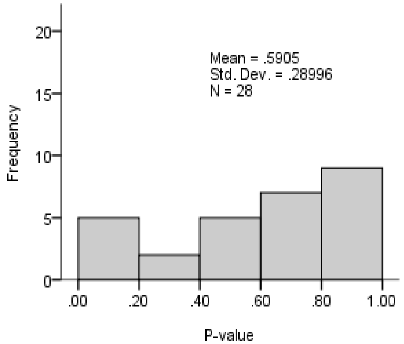
Table F.6 shows that with the addition of lag bank holiday as a covariate, the fit of the model has been improved. This holds true for asthmatics, non-asthmatics and excess.

Trent Region F-test and coefficient histograms

a) Model no lag bank holiday



b) Model with lag bank holiday



c) Model no lag bank holiday versus Model with lag bank holiday

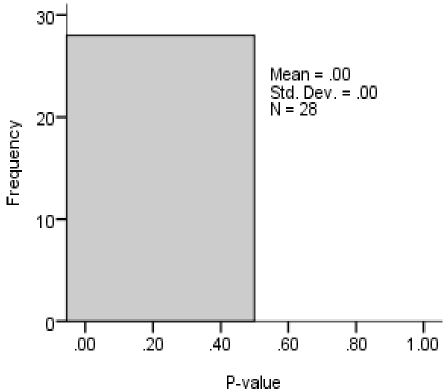
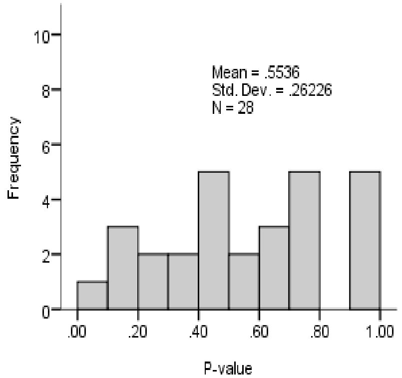
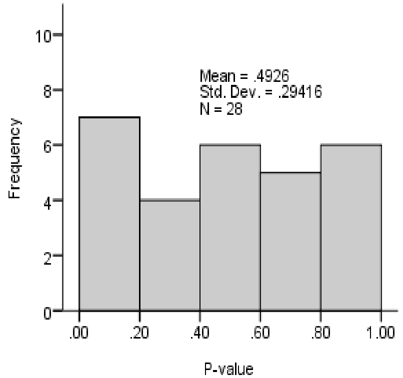


Figure F1. 94: Trent Region All Counts Asthmatics - distribution of F-test P-values model including environmental exposures lagged by seven days a) Model without lag bank holiday added as covariate, b) Model with lag bank holiday as covariate and c) Model no lag bank holiday versus Model with lag bank holiday.

a) Model no lag bank holiday



b) Model with lag bank holiday



c) Model no lag bank holiday versus Model with lag bank holiday

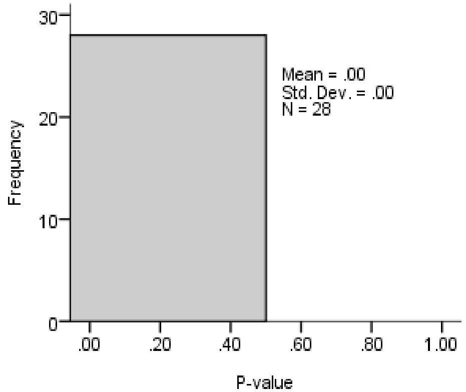


Figure F1. 95: Trent Region All Counts Non-asthmatics - distribution of F-test P-values model including environmental exposures lagged by seven days a) Model without lag bank holiday added as covariate, b) Model with lag bank holiday as covariate and c) Model no lag bank holiday versus Model with lag bank holiday.

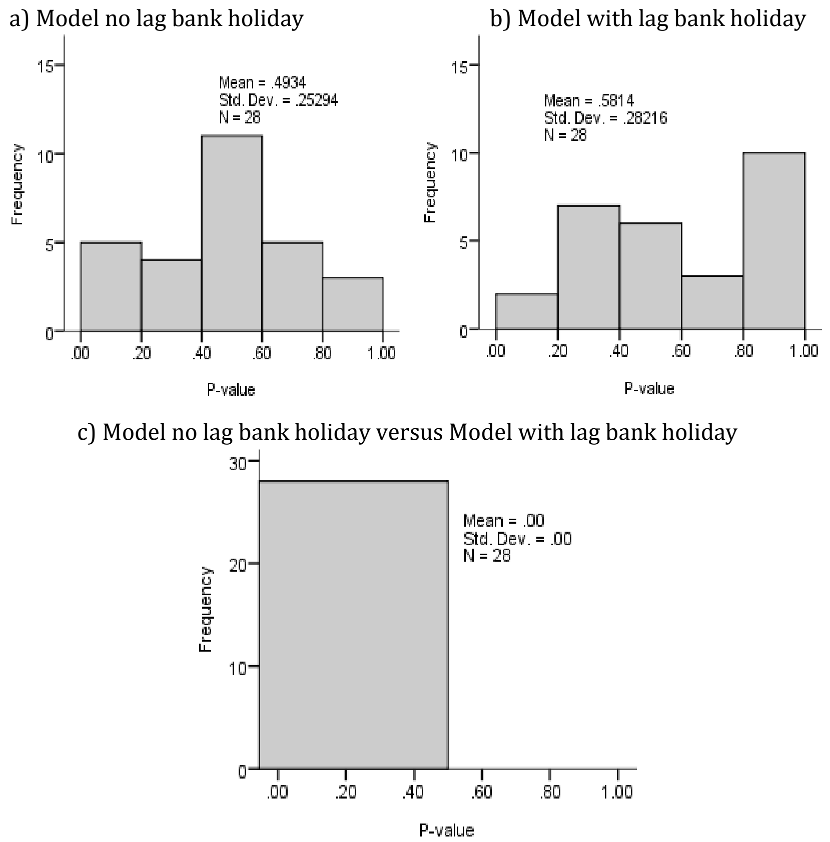


Figure F1. 96: Trent Region All Counts Excess - distribution of F-test P-values model including environmental exposures lagged by seven days a) Model without lag bank holiday added as covariate, b) Model with lag bank holiday as covariate and c) Model no lag bank holiday versus Model with lag bank holiday.

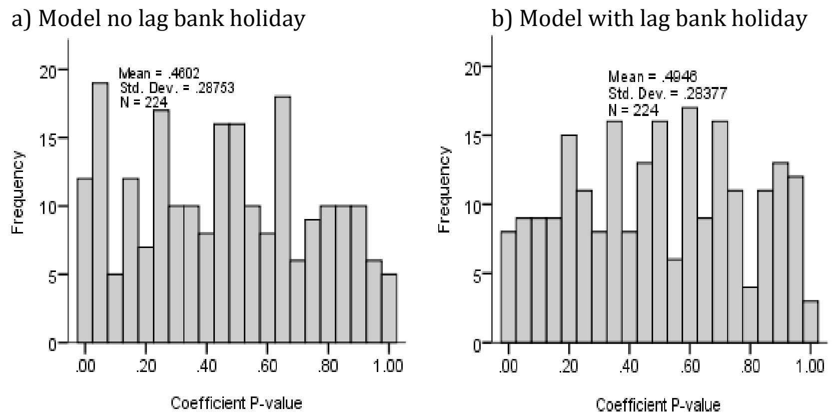


Figure F1. 97: Trent Region All Counts Asthmatics - distribution of coefficient P-values model including environmental exposures lagged by seven days a) Model without lag bank holiday added as covariate and b) Model with lag bank holiday as covariate.

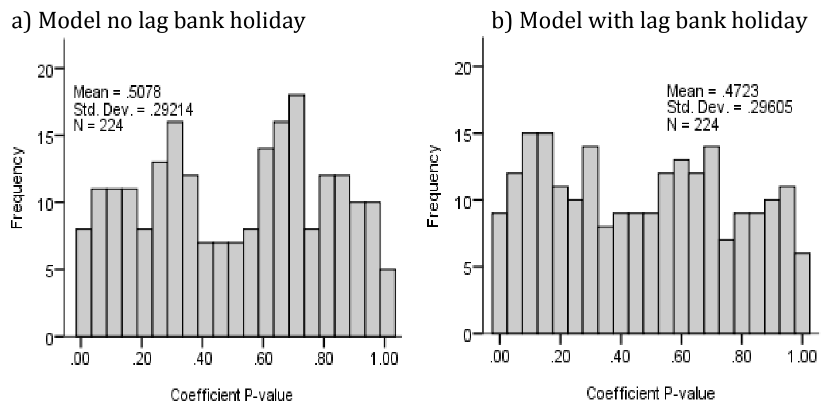


Figure F1. 98: Trent Region All Counts Non-asthmatics - distribution of coefficient P-values model including environmental exposures lagged by seven days a) Model without lag bank holiday added as covariate and b) Model with lag bank holiday as covariate.

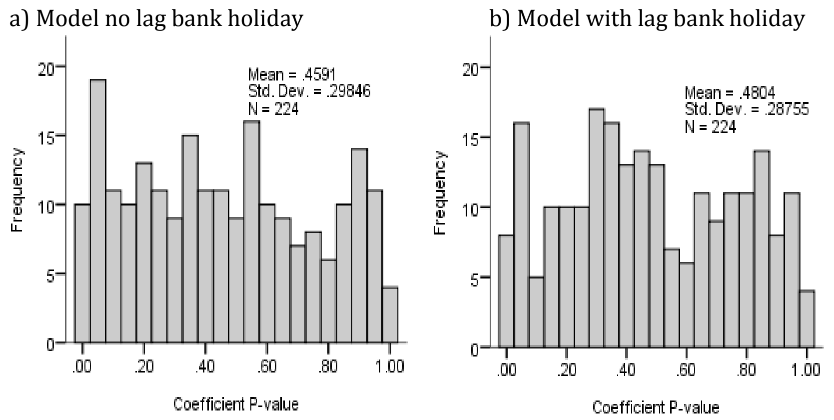


Figure F1. 99: Trent Region All Counts Excess - distribution of coefficient P-values model including environmental exposures lagged by seven days a) Model without lag bank holiday added as covariate and b) Model with lag bank holiday as covariate.

Table F. 7: Trent Region All Counts – F-test model and coefficient P-values with or without lag bank holiday.

Coefficient or F-test	Asthmatics, Non-asthmatics or Excess	Model 1. no lag bank holiday	0.5 - Model 1	Model 2. with lag bank holiday	0.5 - Model 2	Model 1-2
F-test mean P-values	**Asthmatics**	0.44	0.06	0.59	-0.09	-0.15
	Non-asthmatics	0.55	-0.05	0.49	0.01	0.06
	Excess	0.49	0.01	0.58	-0.08	-0.09
Point-est mean P-values	**Asthmatics**	0.46	0.04	0.49	0.01	-0.03
	Non-asthmatics	0.51	-0.01	0.47	0.03	0.04
	Excess	0.46	0.04	0.48	0.02	-0.02

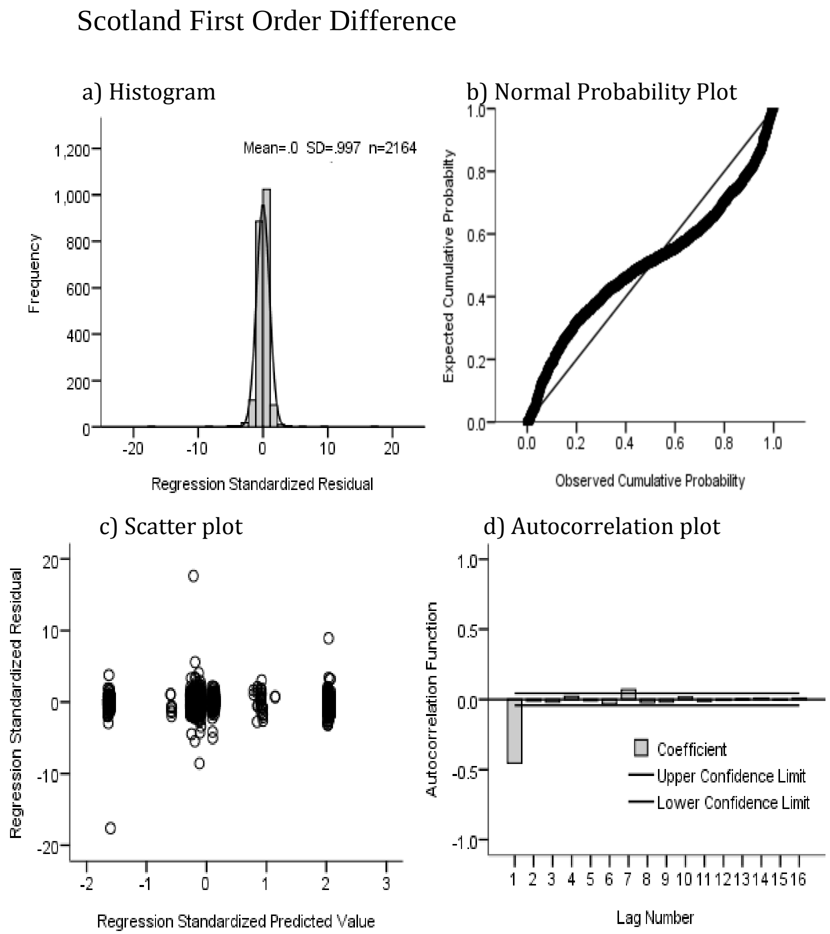


Figure F1. 100: Scotland All Counts first order difference Asthmatics - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

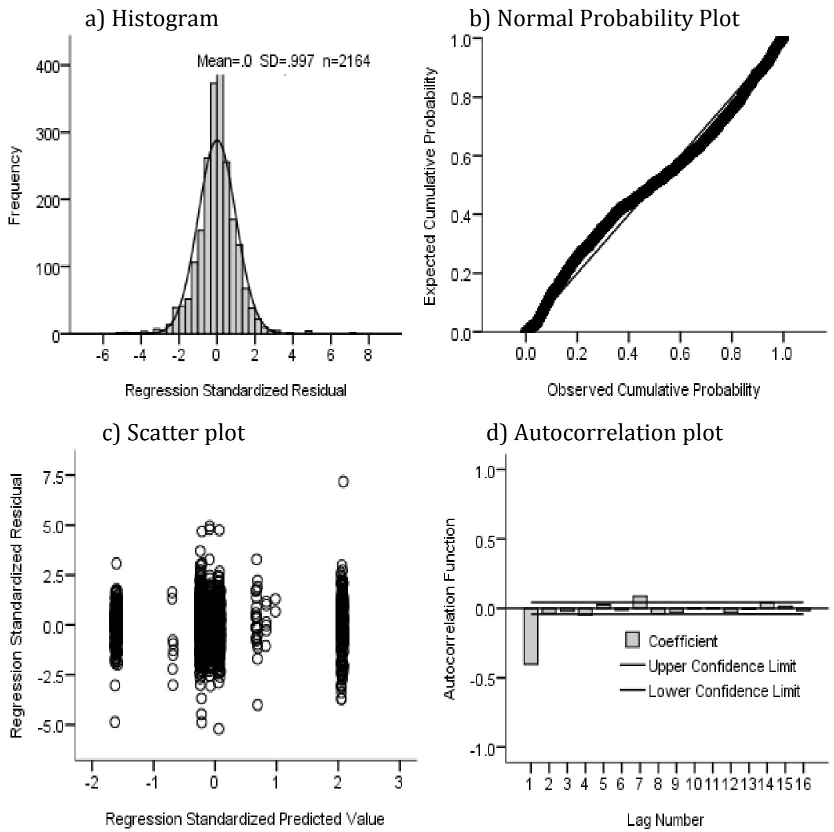


Figure F1. 101: Scotland All Counts first order difference Non-asthmatics - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

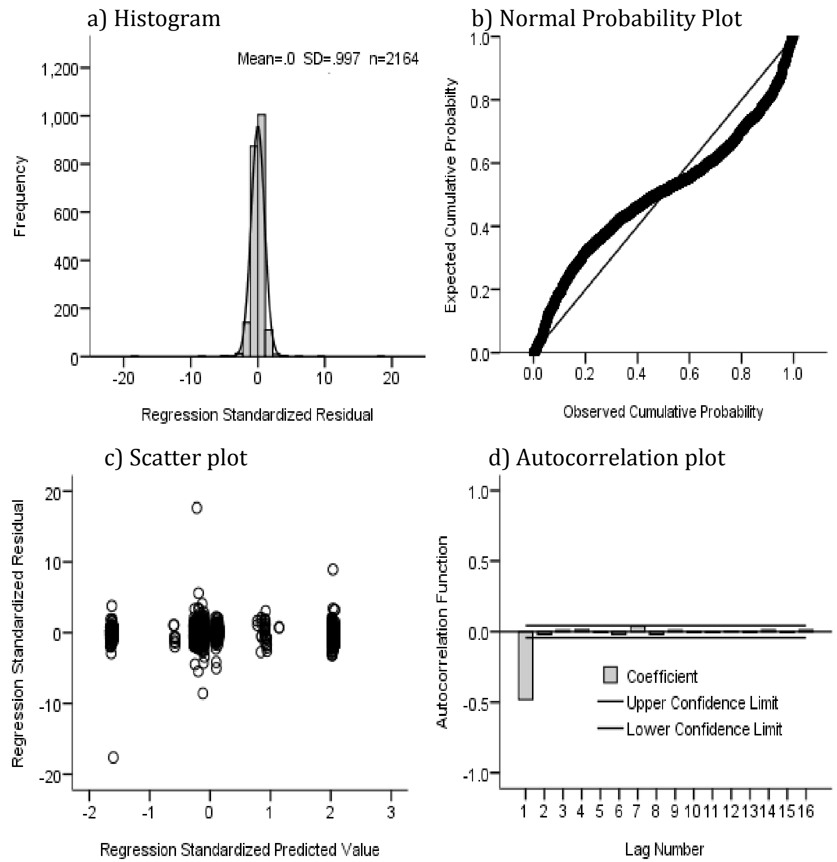


Figure F1. 102: Scotland All Counts first order difference Excess - linear regression null model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

Figures F1.99 to F1.102 show fairly normal distributions but deviation was present in the Normal probability plots.

Autocorrelation was fairly small in all three asthmatics bar the first order.

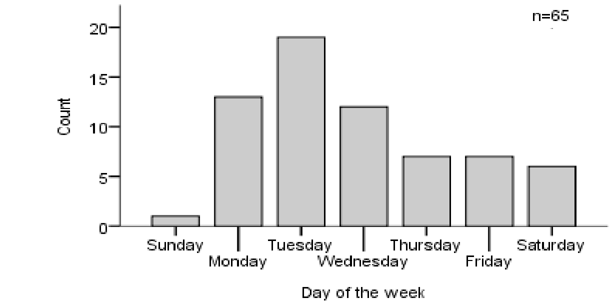


Figure F1. 103: Scotland All Counts - outlying residuals, day of the week frequencies.

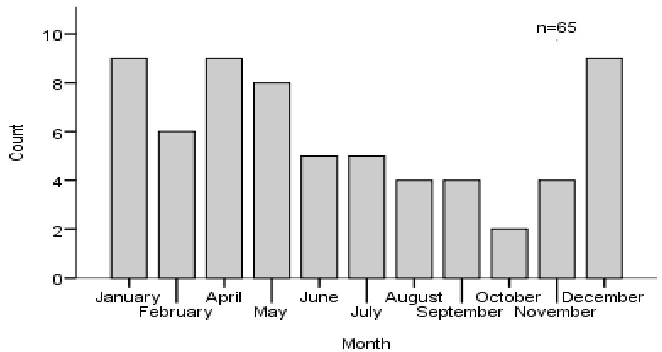


Figure F1. 104: Scotland All Counts - outlying residuals, month of the year frequencies.

Figures F1.103 and F1.104 shows the frequency of outliers was highest on Tuesday and in January, April and December. Outlying residuals were taken out to observe any effect on the assumptions.

Lag bank holiday added as covariate.

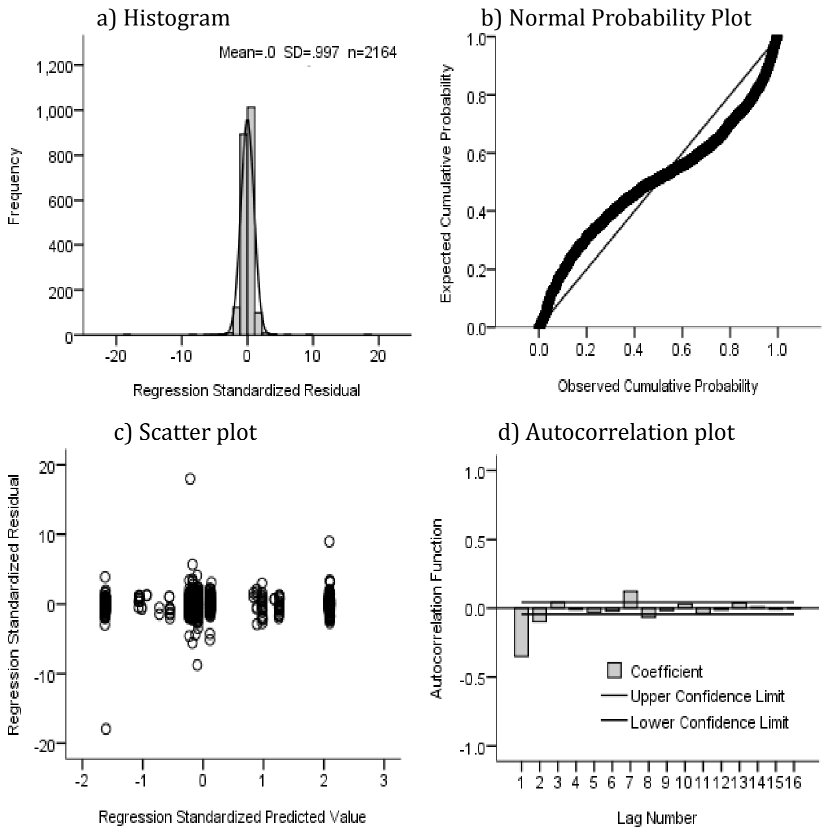


Figure F1. 105: Scotland All Counts first order difference Asthmatics - linear regression null model, + lag bank holiday a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

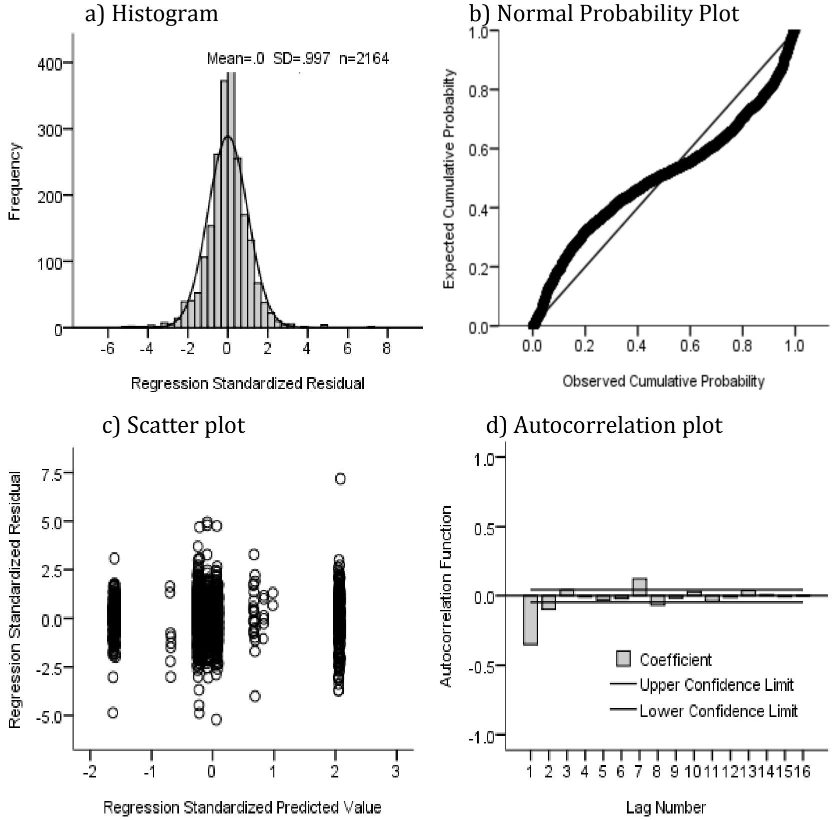


Figure F1. 106: Scotland All Counts first order difference Non-asthmatics - linear regression null model, + lag bank holiday a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot

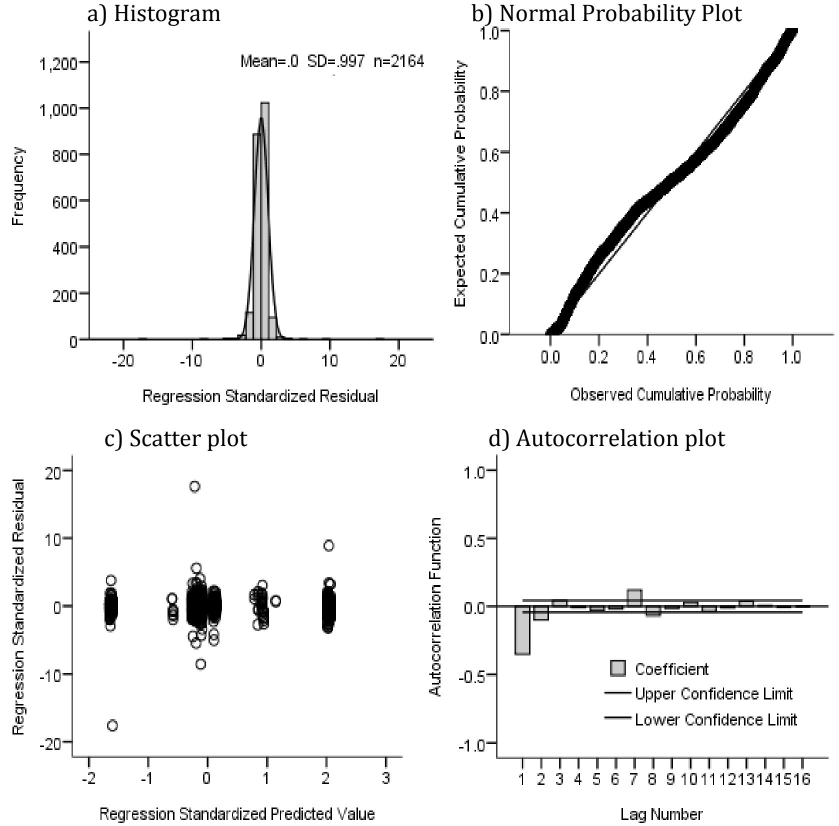


Figure F1. 107: Scotland All Counts first order difference Excess - linear regression null model, + lag bank holiday a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

Table F. 8: Scotland All Counts - F-test comparing null model to null model with lagged bank holiday as covariate.

1st Order Difference: Asthmatics, Non-asthmatics or Excess	All Counts Asthmatics	All Counts Non-asthmatics	All Counts Excess
RSS1	2044850.32	338473.22	1726914.56
RSS2	1976275.21	324916.33	1705763.38
df1	11	11	11
df2	12	12	12
n	2163	2163	2163
F-value	74.64	89.75	26.67
P-value	<0.001	<0.001	<0.001

Table F.8 shows that including lag bank holiday as a covariate improves the fit of the model for Scotland.

Scotland: F-test and coefficient histograms

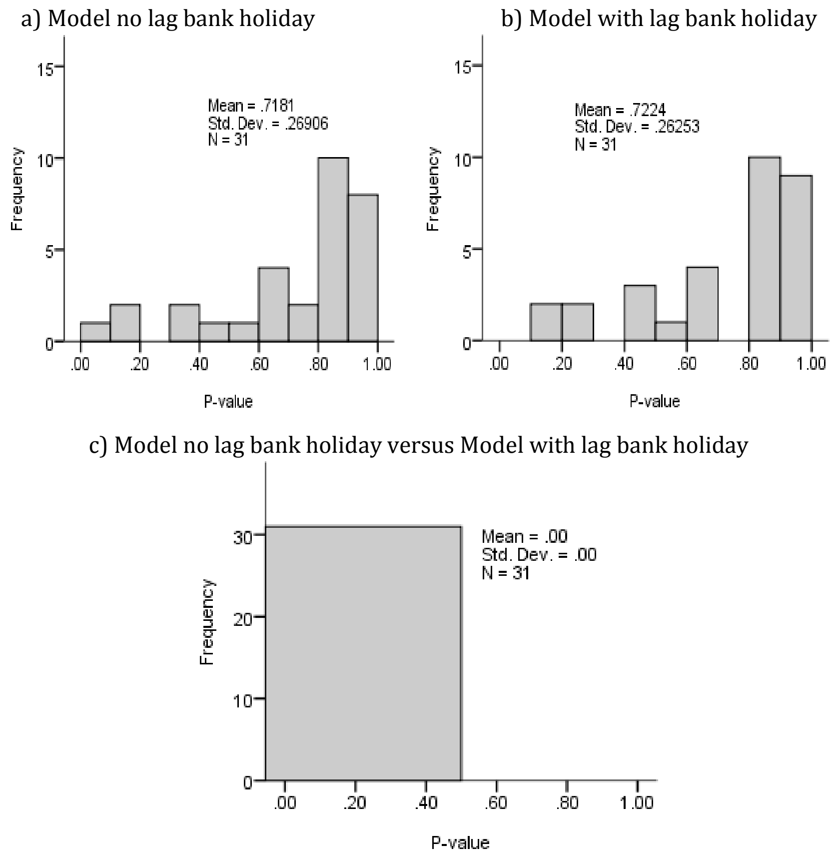


Figure F1. 108: Scotland All Counts Asthmatics - distribution of F-test P-values model including environmental exposures lagged by seven days a) Model without lag bank holiday added as covariate, b) Model with lag bank holiday as covariate and c) Model no lag bank holiday versus Model with lag bank holiday.

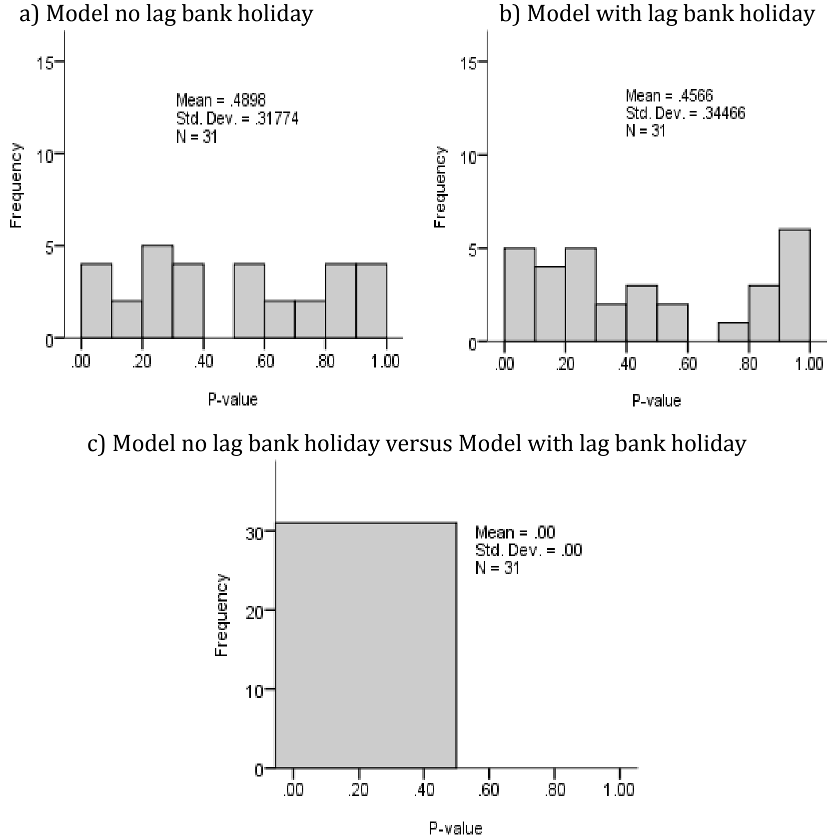


Figure F1. 109: Scotland All Counts Non-asthmatics - distribution of F-test P-values model including environmental exposures lagged by seven days a) Model without lag bank holiday added as covariate, b) Model with lag bank holiday as covariate and c) Model no lag bank holiday versus Model with lag bank holiday.

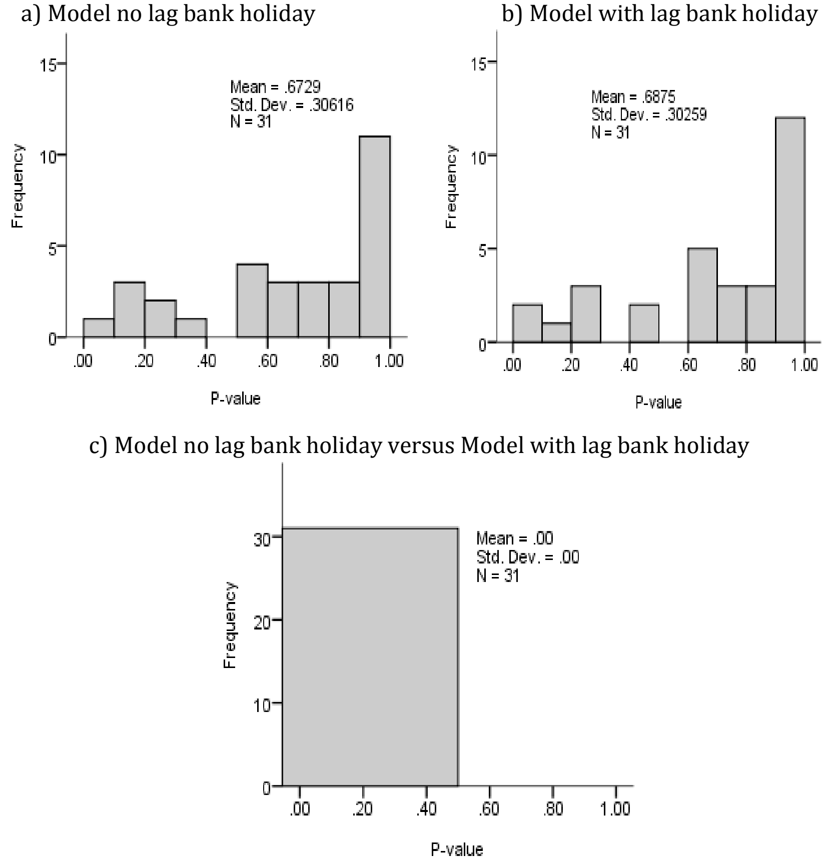


Figure F1. 110: Scotland All Counts Excess - distribution of F-test P-values model including environmental exposures lagged by seven days a) Model without lag bank holiday added as covariate, b) Model with lag bank holiday as covariate and c) c) Model no lag bank holiday versus Model with lag bank holiday.

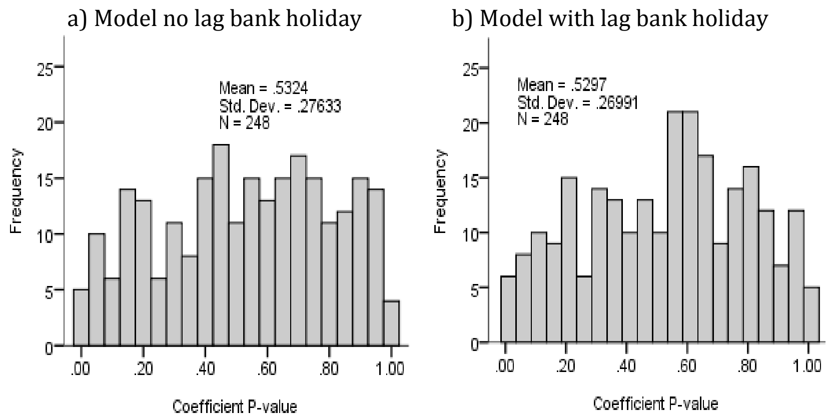


Figure F1. 111: Scotland All Counts Asthmatics - distribution of coefficient P-values model including environmental exposures lagged by seven days a) Model without lag bank holiday added as covariate and b) Model with lag bank holiday as covariate.

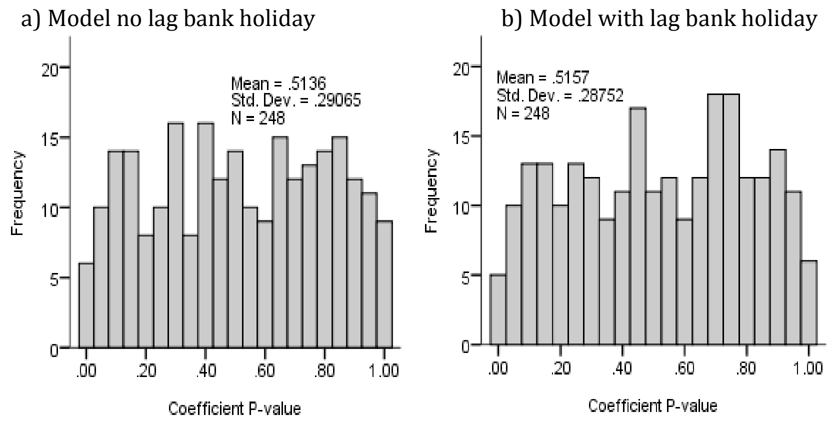


Figure F1. 113: Scotland All Counts Excess - distribution of coefficient P-values model including environmental exposures lagged by seven days a) Model without lag bank holiday added as covariate and b) Model with lag bank holiday as covariate.

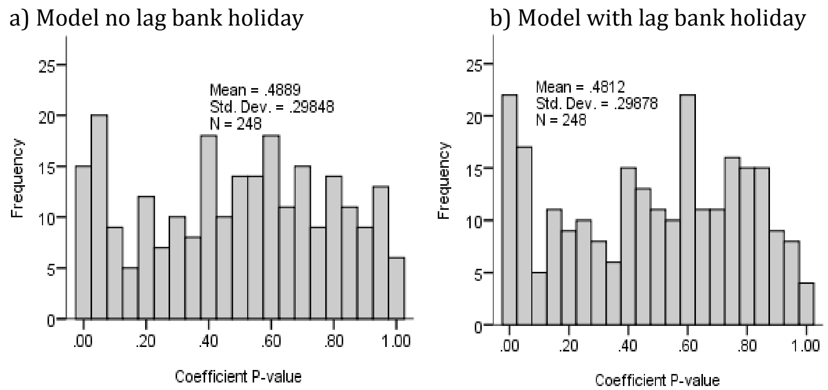


Figure F1. 112: Scotland All Counts Non-asthmatics - distribution of coefficient P-values model including environmental exposures lagged by seven days a) Model without lag bank holiday added as covariate and b) Model with lag bank holiday as covariate.

Table F. 9: All Counts: Scotland – F-test model and coefficient P-values with or without lag bank holiday.

Coefficient or F-test	Asthmatics, Non-asthmatics or Excess	Model 1. no lag bank holiday	0.5 -Model 1	Model 2. with lag bank holiday	0.5 - Model 2	Model 1-2
F-test	**Asthmatics**	0.72	-0.22	0.72	-0.22	0.00
mean	**Non-**	0.49	0.01	0.46	0.04	0.03
P-values	**Excess**	0.67	-0.17	0.69	-0.19	-0.01
Point-est	**Asthmatics**	0.53	-0.03	0.53	-0.03	0.00
mean	**Non-**	0.49	0.01	0.48	0.02	0.01
P-values	**Excess**	0.51	-0.01	0.52	-0.02	0.00

Summary

For England and Wales, Scotland and for the Trent Region, using first order difference improved the autocorrelation for asthmatics, non-asthmatics and excess. Looking at the outlying residuals from All Counts Asthmatics, the most number of outliers fell on the Tuesday, in April, May and December. Including lag bank holiday as a covariate did not improve the assumptions noticeably. However, the F-test showed a significant improvement in the fit of the model when lag bank holiday was added.

F1.4. Comparative Analysis using First Order Difference: All Data versus Outlying Residuals removed (All Counts Only)

England and Wales

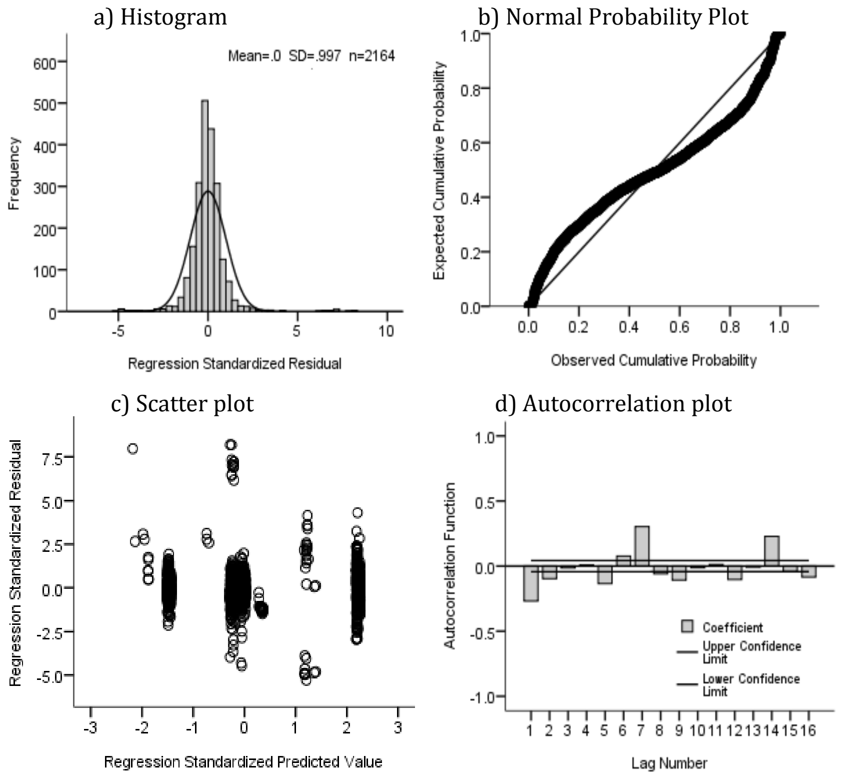


Figure F1. 114: England and Wales All Counts first order difference Asthmatics - linear regression null model + lag bank holiday a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

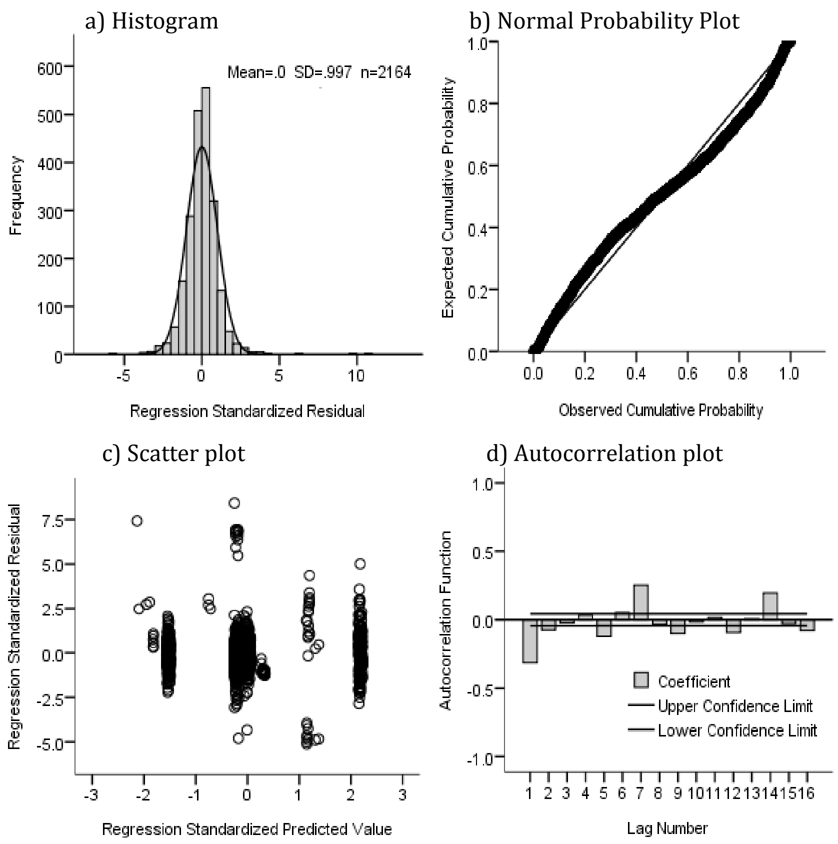


Figure F1. 115: England and Wales All Counts first order difference Non-asthmatics linear regression null model + lag bank holiday a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

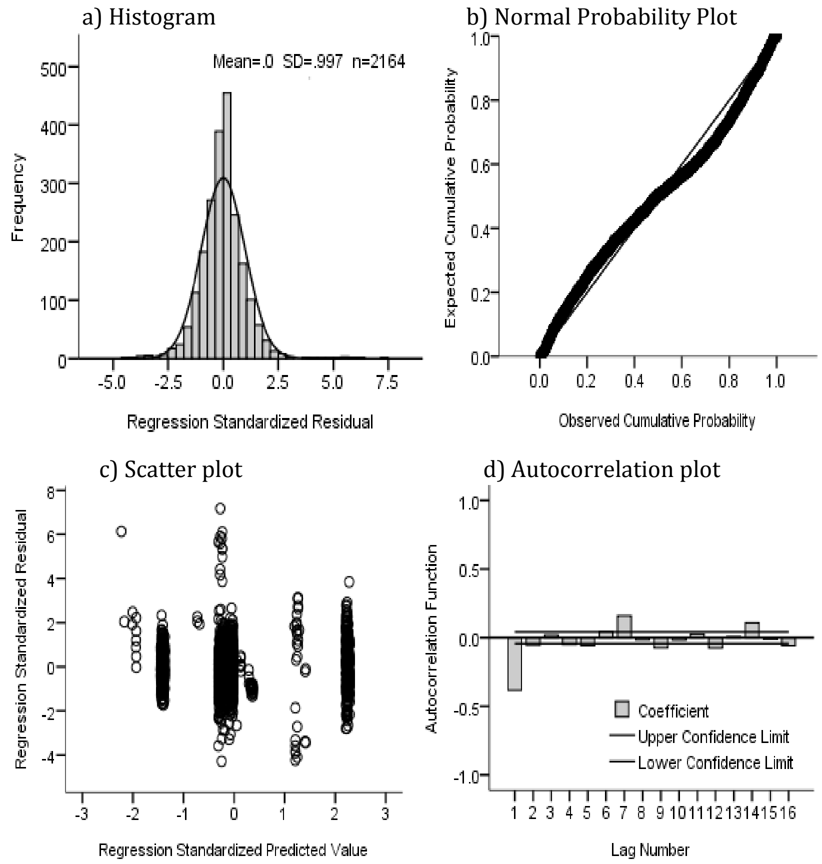


Figure F1. 116: England and Wales All Counts first order difference Excess - linear regression null model + lag bank holiday a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

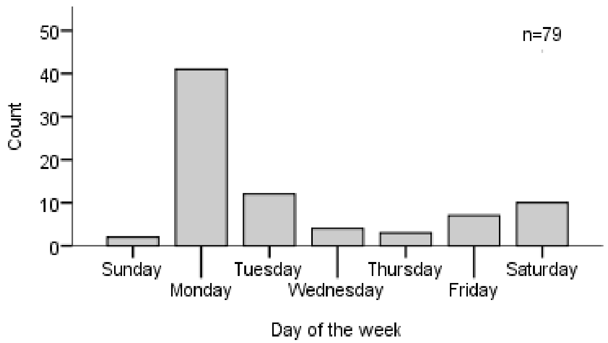


Figure F1. 117: England and Wales All Counts - outlying residuals day of the week frequencies (lag bank holiday included as covariate).

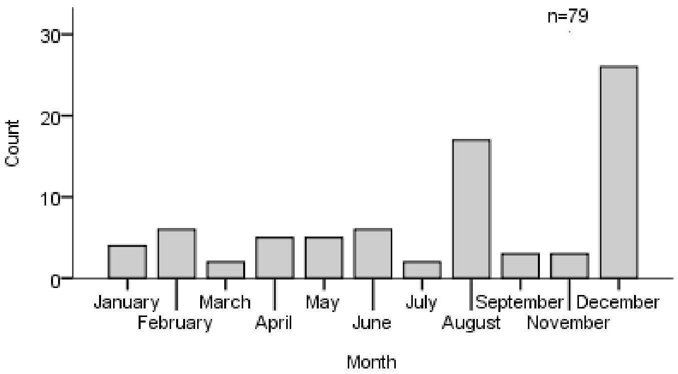


Figure F1. 118: England and Wales All Counts - outlying residuals, month of the year frequencies (lag bank holiday included as covariate).

Outlying residuals were removed to see if there was an improvement on the model.

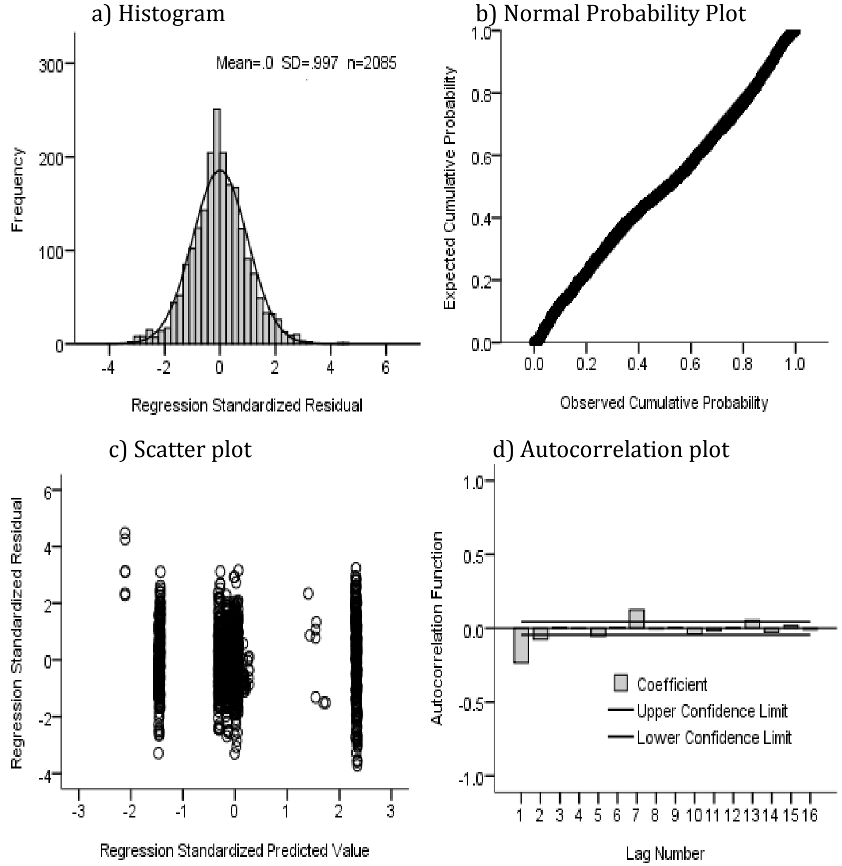


Figure F1. 119: England and Wales All Counts first order difference Asthmatics - linear regression null model + lag bank holiday a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot (omitted data).

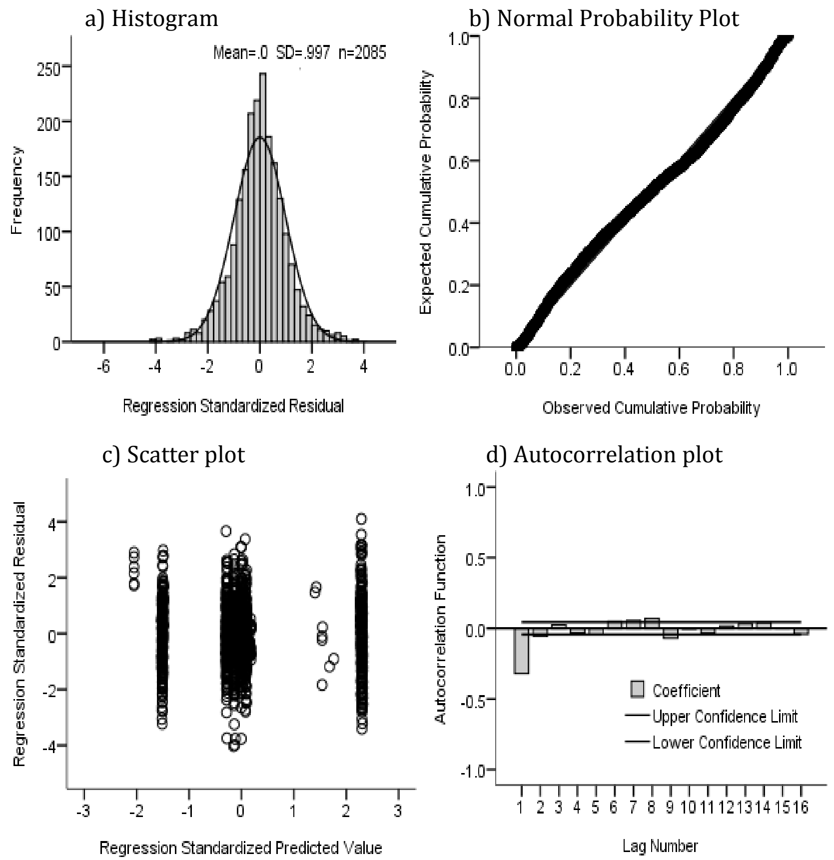


Figure F1. 120: England and Wales All Counts first order difference Non-asthmatics - linear regression null model + lag bank holiday a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot (omitted data).

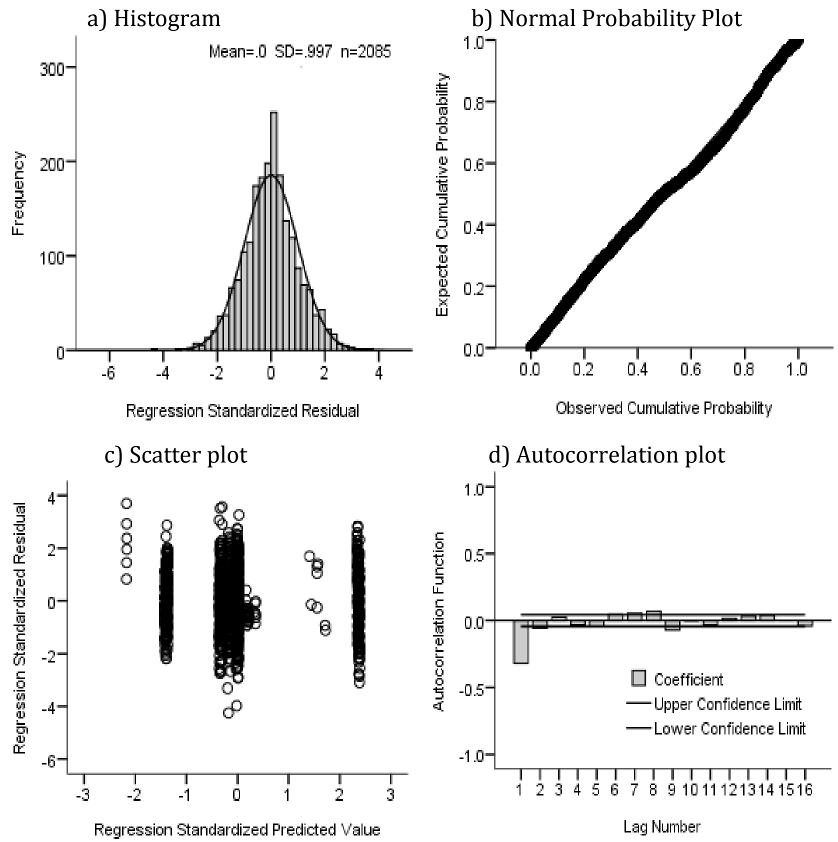


Figure F1. 121: England and Wales All Counts first order difference Excess - linear regression null model + lag bank holiday a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot (omitted data).

England and Wales: F-test and coefficient histograms

a) Model all data b) Model outlying residuals removed

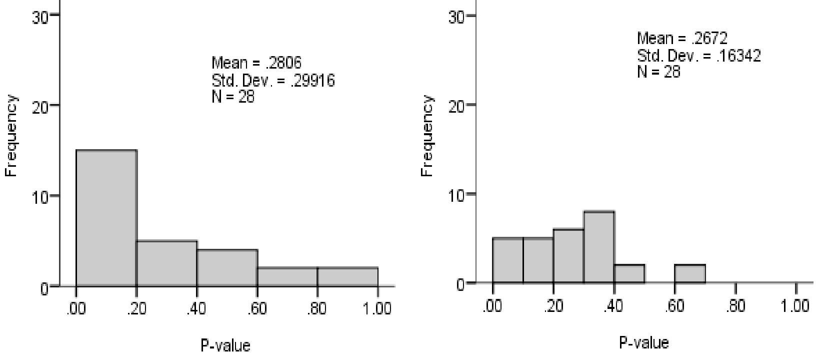


Figure F1. 122: England and Wales All Counts Asthmatics - distribution of F-test P-values model including environmental exposures lagged by seven days a) Model with all data and b) Model with outlying residuals removed.

a) Model all data b) Model outlying residuals removed

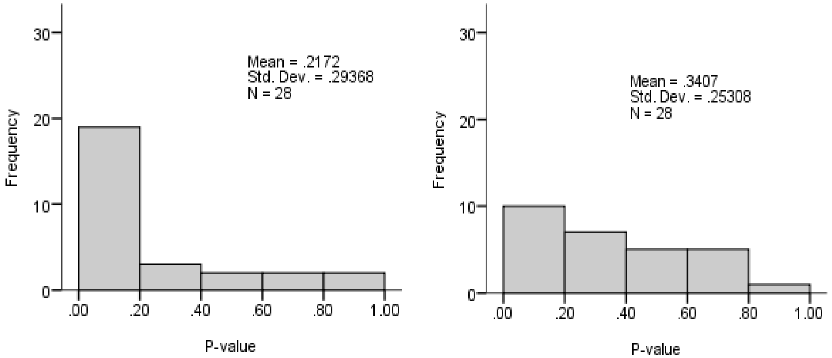


Figure F1. 123: England and Wales All Counts Non-asthmatics - distribution of F-test P-values model including environmental exposures lagged by seven days a) Model with all data and b) Model with outlying residuals removed.

a) Model all data b) Model outlying residuals removed

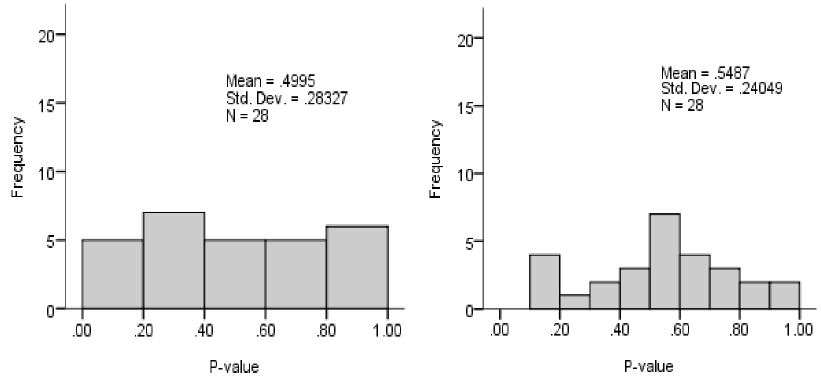


Figure F1. 124: England and Wales All Counts Excess - distribution of F-test P-values model including environmental exposures lagged by seven days a) Model with all data and b) Model with outlying residuals removed.

a) Model all data b) Model outlying residuals removed

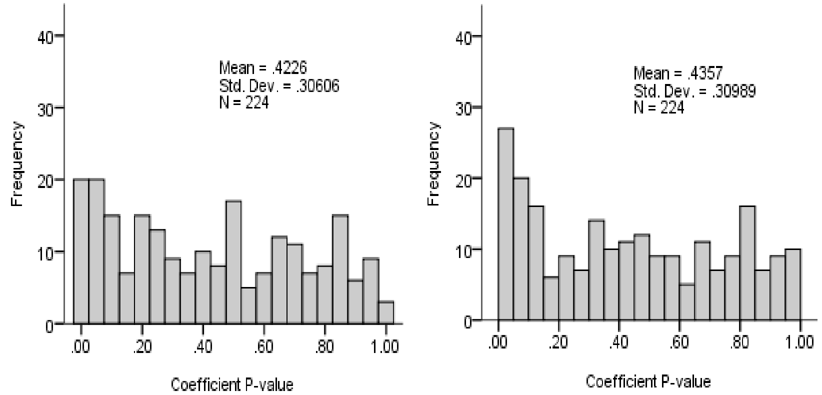


Figure F1. 125: England and Wales All Counts Asthmatics - distribution of coefficient P-values model including environmental exposures lagged by seven days a) Model with all data and b) Model with outlying residuals removed.

a) Model all data

b) Model outlying residuals removed

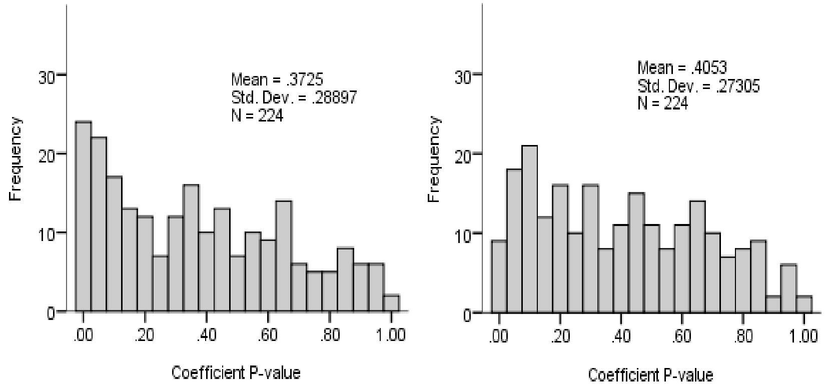


Figure F1. 126: England and Wales All Counts Non-asthmatics - distribution of Coefficient P-values model including environmental exposures lagged by seven days a) Model with all data and b) Model with outlying residuals removed.

a) Model all data

b) Model outlying residuals removed

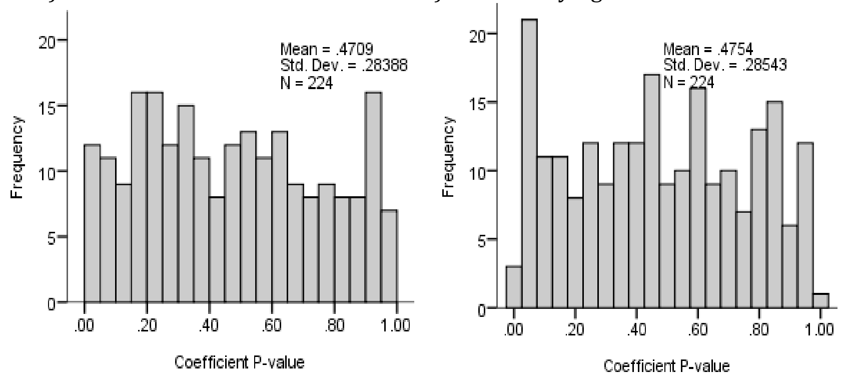


Figure F1. 127: England and Wales All Counts Excess - distribution of coefficient P-values model including environmental exposures lagged by seven days a) Model with all data and b) Model with outlying residuals removed.

There were small differences between models based on all the data and models with outlying residuals removed.

Table F. 10: England and Wales All Counts F-test model and coefficient P-values comparison between model with all data and outlying residuals removed

Coefficient or F-test	Asthmatics, Non-asthmatics or Excess	Model 1. All data	0.5 - Model 1	Model 2. Omitted data	0.5 - Model 2	Model 1-2
F-test	Asthmatics	0.28	0.22	0.27	0.23	0.01
mean	Non-asthmatics	0.22	0.28	0.34	0.16	-0.12
P-values	Excess	0.50	0.00	0.55	-0.05	-0.05
Point-est	Asthmatics	0.42	0.08	0.44	0.06	-0.01
mean	Non-asthmatics	0.37	0.13	0.41	0.09	-0.03
P-values	Excess	0.47	0.03	0.48	0.02	0.00

Trent Region

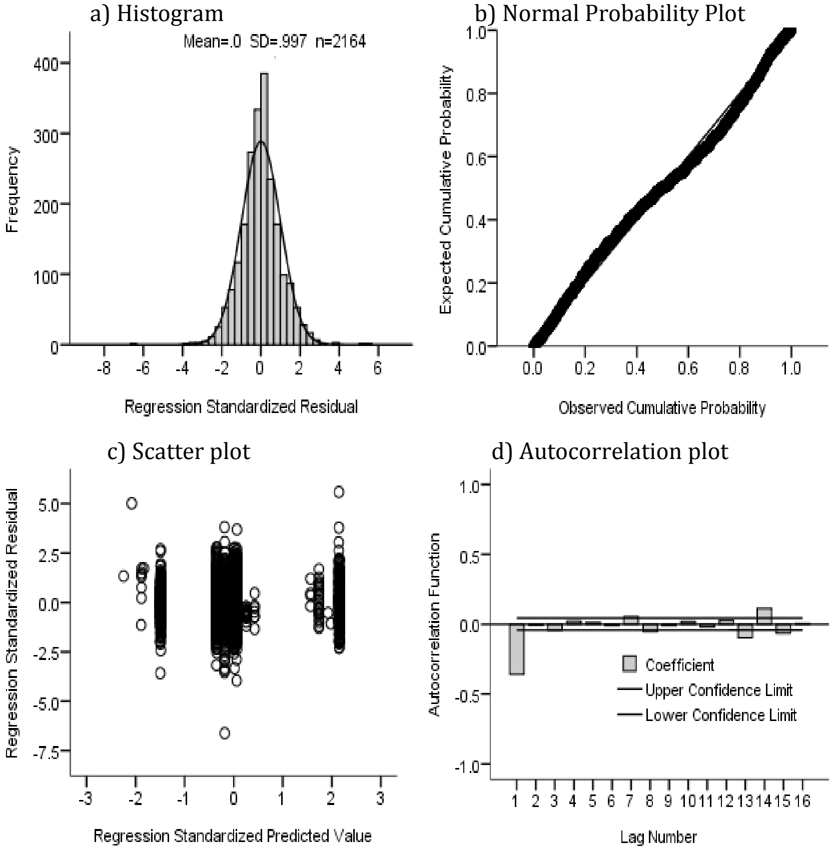


Figure F1. 128: Trent Region All Counts first order difference Asthmatics - linear regression null model, + lag bank holiday a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

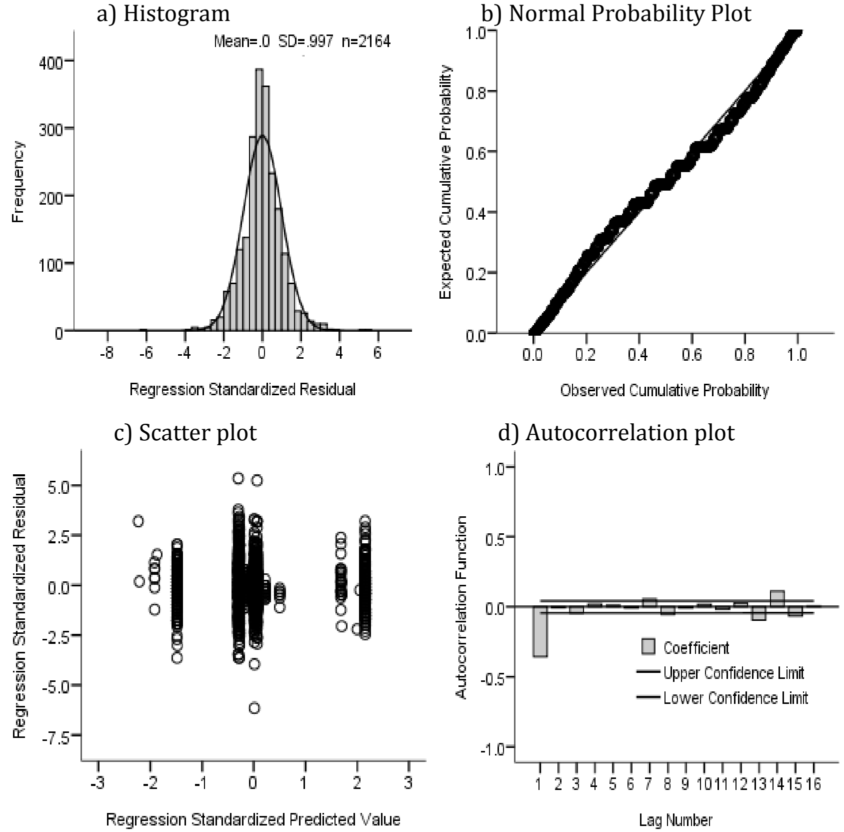


Figure F1. 129: Trent Region All Counts first order difference Non-asthmatics - linear regression null model, + lag bank holiday a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

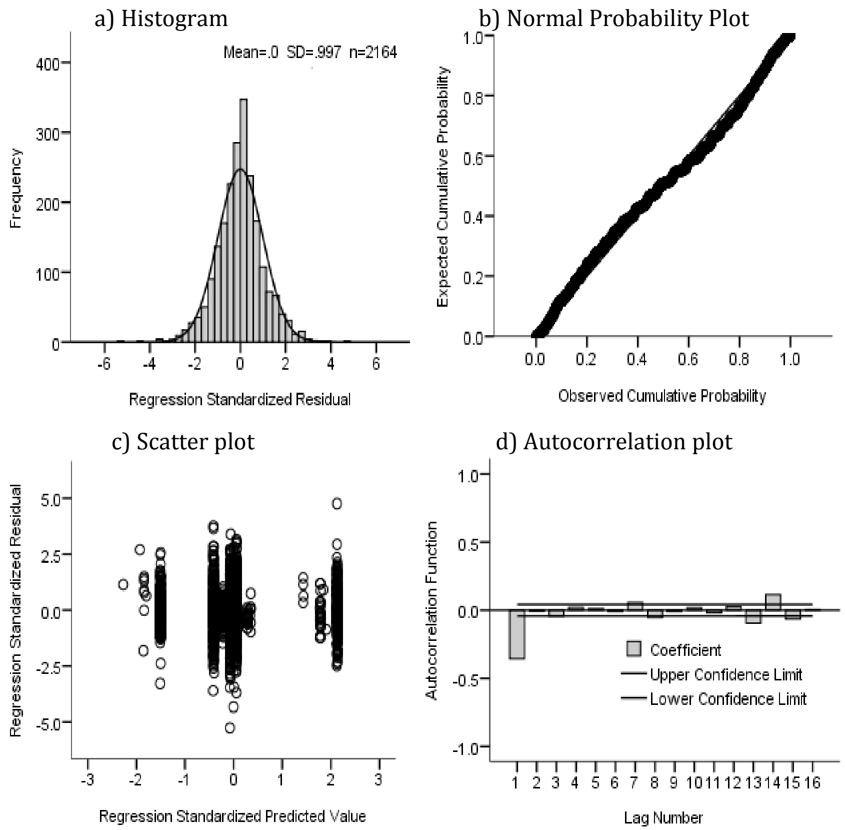


Figure F1. 130: Trent Region All Counts first order difference Excess - linear regression null model, + lag bank holiday a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

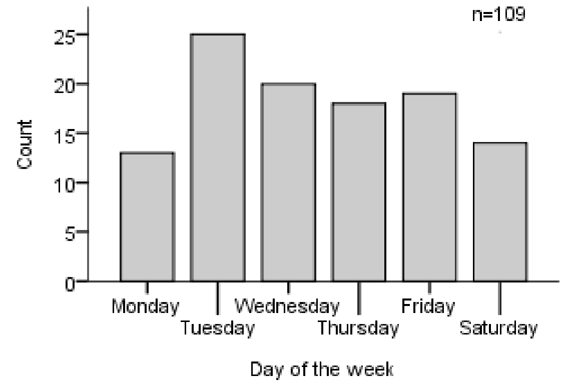


Figure F1. 131: Trent Region All Counts - outlying residuals day of the week frequencies (lag bank holiday included as covariate).

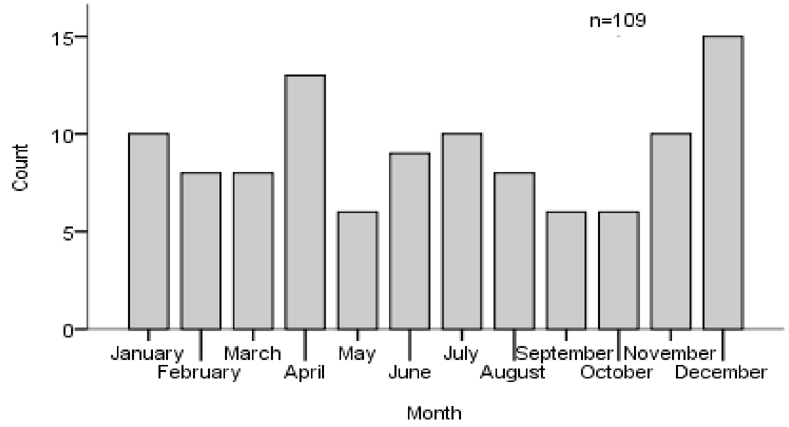


Figure F1. 132: Trent Region All Counts - outlying residuals day of the week frequencies (lag bank holiday included as covariate).

Outlying residuals were removed to see if there was an improvement on the model.

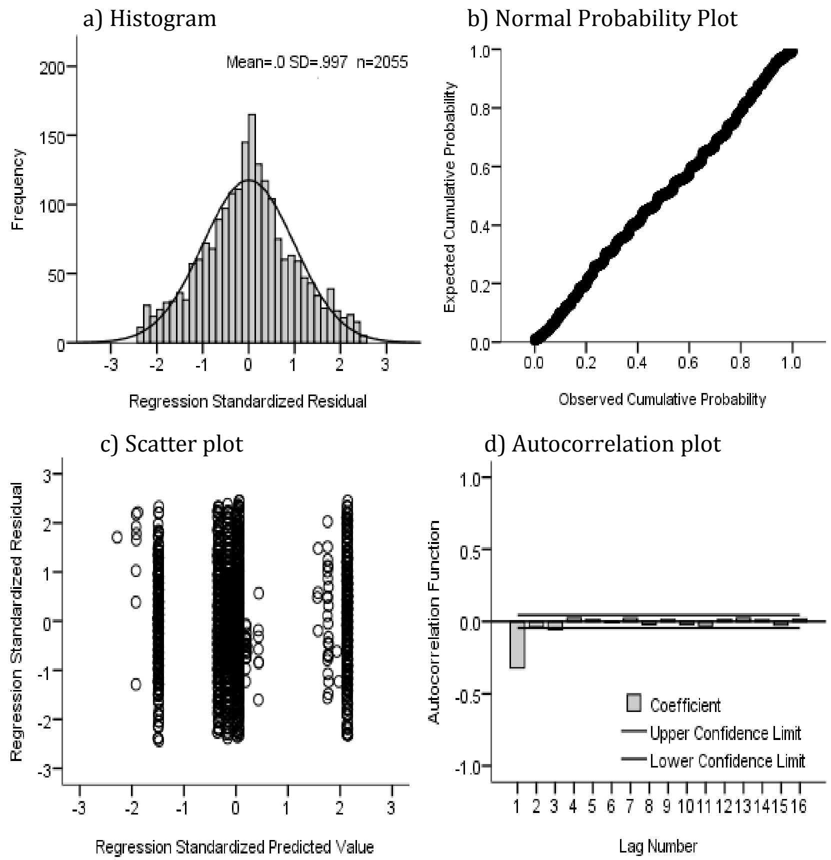


Figure F1. 133: Trent Region All Counts first order difference Asthmatics - linear regression null model + lag bank holiday a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot (omitted data).

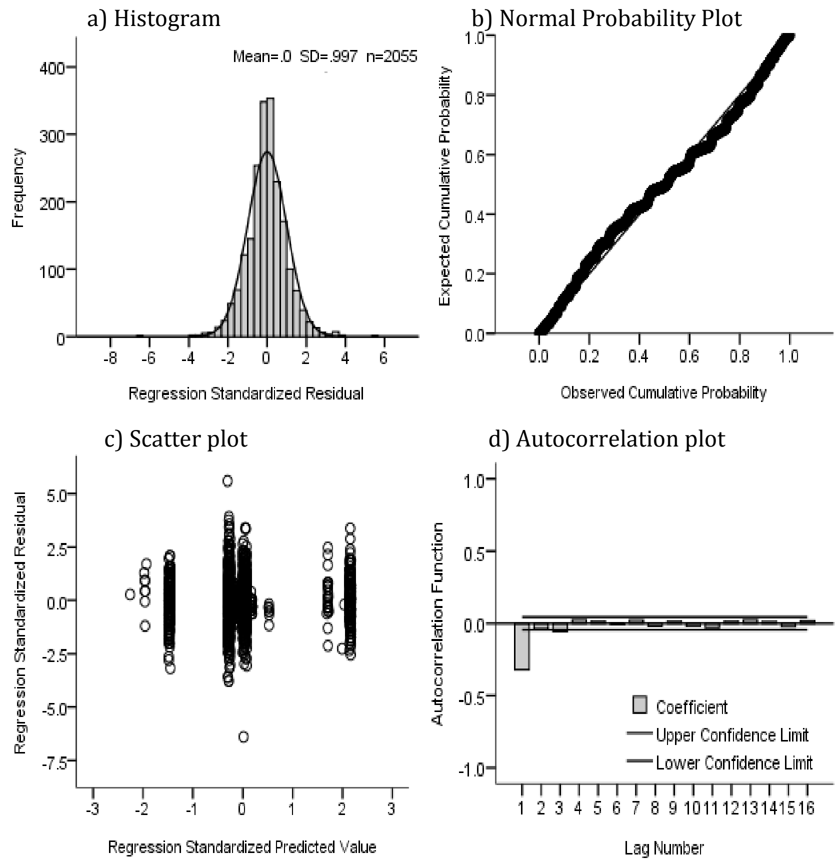


Figure F1. 134: Trent Region All Counts first order difference Non-asthmatics – linear regression null model + lag bank holiday a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot (omitted data).

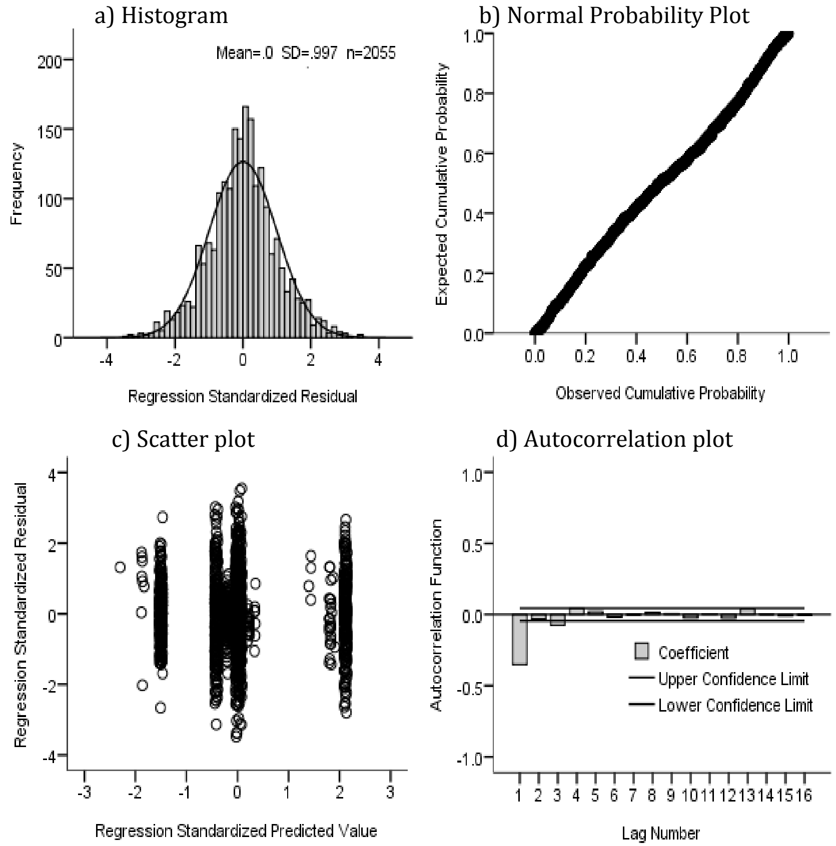


Figure F1. 135: Trent Region All Counts first order difference Excess -linear regression null model, + lag bank holiday a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot (omitted data).

Figures F1.133 to F1.135 illustrate similar plots to the model with all the data included. First order autocorrelation was still quite high.

Trent Region: F-test and Coefficient P-value Histograms

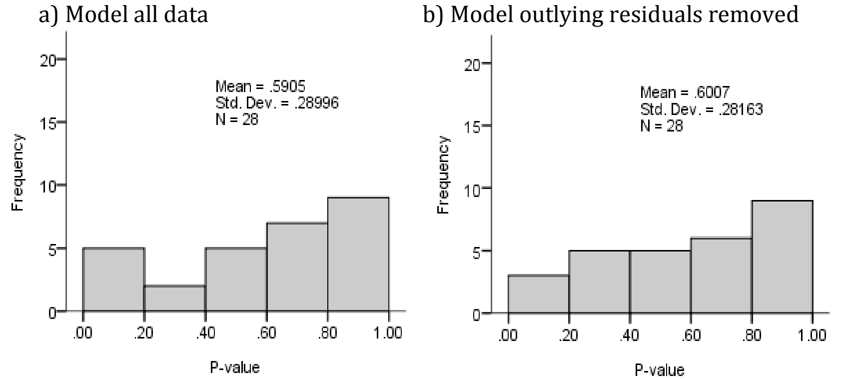


Figure F1. 136: Trent Region All Counts Asthmatics - distribution of F-test P-values model including environmental exposures lagged by seven days a) Model with all data and b) Model with outlying residuals removed.

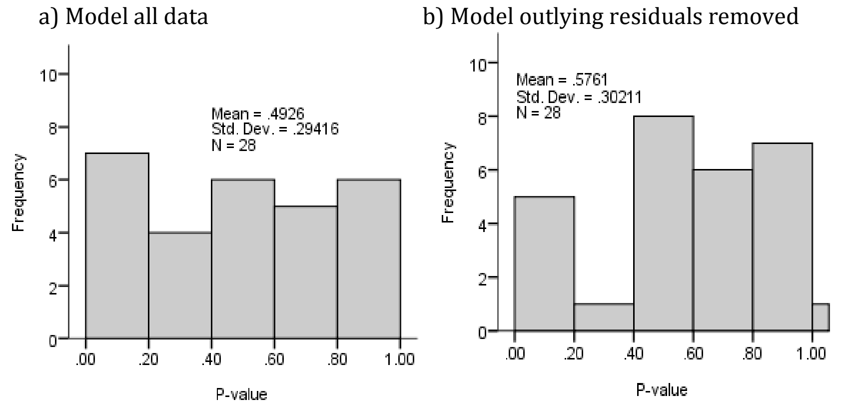


Figure F1. 137: Trent Region All Counts Non-asthmatics - distribution of F-test P-values model including environmental exposures lagged by seven days a) Model with all data and b) Model with outlying residuals removed.

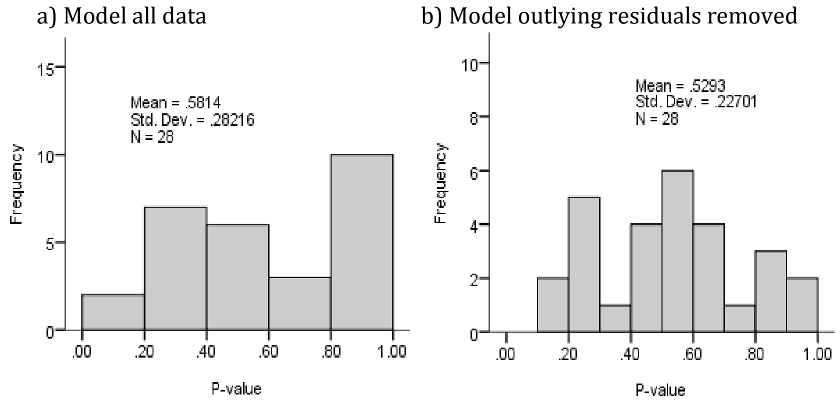


Figure F1. 138: Trent Region All Counts Excess - distribution of F-test P-values model including environmental exposures lagged by seven days a) Model with all data and b) Model with outlying residuals removed.

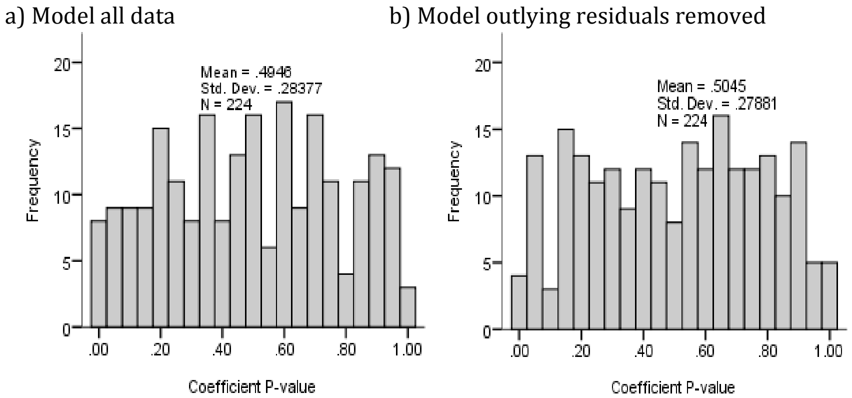


Figure F1. 139: Trent Region All Counts Asthmatics - distribution of coefficient P-values model including environmental exposures lagged by seven days a) Model with all data and b) Model with outlying residuals removed.

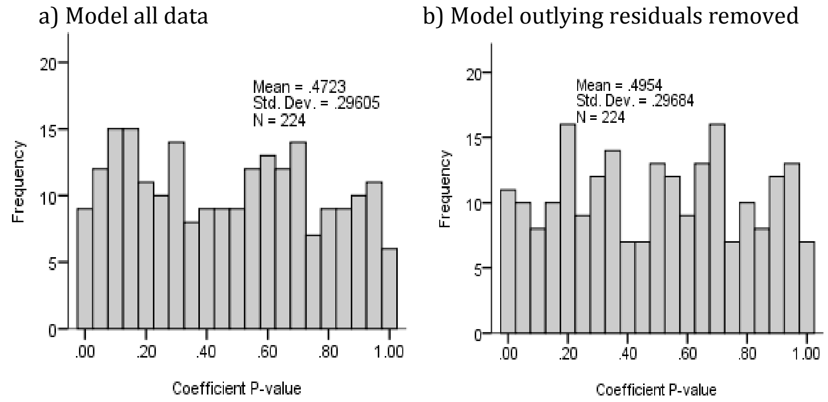


Figure F1. 140: Trent Region All Counts Non-asthmatics - distribution of coefficient P-values model including environmental exposures lagged by seven days a) model with all data and b) model with outlying residuals removed.

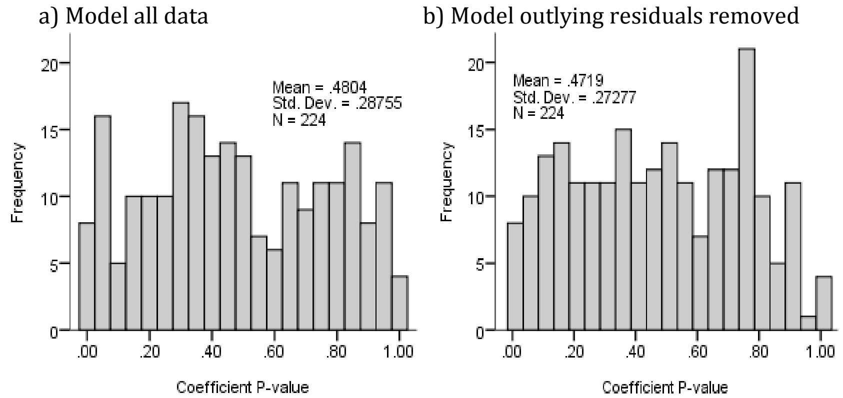


Figure F1. 141: Trent Region All Counts Excess - distribution of coefficient P-values model including environmental exposures lagged by seven days a) Model with all data and b) Model with outlying residuals removed.

Table F. 11: Trent Region All Counts - F-test model and coefficient P-values comparison between model with all data and outlying residuals removed.

Coefficient or F-test	Asthmatics, Non-asthmatics or Excess	Model 1. All data	0.5 -Model 1	Model 2. Outliers omitted	0.5 - Model 2	Model 1-2
F-test mean P-values	Asthmatics	0.59	-0.09	0.60	-0.10	-0.01
	Non-asthmatics	0.49	0.01	0.58	-0.08	-0.08
	Excess	0.58	-0.08	0.53	-0.03	0.05
Point-est mean P-values	Asthmatics	0.49	0.01	0.50	0.00	-0.01
	Non-asthmatics	0.47	0.03	0.50	0.00	-0.02
	Excess	0.48	0.02	0.47	0.03	0.01

Scotland

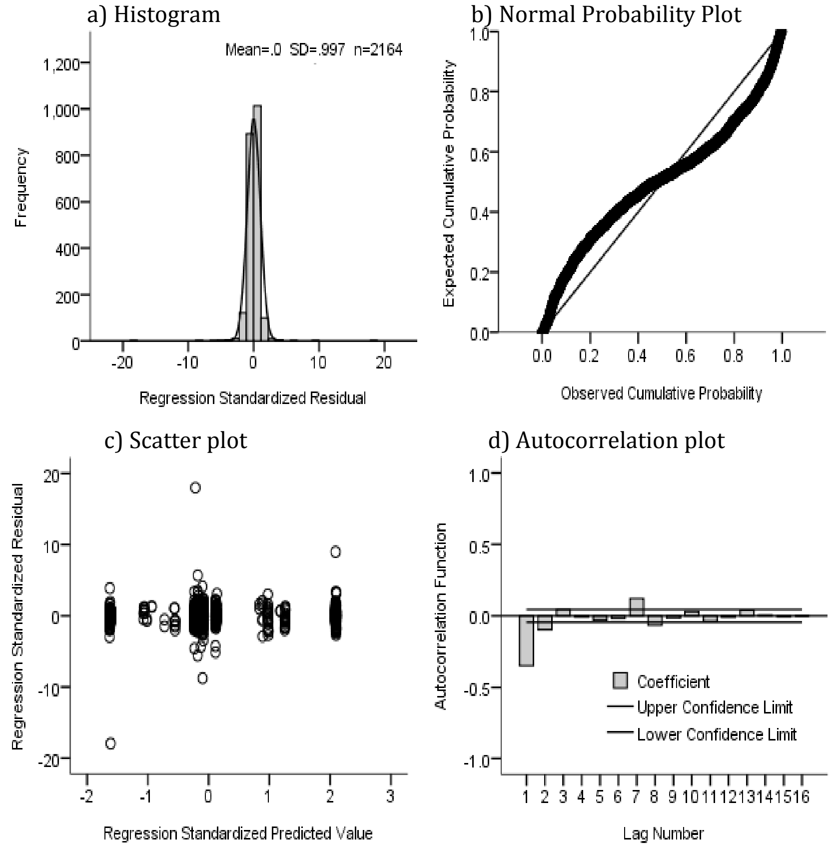


Figure F1. 142: Scotland All Counts first order difference Asthmatics - linear regression null model, + lag bank holiday a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

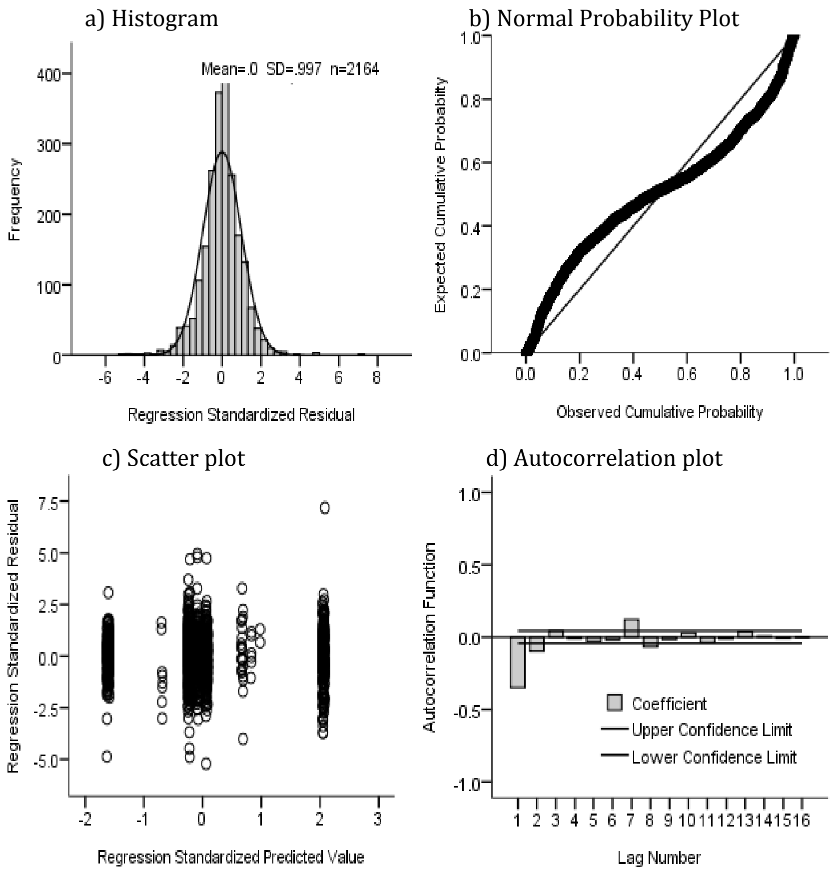


Figure F1. 143: Scotland All Counts first order difference Non-asthmatics - linear regression null model, + lag bank holiday a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

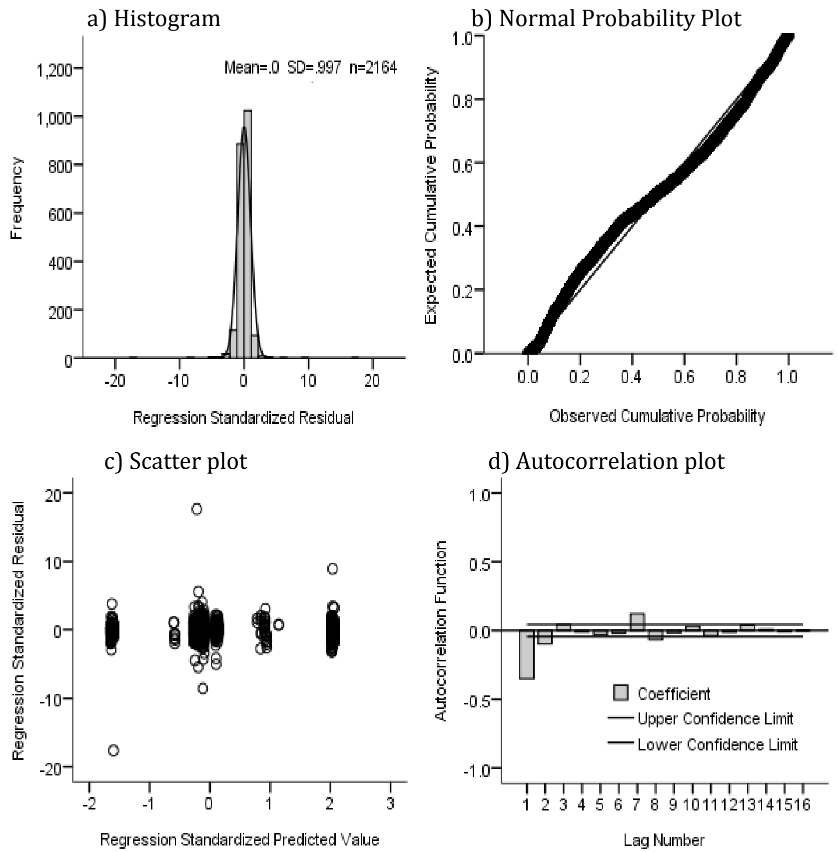


Figure F1. 144: Scotland All Counts first order difference Excess - linear regression null model, + lag bank holiday a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

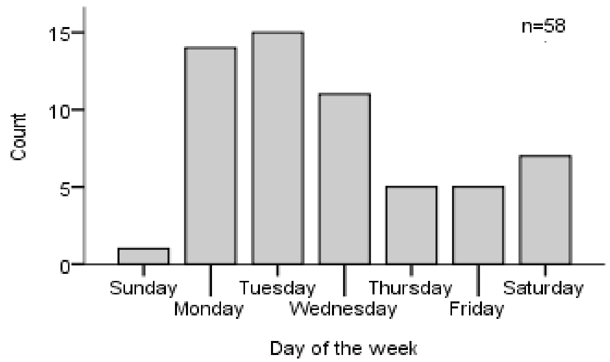


Figure F1. 145: Scotland All Counts - outlying residuals day of the week frequencies (lag bank holiday included as covariate).

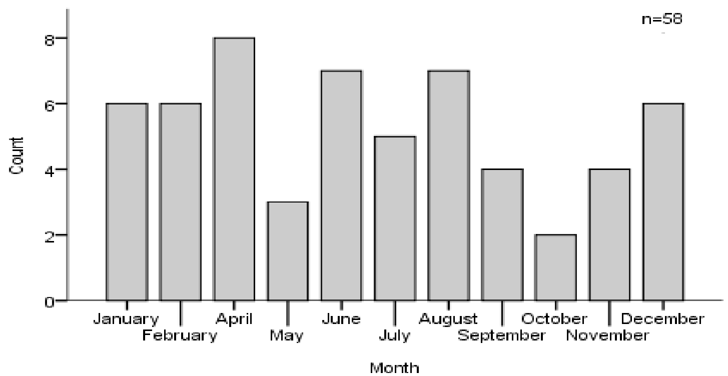


Figure F1. 146: Scotland All Counts - outlying residuals month of the year frequencies (lag bank holiday included as covariate).

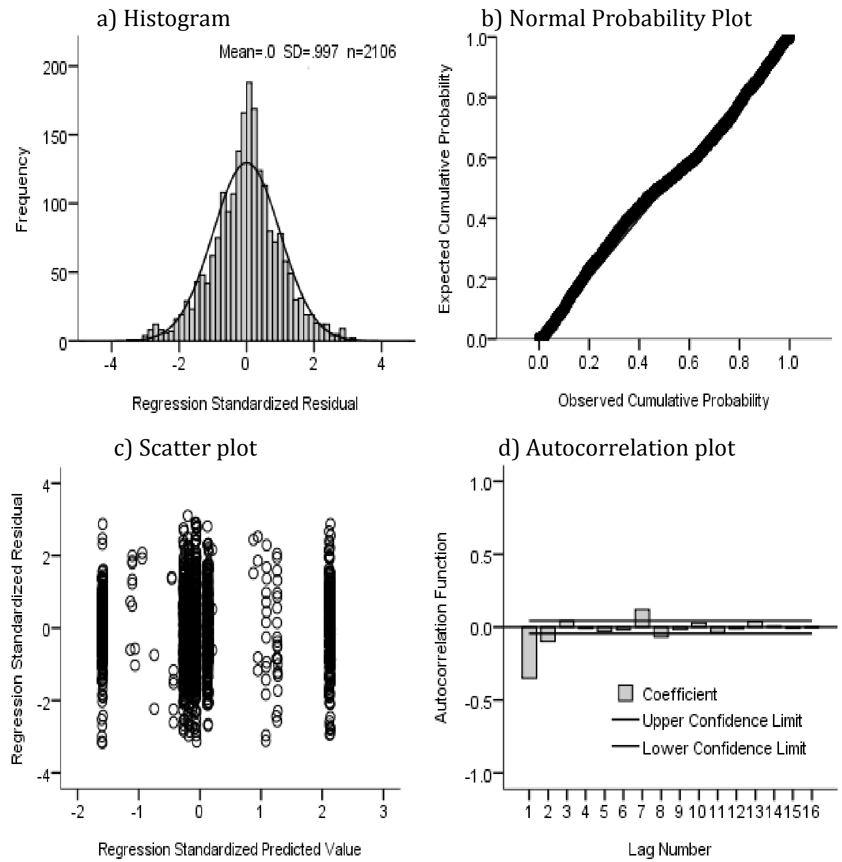


Figure F1. 147: Scotland All Counts first order difference Asthmatics - linear regression null model + lag bank holiday a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot (omitted data).

Outlying residuals were removed to see if there was an improvement on the model.

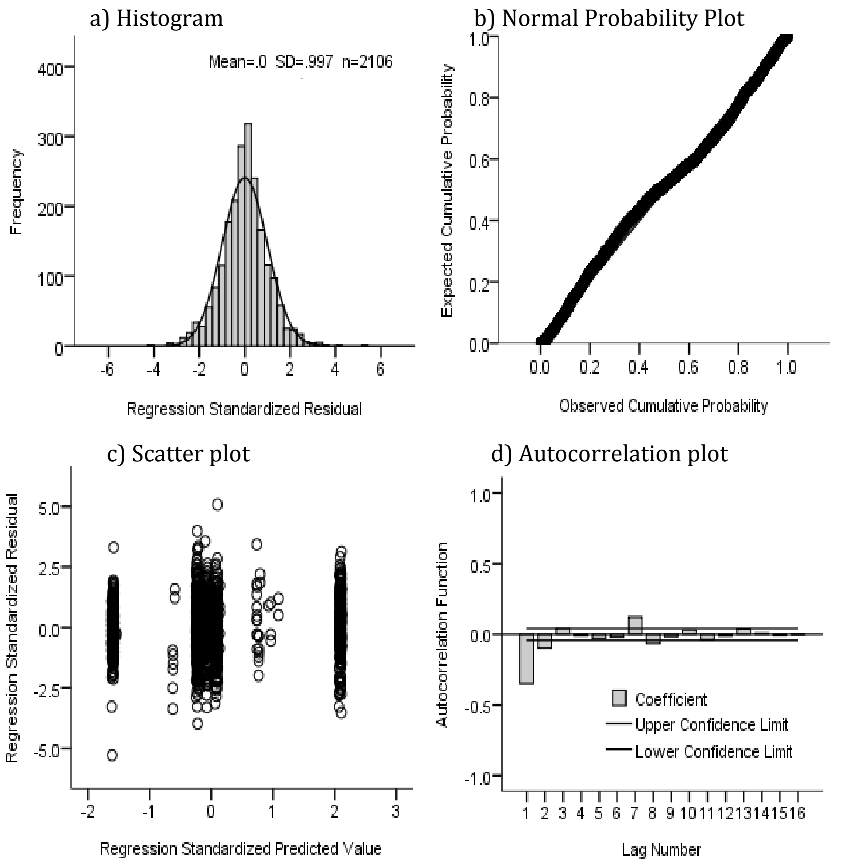


Figure F1. 148: Scotland All Counts first order difference Non-asthmatics - linear regression null model + lag bank holiday a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot (omitted data).

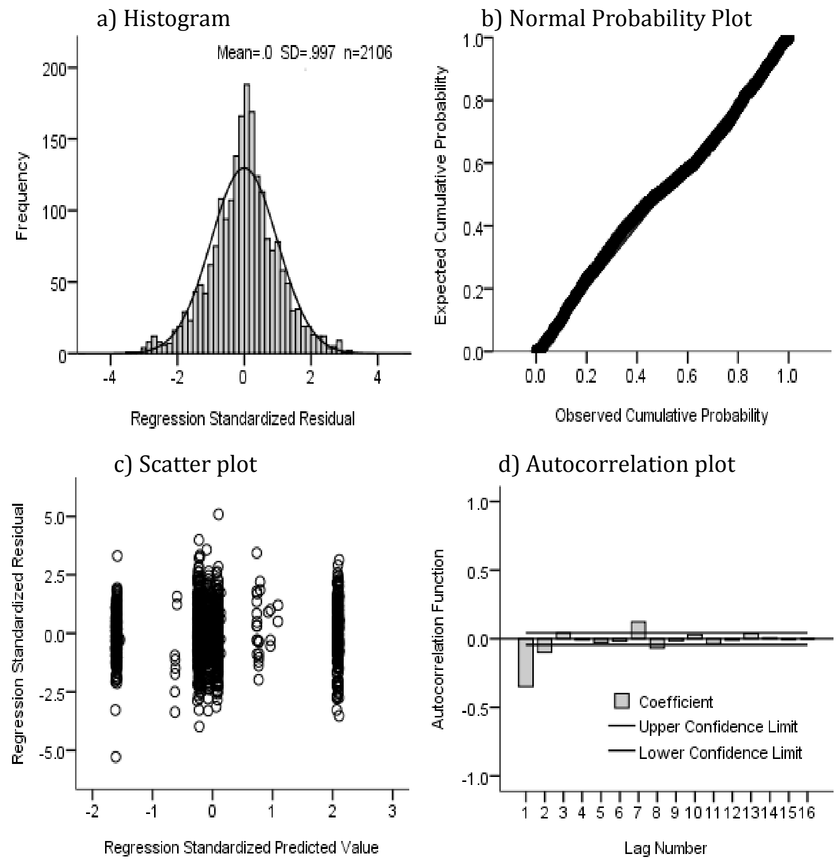


Figure F1. 149: Scotland All Counts first order difference Excess - linear regression null model + lag bank holiday a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot (omitted data).

Scotland: Coefficient and F-test P-value Histograms

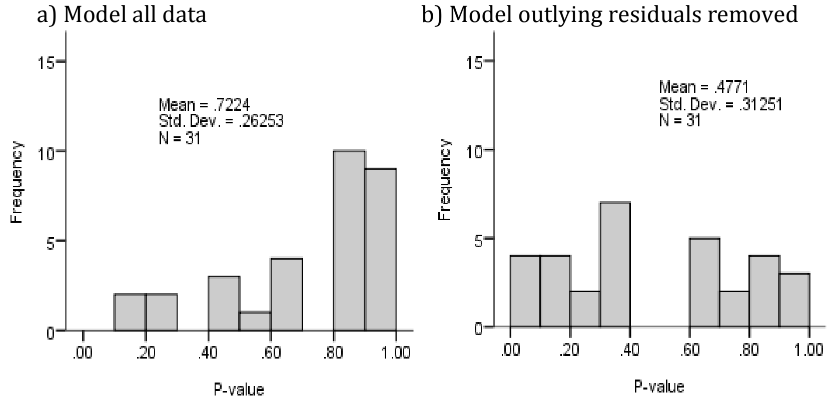


Figure F1. 150: Scotland All Counts Asthmatics - distribution of F-test P-values model including environmental exposures lagged by seven days a) Model with all data and b) Model with outlying residuals removed.

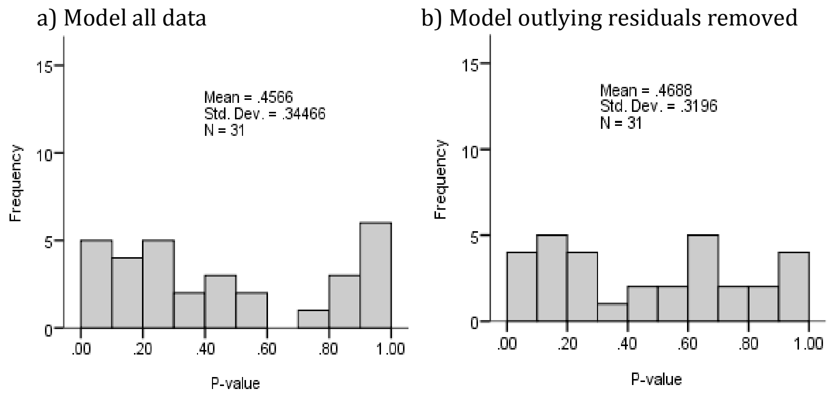


Figure F1. 151: Scotland All Counts Non-asthmatics - distribution of F-test P-values model including environmental exposures lagged by seven days a) Model with all data and b) Model with outlying residuals removed.

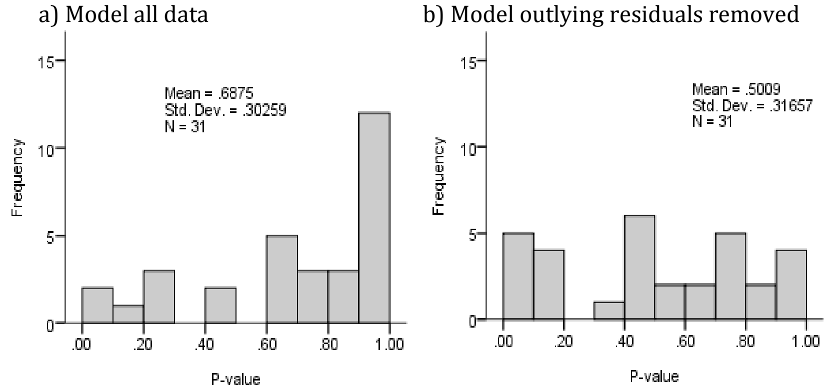


Figure F1. 152: Scotland All Counts Excess - distribution of F-test P-values model including environmental exposures lagged by seven days a) Model with all data and b) Model with outlying residuals removed.

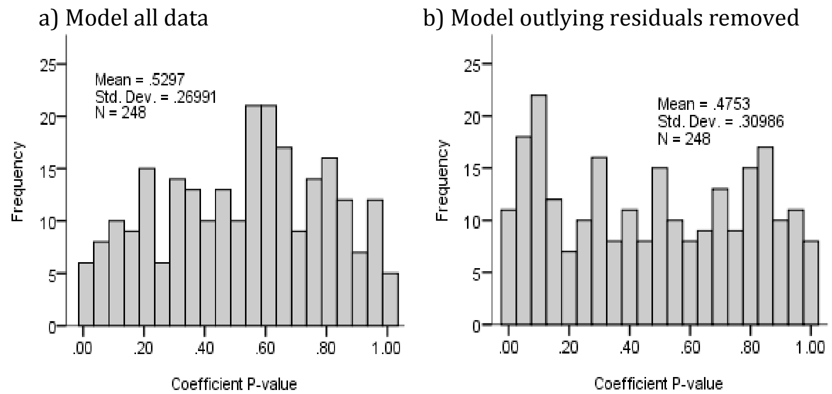


Figure F1. 153: Scotland All Counts Asthmatics - distribution of coefficient P-values model including environmental exposures lagged by seven days a) Model with all data and b) Model with outlying residuals removed.

a) Model all data b) Model outlying residuals removed

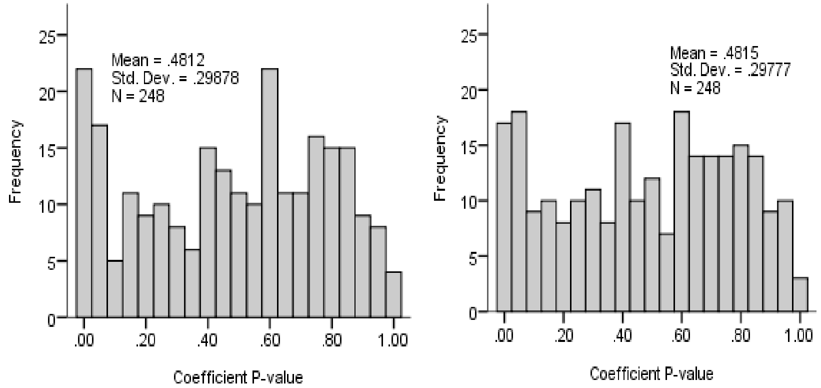


Figure F1. 154: Scotland All Counts Non-asthmatics - distribution of coefficient P-values model including environmental exposures lagged by seven days a) Model with all data and b) Model with outlying residuals removed.

a) Model all data b) Model outlying residuals removed

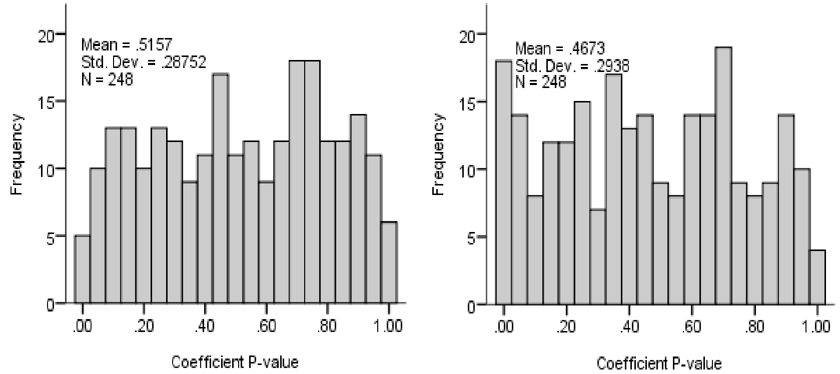


Figure F1. 155: Scotland All Counts Excess - distribution of coefficient P-values model including environmental exposures lagged by seven days a) Model with all data and b) Model with outlying residuals removed.

Table F. 12: Scotland: All Counts - F-test and coefficient P-values comparison between model with all data and outlying residuals removed.

Coefficient or F-test	Asthmatics, Non-asthmatics or Excess	Model 1. All data	0.5 - Model 1	Model 2. Omitted data	0.5 - Model 2	Model 1-2
F-test mean P-values	**Asthmatics**	0.72	-0.22	0.48	0.02	0.25
	Non-asthmatics	0.46	0.04	0.47	0.03	-0.01
	Excess	0.69	-0.19	0.50	0.00	0.19
Point-est mean P-values	**Asthmatics**	0.53	-0.03	0.48	0.02	0.05
	Non-asthmatics	0.48	0.02	0.48	0.02	0.00
	Excess	0.52	-0.02	0.47	0.03	0.05

For Scotland, removing outlying residuals made little difference to the result.

F1.5. Comparative Analysis using First Order Difference: Linear versus Poisson Regression (All Counts Only) Comparison of F-test results

England and Wales: F-test and coefficient histograms

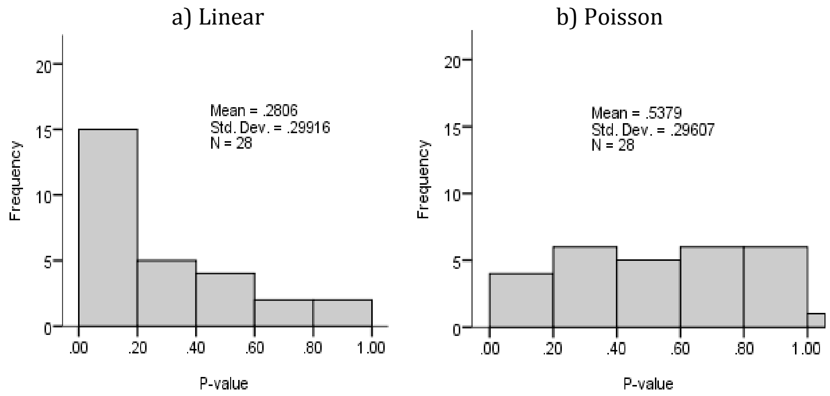


Figure F1. 156: England and Wales All Counts Asthmatics- distribution of F-test P-values model including environmental Exposures lagged by seven days a) Linear and b) Poisson.

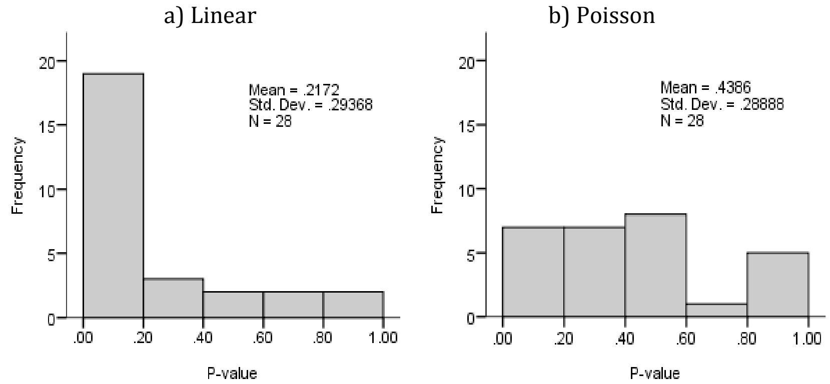


Figure F1. 157: England and Wales All Counts Non-asthmatics - distribution of F-test P-values model including environmental exposures lagged by seven days a) Linear and b) Poisson.

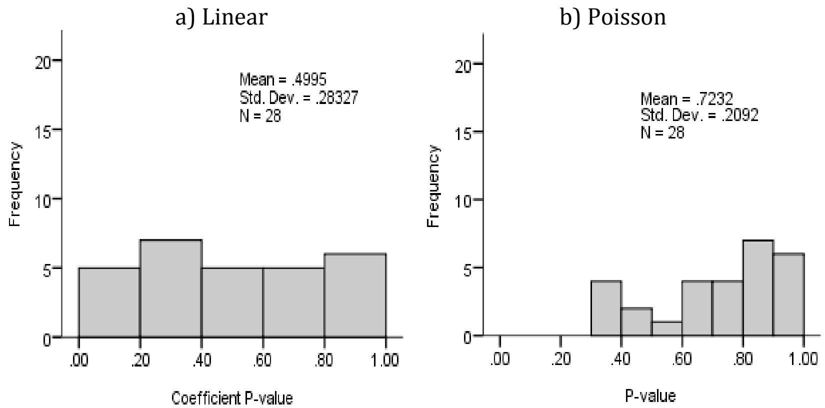


Figure F1. 158: England and Wales All Counts Excess - distribution of F-test P-values model including environmental exposures lagged by seven days a) Linear and b) Poisson.

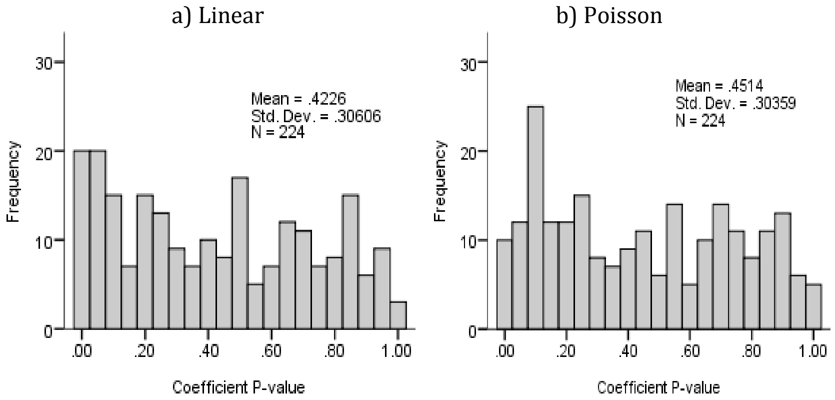


Figure F1. 159: England and Wales All Counts Asthmatics - distribution of coefficient P-values model including environmental exposures lagged by seven days a) Linear and b) Poisson.

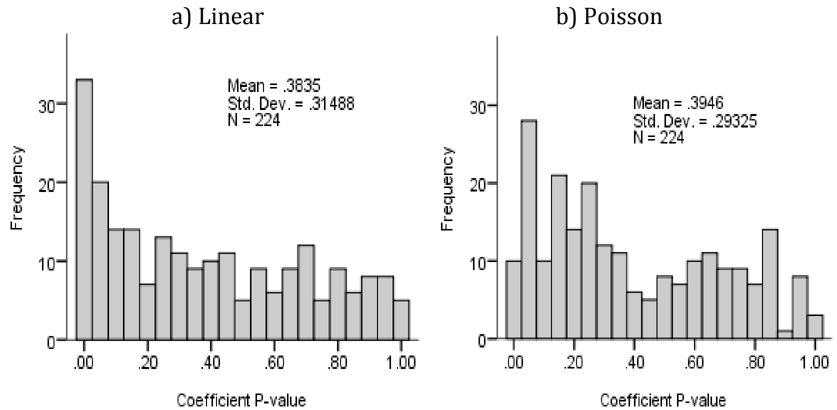


Figure F1. 160: England and Wales All Counts Non-asthmatics - distribution of coefficient P-values model including environmental exposures lagged by seven days a) Linear and b) Poisson.

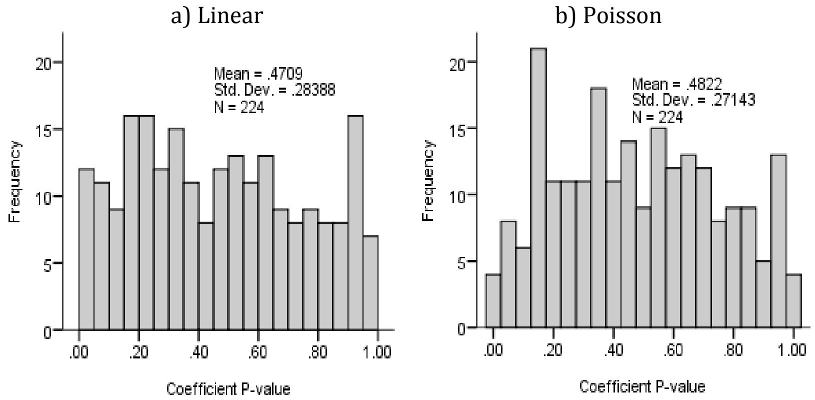


Figure F1. 161: England and Wales All Counts Excess - distribution of coefficient P-values model including environmental exposures lagged by seven days a) Linear and b) Poisson.

Table F. 13: England and Wales All Counts – F-test model and coefficient P-values comparison of linear versus Poisson.

Coefficient or F test	Asthmatics, Non-asthmatics or Excess	Model 1. Linear	0.5 -Model 1	Model 2. Poisson	0.5 - Model 2	Model 1-2
F-test mean P-values	**Asthmatics**	0.28	0.22	0.54	-0.04	-0.26
	Non-asthmatics	0.22	0.28	0.44	0.06	-0.22
	Excess	0.50	0.00	0.72	-0.22	-0.22
Point-est mean P-values	**Asthmatics**	0.42	0.08	0.45	0.05	-0.03
	Non-asthmatics	0.38	0.12	0.39	0.11	-0.01
	Excess	0.47	0.03	0.48	0.02	-0.01

For England and Wales, examining the F-test P-value histograms, performing a linear regression provided better results in comparison to Poisson. There was no difference in the coefficient P-value histograms.

Trent Region: F-test and coefficient histograms

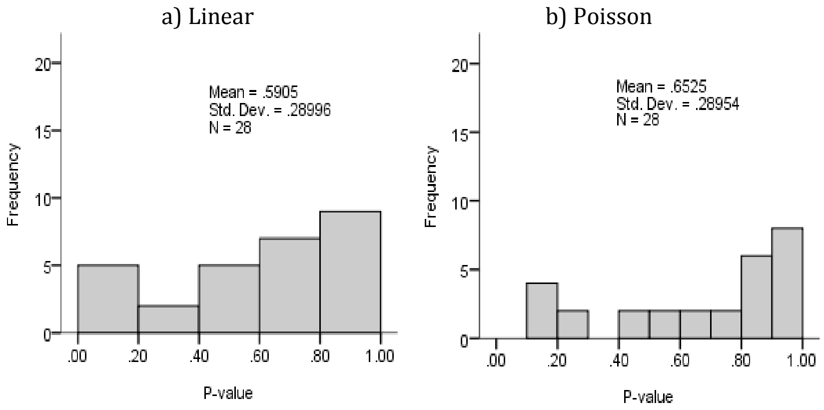


Figure F1. 162: Trent Region All Counts Asthmatics - distribution of F-test P-values model including environmental exposures lagged by seven days a) Linear and b) Poisson.

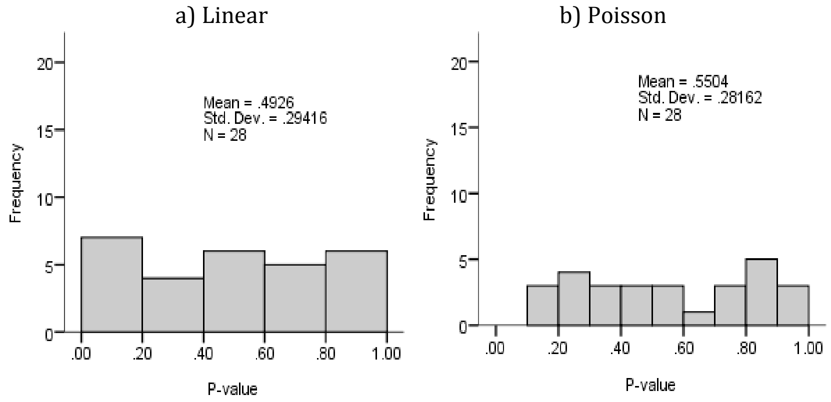


Figure F1. 163: Trent Region All Counts Non-asthmatics - distribution of F-test P-values model including environmental exposures lagged by seven days a) Linear and b) Poisson.

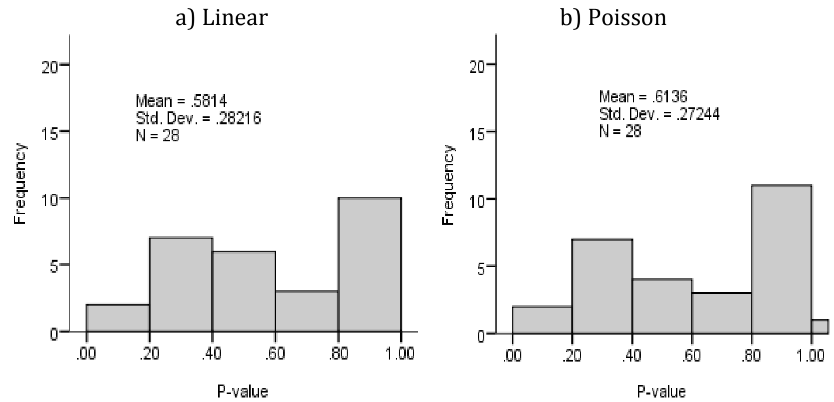


Figure F1. 164: Trent Region All Counts Excess - distribution of F-test P-values model including environmental exposures lagged by seven days a) Linear and b) Poisson.

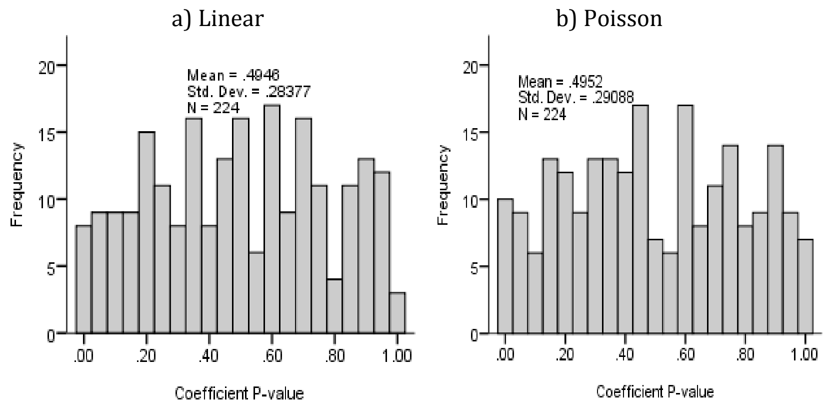


Figure F1. 165: Trent Region All Counts Asthmatics - distribution of coefficient P-values model including environmental exposures lagged by seven days a) Linear and b) Poisson.

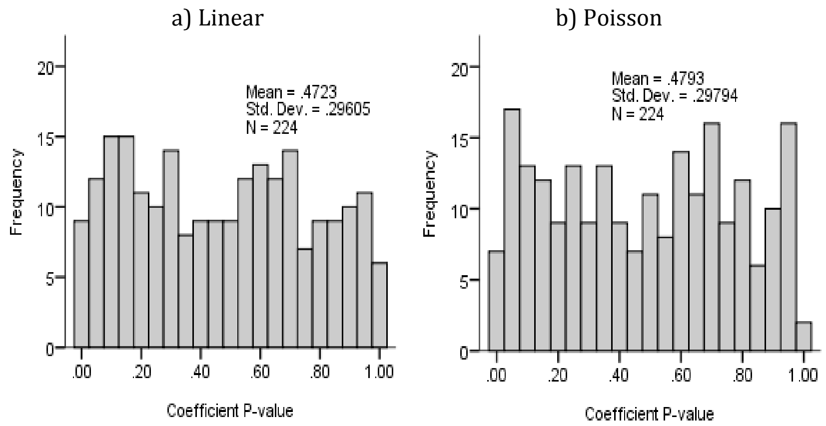


Figure F1. 166: Trent Region All Counts Non-asthmatics - distribution of coefficient P-values model including environmental exposures lagged by seven days a) Linear and b) Poisson.

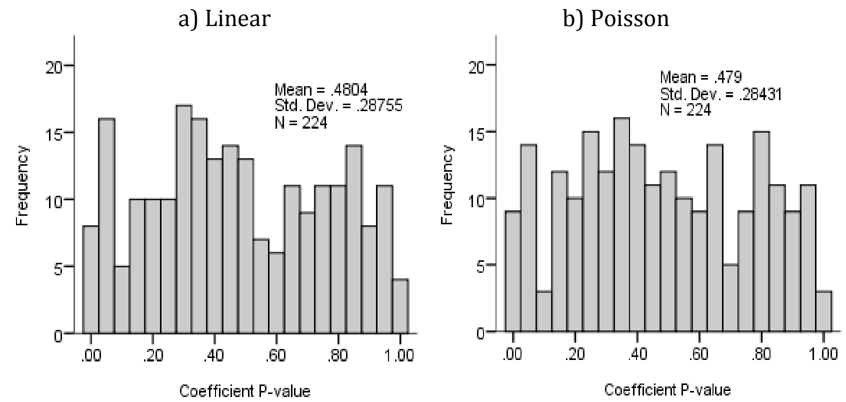


Figure F1. 167: Trent Region All Counts Excess - distribution of coefficient P-values model including environmental exposures lagged by seven days a) Linear and b) Poisson.

Table F. 14: Trent Region All Counts – F-test model and coefficient P-values comparison of linear versus Poisson.

Coefficient or F test	Asthmatics, Non-asthmatics or Excess	Model 1. Linear	0.5 -Model 1	Model 2. Poisson	0.5 - Model 2	Model 1-2
F-test mean P-values	Asthmatics	0.59	-0.09	0.65	-0.15	-0.06
	Non-asthmatics	0.49	0.01	0.55	-0.05	-0.06
	Excess	0.58	-0.08	0.61	-0.11	-0.03
Point-est mean P-values	Asthmatics	0.49	0.01	0.50	0.00	0.00
	Non-asthmatics	0.47	0.03	0.48	0.02	-0.01
	Excess	0.48	0.02	0.48	0.02	0.00

For the Trent Region, there was a slight difference between the F-test and coefficient P-value histograms and results show slightly better results using the linear method. However, as counts were extremely low for the Trent Region, it was concluded that conducting a Poisson analysis was more suitable for Trent Region.

Scotland: F-test and coefficient Histograms

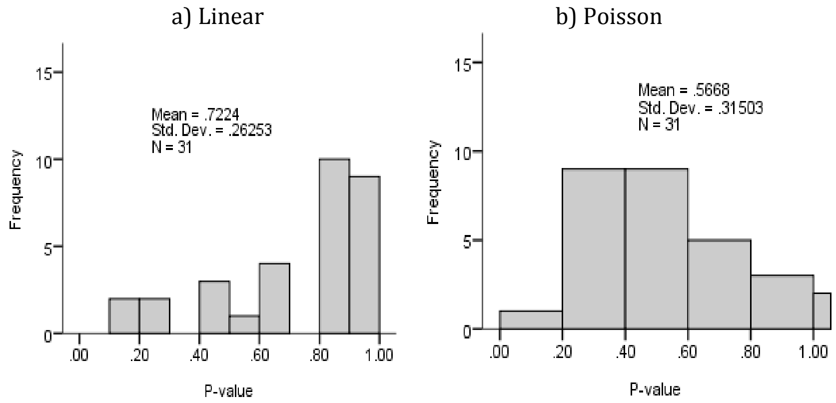


Figure F1. 168: Scotland All Counts Asthmatics - distribution of F-test P-values model including environmental exposures lagged by seven days a) Linear and b) Poisson.

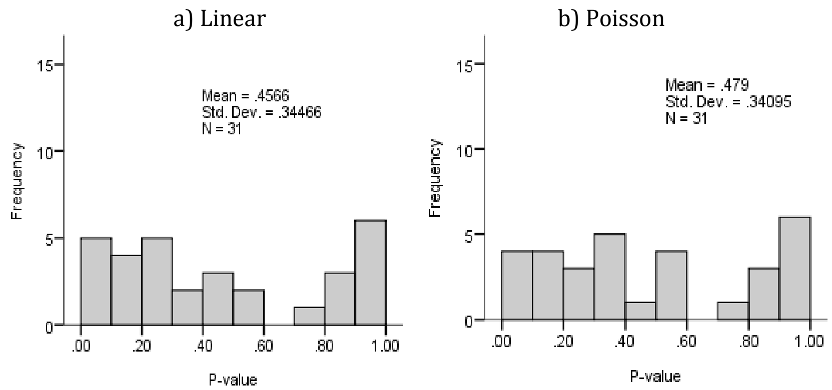


Figure F1. 169: Scotland All Counts Non-asthmatics - distribution of F-test P-values model including environmental exposures lagged by seven days a) Linear and b) Poisson.

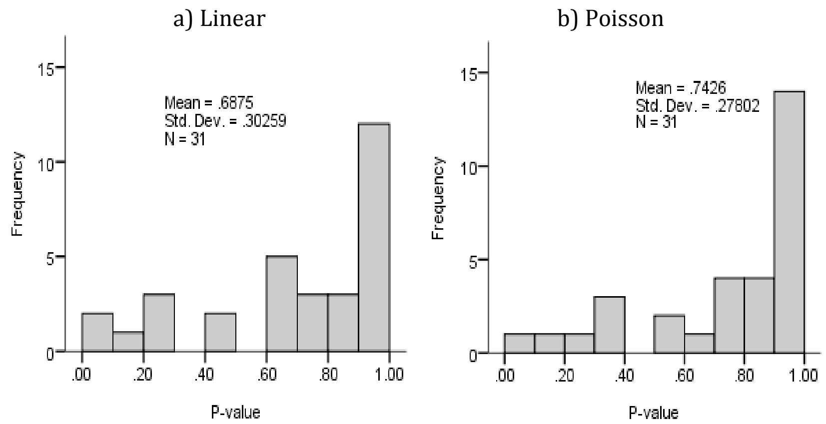


Figure F1. 170: Scotland All Counts Excess - distribution of F-test P-values model including environmental exposures lagged by seven days a) Linear and b) Poisson.

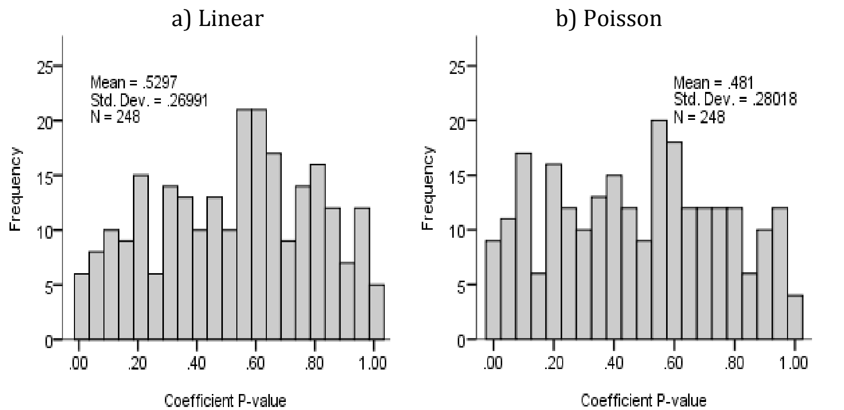


Figure F1. 171: Scotland All Counts Asthmatics - distribution of coefficient P-values model including environmental exposures lagged by seven days a) Linear and b) Poisson.

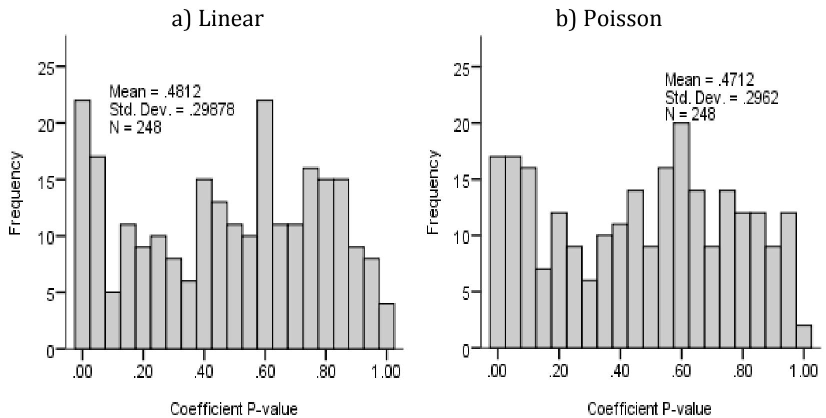


Figure F1. 172: Scotland All Counts Non-asthmatics - distribution of coefficient P-values model including environmental exposures lagged by seven days a) Linear and b) Poisson.

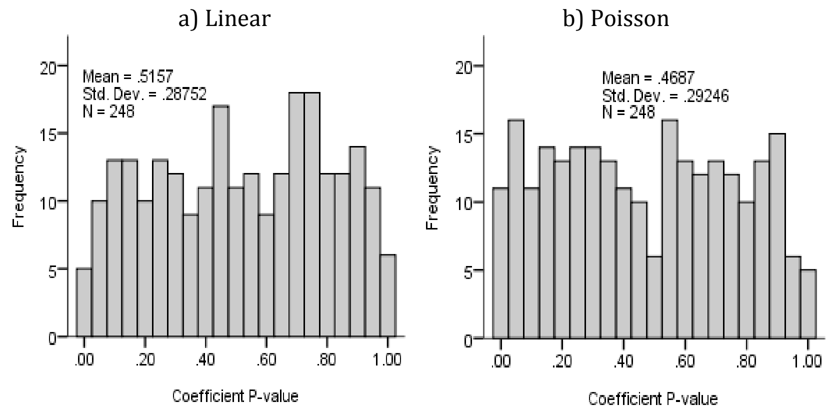


Figure F1. 173: Scotland All Counts Excess - distribution of coefficient P-values model including environmental exposures lagged by seven days a) Linear and b) Poisson.

Table F. 15: Scotland All Counts – F-test model and coefficient P-values comparison of linear versus Poisson.

Coefficient or F test	Asthmatics, Non-asthmatics or Excess	Model 1. Linear	0.5 - Model 1	Model 2. Poisson	0.5 - Model 2	Model 1-2
F-test mean P-values	Asthmatics	0.72	-0.22	0.57	-0.07	0.16
	Non-asthmatics	0.46	0.04	0.48	0.02	-0.02
	Excess	0.69	-0.19	0.74	-0.24	-0.06
Point-est mean P-values	Asthmatics	0.53	-0.03	0.48	0.02	0.05
	Non-asthmatics	0.48	0.02	0.47	0.03	0.01
	Excess	0.52	-0.02	0.47	0.03	0.05

For Scotland, there was slight differences between the F-test and coefficient P-value histograms. Overall, conducting a Poisson analysis was deemed more suitable for Scotland.

F1.6. Comparative Analysis using First Order Difference: Poisson Regression f-test three dates omitted (Scotland All Counts only)

First order difference produced negative integers; constants were added to make all first order difference daily counts positive.

Three dates omitted

Scotland

a) Poisson (n=2164) b) Poisson (n=2161)

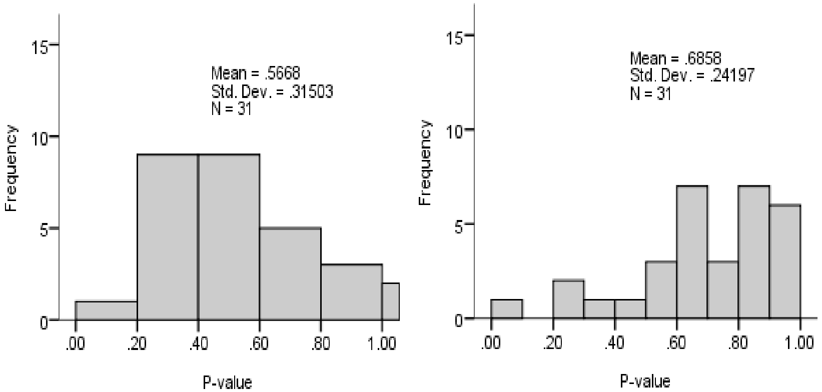


Figure F1. 174: Scotland All Counts Asthmatics - distribution of F test P-values model including environmental exposures lagged by seven days a) Poisson (n=2164) and b) Poisson (n=2161).

a) Poisson (n=2164) b) Poisson (n=2161)

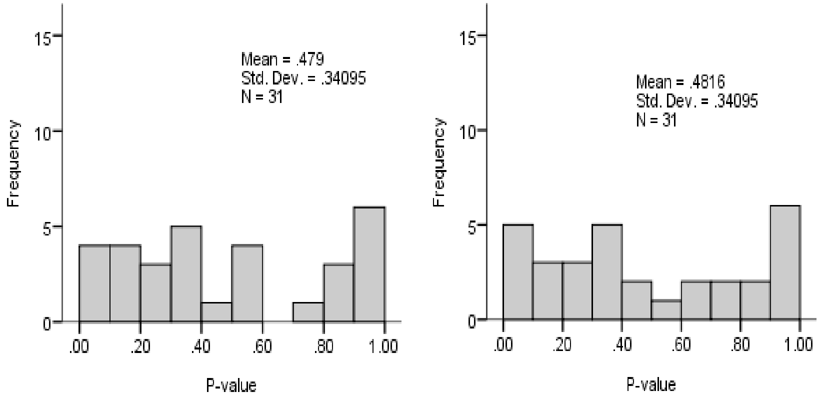


Figure F1. 175: Scotland All Counts Non-asthmatics - distribution of F test P-values model including environmental exposures lagged by seven days a) Poisson (n=2164) b) and Poisson (n=2161).

a) Poisson (n=2164) b) Poisson (n=2161)

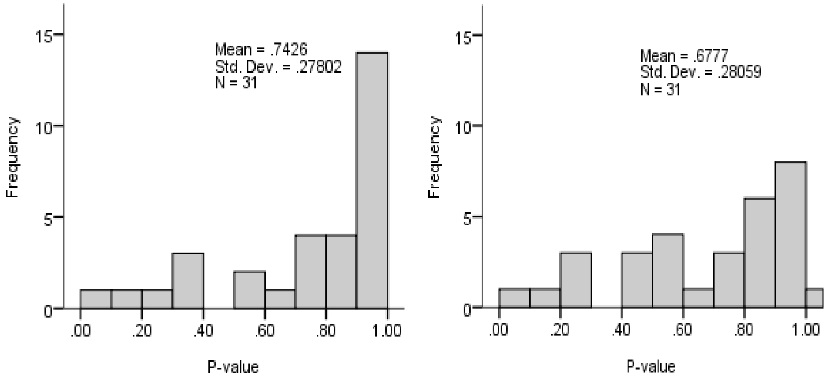


Figure F1. 176: Scotland All Counts Excess - distribution of F test P-values model including environmental exposures lagged by seven days a) Poisson (n=2164) and b) Poisson (n=2161).

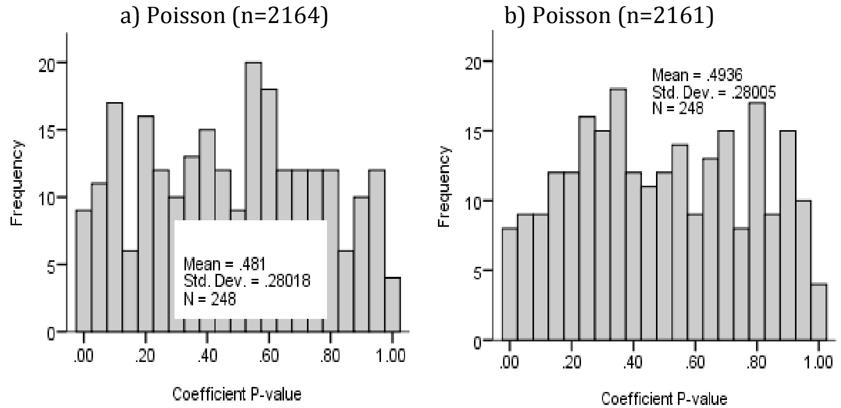


Figure F1. 177: Scotland All Counts Asthmatics - distribution of coefficient P-values model including environmental exposures lagged by seven days a) Poisson (n=2164) and b) Poisson (n=2161)

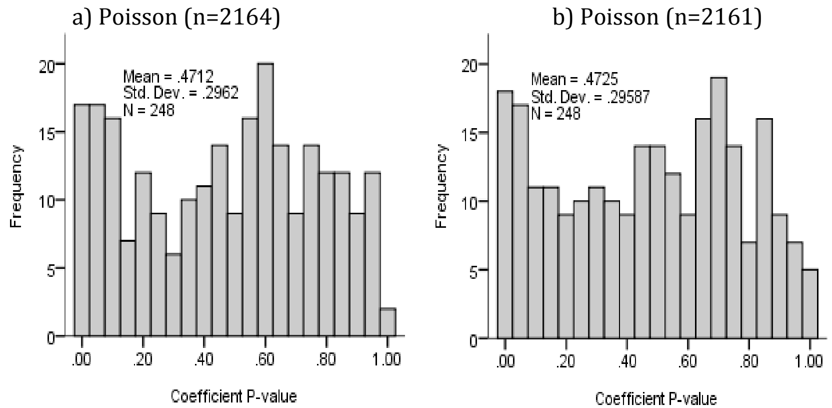


Figure F1. 178: Scotland All Counts Non-asthmatics - distribution of coefficient P-values model including environmental exposures lagged by seven days a) Poisson (n=2164) and b) Poisson (n=2161).

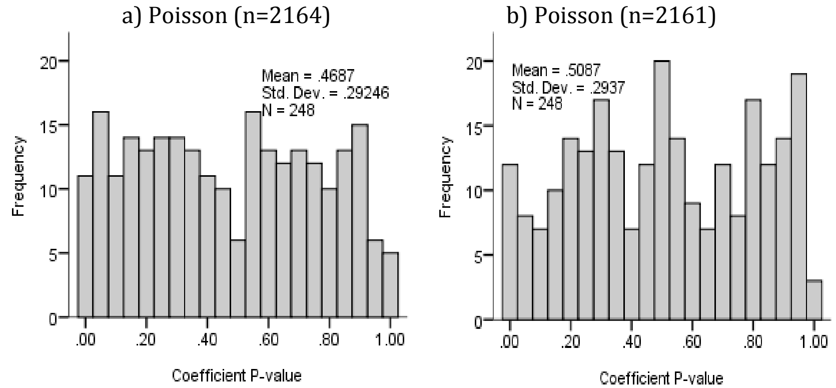


Figure F1. 179: Scotland All Counts Excess - distribution of coefficient P-values model including environmental exposures lagged by seven days a) Poisson (n=2164) and b) Poisson (n=2161)

Table F. 16: Scotland All Counts – F-test model and coefficient P-values comparison of linear versus Poisson (three dates removed).

Coefficient or F test	Asthmatics, Non-asthmatics or Excess	Model 1. Poisson n=2164	0.5 -Model 1	Model 2. Poisson n=2161	0.5 – Model 2	Model 1-2
F-test mean P-values	**Asthmatics**	0.57	-0.07	0.69	-0.19	-0.12
	Non-asthmatics	0.48	0.02	0.48	0.02	0.00
	Excess	0.74	-0.24	0.68	-0.18	0.06
Point-est mean P-values	**Asthmatics**	0.48	0.02	0.49	0.01	-0.01
	Non-asthmatics	0.47	0.03	0.47	0.03	0.00
	Excess	0.47	0.03	0.51	-0.01	-0.04

The difference between the linear and Poisson model P-values was more profound when taking the three dates out. The Poisson model provided a better fit. Therefore, these three dates were removed.

F1.7. Comparative Analysis using the rank of Daily Counts and First Order Difference: Linear versus Poisson Regression (Scotland and Trent Region, All Counts Only)

First comparison = between mean F test and coefficient P-values from multiple regression using the rank of the daily counts and Poisson regression using daily counts.

Second comparison = between mean F test and coefficient P-values from multiple regression using the rank of the first order difference and Poisson regression using first order difference.

Trent Region: Linear with rank of daily counts and Poisson with daily counts

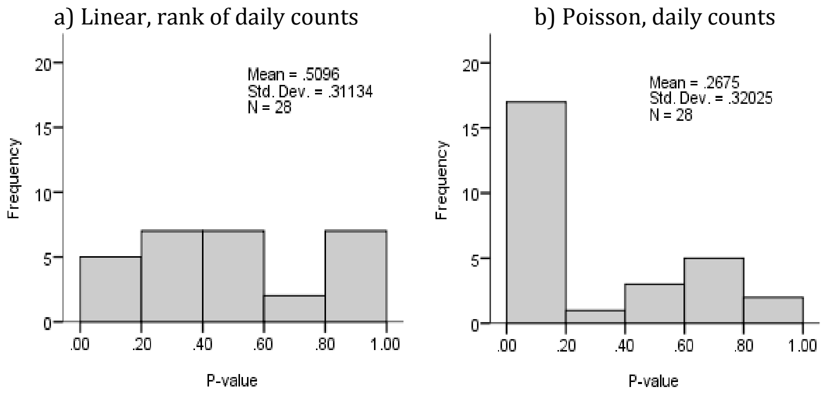


Figure F1. 180: Trent Region All Counts Asthmatics - distribution of F-test P-values model including environmental exposures lagged by seven days a) Linear, rank of daily counts and b) Poisson, daily counts.

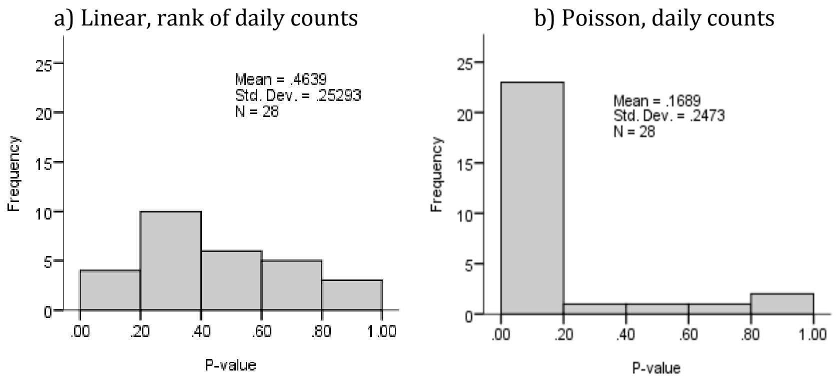


Figure F1. 181. Trent Region All Counts Non-asthmatics - distribution of F-test P-values model including environmental exposures lagged by seven days a) Linear, rank of daily counts and b) Poisson, daily counts.

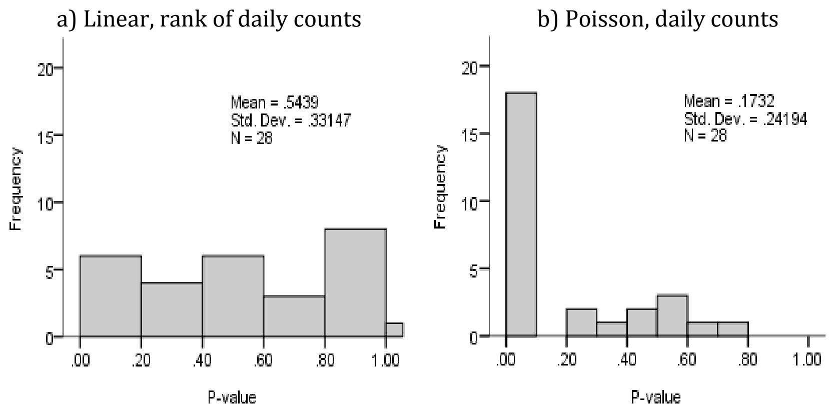


Figure F1. 182: Trent Region All Counts Excess - distribution of F-test P-values model including environmental exposures lagged by seven days a) Linear, rank of daily counts and b) Poisson, daily counts.

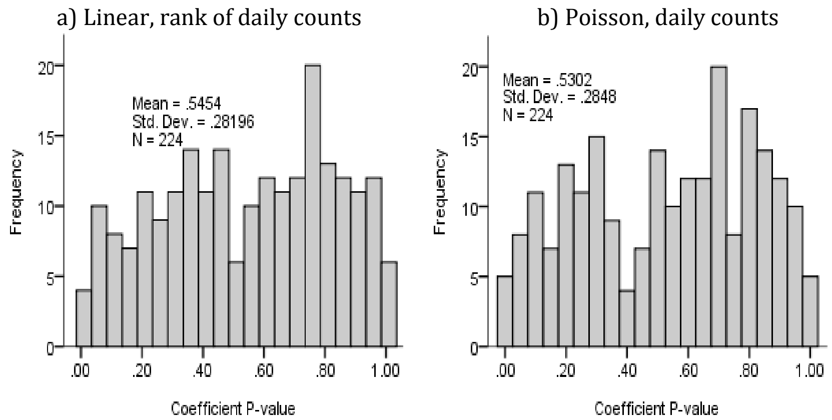


Figure F1. 183: Trent Region All Counts Asthmatics - distribution of coefficient P-values model including environmental exposures lagged by seven days a) Linear, rank of daily counts and b) Poisson, daily counts.

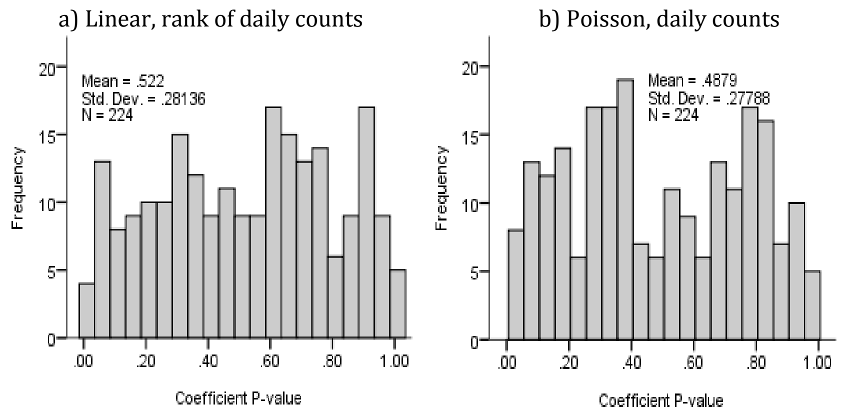


Figure F1. 184: Trent Region All Counts Non-asthmatics - distribution of coefficient P-values model including environmental exposures lagged by seven days a) Linear, rank of daily counts and b) Poisson, daily counts.

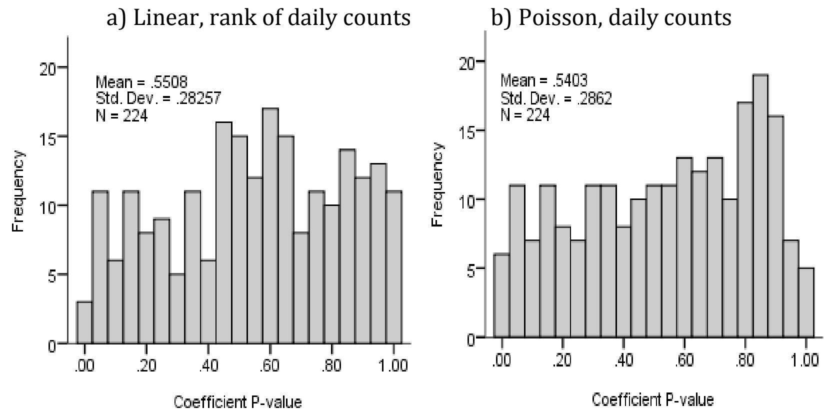


Figure F1. 185: Trent Region All Counts Excess - distribution of coefficient P-values model including environmental exposures lagged by seven days a) Linear, rank of daily counts and b) Poisson, daily counts.

Table F. 17: All Counts: Trent Region – F-test and coefficient mean P-values comparison of Linear (rank of daily counts) versus Poisson (daily counts).

Coefficient or F test	Asthmatics, Non-asthmatics or Excess	Model 1. Linear using rank of daily counts	0.5 - Model 1	Model 2. Poisson using daily counts	0.5 - Model 2	Model 1-2
F-test mean P-values	**Asthmatics**	0.51	-0.01	0.27	0.23	0.24
	Non-asthmatics	0.46	0.04	0.17	0.33	0.30
	Excess	0.54	-0.04	0.17	0.33	0.37
Point-est mean P-values	**Asthmatics**	0.55	-0.05	0.53	-0.03	0.02
	Non-asthmatics	0.52	-0.02	0.49	0.01	0.03
	Excess	0.55	-0.05	0.54	-0.04	0.01

Figures F1.180 to F1.182 illustrate the F-test P-value distributions from multiple regressions performed on the rank of daily counts and Poisson regressions performed on daily counts for the Trent Region. Comparing the Linear model to the Poisson, there were quite big differences in the F-test results. Figures F1.183 to F1.185 show the coefficient P-value distributions for the Linear and Poisson Models, they highlight small differences between the two models.

Trent Region: Linear with rank of first order difference and Poisson with first order difference

a) Linear, rank of first order difference   b) Poisson, first order difference

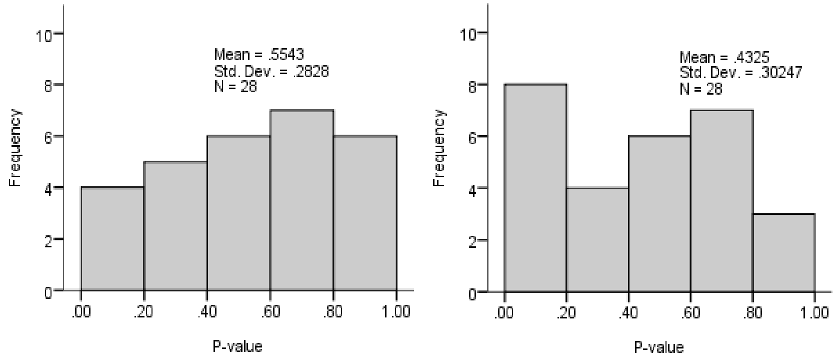


Figure F1. 186: Trent Region All Counts Asthmatics - distribution of F-test P-values model including environmental exposures lagged by seven days a) Linear, rank of first order difference and b) Poisson, daily counts, first order difference.

a) Linear, rank of first order difference   b) Poisson, first order difference

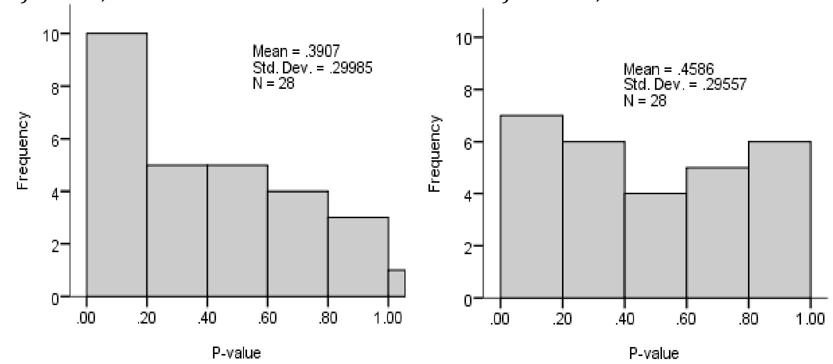


Figure F1. 187: Trent Region All Counts Non-asthmatics - distribution of F-test P-values model including environmental exposures lagged by seven days a) Linear, rank of first order difference and b) Poisson, daily counts, first order difference.

a) Linear, rank of first order difference b) Poisson, first order difference

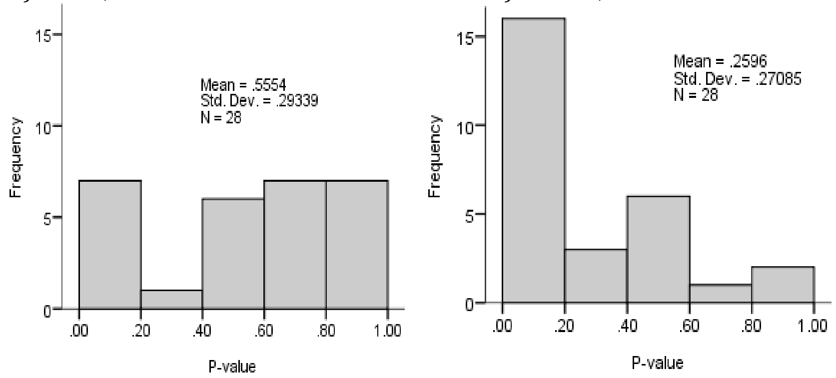


Figure F1. 188: Trent Region All Counts Excess - distribution of F-test P-values model including environmental exposures lagged by seven days a) Linear, rank of first order difference and b) Poisson, daily counts, first order difference.

a) Linear, rank of first order difference b) Poisson, first order difference

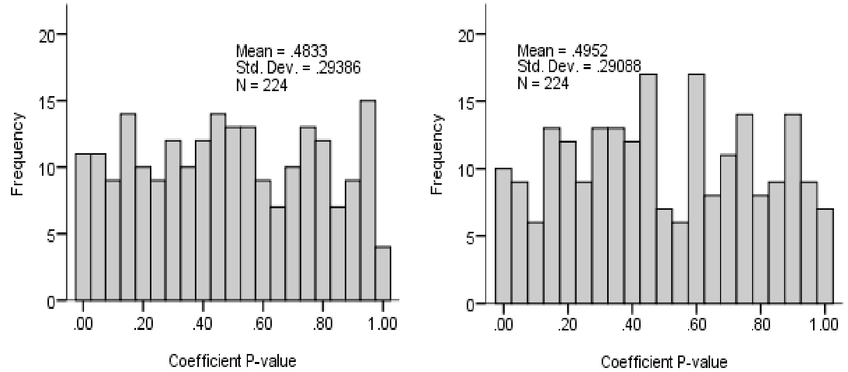


Figure F1. 189: Trent Region All Counts Asthmatics - distribution of coefficient P-values model including environmental exposures lagged by seven days a) Linear, rank of first order difference and b) Poisson, daily counts, first order difference.

a) Linear, rank of first order difference b) Poisson, first order difference

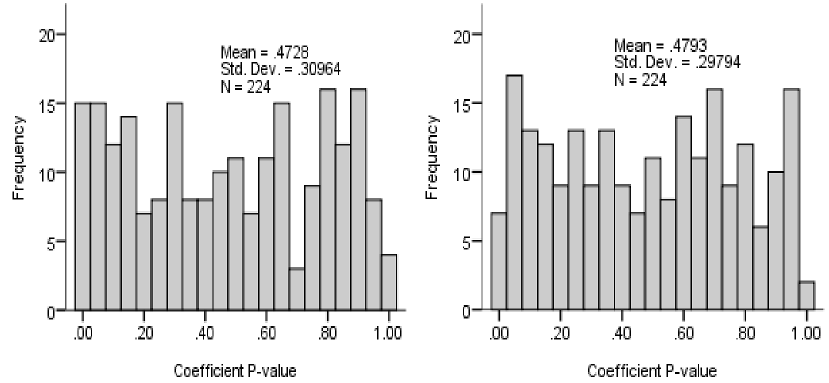


Figure F1. 190: Trent Region All Counts Non-asthmatics - distribution of coefficient P-values model including environmental exposures lagged by seven days a) Linear, rank of first order difference and b) Poisson, daily counts, first order difference.

a) Linear, rank of first order difference b) Poisson, first order difference

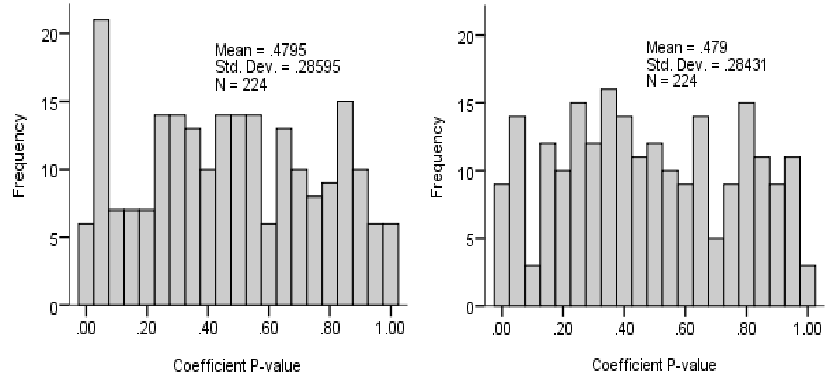


Figure F1. 191: Trent Region All Counts daily counts Excess - distribution of coefficient P-values model including environmental exposures lagged by seven days a) Linear, rank of first order difference and b) Poisson, daily counts, first order difference.

Table F. 18: Trent Region All Counts – F-test model and coefficient P-values comparison of Linear (rank of first order difference) versus Poisson (first order difference).

Coefficient or F test	Asthmatics, Non-asthmatics or Excess	Model 1: Linear using rank of first order difference	0.5 - Model 1	Model 2: Poisson using first order difference	0.5 - Model 2	Model 1-2
F-test mean P-values	Asthmatics	0.55	-0.05	0.43	0.07	0.12
	Non-	0.39	0.11	0.46	0.04	-0.07
	Excess	0.56	-0.06	0.26	0.24	0.30
Coefficient mean P-values	Asthmatics	0.48	0.02	0.50	0.00	-0.01
	Non-	0.47	0.03	0.48	0.02	-0.01
	Excess	0.48	0.02	0.48	0.02	0.00

Figures F1.186 to F1.188 illustrate the F-test P-value distributions from multiple regressions performed on the rank of first order difference and Poisson regressions performed on first order difference for Trent Region. Comparing the Linear model to the Poisson, for asthmatics and excess there were wide differences between the F-test mean P-values but for non-asthmatics, the differences were smaller. Figures F1.189 to F1.191 show the coefficient P-value distributions for the Linear and Poisson models, they highlight small differences between the two models.

Scotland: Linear with rank of daily counts and Poisson with daily counts

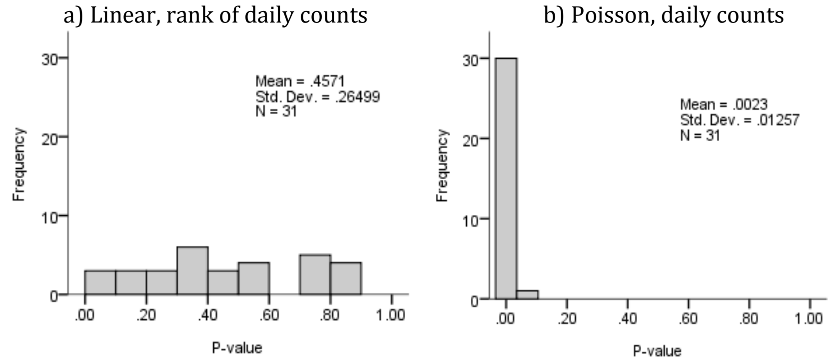


Figure F1. 192: Scotland All Counts Asthmatics - distribution of F-test P-values model including environmental Exposures lagged by seven days a) Linear, rank of daily counts and b) Poisson, daily counts.

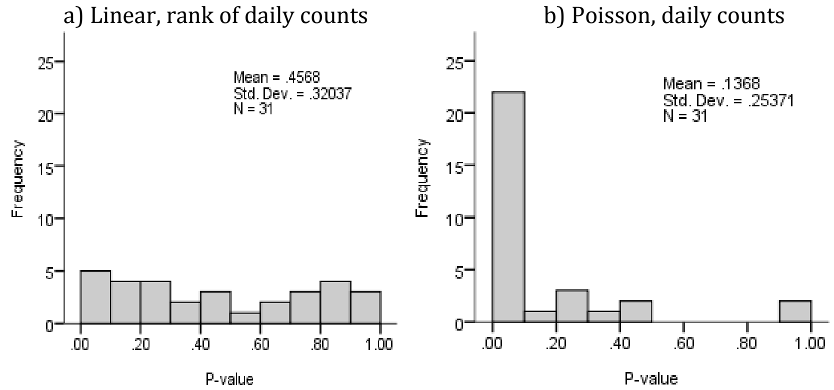


Figure F1. 193: Scotland All Counts Non-asthmatics - distribution of F-test P-values model including environmental exposures lagged by seven days a) Linear, rank of daily counts and b) Poisson, daily counts.

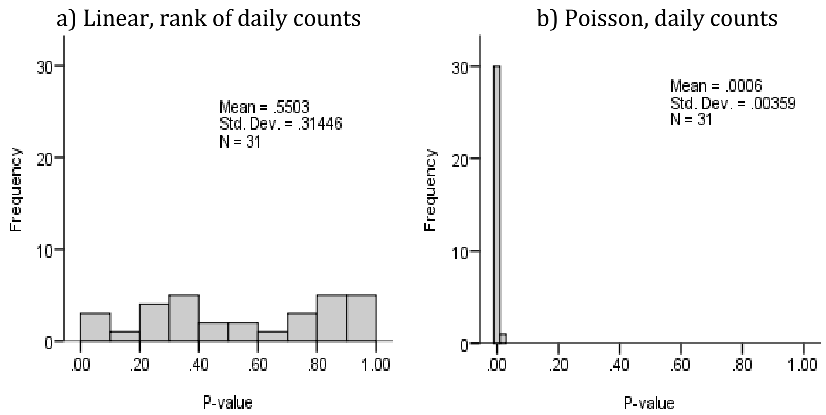


Figure F1. 194: Scotland All Counts Excess - distribution of F-test P-values model including environmental exposures lagged by seven days a) Linear, rank of daily counts and b) Poisson, daily counts.

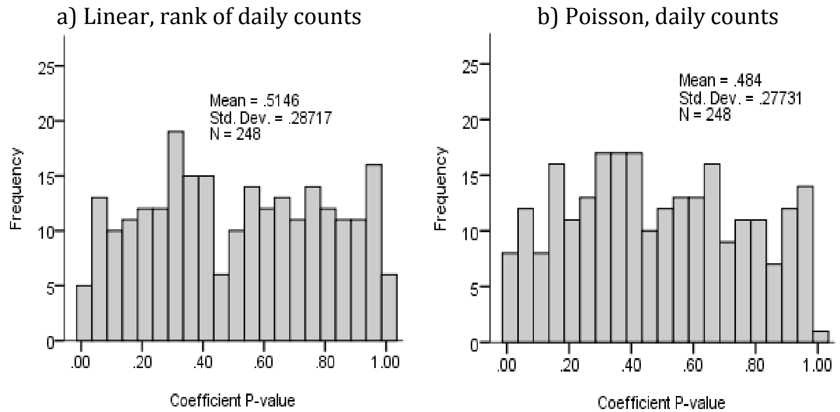


Figure F1. 195: All Counts Asthmatics - distribution of coefficient P-values model including environmental exposures lagged by seven days a) Linear, rank of daily counts and b) Poisson, daily counts.

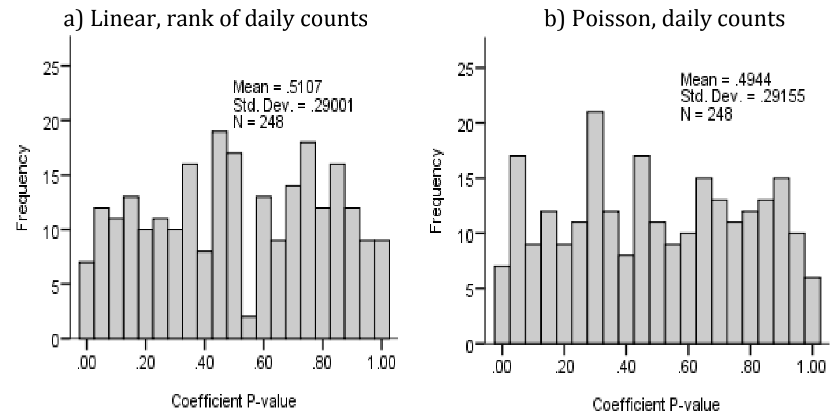


Figure F1. 196: Scotland All Counts Non-asthmatics - distribution of coefficient P-values model including environmental exposures lagged by seven days a) Linear, rank of daily counts and b) Poisson, daily counts.

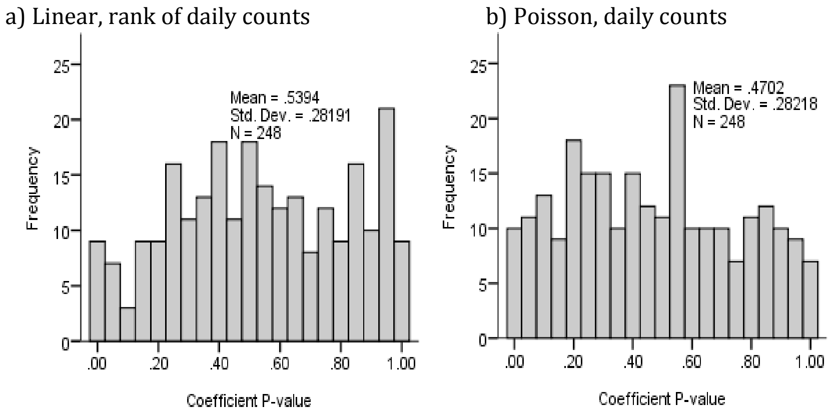


Figure F1. 197: Scotland All Counts Excess - distribution of coefficient P-values model including environmental exposures lagged by seven days a) Linear, rank of daily counts and b) Poisson, daily counts.

Table F. 19: Scotland All Counts – F-test model and coefficient P-values comparison of Linear (rank of daily counts) versus Poisson (daily counts).

Coefficient or F test	Asthmatics, Non-asthmatics or Excess	Model 1. Linear using rank of daily counts	0.5 - Model 1	Model 2. Poisson using daily counts	0.5 - Model 2	Model 1-2
F-test mean P-values	Asthmatics	0.46	0.04	0.00	0.50	0.45
	Non-asthmatics	0.46	0.04	0.14	0.36	0.32
	Excess	0.55	-0.05	0.00	0.50	0.55
Point-est mean P-values	Asthmatics	0.51	-0.01	0.48	0.02	0.03
	Non-asthmatics	0.51	-0.01	0.49	0.01	0.02
	Excess	0.54	-0.04	0.47	0.03	0.07

Figures F1.192 to F1.194 illustrate the F-test P-value distributions from multiple regressions performed on the rank of daily counts and Poisson regressions performed on daily counts for Scotland. Comparing the Linear model to the Poisson, there were quite big differences in the F-test results. Figures F1.195 to F1.197 show the coefficient P-value distributions for the Linear and Poisson models, they highlight small differences between the two models.

Scotland: Linear with rank of first order difference and Poisson with first order difference

a) Linear, rank of first order difference b) Poisson, first order difference

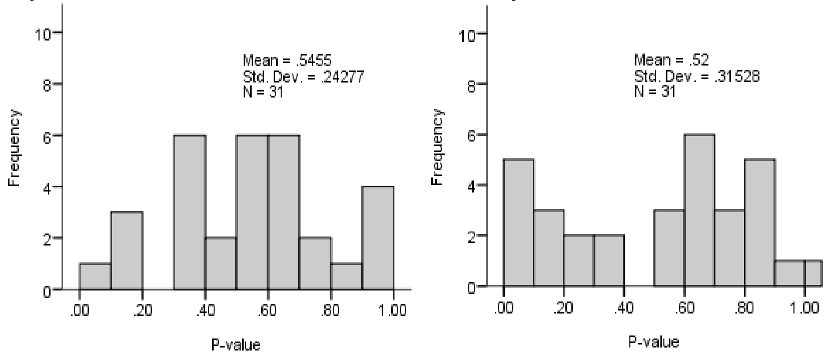


Figure F1. 198: Scotland All Counts Asthmatics - distribution of F-test P-values model including environmental exposures lagged by seven days a) Linear, rank of first order difference and b) Poisson, daily counts, first order difference.

a) Linear, rank of first order difference b) Poisson, first order difference

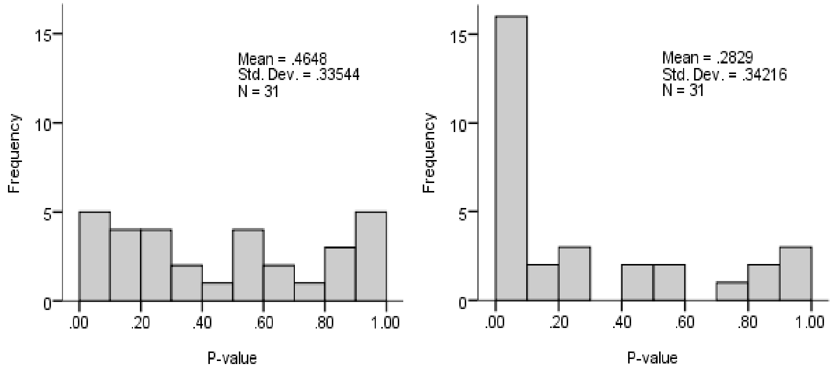


Figure F1. 199: Scotland All Counts Non-asthmatics - distribution of F-test P-values model including environmental exposures lagged by seven days a) Linear, rank of first order difference and b) Poisson, daily counts, first order difference.

a) Linear, rank of first order difference b) Poisson, first order difference

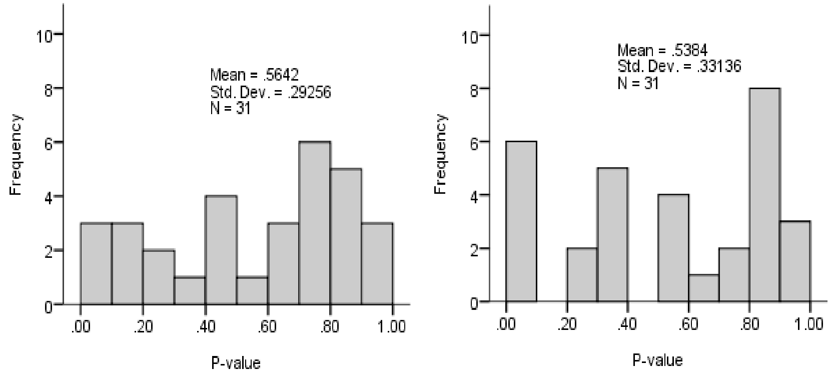


Figure F1. 200: Scotland All Counts Excess - distribution of F-test P-values model including environmental exposures lagged by seven days a) Linear, rank of first order difference and b) Poisson, daily counts, first order difference.

a) Linear, rank of first order difference b) Poisson, first order difference

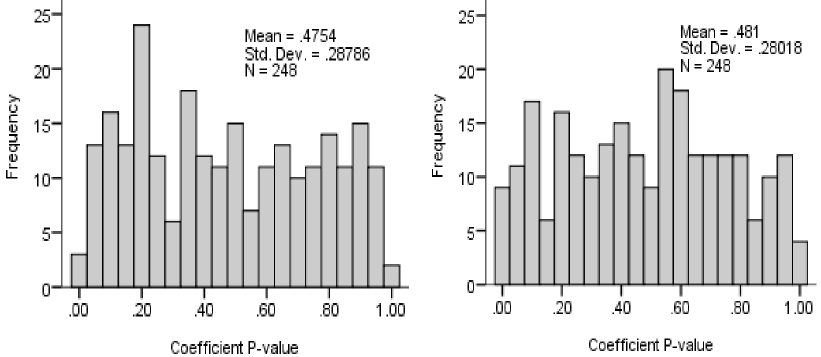


Figure F1. 201: Scotland All Counts Asthmatics - distribution of coefficient P-values model including environmental exposures lagged by seven days a) Linear, rank of first order difference and b) Poisson, daily counts, first order difference.

a) Linear, rank of first order difference b) Poisson, first order difference

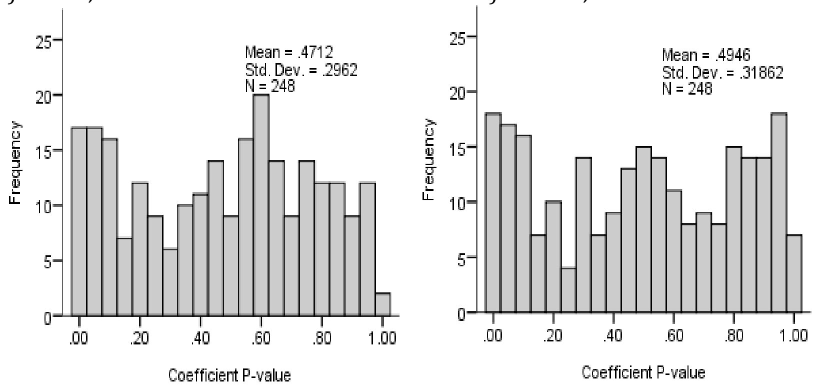


Figure F1. 202: Scotland All Counts Non-asthmatics- distribution of coefficient P-values model including environmental exposures lagged by seven days a) Linear, rank of first order difference and b) Poisson, daily counts, first order difference.

a) Linear, rank of first order difference b) Poisson, first order difference

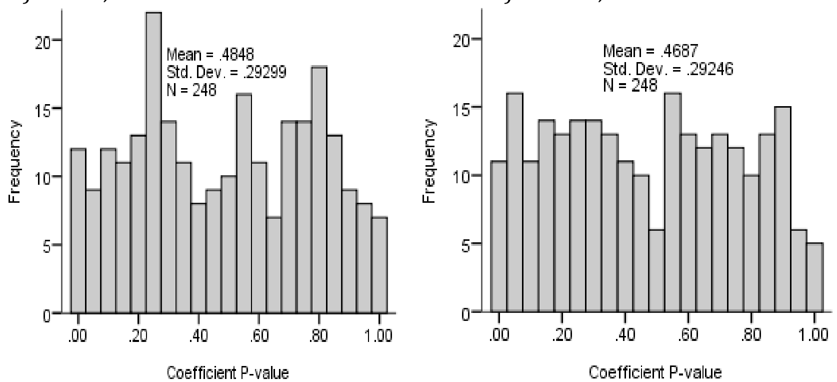


Figure F1. 203: Scotland All Counts Excess - distribution of coefficient P-values model including environmental exposures lagged by seven days a) Linear, rank of first order difference and b) Poisson, daily counts, first order difference.

Table F. 20: Scotland All Counts – F-test model and coefficient P-values comparison of Linear (rank of first order difference) versus Poisson (first order difference).

Coefficient or F test	Asthmatics, Non-asthmatics or Excess	Model 1: Linear using rank of first order difference	0.5 - Model 1	Model 2: Poisson using first order difference	0.5 - Model 2	Model 1-2
F-test mean P-values	**Asthmatics**	0.55	-0.05	0.52	-0.02	0.03
	Non-asthmatics	0.46	0.04	0.28	0.22	0.18
	Excess	0.56	-0.06	0.54	-0.04	0.03
Point-est mean P-values	**Asthmatics**	0.48	0.02	0.48	0.02	0.01
	Non-asthmatics	0.47	0.03	0.49	0.01	-0.02
	Excess	0.47	0.03	0.48	0.02	-0.02

Figures F1.98 to F1.201 illustrate the F-test P-value distributions from multiple regressions performed on the rank of first order difference and Poisson regressions performed on first order difference for Scotland. Comparing the Linear model to the Poisson, for asthmatics and excess there was little difference between the F-test mean P-values but for non-asthmatics, the difference was wider. Figures F1.201 to F1.203 show the coefficient P-value distributions for the Linear and Poisson Model, they highlight small differences between the two models.

F2. Results for Multiple Regression Analyses

F2.1. England and Wales Multiple Regression

F2.1.1. England and Wales Regressions Asthmatics and Non-asthmatics

Table F. 21: England and Wales - F-values (on 8 and 2163 degrees of freedom) and P-values from comparison of null model against model including each predictor lagged by 7 days, a) Asthmatics and b) Non-asthmatics.

a) Asthmatics			All Counts		Acute Visits		Casualty Counts		Emergency Consultations		Emergency Counts		Out of Hours Counts	
	Exposure		F-value	P-value	F-value	P-value	F-value	P-value	F-value	P-value	F-value	P-value	F-value	P-value
Outdoor air pollutants	Min'	NO	1.62	0.115	1.13	0.342	2.32	*0.018	1.37	0.203	0.74	0.657	1.01	0.430
		NO_2	2.12	*0.031	0.27	0.975	1.70	0.093	0.59	0.788	1.54	*0.138	0.28	0.973
		NOD	1.26	0.259	0.31	0.963	2.09	*0.034	1.17	0.311	0.80	0.601	0.46	0.882
		SO_2	0.83	0.579	0.64	0.746	0.45	0.890	1.14	0.330	0.45	0.894	0.87	0.544
		PM_{10}	0.60	0.779	0.47	0.879	0.69	0.704	1.67	0.102	0.78	0.616	0.63	0.751
		O_3	1.73	0.086	1.33	0.226	0.98	0.449	1.25	0.266	0.83	0.576	1.45	0.172
		CO	1.21	0.289	0.77	0.625	0.87	0.539	0.51	0.847	0.32	0.958	0.77	0.630
	Mean	NO	2.56	*0.009	0.54	0.828	1.20	0.297	1.73	0.087	0.34	0.950	0.98	0.447
		NO_2	2.54	*0.009	0.78	0.620	0.27	0.975	0.40	0.921	0.43	0.906	1.14	0.336
		NOD	2.57	*0.009	0.57	0.799	1.07	0.380	1.49	0.157	0.24	0.984	0.83	0.573
		SO_2	1.11	0.356	2.03	*0.039	0.23	0.984	0.26	0.979	0.74	0.652	0.83	0.575
		PM_{10}	1.66	0.104	1.02	0.415	0.38	0.930	1.70	0.094	0.93	0.494	1.88	*0.058
		O_3	1.18	0.308	0.62	0.764	0.70	0.688	1.42	0.182	0.75	0.651	0.61	0.768
		CO	2.15	*0.029	0.87	0.541	0.78	0.621	0.49	0.867	0.70	0.696	1.67	0.100
	Max'	NO	1.63	0.110	0.78	0.617	0.58	0.791	0.62	0.761	0.38	0.933	0.92	0.500
		NO_2	1.65	0.107	0.47	0.881	0.35	0.946	0.45	0.888	0.50	0.857	0.15	0.996
		NOD	1.87	0.061	0.71	0.684	0.52	0.839	0.77	0.629	0.43	0.901	0.59	0.787
		SO_2	0.87	0.545	1.22	0.282	0.40	0.922	0.27	0.975	1.20	0.297	1.20	0.294
		PM_{10}	1.93	0.052	0.25	0.982	0.96	0.463	0.62	0.761	0.52	0.841	0.90	0.518
		O_3	0.97	0.458	0.36	0.941	1.14	0.331	1.34	0.219	0.63	0.752	0.37	0.938
		CO	2.32	*0.018	0.98	0.446	0.20	0.991	0.49	0.863	0.45	0.893	0.83	0.577
Weather	Min'	Temperature	1.11	0.354	0.49	0.867	0.22	0.988	1.50	0.153	0.55	0.818	0.79	0.615
	Max'	Temperature	0.66	0.726	2.06	**0.037	0.99	0.445	2.69	*0.006	0.49	0.861	0.58	0.797
		Sun	0.84	0.567	0.44	0.897	0.49	0.862	0.43	0.905	1.35	0.214	1.80	0.073
		Rain	0.19	0.993	0.50	0.854	0.79	0.609	0.93	0.493	0.76	0.634	1.09	0.365
		Pressure	0.46	0.882	1.53	0.142	1.03	0.413	0.71	0.683	0.33	0.957	0.91	0.507
		Wind speed	2.26	*0.021	0.68	0.707	2.01	*0.041	0.89	0.525	1.10	0.362	0.80	0.601
Pollen		Grass	2.87	**0.004	0.20	0.991	2.47	**0.012	0.35	0.946	1.22	0.281	0.95	0.474
Total number of statistically significant models				8		2		4		1		0		0

Table F. 21 continued.

b) Non-asthmatics		**Exposure**	**All Counts**		**Acute Visits**		**Casualty Counts**		**Emergency Consultations**		**Emergency Counts**		**Out of Hours Counts**	
			F-value	**P-value**	**F-value**	**P-value**	**F-value**	**P-value**	**F-value**	**P-value**	**F-value**	**P-value**	**F-value**	**P-value**
Outdoor air pollutants	**Min'**	**NO**	2.50	*0.011	2.40	**0.014	0.54	0.827	0.43	0.902	0.76	0.636	0.31	0.963
		NO_2	1.87	0.061	0.73	0.666	1.21	0.289	0.60	0.779	0.40	0.920	0.87	0.542
		NOD	1.83	0.067	1.45	0.171	0.75	0.647	0.41	0.914	0.81	0.592	0.61	0.766
		SO_2	0.67	0.719	0.94	0.479	0.23	0.986	0.17	0.994	0.43	0.902	0.29	0.969
		PM_{10}	0.41	0.916	1.10	0.362	0.45	0.894	0.62	0.764	0.52	0.845	0.36	0.942
		O_3	1.38	0.201	0.67	0.714	1.21	0.288	0.78	0.625	1.06	0.390	0.55	0.821
		CO	1.52	0.144	0.85	0.555	0.92	0.497	0.23	0.986	0.59	0.788	0.12	0.999
	Mean	**NO**	2.74	*0.005	1.24	0.273	0.85	0.557	0.62	0.757	1.48	0.160	0.75	0.648
		NO_2	2.75	*0.005	0.63	0.756	1.68	0.099	0.72	0.673	1.04	0.406	0.40	0.919
		NOD	2.68	*0.006	1.08	0.373	1.03	0.408	0.71	0.681	1.47	0.162	0.73	0.664
		SO_2	2.29	*0.019	1.26	0.262	0.68	0.714	1.72	*0.090	1.54	0.137	0.45	0.890
		PM_{10}	2.02	*0.041	2.00	*0.042	0.42	0.910	0.72	0.671	1.20	0.293	0.81	0.592
		O_3	1.78	0.077	0.36	0.944	3.11	**0.002	0.65	0.733	1.87	0.061	0.49	0.864
		CO	2.35	*0.016	1.46	0.168	1.13	0.337	0.71	0.686	1.39	0.194	0.50	0.854
	Max'	**NO**	1.91	0.054	1.86	0.062	1.70	0.094	1.24	0.274	1.57	0.128	0.64	0.748
		NO_2	1.73	0.088	1.72	0.089	1.13	0.340	0.13	0.998	0.92	0.500	0.64	0.746
		NOD	2.16	*0.028	1.86	0.062	1.79	0.075	0.95	0.477	1.65	0.105	0.66	0.731
		SO_2	1.68	0.098	2.31	*0.018	0.49	0.862	1.18	0.306	2.04	*0.039	0.52	0.839
		PM_{10}	1.40	0.191	1.47	0.163	0.54	0.828	1.19	0.299	0.81	0.593	0.57	0.803
		O_3	1.37	0.206	0.63	0.755	1.77	0.078	0.52	0.839	1.02	0.417	0.26	0.977
		CO	2.12	*0.031	2.00	*0.043	0.67	0.718	1.44	0.173	1.71	0.091	0.63	0.756
Weather	**Min'**	**Temperature**	0.45	0.888	1.39	0.194	2.37	*0.015	1.21	0.291	0.84	0.564	0.60	0.776
	Max'	**Temperature**	0.82	0.586	0.24	0.984	2.30	*0.019	0.76	0.636	1.18	0.310	0.88	0.530
		Sun	1.81	0.071	0.49	0.861	1.29	0.242	1.48	0.158	0.81	0.595	0.33	0.955
		Rain	0.60	0.782	1.30	0.239	1.01	0.426	0.73	0.664	0.18	0.993	0.59	0.784
		Pressure	0.84	0.571	0.45	0.889	1.17	0.314	1.10	0.362	0.93	0.494	0.28	0.973
		Wind speed	1.38	0.201	0.83	0.576	0.66	0.724	0.55	0.819	0.81	0.593	1.65	*0.106
Pollen		**Grass**	3.32	**0.001	0.85	0.555	0.40	0.922	1.68	0.099	2.06	**0.037	1.49	0.155
Total number of statistically significant models				10		4		3		1		2		0

** Most significant P-value out of 28 triggers.

* Statistically significant trigger.

For All Counts, eight environmental exposures were statistically associated with daily counts of asthmatics and ten environmental exposures for non-asthmatics (Table F.21). Other medical contacts had fewer or no statistically significant models including environmental exposures. The most statistically significant model for both All Counts Asthmatics and non-asthmatics was grass.

Table F. 22: England and Wales - point-estimate descriptive statistics (n=224), asthmatics and non-asthmatics.

Asthmatics or Non-	Statistic	All Counts	Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours Counts
Asthmatics	Mean	0.15	0.00	0.00	0.00	0.00	0.00
	Median	0.01	0.00	0.00	0.00	0.00	0.00
	Minimum	-41.89	-0.96	-1.44	-1.90	-2.39	-2.31
	Maximum	36.44	0.73	1.54	1.38	1.83	1.93
Non-asthmatics	Mean	0.08	0.00	0.00	0.00	0.00	0.00
	Median	0.00	0.00	0.00	0.00	0.00	0.00
	Minimum	-21.86	-0.49	-1.74	-0.67	-2.76	-0.45
	Maximum	23.20	0.38	1.17	0.72	2.16	0.74

Table F. 23: England and Wales - number of statistically significant autoregressive point-estimates per environmental exposure (n=8), a) Asthmatics and b) Non-asthmatics.

a) Asthmatics	Exposure		All Counts	Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours Counts
Outdoor air pollutants	Min'	NO	2	0	3	1	0	1
		NO_2	1	0	1	1	1	0
		NOD	1	0	3	1	0	0
		SO_2	0	0	0	1	0	0
		PM_{10}	0	0	0	0	0	0
		O_3	1	1	0	0	0	2
		CO	1	0	0	0	0	0
	Mean	NO	2	0	1	0	0	1
		NO_2	2	0	0	0	0	2
		NOD	1	0	1	0	0	0
		SO_2	0	2	0	0	0	0
		PM_{10}	2	2	0	1	1	2
		O_3	0	0	0	1	0	0
		CO	1	0	1	1	0	2
	Max'	NO	2	0	0	1	0	0
		NO_2	1	0	0	1	0	0
		NOD	2	0	0	1	0	0
		SO_2	0	0	0	1	1	0
		PM_{10}	2	0	0	1	0	1
		O_3	1	0	1	0	0	0
		CO	2	0	0	1	0	1
Weather	Min'	Temperature	0	0	0	2	0	1
	Max'	Temperature	0	2	1	1	0	0
		Sun	0	0	0	1	1	2
		Rain	0	0	0	1	0	1
		Pressure	0	2	0	0	0	1
		Wind speed	2	0	3	1	0	1
Pollen		Grass	3	0	2	0	1	0
Total			29	9	17	19	5	18
Mean			1.04	0.32	0.61	0.68	0.18	0.64

Table F. 23 continued

b) Non-asthmatics Exposure			All Counts	Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours Counts
Outdoor air pollutants	Min'	NO	4	2	0	0	0	0
		NO_2	2	1	1	0	0	0
		NOD	2	1	0	0	0	0
		SO_2	0	1	0	0	0	0
		PM_{10}	0	1	0	0	0	0
		O_3	1	0	1	0	1	0
		CO	1	0	1	0	0	0
	Mean	NO	1	1	1	0	2	0
		NO_2	3	0	2	1	1	0
		NOD	1	1	1	0	1	0
		SO_2	1	0	0	2	2	0
		PM_{10}	2	3	0	0	1	0
		O_3	1	0	4	0	2	0
		CO	1	1	1	0	1	0
	Max'	NO	1	1	2	1	1	0
		NO_2	1	2	1	0	1	0
		NOD	1	2	2	1	1	0
		SO_2	2	3	0	1	2	0
		PM_{10}	1	1	0	1	1	0
		O_3	1	0	2	0	1	0
		CO	1	2	1	1	1	0
Weather	Min'	Temperature	0	2	2	0	0	0
	Max'	Temperature	0	0	4	0	1	1
		Sun	2	0	1	1	0	0
		Rain	0	0	0	0	0	0
		Pressure	0	0	2	1	2	0
		Wind speed	0	0	0	0	0	2
Pollen		Grass	4	1	0	2	3	2
Total			34	26	29	12	25	5
Mean			1.21	0.93	1.04	0.43	0.89	0.18

Table F.23 show that with exception to Emergency Consultations and Out of Hours Counts, non-asthmatics had a higher total number of statistically significant point-estimates across all environmental exposures than asthmatics. Grass had a higher number of statistically significant point-estimates in comparison to other environmental exposures.

Model P-value distributions

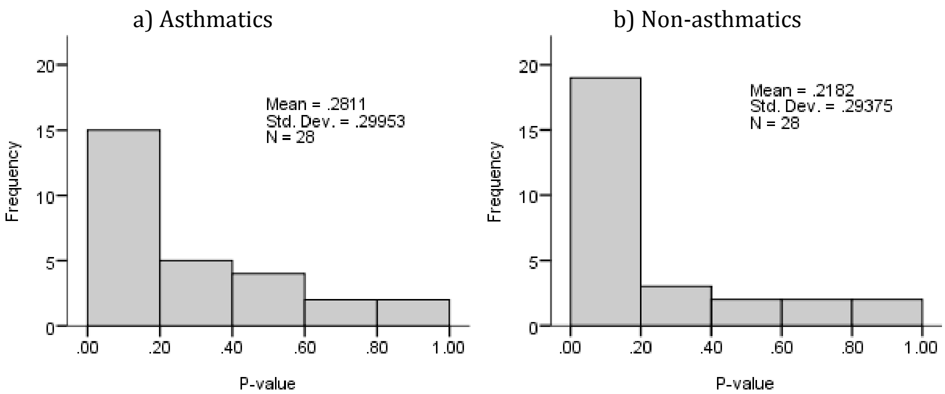


Figure F2. 1: England and Wales All Counts - distribution of F-test P-values a) Asthmatics and b) Non-asthmatics.

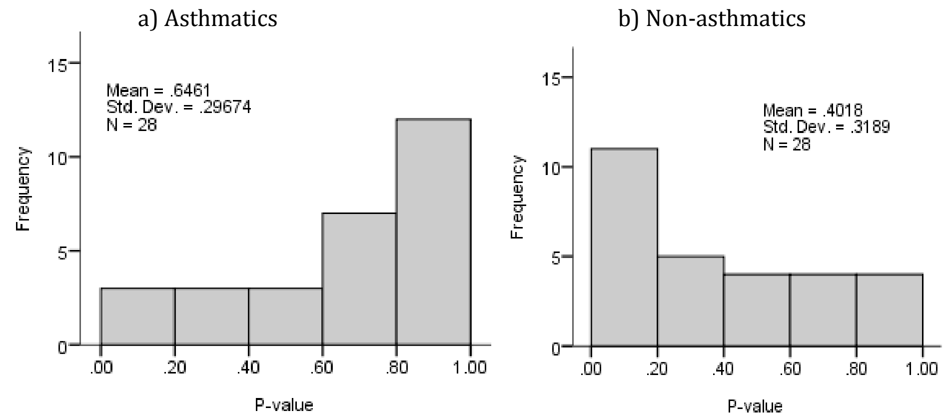


Figure F2. 2: England and Wales Acute Visits - distribution of F-test P-values a) Asthmatics and b) Non-asthmatics.

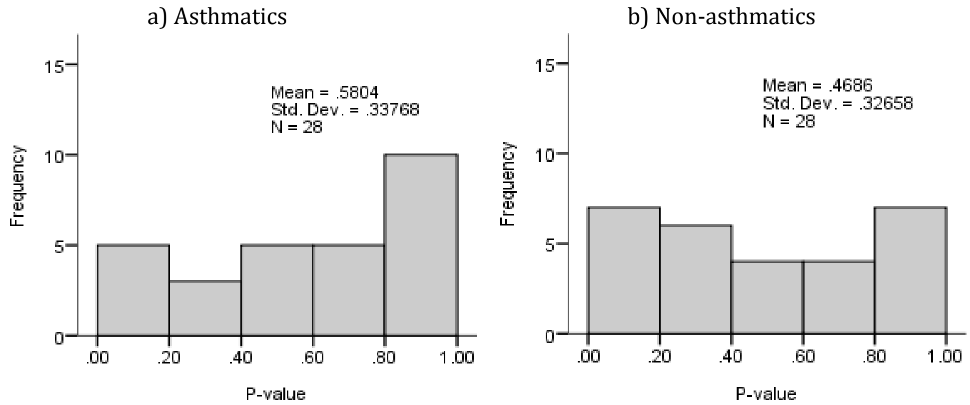


Figure F2. 3: England and Wales Casualty Counts - distribution of F-test P-values a) Asthmatics and b) Non-asthmatics.

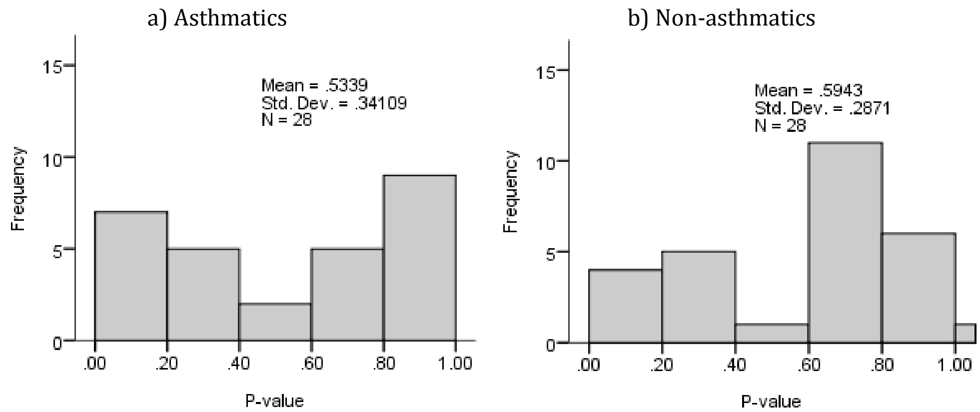


Figure F2. 4: England and Wales Emergency Consultations - distribution of F-test P-values a) Asthmatics and b) Non-asthmatics.

a) Asthmatics b) Non-asthmatics

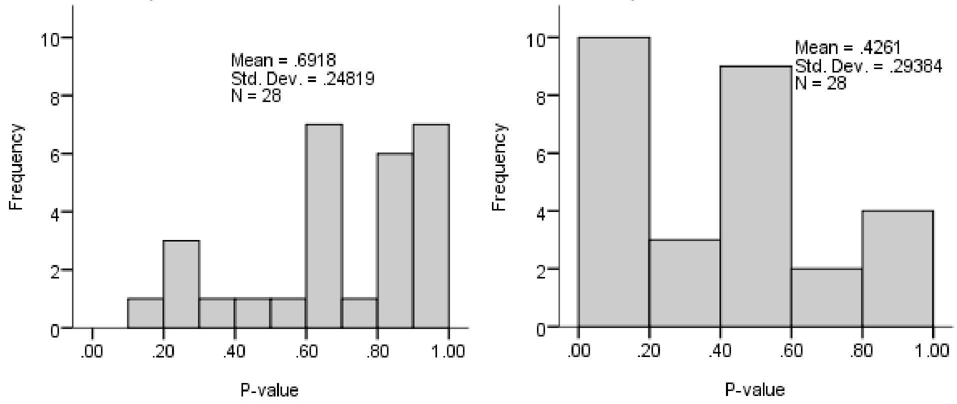


Figure F2. 5: England and Wales Emergency Counts - distribution of F-test P-values a) Asthmatics and Non-asthmatics.

a) Asthmatics b) Non-asthmatics

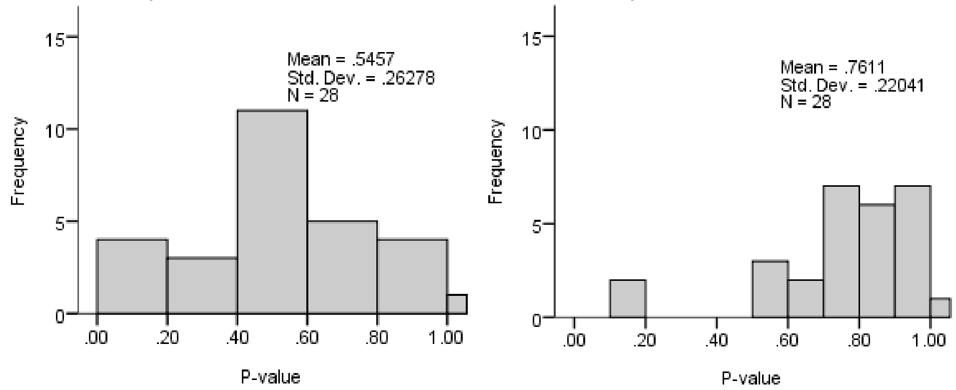


Figure F2. 6: England and Wales Out of Hours Counts - distribution of F-test P-values a) Asthmatics and b) Non-asthmatics.

All Counts asthmatics and non-asthmatics, the F-test P-values were positively distributed (Figure F2.1). For the other medical contacts, the F-test P-value histograms displayed uniformed or slight negative distributions (Figures F2.2 to F2.6). Table F.24 illustrates that with the exception of Emergency Consultations and Out of Hours Counts, the F-test mean P-value was lower for non-asthmatics than asthmatics inferring that environmental triggers had a stronger effect on the non-asthmatics groups. Only All Counts asthmatics have a lower mean P-value than that set by the null value set at 0.5. For all other asthmatics grouped in the remaining medical contacts, the mean P-value was higher than that set by the null value.

Table F. 24: England and Wales - Mean F-test P-value's distance from the null value (0.5) and difference between asthmatics and non-asthmatics.

Medical Contact	Asthmatics	0.5-Asthmatics	Non-asthmatics	0.5-Non-asthmatics	Difference between Asthmatics and Non-asthmatics
All Counts	0.28	0.22	0.22	0.28	0.06
Acute Visits	0.64	-0.14	0.40	0.10	0.24
Casualty Counts	0.58	-0.08	0.47	0.03	0.11
Emergency Consultations	0.53	-0.03	0.59	-0.09	-0.06
Emergency Counts	0.69	-0.19	0.43	0.07	0.27
Out of Hours Counts	0.55	-0.05	0.76	-0.26	-0.22

Point-estimate P-value distributions

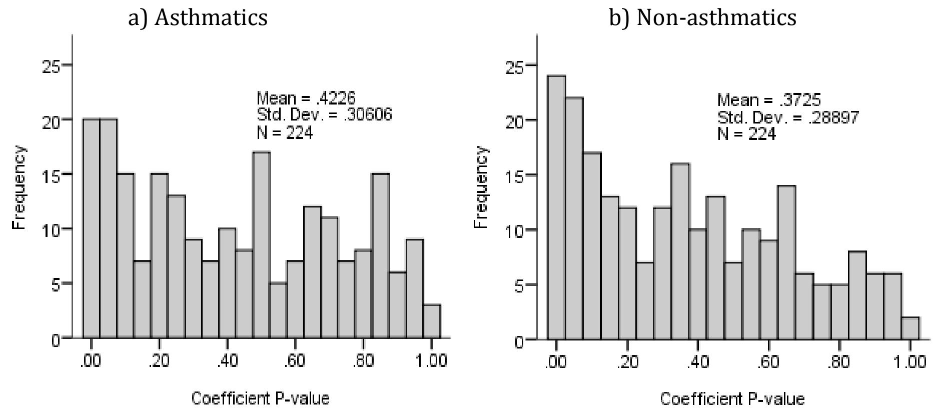


Figure F2. 7: England and Wales All Counts - distribution of the regression point-estimate P-values a) Asthmatics and b) Non-asthmatics.

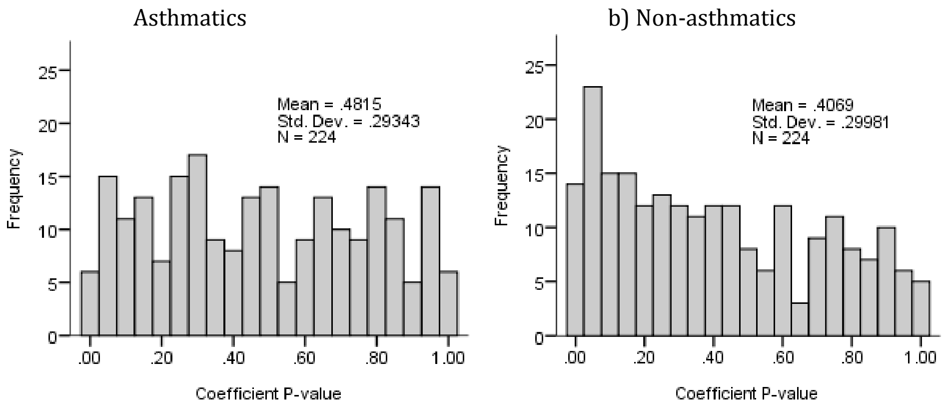


Figure F2. 8: England and Wales Acute Visits - distribution of the regression point-estimate P-values a) Asthmatics and b) Non-asthmatics.

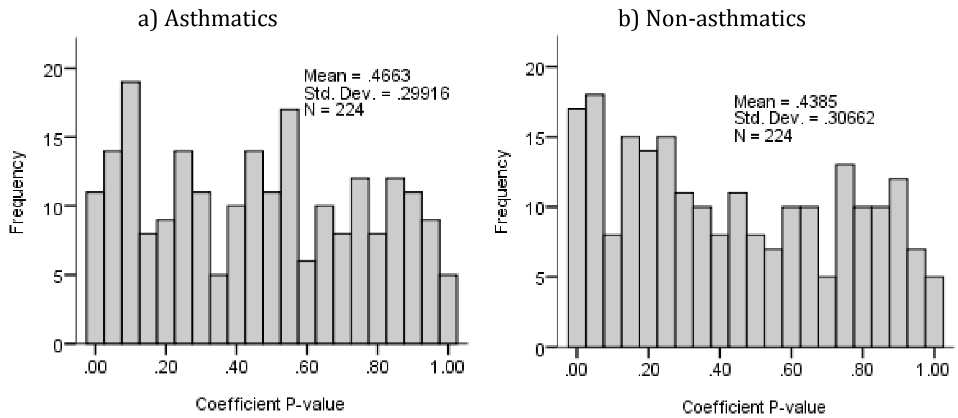


Figure F2. 9: England and Wales Casualty Counts - distribution of the regression point-estimate P-values a) Asthmatics and b) Non-asthmatics.

a) Asthmatics b) Non-asthmatics

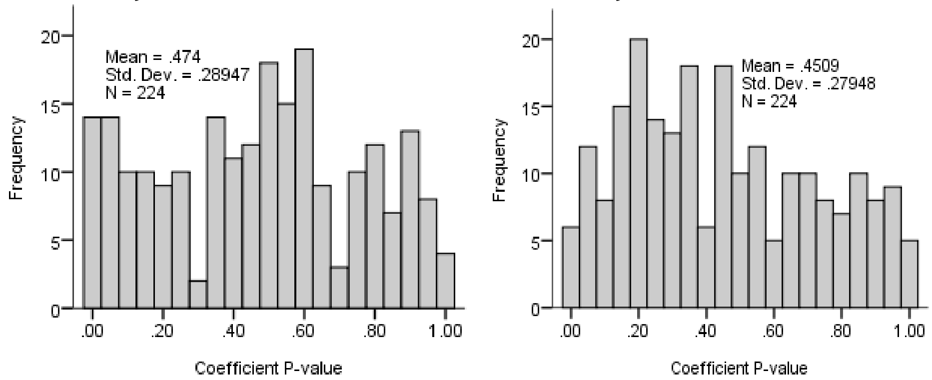


Figure F2. 10: England and Wales Emergency Consultations - distribution of the regression point-estimate P-values a) Asthmatics and b) Non-asthmatics.

a) Asthmatics b) Non-asthmatics

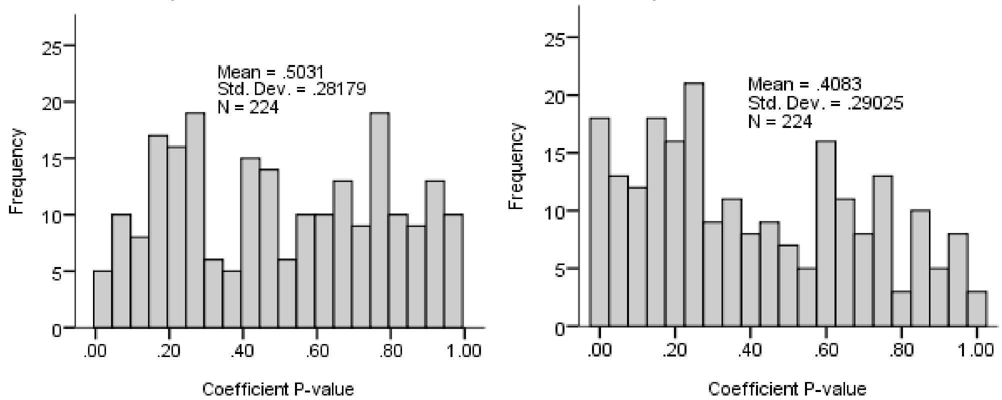


Figure F2. 11: England and Wales Emergency Counts - distribution of the regression point-estimate P-values a) Asthmatics and b) Non-asthmatics.

a) Asthmatics b) Non-asthmatics

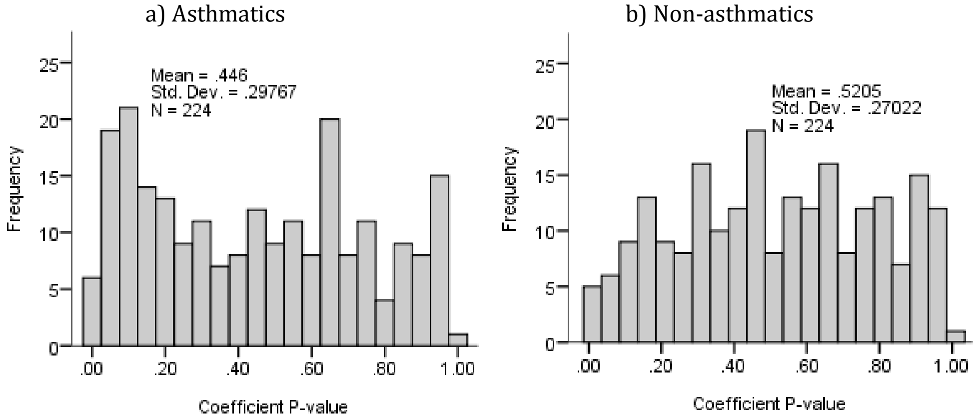


Figure F2. 12: England and Wales Out of Hours Counts - distribution of the regression point-estimate P-values a) Asthmatics and b) Non-asthmatics.

Figure F2.7 displays a slight positive distribution for All Counts asthmatics and non-asthmatics. For all other medical contacts, the remaining histograms show fairly uniformed point-estimate P-value distributions. Table F.25 illustrates that with exception to Out of Hours Counts, non-asthmatics had a lower point-estimate mean P-value than asthmatics. This infers that environmental triggers have a stronger effect on the non-asthmatics rather than asthmatics.

Table F. 25: England and Wales – regression mean point-estimate P-value's distance from the null value (0.5) and difference between asthmatics and non-asthmatics.

Medical Contact	Asthmatics	0.5-Asthmatics	Non-asthmatics	0.5-Non-asthmatics	Difference between Asthmatics and Non-asthmatics
All Counts	0.42	0.08	0.37	0.13	0.05
Acute Visits	0.48	0.02	0.41	0.09	0.07
Casualty Counts	0.47	0.03	0.44	0.06	0.03
Emergency Consultations	0.47	0.03	0.45	0.05	0.02
Emergency Counts	0.50	0.00	0.41	0.09	0.09
Out of Hours Counts	0.45	0.05	0.52	-0.02	-0.07

Lag effects

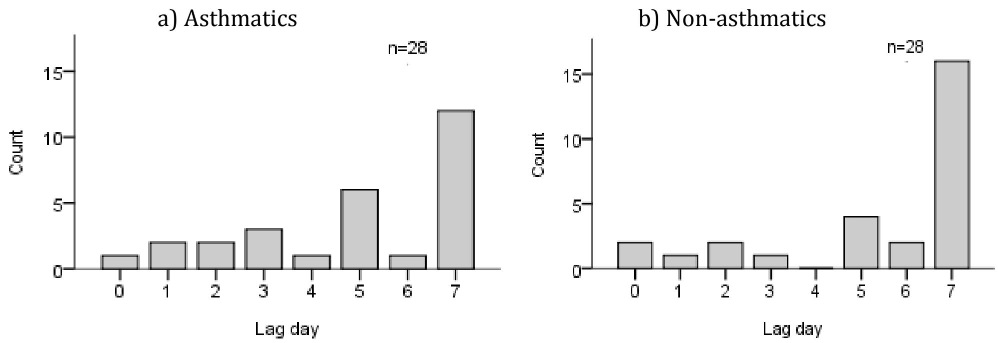


Figure F2. 13: England and Wales All Counts - number of the most significant regression point-estimates per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

Figure F2.13 shows that for All Counts asthmatics and non-asthmatics, the number of the most significant point-estimates per environmental exposure was highest on lag day seven.

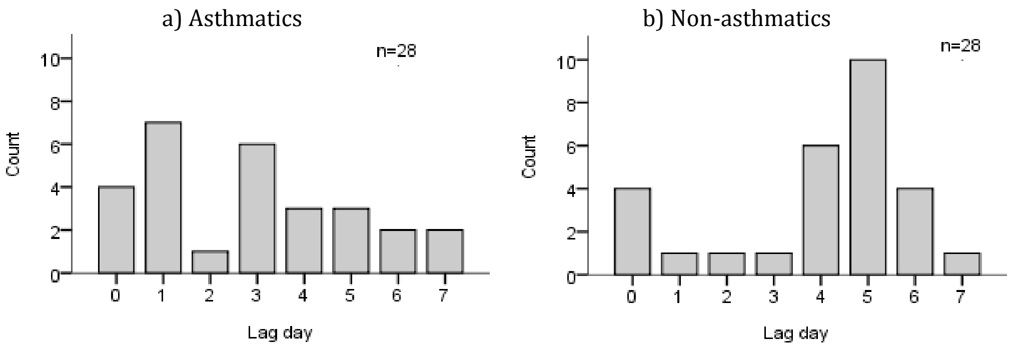


Figure F2. 14: England and Wales Acute Visits - number of the most significant regression point-estimates per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

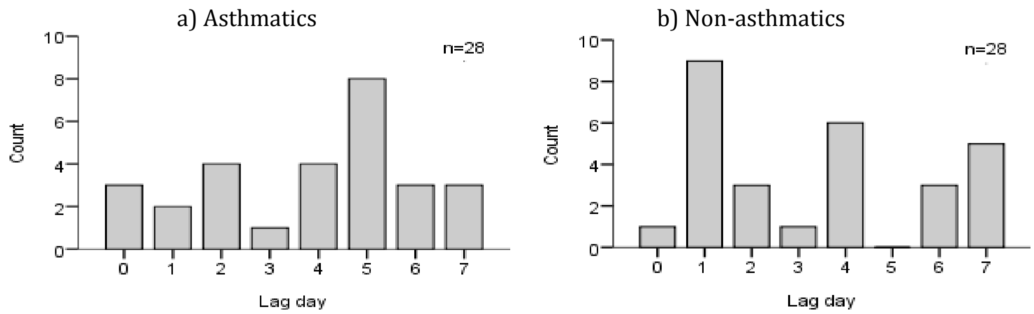


Figure F2. 15: England and Wales Casualty Counts - number of the most significant regression point-estimates per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

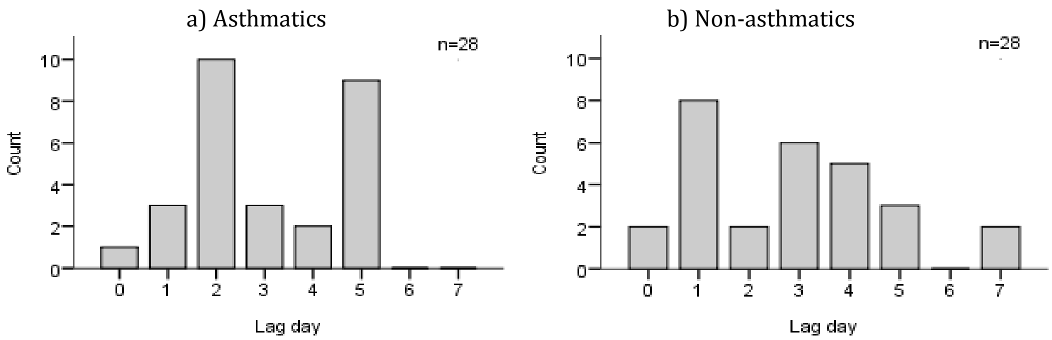


Figure F2. 16: England and Wales Emergency Consultations - number of the most significant regression point-estimates per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

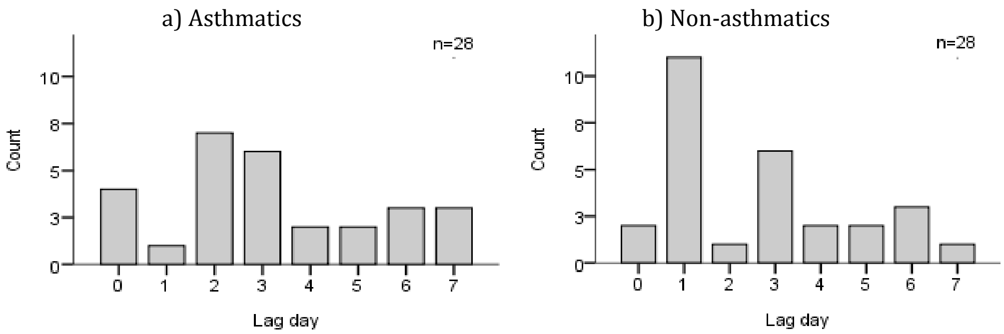


Figure F2. 17: England and Wales Emergency Counts - number of the most significant regression point-estimates per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

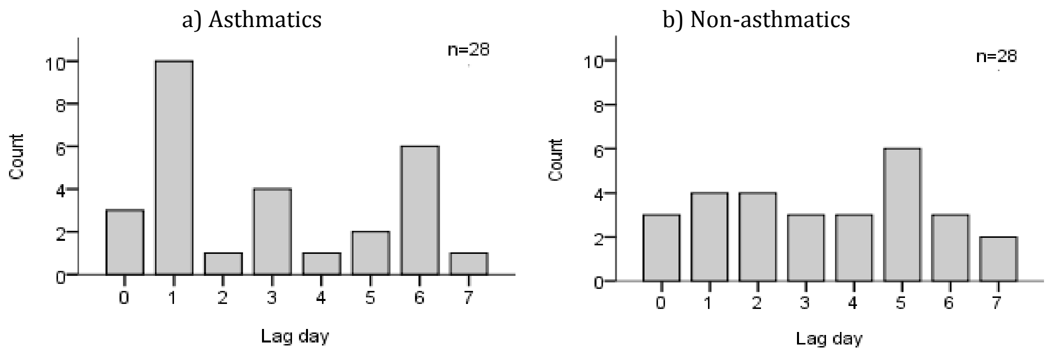


Figure F2. 18: England and Wales Out of Hours Counts - number of the most significant regression point-estimates per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

F2.1.2. England and Wales Regressions Excess

Table F. 26: England and Wales - F-values (on 8 and 2163 degrees of freedom) and P-values from comparison of null model against model including each predictor lagged by 7 days, Excess.

Exposure			All Counts		Acute Visits		Casualty Counts		Emergency Consultations		Emergency Counts		Out of Hours Counts	
			F-value	P-value	F-value	P-value	F-value	P-value	F-value	P-value	F-value	P-value	F-value	P-value
Outdoor air pollutants	Min'	NO	0.54	0.830	1.31	0.231	2.74	**0.005	2.09	*0.033	1.50	0.153	1.10	0.358
		NO_2	1.49	0.155	0.47	0.878	1.82	0.070	1.21	0.289	1.65	0.105	0.32	0.957
		NOD	0.69	0.700	0.55	0.822	2.33	*0.017	1.81	0.071	1.54	0.137	1.11	0.354
		SO_2	1.26	0.258	0.88	0.534	0.40	0.919	0.73	0.665	0.35	0.945	1.01	0.425
		PM_{10}	0.56	0.813	0.39	0.926	0.60	0.782	1.18	0.309	0.61	0.769	0.52	0.842
		O_3	1.30	0.238	0.97	0.461	0.89	0.524	1.57	0.129	0.42	0.909	0.85	0.558
		CO	0.91	0.503	0.83	0.574	1.01	0.428	0.43	0.904	0.41	0.915	0.68	0.707
	Mean	NO	1.21	0.290	0.62	0.763	0.82	0.589	1.77	0.078	0.80	0.599	0.75	0.646
		NO_2	1.18	0.305	1.00	0.433	0.61	0.767	0.61	0.767	1.17	0.311	1.55	0.135
		NOD	1.19	0.303	0.76	0.641	0.73	0.668	1.66	0.104	0.93	0.490	0.88	0.530
		SO_2	0.31	0.964	1.54	0.139	0.15	0.997	1.39	0.194	0.92	0.502	0.34	0.950
		PM_{10}	0.89	0.528	0.69	0.703	0.53	0.835	0.80	0.606	1.36	0.208	2.53	**0.010
		O_3	0.89	0.525	0.32	0.960	0.65	0.733	2.67	*0.006	1.62	0.115	0.23	0.985
		CO	1.16	0.319	0.31	0.964	0.44	0.895	0.66	0.730	0.67	0.721	1.23	0.274
	Max'	NO	0.76	0.635	0.73	0.662	0.63	0.751	1.32	0.230	0.96	0.468	0.88	0.532
		NO_2	0.77	0.628	1.36	0.207	0.37	0.935	0.28	0.973	0.53	0.834	0.18	0.994
		NOD	0.90	0.515	0.82	0.585	0.52	0.841	1.30	0.241	1.01	0.424	0.57	0.804
		SO_2	0.52	0.840	0.94	0.482	0.21	0.990	0.72	0.678	0.87	0.537	0.76	0.636
		PM_{10}	1.58	0.124	0.35	0.944	0.22	0.988	1.30	0.239	0.91	0.509	0.93	0.488
		O_3	0.83	0.573	0.40	0.920	2.03	*0.040	1.66	0.102	1.41	0.188	0.50	0.859
		CO	1.65	0.107	0.89	0.523	0.28	0.971	0.87	0.538	0.52	0.843	0.71	0.681
Weather	Min'	Temperature	1.41	0.189	0.12	0.999	1.02	0.415	1.18	0.310	0.60	0.775	1.20	0.294
	Max'	Temperature	0.61	0.771	2.11	**0.032	0.58	0.796	3.02	**0.002	0.37	0.937	0.85	0.562
		Sun	0.77	0.630	0.34	0.951	0.19	0.992	1.82	0.069	1.09	0.365	1.10	0.359
		Rain	0.36	0.940	0.87	0.537	0.38	0.934	0.35	0.946	0.46	0.883	0.71	0.682
		Pressure	0.29	0.970	1.74	0.084	0.44	0.900	1.53	0.142	0.35	0.948	0.78	0.623
		Wind speed	1.94	*0.051	0.41	0.916	1.02	0.422	0.86	0.552	0.35	0.946	0.41	0.915
Pollen		Grass	1.23	0.280	0.43	0.902	1.38	0.198	0.90	0.513	1.95	**0.049	2.09	*0.033
Total number of statistically significant models				0		1		2		3		1		2

** Most significant P-value out of 28 triggers.

* Statistically significant trigger.

No exposure improved the fit of the data compared to the null model for All Counts Excess.

Point-estimate statistics

Table F. 27: England and Wales - point-estimate descriptive statistics (n=224), Excess.

Statistic	All Counts	Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours Counts
Mean	0.06	0.00	0.00	0.00	0.00	0.00
Median	0.01	0.00	0.00	0.00	0.00	0.00
Minimum	-26.68	-0.74	-2.02	-1.72	-2.52	-2.23
Maximum	25.10	1.23	1.75	0.94	2.27	2.07

Table F. 28: England and Wales -number of statistically significant autoregressive point-estimates per environmental exposure (n=8), Excess.

Exposure			All Counts	Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours Counts
Outdoor air pollutants	Min'	NO	0	2	3	3	0	1
		NO_2	0	0	3	1	3	0
		NOD	0	0	4	2	2	1
		SO_2	2	0	0	1	0	0
		PM_{10}	0	0	0	1	0	0
		O_3	2	0	1	2	0	0
		CO	0	1	0	0	0	0
	Mean	NO	1	0	0	3	0	0
		NO_2	0	0	0	0	1	3
		NOD	1	0	0	3	0	1
		SO_2	0	2	0	2	0	0
		PM_{10}	0	0	0	1	2	3
		O_3	0	0	0	3	3	0
		CO	0	0	0	0	0	0
	Max'	NO	0	1	0	2	0	0
		NO_2	0	2	0	0	0	0
		NOD	0	1	0	2	1	0
		SO_2	0	0	0	0	1	0
		PM_{10}	1	0	0	2	0	0
		O_3	1	0	2	1	2	0
		CO	1	1	0	0	0	0
Weather	Min'	Temperature	0	0	1	2	0	2
	Max'	Temperature	0	3	0	4	0	1
		Sun	0	0	0	2	1	1
		Rain	0	0	0	0	0	0
		Pressure	0	3	0	2	0	1
		Wind speed	2	0	1	0	0	0
Pollen		Grass	1	0	1	1	3	2
Total			12	16	16	40	19	16
Mean			0.43	0.57	0.57	1.43	0.68	0.57

Table F.28 shows All Counts had the lowest total number of statistically significant point-estimates (n=224) whilst Emergency Consultations have the highest total number of statistically significant point-estimates.

Model P-value distributions

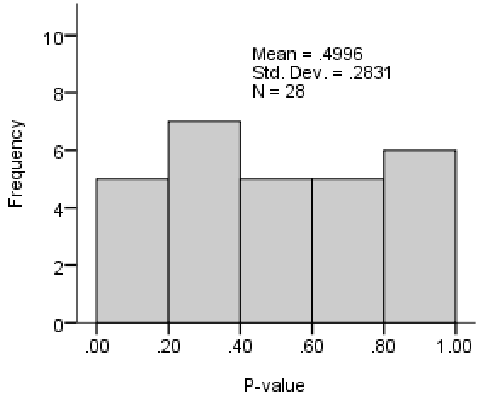


Figure F2. 19: England and Wales All Counts - distribution of F-test P-values, Excess.

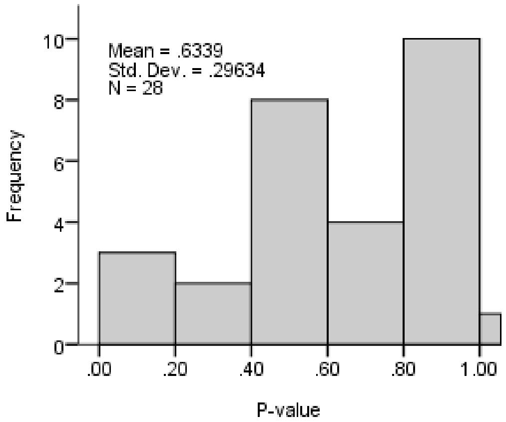


Figure F2. 20: England and Wales Acute Visits - distribution of F-test P-values, Excess.

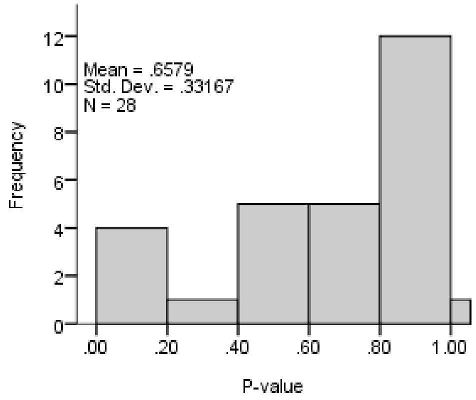


Figure F2. 21: England and Wales Casualty Counts - distribution of F-test P-values, Excess.

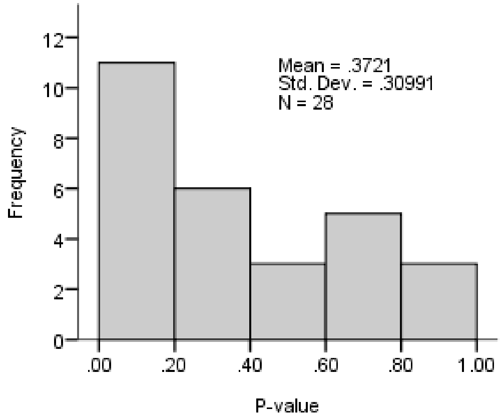


Figure F2. 22: England and Wales Emergency Consultations - distribution of F-test P-values, Excess.

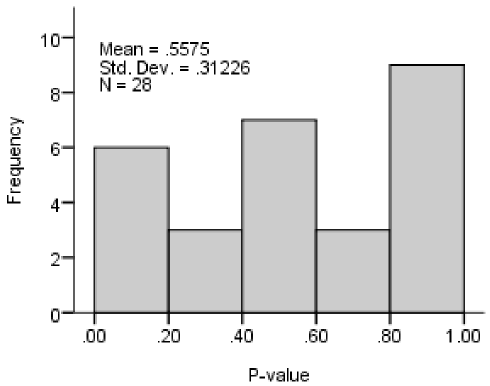


Figure F2. 23: England and Wales Emergency Counts - distribution of F-test P-values, Excess.

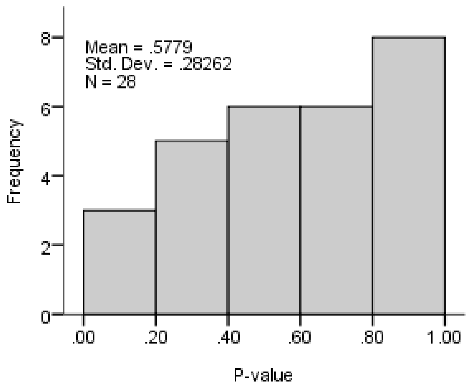


Figure F2. 24: England and Wales Out of Hours Counts - distribution of F-test P-values, Excess.

All Counts displays a uniformed distribution for the F-test P-values (Figure F2.19). Emergency Consultations displayed a positive distribution (Figure F2.22). For all other medical contacts, F-test mean P-values followed slight negatively skewed distributions. A uniformed distribution infers no effects from environmental exposures to daily counts. This was supported by Table F.29.

Table F. 29: England and Wales – Mean F-test P-value's distance from the null value (0.5), Excess.

Medical Contact	Excess	0.5-Excess
All Counts	0.50	0.00
Acute Visits	0.63	-0.13
Casualty Counts	0.66	-0.16
Emergency Consultations	0.37	0.13
Emergency Counts	0.56	-0.06
Out of Hours Counts	0.58	-0.08

Point-estimate P-value distributions

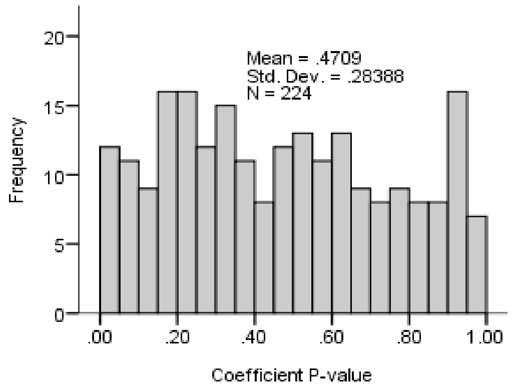


Figure F2. 25: England and Wales All Counts - distribution of the regression P-values, Excess.

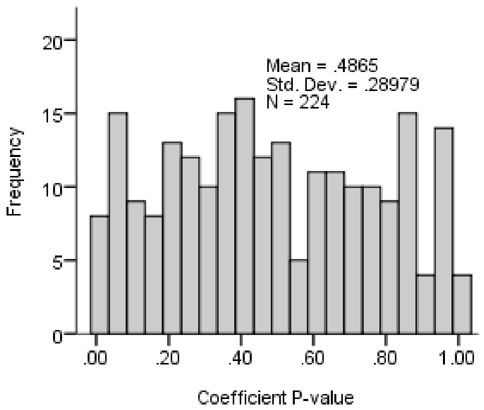


Figure F2. 26: England and Wales Acute Visits - distribution of the regression point-estimate P-values, Excess.

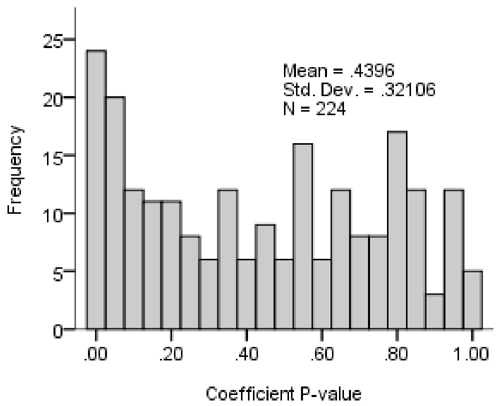


Figure F2. 28: England and Wales Emergency Consultations - distribution of the regression point-estimate P-values, Excess.

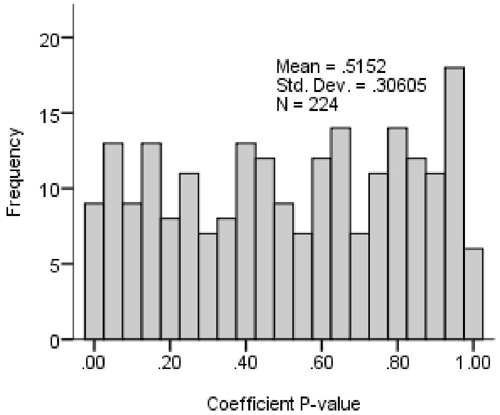


Figure F2. 27: England and Wales Casualty Counts - distribution of the regression point-estimate P-values, Excess.

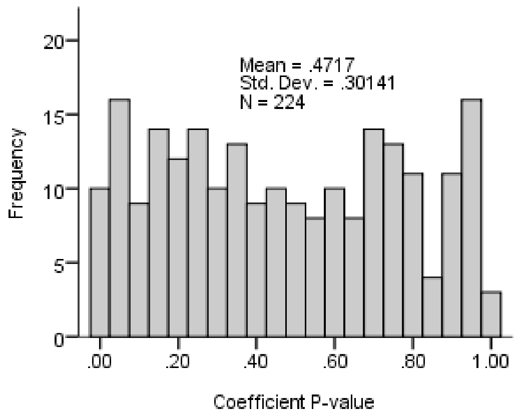


Figure F2. 29: England and Wales Emergency Counts - distribution of the regression point-estimate P-values, Excess.

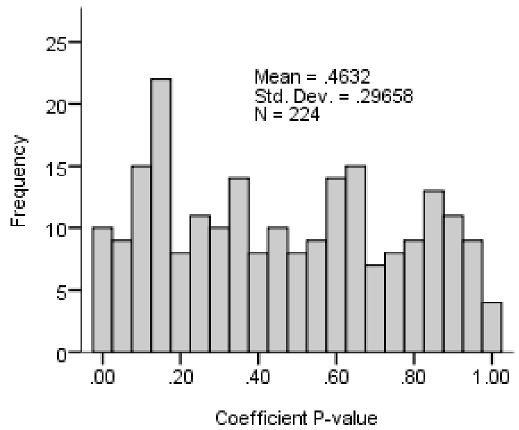


Figure F2. 30: England and Wales Out of Hours Counts - distribution of the regression point-estimate P-values, Excess.

Emergency Consultations exhibits a positively skewed distribution of the point-estimate P-values for the excess between asthmatics and non-asthmatics. For all other medical contacts, the distribution exhibits a uniformed shape indicating a weak or no effects from environmental triggers to daily counts. Table F.30 shows that with the exception of Casualty counts; all other medical contacts had a mean P-value slightly lower than the null value set at 0.5.

Table F. 30: England and Wales – regression mean point-estimate P-value's distance from the null value (0.5), Excess.

Medical Contact	Excess	0.5-Excess
All Counts	0.47	0.03
Acute Visits	0.49	0.01
Casualty Counts	0.52	-0.02
Emergency Consultations	0.44	0.06
Emergency Counts	0.47	0.03
Out of Hours Counts	0.46	0.04

Lag effects

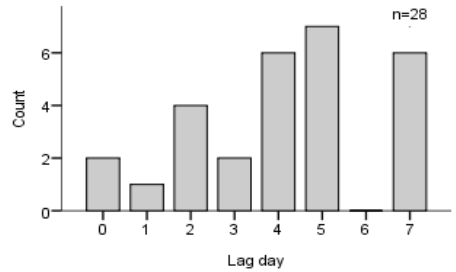


Figure F2. 31: England and Wales All Counts - number of the most significant regression point-estimates per environmental exposure by lag day, Excess.

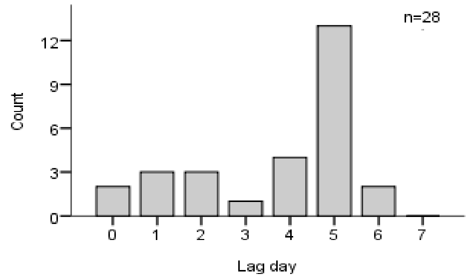


Figure F2. 32: England and Wales Acute Visits - Number of the most significant regression point-estimates per environmental exposure by lag day, Excess.

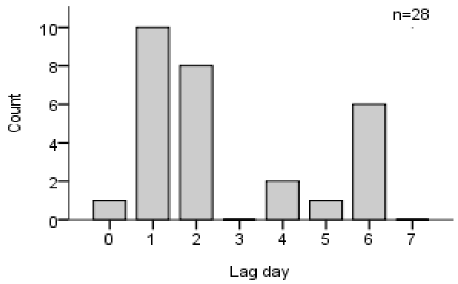


Figure F2. 33: England and Wales Casualty Counts - number of the most significant regression point-estimates per environmental exposure by lag day, Excess.

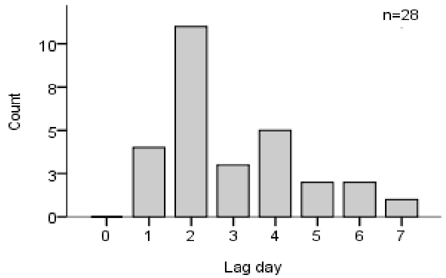


Figure F2. 34: England and Wales Emergency Consultations - number of the most significant regression point-estimates per environmental exposure by lag day, Excess.

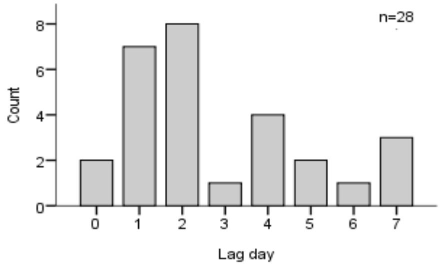


Figure F2. 35: England and Wales Emergency Counts - number of the most significant regression point-estimates per environmental exposure by lag day, Excess.

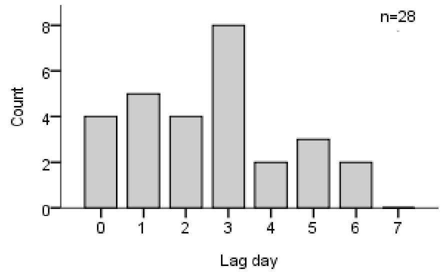


Figure F2. 36: England and Wales Out of Hours Counts - number of the most significant regression point-estimates per environmental exposure by lag day, Excess.

There was no outstanding lag day that the highest numbers of most significant point-estimates (per environmental exposure) cluster on.

F2.2. Trent Region Multiple Regressions

F2.2.1. Trent Region Regressions Asthmatics and Non-asthmatics

Table F. 31: Trent Region - F-values (on 8 and 2163 degrees of freedom) and P-values from comparison of null model against model including each predictor lagged by 7 days, a) Asthmatics and b) Non-asthmatics.

a) Asthmatics			All Counts		Acute Visits		Casualty Counts		Emergency Consultations		Emergency Counts		Out of Hours Counts	
	Exposure		F-value	P-value	F-value	P-value	F-value	P-value	F-value	P-value	F-value	P-value	F-value	P-value
Outdoor air pollutants	Min'	NO	0.95	0.472	0.47	0.881	0.98	0.448	0.54	0.823	0.64	0.744	0.87	0.540
		NO_2	1.41	0.188	0.32	0.959	1.18	0.307	0.59	0.789	0.84	0.565	1.39	0.195
		NOD	1.49	0.155	0.44	0.898	0.69	0.697	0.38	0.932	0.33	0.953	0.99	0.441
		SO_2	0.36	0.943	1.01	0.428	0.40	0.920	1.23	0.279	0.71	0.683	1.03	0.414
		PM_{10}	0.84	0.568	2.22	*0.023	0.73	0.664	0.61	0.767	0.55	0.817	0.82	0.585
		O_3	0.56	0.809	1.62	0.114	0.58	0.798	0.76	0.641	1.60	0.119	1.26	0.261
		CO	1.54	*0.139	0.89	0.526	0.85	0.561	1.65	0.105	0.43	0.904	0.80	0.600
	Mean	NO	0.58	0.798	1.56	0.132	0.90	0.518	0.53	0.834	0.46	0.886	0.58	0.793
		NO_2	0.62	0.765	1.38	0.202	1.85	0.064	0.55	0.815	0.99	0.445	0.52	0.839
		NOD	0.43	0.907	1.64	0.108	0.99	0.440	0.49	0.866	0.38	0.930	0.54	0.828
		SO_2	0.79	0.612	1.18	0.306	0.78	0.616	0.69	0.703	1.61	0.117	0.66	0.724
		PM_{10}	0.36	0.940	2.60	*0.008	1.32	0.231	0.94	0.479	0.97	0.457	1.23	0.279
		O_3	0.87	0.537	0.79	0.611	2.00	*0.043	0.66	0.726	2.00	**0.043	1.46	0.168
		CO	0.56	0.812	2.97	**0.003	1.10	0.358	0.55	0.816	0.05	1.000	0.86	0.552
	Max'	NO	0.55	0.821	1.91	0.055	0.64	0.744	0.90	0.517	0.62	0.763	0.54	0.824
		NO_2	0.17	0.995	1.33	0.224	1.04	0.406	1.38	0.200	0.88	0.532	0.73	0.664
		NOD	0.46	0.883	1.84	0.065	0.68	0.707	1.18	0.306	0.60	0.782	0.52	0.845
		SO_2	1.32	0.227	1.16	0.318	0.72	0.673	0.35	0.948	1.12	0.349	0.97	0.454
		PM_{10}	0.67	0.723	1.94	0.050	2.83	**0.004	0.66	0.726	0.89	0.521	0.84	0.567
		O_3	0.40	0.922	0.57	0.805	0.82	0.583	0.27	0.976	1.33	0.225	2.55	**0.009
		CO	0.41	0.914	2.05	*0.037	0.80	0.601	1.31	0.232	0.14	0.997	0.29	0.969
Weather	Min'	Temperature	0.43	0.901	0.70	0.690	1.01	0.425	0.36	0.944	0.69	0.702	0.71	0.684
	Max'	Temperature	0.78	0.616	0.76	0.642	1.00	0.437	1.64	0.108	1.90	0.056	1.41	0.189
		Sun	0.97	0.458	0.62	0.762	1.72	0.090	0.58	0.793	1.52	0.143	0.57	0.805
		Rain	1.31	0.233	0.99	0.440	1.94	0.051	2.71	**0.006	1.11	0.356	0.59	0.784
		Pressure	0.42	0.907	1.93	0.051	0.79	0.607	1.26	0.259	0.47	0.877	0.68	0.706
		Wind speed	0.46	0.883	0.63	0.756	1.06	0.389	0.88	0.529	0.56	0.808	1.32	0.227
Pollen		Grass	1.50	0.151	0.13	0.998	0.78	0.618	1.72	0.090	1.02	0.418	0.83	0.576
Total number of statistically significant models				0		4		2		1		1		1

Table F.31 continued.

b) Non-asthmatics Exposure			All Counts		Acute Visits		Casualty Counts		Emergency Consultations		Emergency Counts		Out of Hours Counts	
			F-value	P-value	F-value	P-value	F-value	P-value	F-value	P-value	F-value	P-value	F-value	P-value
Outdoor air pollutants	Min'	NO	1.65	*0.105	4.15	**<0.001	0.99	0.440	0.40	0.923	0.92	0.500	1.05	0.398
		NO_2	1.15	0.326	0.79	0.613	0.44	0.897	0.55	0.816	0.10	0.999	0.34	0.951
		NOD	1.31	0.235	1.43	0.178	0.93	0.490	0.47	0.881	0.70	0.696	0.99	0.439
		SO_2	0.74	0.657	0.62	0.760	0.39	0.928	1.32	0.228	0.54	0.826	0.33	0.957
		PM_{10}	0.97	0.455	0.62	0.760	1.20	0.292	0.28	0.971	0.34	0.948	0.80	0.603
		O_3	1.05	0.398	0.80	0.603	0.42	0.910	1.98	*0.046	1.19	0.303	1.22	0.284
		CO	0.94	0.478	0.96	0.464	0.76	0.637	1.23	0.279	0.75	0.651	0.88	0.532
	Mean	NO	1.60	0.120	0.69	0.702	0.92	0.499	0.78	0.621	0.92	0.497	0.81	0.589
		NO_2	0.44	0.899	1.16	0.317	0.43	0.906	1.54	0.137	0.51	0.853	0.35	0.945
		NOD	1.37	0.204	0.77	0.628	0.80	0.604	0.68	0.713	0.61	0.772	0.61	0.768
		SO_2	0.55	0.822	2.82	*0.004	1.09	0.367	0.30	0.966	0.62	0.758	0.40	0.919
		PM_{10}	0.48	0.871	0.94	0.482	1.22	0.281	0.61	0.773	0.26	0.978	0.71	0.686
		O_3	1.28	0.252	2.25	*0.022	0.91	0.511	0.51	0.847	1.31	0.234	0.92	0.498
		CO	0.82	0.587	1.42	0.183	11.10	**<0.001	0.28	0.973	0.96	0.467	0.73	0.662
	Max'	NO	1.48	0.159	1.02	0.422	0.96	0.464	1.11	0.353	0.61	0.767	0.63	0.754
		NO_2	0.68	0.714	0.99	0.442	0.74	0.659	2.13	0.030	0.37	0.936	0.31	0.963
		NOD	1.32	0.227	1.02	0.422	1.14	0.335	1.15	0.326	0.65	0.739	0.64	0.745
		SO_2	0.46	0.881	2.78	*0.005	0.49	0.867	0.10	0.999	0.67	0.718	0.35	0.946
		PM_{10}	0.48	0.874	0.24	0.983	1.10	0.358	1.09	0.365	0.66	0.730	0.71	0.685
		O_3	1.07	0.381	0.83	0.572	0.54	0.826	0.88	0.531	0.77	0.629	0.82	0.583
		CO	0.49	0.861	2.09	*0.033	0.98	0.447	0.68	0.710	0.83	0.577	0.43	0.903
Weather	Min'	Temperature	0.22	0.987	0.75	0.648	1.33	0.226	1.06	0.392	0.73	0.663	0.53	0.831
	Max'	Temperature	0.40	0.921	0.60	0.781	1.03	0.414	0.80	0.605	0.38	0.930	1.40	0.191
		Sun	0.63	0.753	0.80	0.605	2.59	*0.008	0.30	0.965	1.45	0.169	0.71	0.682
		Rain	1.09	0.370	1.04	0.405	1.13	0.342	0.41	0.915	2.10	*0.033	0.82	0.589
		Pressure	0.81	0.595	1.26	0.258	1.30	0.239	1.76	0.080	1.25	0.263	1.45	*0.171
		Wind speed	0.67	0.722	1.40	0.192	1.53	0.142	1.00	0.433	0.78	0.620	0.86	0.549
Pollen		Grass	0.85	0.556	1.14	0.336	3.08	*0.002	3.33	**0.001	2.13	**0.030	0.73	0.666
Total number of statistically significant models				0		5		3		2		2		0

** Most significant P-value out of 28 triggers.

* Statistically significant trigger.

For All Counts, no environmental exposures improved the fit of the data compared to the null model.

Point-estimate statistics

Table F. 32: Trent Region - point-estimate descriptive statistics (n-224 point-estimates), asthmatics and non-asthmatics.

Asthmatics or Non-asthmatics	Statistic	All Counts	Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours Counts
Asthmatics	**Mean**	0.01	0.01	0.00	0.00	0.00	-0.02
	Median	0.00	0.00	0.00	0.00	0.00	0.00
	Minimum	-10.97	-7.67	-6.51	-8.19	-5.71	-6.41
	Maximum	8.15	7.66	6.58	8.78	7.19	12.17
Non-asthmatics	**Mean**	0.01	-0.01	-0.01	0.00	-0.02	-0.01
	Median	0.00	0.00	0.00	0.00	0.00	0.00
	Minimum	-7.52	-5.23	-6.02	-5.70	-6.86	-9.07
	Maximum	7.35	4.80	7.16	4.05	10.06	6.26

Table F. 33: Trent Region - number of statistically significant autoregressive point-estimates per environmental exposure (n=8), a) Asthmatics and b) Non-asthmatics.

a) Asthmatics	Exposure		All Counts	Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours Counts
Outdoor air pollutants	**Min’**	**NO**	1	0	1	1	0	0
		NO_2	1	0	2	0	0	1
		NOD	2	0	0	0	0	1
		SO_2	0	0	0	2	0	1
		PM_{10}	1	3	0	0	0	1
		O_3	0	2	0	1	1	1
		CO	2	0	0	2	0	1
	Mean	**NO**	0	2	2	1	0	0
		NO_2	0	2	4	0	1	0
		NOD	0	2	2	0	0	0
		SO_2	0	2	1	2	3	0
		PM_{10}	0	3	2	2	1	1
		O_3	1	0	4	0	3	2
		CO	0	7	1	0	0	1
	Max’	**NO**	0	3	0	0	0	0
		NO_2	0	1	2	2	1	0
		NOD	0	3	1	2	0	0
		SO_2	2	1	1	0	1	1
		PM_{10}	0	2	3	1	0	1
		O_3	0	0	0	0	1	2
		CO	0	2	1	2	0	0
Weather	**Min’**	**Temperature**	0	0	1	0	0	1
	Max’	**Temperature**	1	0	0	1	2	2
		Sun	1	0	2	0	2	0
		Rain	1	0	2	1	0	0
		Pressure	0	2	1	2	0	0
		Wind speed	0	0	2	0	0	1
Pollen		**Grass**	1	0	0	2	1	0
Total			14	37	35	24	17	18
Mean			0.50	1.32	1.25	0.86	0.61	0.64

Table F.33 continued

b) Non-asthmatics Exposure			All Counts	Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours Counts
Outdoor air pollutants	Min’	**NO**	2	2	0	0	0	1
		NO_2	0	0	0	0	0	0
		NOD	0	0	0	0	0	1
		SO_2	1	0	0	2	0	0
		PM_{10}	2	0	0	0	0	1
		O_3	1	0	0	2	1	1
		CO	1	0	0	1	0	1
	Mean	**NO**	2	0	0	2	0	0
		NO_2	0	1	0	4	0	0
		NOD	2	0	0	2	0	0
		SO_2	0	3	2	0	0	0
		PM_{10}	0	1	1	0	0	1
		O_3	1	2	1	0	2	1
		CO	0	2	0	0	2	0
	Max’	**NO**	2	0	0	2	0	0
		NO_2	1	2	0	2	0	0
		NOD	2	0	1	2	0	0
		SO_2	0	2	0	0	0	0
		PM_{10}	0	0	1	0	0	0
		O_3	1	1	0	0	0	1
		CO	0	1	2	1	1	0
Weather	Min’	**Temperature**	0	0	2	2	0	0
	Max’	**Temperature**	0	0	0	1	0	3
		Sun	0	1	3	0	2	0
		Rain	1	0	2	0	3	0
		Pressure	1	1	2	4	1	1
		Wind speed	1	2	3	0	1	1
Pollen		**Grass**	0	2	2	2	2	0
Total			21	23	22	29	15	13
Mean			0.75	0.82	0.79	1.04	0.54	0.46

Acute Visits asthmatics and Emergency Consultations non-asthmatics had the highest number of statistically significant point-estimates.

Model P-value distributions

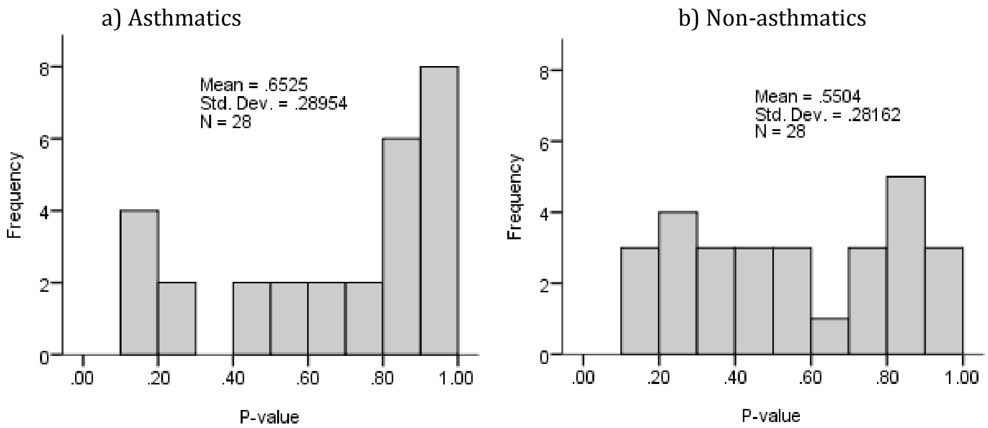


Figure F2. 37: Trent Region All Counts - distribution of F-test P-values a) Asthmatics and b) Non-asthmatics.

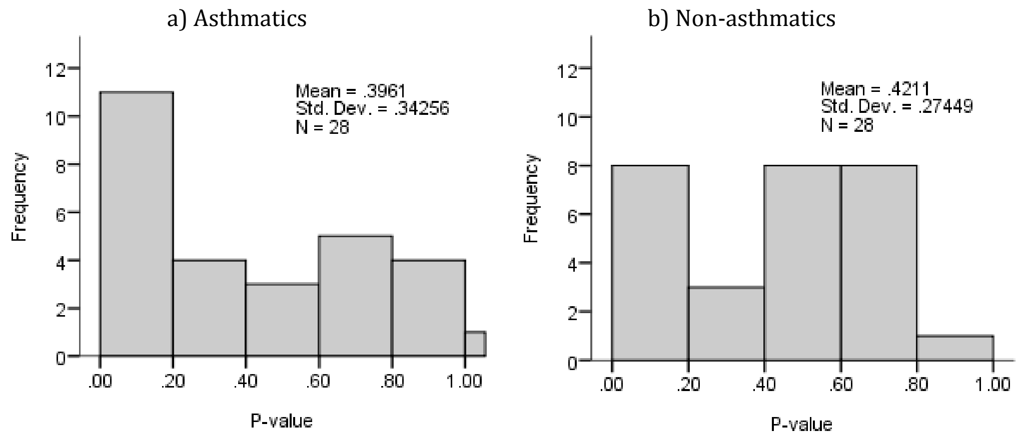


Figure F2. 38: Trent Region Acute Visits - distribution of F-test P-values a) Asthmatics and b) Non-asthmatics.

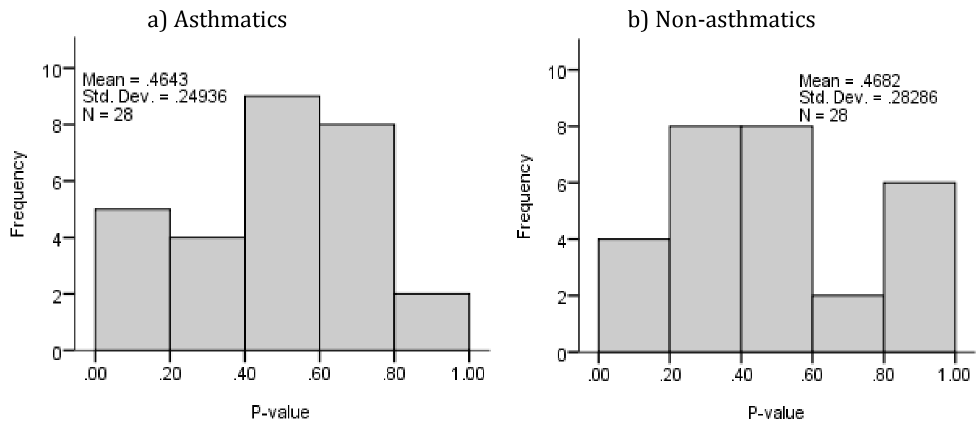


Figure F2. 39: Trent Region Casualty Counts - distribution of F-test P-values a) Asthmatics and b) Non-asthmatics.

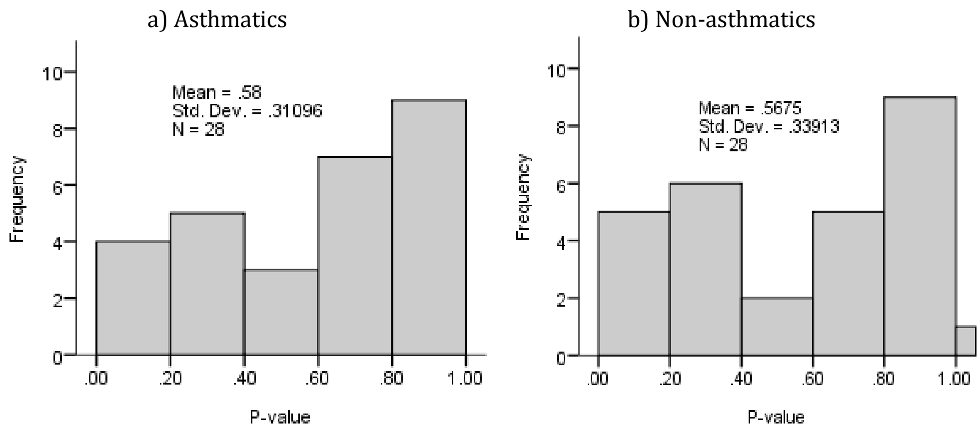


Figure F2. 40: Trent Region Emergency Consultations - distribution of F-test P-values a) Asthmatics and b) Non-asthmatics.

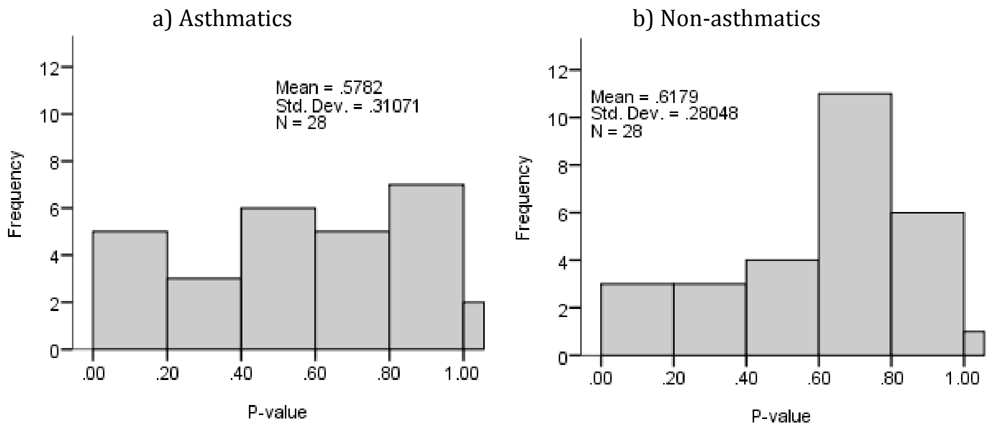


Figure F2. 41: Trent Region Emergency Counts - distribution of F-test P-values a) Asthmatics and Non-asthmatics.

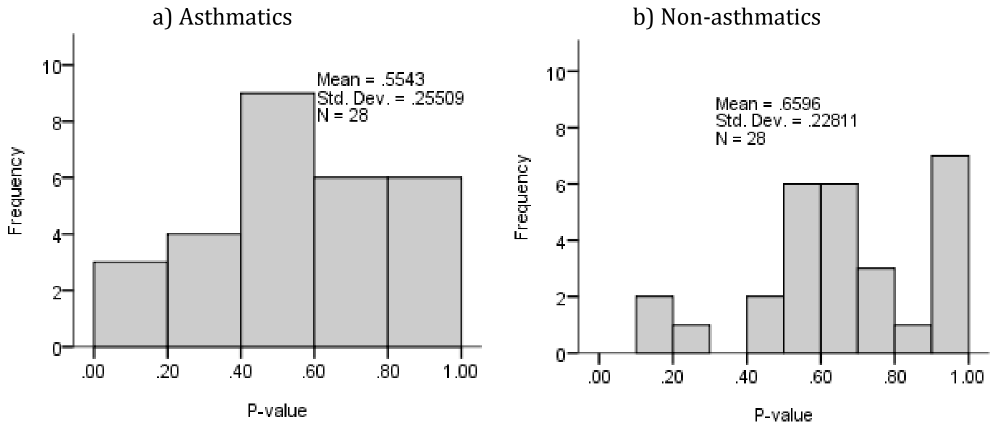


Figure F2. 42: Trent Region Out of Hours Counts - distribution of F-test P-values a) Asthmatics and b) Non-asthmatics.

All medical contacts have uniformed or slight negatively skewed distributions inferring no overall environmental association with daily counts. Acute Visits asthmatics had the lowest F-test mean P-value. Asthmatics had lower mean P-values for three of the six groups. The majority of the mean P-values were higher than the null value set at 0.5 inferring no overall environmental effects on medical contacts.

Table F. 34: Trent Region – Mean F-test P-value's distance from the null value (0.5) and difference between asthmatics and non-asthmatics.

Medical Contact	Asthmatics	0.5-Asthmatics	Non-asthmatics	0.5-Non-asthmatics	Difference between Asthmatics and Non-asthmatics
All Counts	0.65	-0.15	0.55	-0.05	0.10
Acute Visits	0.40	0.10	0.42	0.08	-0.03
Casualty Counts	0.46	0.04	0.47	0.03	0.00
Emergency Consultations	0.58	-0.08	0.57	-0.07	0.01
Emergency Counts	0.58	-0.08	0.62	-0.12	-0.04
Out of Hours Counts	0.55	-0.05	0.66	-0.16	-0.11

Point-estimate P-value distributions

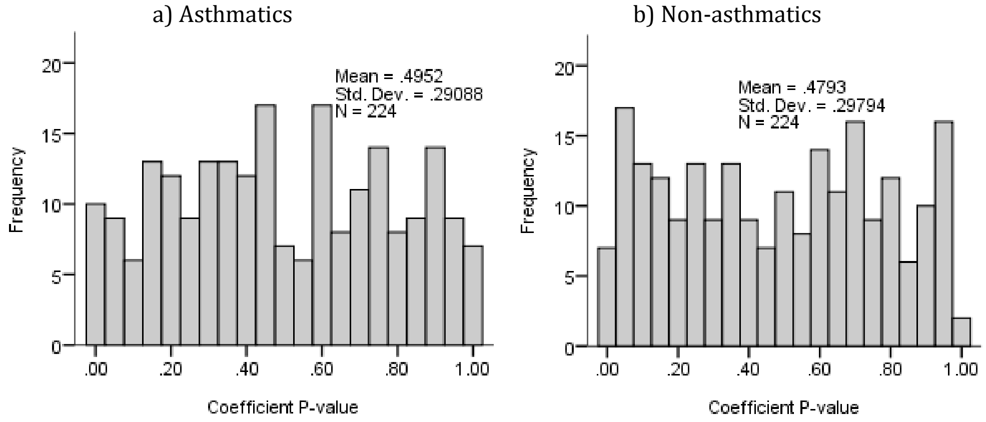


Figure F2. 43: Trent Region All Counts - distribution of the regression point-estimate P-values a) Asthmatics and b) Non-asthmatics.

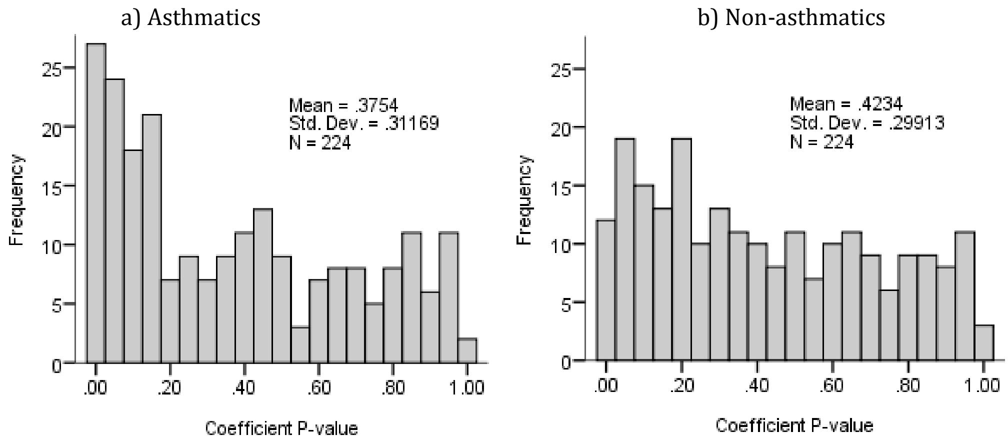


Figure F2. 44: Trent Region Acute Visits - distribution of the regression point-estimate P-values a) Asthmatics and b) Non-asthmatics.

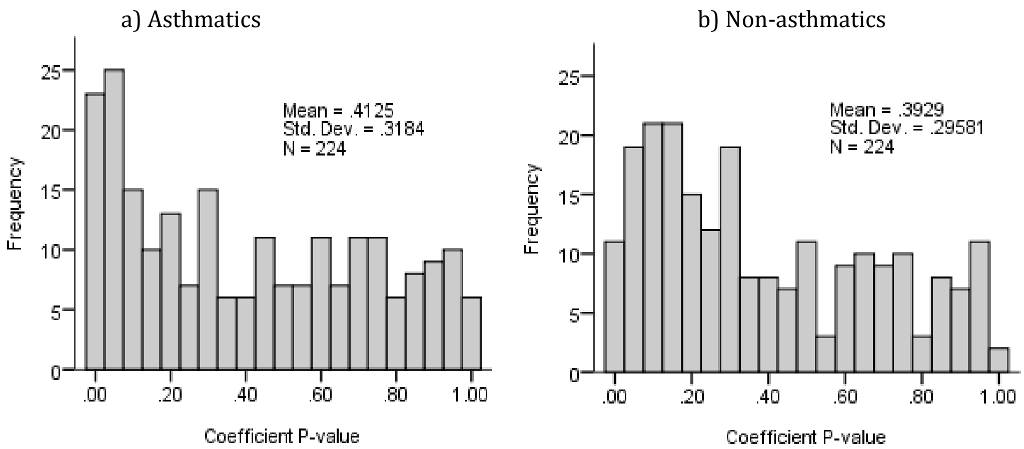


Figure F2. 45: Trent Region Casualty Counts - distribution of the regression point-estimate P-values a) Asthmatics and b) Non-asthmatics.

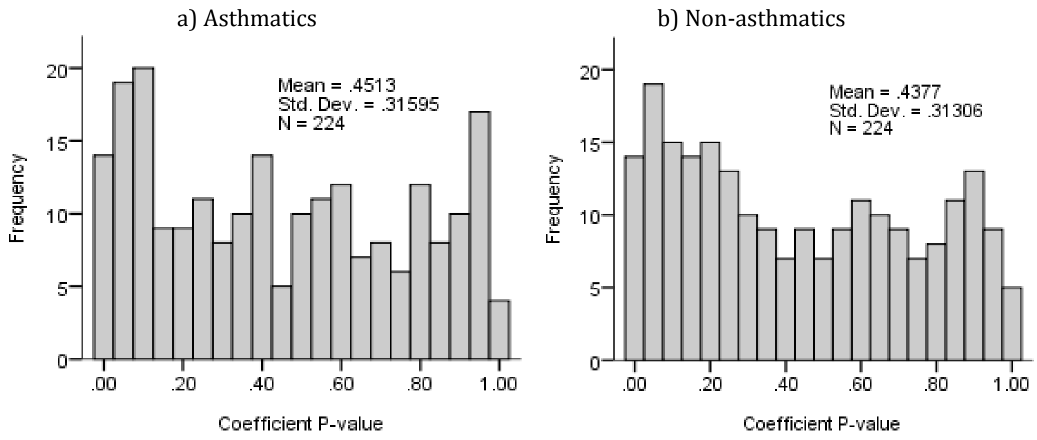


Figure F2. 46: Trent Region Emergency Consultations - distribution of the regression point-estimate P-values a) Asthmatics and b) Non-asthmatics.

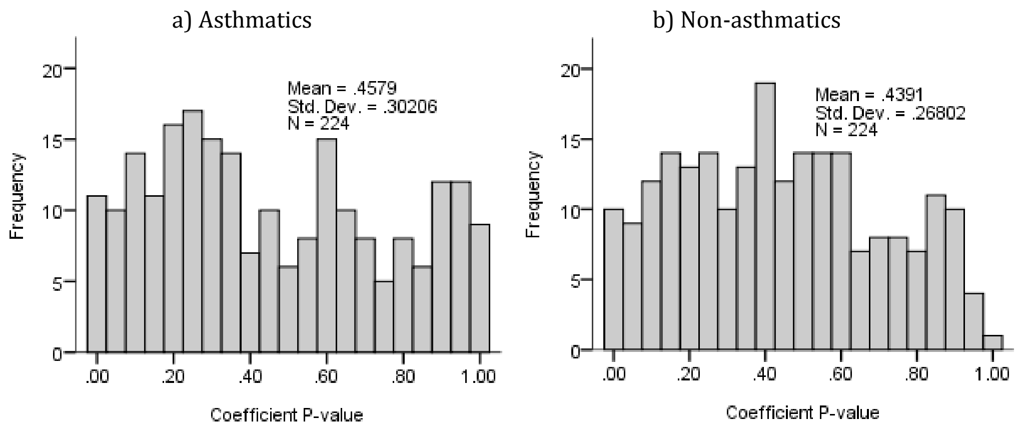


Figure F2. 47: Trent Region Emergency Counts - distribution of the regression point-estimate P-values a) Asthmatics and Non-asthmatics.

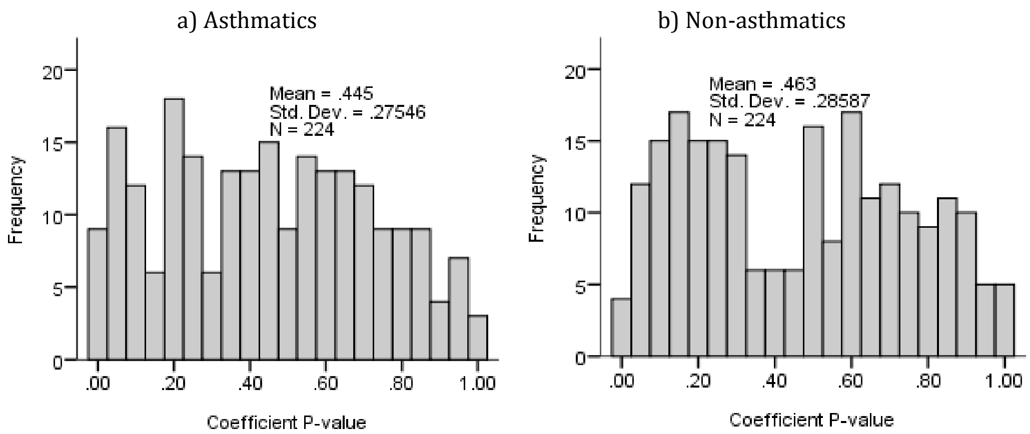


Figure F2. 48: Trent Region Out of Hours Counts - distribution of the regression point-estimate P-values a) Asthmatics and b) Non-asthmatics.

Figures F2.43 to F2.48 displays uniformed or slight positively skewed point-estimate mean P-values conjecturing weak or no associations between environmental exposures and daily counts. This was supported by Table F.35. Acute Visits asthmatics had the lowest point-estimate mean P-value.

Table F. 35: Trent Region - regression mean point-estimate P-value's distance from the null value (0.5) and difference between asthmatics and non-asthmatics.

Medical Contact	Asthmatics	0.5-Asthmatics	Non-asthmatics	0.5-Non-asthmatics	Difference between Asthmatics and Non-asthmatics
All Counts	0.50	0.00	0.48	0.02	0.02
Acute Visits	0.38	0.12	0.42	0.08	-0.05
Casualty Counts	0.41	0.09	0.39	0.11	0.02
Emergency Consultations	0.45	0.05	0.44	0.06	0.01
Emergency Counts	0.46	0.04	0.44	0.06	0.02
Out of Hours Counts	0.45	0.06	0.46	0.04	-0.02

Lag effects

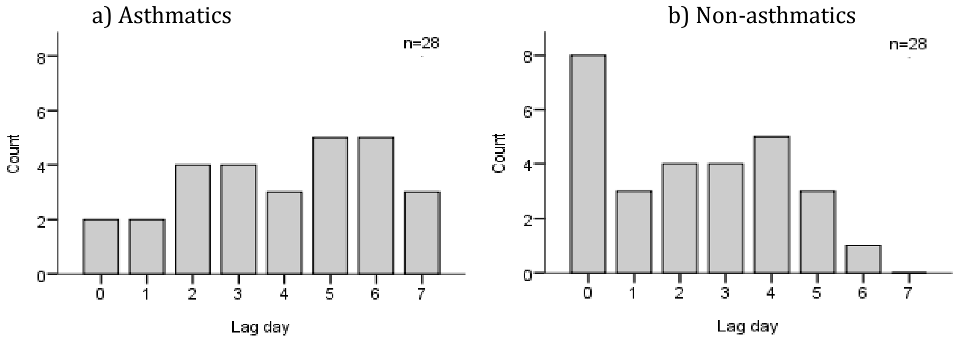


Figure F2. 49: Trent Region All Counts - number of the most significant regression point-estimates per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

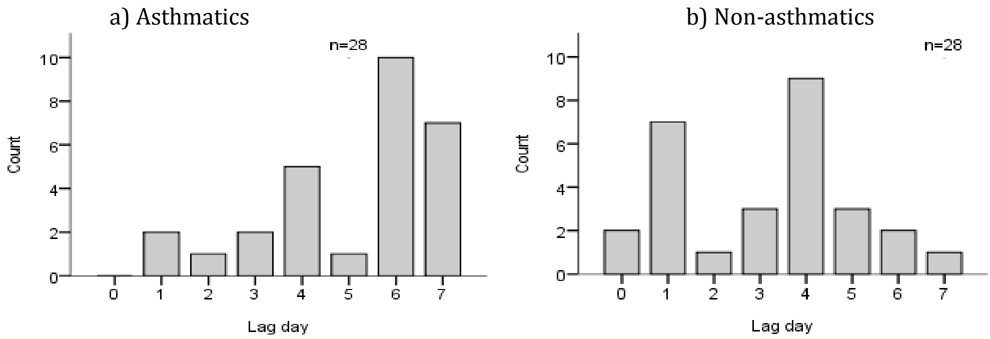


Figure F2. 50: Trent Region Acute Visits - number of the most significant regression point-estimates per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

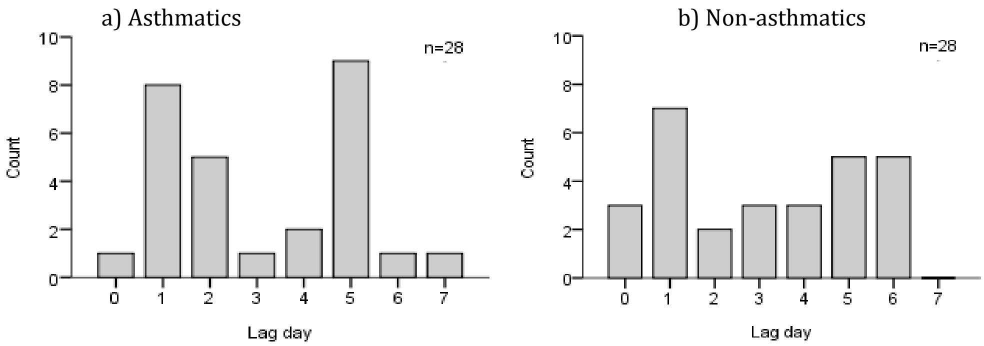


Figure F2. 51: Trent Region Casualty Counts - number of the most significant regression point-estimates per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

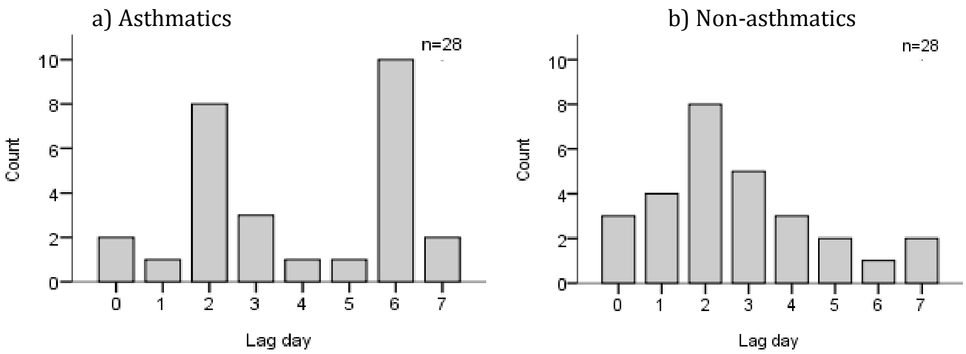


Figure F2. 52: Trent Region Emergency Consultations - number of the most significant regression point-estimates per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

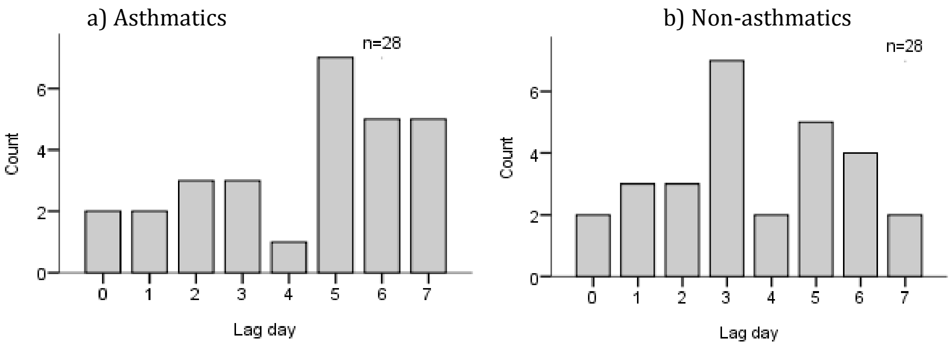


Figure F2. 53: Trent Region Emergency Counts - number of the most significant regression point-estimates per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

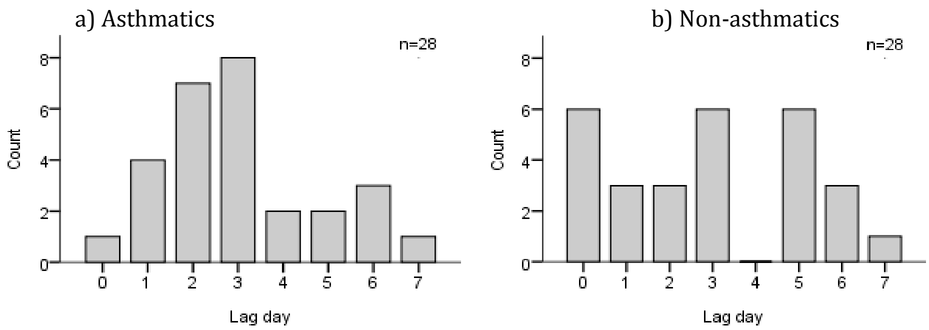


Figure F2. 54: Trent Region Out of Hours Counts - number of the most significant regression point-estimates per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

Figure F2.49 to F2.54 show no outstanding lag day whereby the highest number of most significant (per environmental exposure) point-estimates fall on. For All Counts, the highest number of most significant point-estimates fall on lag day five or six for asthmatics and current day for non-asthmatics.

F2.2.2. Trent Region Regressions Excess

Table F. 36: Trent Region - F-values (on 8 and 2163 degrees of freedom) and P-values from comparison of null model against model including each predictor lagged by 7 days, Excess.

Exposure			All Counts		Acute Visits		Casualty Counts		Emergency Consultations		Emergency Counts		Out of Hours Counts	
			F-value	P-value	F-value	P-value	F-value	P-value	F-value	P-value	F-value	P-value	F-value	P-value
Outdoor air pollutants	Min’	NO	1.22	0.282	1.75	0.082	1.39	0.198	0.27	0.975	0.54	0.828	1.17	0.315
		NO_2	0.97	0.457	0.25	0.982	0.86	0.552	0.96	0.468	0.61	0.769	1.32	0.230
		NOD	1.14	0.333	1.15	0.329	0.76	0.636	0.39	0.925	0.78	0.622	1.64	0.109
		SO_2	0.73	0.667	0.46	0.882	0.51	0.852	0.54	0.824	0.87	0.544	0.90	0.513
		PM_{10}	0.75	0.644	1.59	0.122	0.66	0.725	0.71	0.685	0.59	0.786	1.44	0.174
		O_3	0.29	0.969	1.70	0.095	0.52	0.841	0.71	0.685	0.56	0.808	0.75	0.652
		CO	0.89	0.521	1.10	0.359	1.06	0.387	0.44	0.900	0.17	0.995	0.79	0.611
	Mean	NO	1.43	0.177	1.44	0.174	0.21	0.989	0.68	0.706	0.48	0.868	0.36	0.942
		NO_2	0.47	0.876	1.62	0.114	1.27	0.255	0.26	0.977	0.54	0.826	0.37	0.934
		NOD	1.07	0.381	1.55	0.136	0.39	0.928	0.36	0.940	0.43	0.902	0.36	0.939
		SO_2	1.08	0.371	2.87	*0.004	0.52	0.845	0.38	0.930	1.21	0.289	0.60	0.776
		PM_{10}	0.56	0.813	2.84	*0.004	0.79	0.611	0.93	0.491	0.86	0.546	1.63	0.111
		O_3	0.51	0.848	1.25	0.266	1.31	0.232	0.40	0.919	2.06	*0.036	1.73	0.087
		CO	0.55	0.822	2.74	*0.005	0.55	0.821	0.29	0.969	0.27	0.976	0.30	0.965
	Max’	NO	0.51	0.849	0.95	0.471	0.25	0.980	0.37	0.939	1.01	0.429	0.66	0.727
		NO_2	0.44	0.901	1.17	0.310	0.91	0.504	0.56	0.812	0.95	0.476	0.79	0.613
		NOD	0.52	0.846	0.96	0.467	0.34	0.952	0.37	0.938	1.05	0.393	0.69	0.698
		SO_2	1.26	0.258	1.71	0.090	0.46	0.883	0.35	0.945	1.40	0.191	0.78	0.618
		PM_{10}	1.07	0.380	1.56	0.133	2.07	*0.036	1.01	0.423	0.90	0.515	1.01	0.428
		O_3	0.56	0.809	0.97	0.454	0.99	0.440	0.71	0.681	1.94	*0.050	2.89	**0.003
		CO	0.78	0.617	1.16	0.318	0.45	0.892	0.77	0.633	0.58	0.798	0.21	0.989
Weather	Min’	Temperature	0.35	0.947	0.89	0.520	0.88	0.529	0.80	0.605	0.50	0.860	0.50	0.856
	Max’	Temperature	1.20	0.292	0.69	0.702	0.44	0.896	2.39	*0.015	1.42	0.182	1.24	0.273
		Sun	0.81	0.597	0.73	0.665	1.00	0.436	0.54	0.829	0.90	0.518	0.49	0.865
		Rain	0.47	0.877	0.49	0.866	2.18	**0.026	1.92	0.052	2.27	**0.021	0.87	0.543
		Pressure	0.86	0.547	2.90	**0.003	0.45	0.894	1.42	0.183	1.31	0.236	1.62	0.114
		Wind speed	0.14	0.997	1.18	0.308	0.46	0.883	0.87	0.540	0.52	0.842	0.73	0.668
Pollen		Grass	1.75	*0.082	0.45	0.890	0.66	0.723	0.50	0.856	0.43	0.905	0.74	0.652
Total number of statistically significant models				0		4		2		1		3		1

** Most significant P-value out of 28 triggers.

* Statistically significant trigger.

For All Counts Excess, no environmental exposure improved the fit of the data compared to the null model.

Point-estimate statistics

Table F. 37: Trent Region - point-estimate descriptive statistics (n=224), Excess.

Statistic	All Counts	Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours Counts
Mean	0.01	0.01	0.01	0.01	0.01	-0.01
Median	0.00	0.00	0.00	0.00	0.00	0.00
Minimum	-11.30	-8.41	-8.88	-4.78	-3.58	-8.10
Maximum	6.19	12.82	7.87	4.74	5.64	5.85

Table F. 38: Trent Region - number of statistically significant autoregressive point-estimates per environmental exposure (n=8), Excess.

Exposure			All Counts	Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours counts
Outdoor air pollutants	**Min'**	**NO**	0	3	2	0	0	2
		NO_2	1	0	0	0	0	1
		NOD	2	1	0	0	1	2
		SO_2	1	0	0	0	1	0
		PM_{10}	0	1	0	0	0	2
		O_3	0	1	0	0	0	0
		CO	1	1	2	0	0	0
	Mean	**NO**	0	2	0	0	0	0
		NO_2	0	2	2	0	0	0
		NOD	0	3	0	0	0	0
		SO_2	1	3	0	1	2	0
		PM_{10}	0	4	0	1	1	2
		O_3	0	1	2	0	6	3
		CO	0	2	0	0	0	0
	Max'	**NO**	0	1	0	0	0	0
		NO_2	0	0	2	0	1	0
		NOD	0	1	0	0	0	0
		SO_2	1	2	1	0	2	1
		PM_{10}	1	2	3	0	1	1
		O_3	0	0	0	0	3	3
		CO	0	0	0	1	0	0
Weather	**Min'**	**Temperature**	0	0	1	1	0	0
	Max'	**Temperature**	2	1	0	4	2	2
		Sun	0	1	0	0	0	0
		Rain	0	0	3	1	2	1
		Pressure	1	4	0	2	1	1
		Wind speed	0	1	0	0	0	0
Pollen		**Grass**	2	0	0	0	0	0
Total			13	37	18	11	23	21
Mean			0.46	1.32	0.64	0.39	0.82	0.75

Model P-value distributions

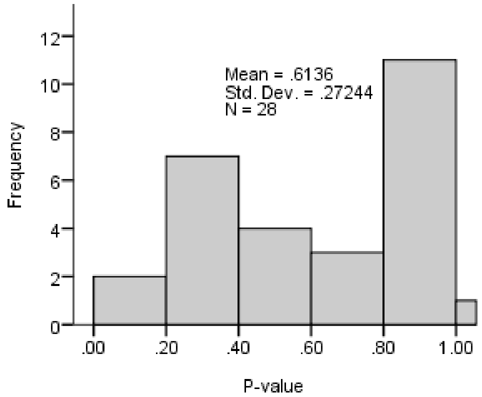


Figure F2. 55: Trent Region All Counts - distribution of F-test P-values, Excess.

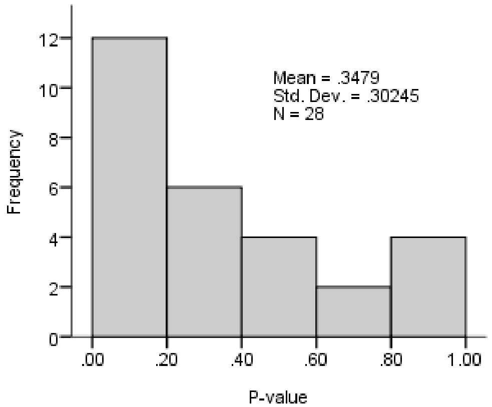


Figure F2. 56: Trent Region Acute Visits - distribution of F-test P-values, Excess.

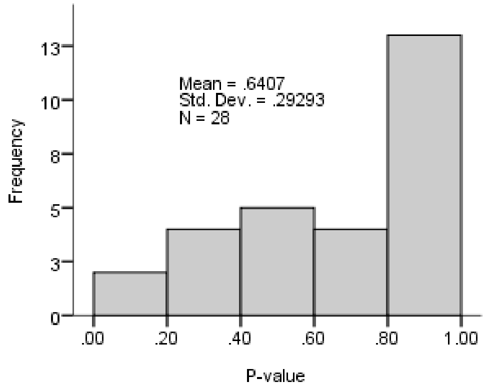


Figure F2. 57: Trent Region Casualty Counts - distribution of F-test P-values, Excess.

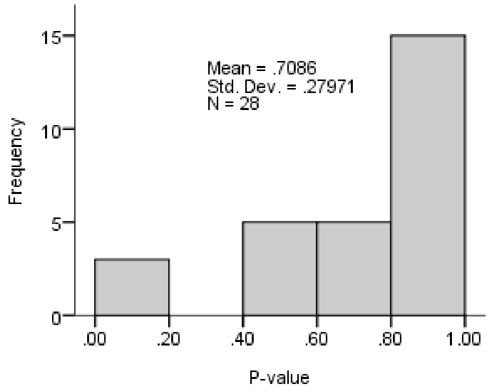


Figure F2. 58: Trent Region Emergency Consultations - distribution of F-test P-values, Excess.

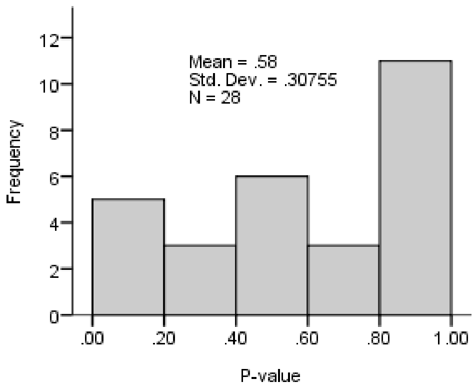


Figure F2. 59: Trent Region Emergency Counts - distribution of F-test P-values, Excess.

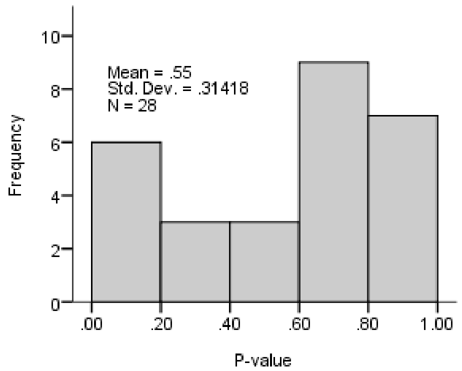


Figure F2. 60: Trent Region Out of Hours Counts - distribution of F-test P-values, Excess.

F-test P-values from the overall model for all medical contacts excess (bar Acute Visits) exhibit uniformed or slight negative distributions. This implies not overall association between daily environmental exposures and daily counts. Only Acute Visits excess had an F-test mean P-value less than that set by the null value (see Table F.39).

Table F. 39: Trent Region – Mean F-test P-value's distance from the null value (0.5), Excess.

Medical Contact	Excess	0.5-Excess
All Counts	0.61	-0.11
Acute Visits	0.35	0.15
Casualty Counts	0.64	-0.14
Emergency Consultations	0.71	-0.21
Emergency Counts	0.58	-0.08
Out of Hours Counts	0.55	-0.05

Point-estimate P-values distributions

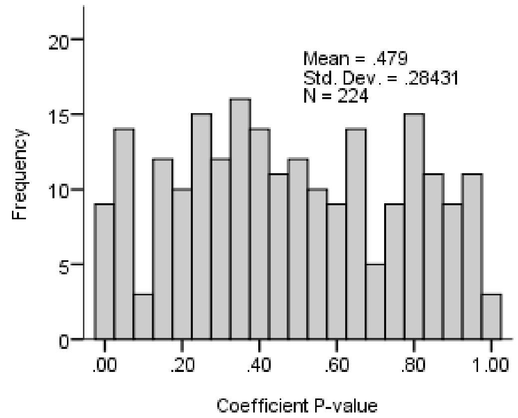


Figure F2. 61: Trent Region All Counts - distribution of the regression point-estimate P-values, Excess.

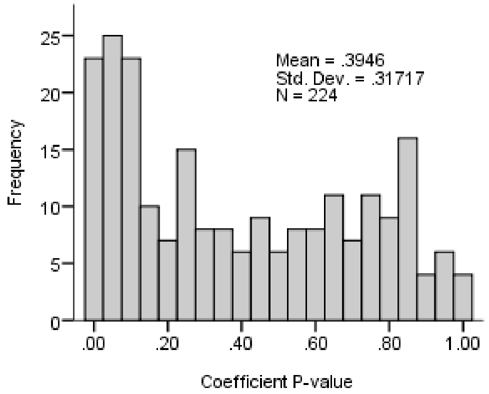


Figure F2. 62: Trent Region Acute Visits - distribution of the regression point-estimate P-values, Excess.

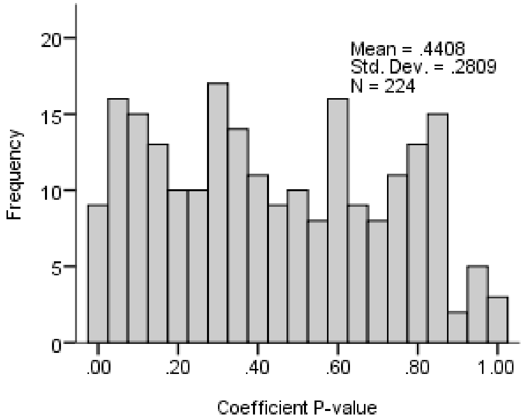


Figure F2. 63: Trent Region Casualty Counts - distribution of the regression point-estimate P-values, Excess.

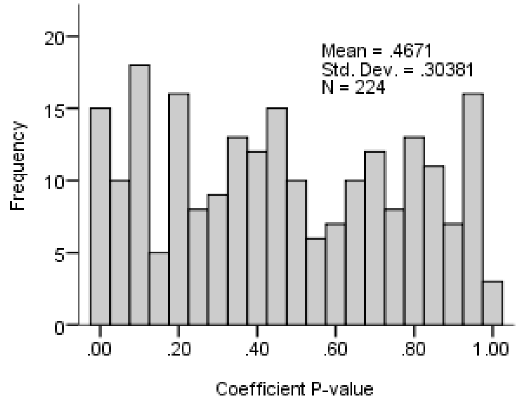


Figure F2. 64: Trent Region Emergency Consultations - distribution of the regression point-estimate P-values, Excess.

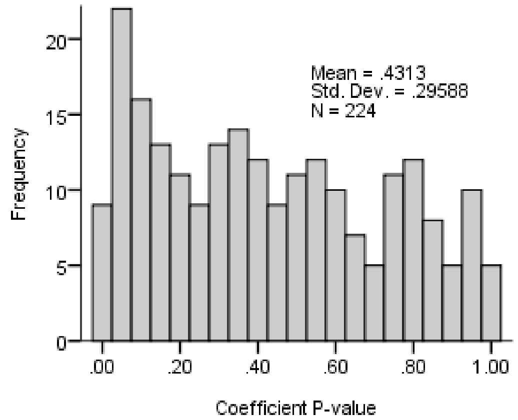


Figure F2. 65: Trent Region Emergency Counts - distribution of the regression point-estimate P-values, Excess.

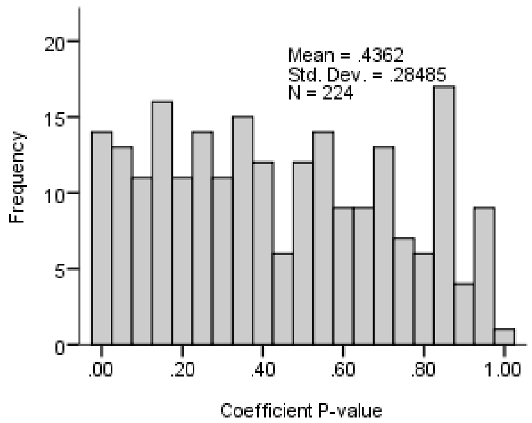


Figure F2. 66: Trent Region Out of Hours Counts - distribution of the regression point-estimate P-values, Excess.

With exception to Acute Visits, the point-estimate P-values from other medical contacts display a uniform or weak positively distribution inferring a weak or non-significant association between exposures and daily counts.

Table F. 40: Trent Region - regression mean point-estimate P-value's distance from the null value (0.5), Excess.

Medical Contact	Excess	0.5-Excess
All Counts	0.48	0.02
Acute Visits	0.39	0.11
Casualty Counts	0.44	0.06
Emergency Consultations	0.47	0.03
Emergency Counts	0.43	0.07
Out of Hours Counts	0.44	0.06

Lag effects

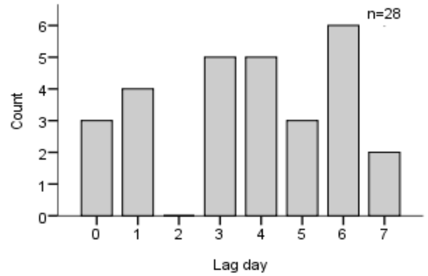


Figure F2. 67: Trent Region All Counts - number of the most significant regression point-estimates per environmental exposure by lag day, Excess.

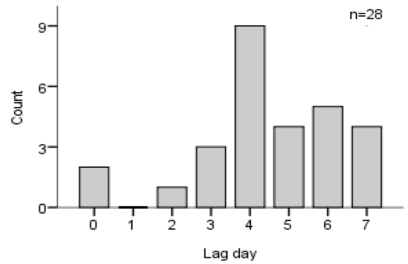


Figure F2. 68: Trent Region Acute Visits - number of the most significant regression point-estimates per environmental exposure by lag day, Excess.

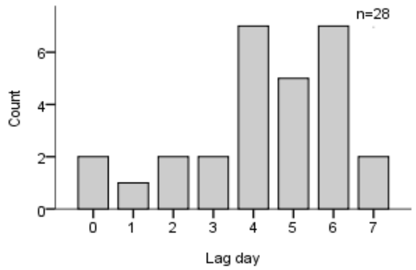


Figure F2. 69: Trent Region Casualty Counts - number of the most significant regression point-estimates per environmental exposure by lag day, Excess.

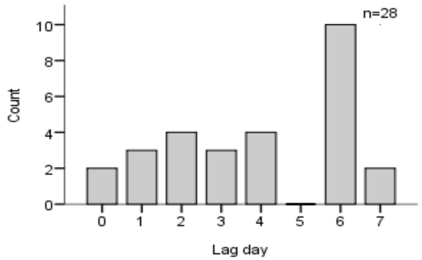


Figure F2. 70: Trent Region Emergency Consultations - number of the most significant regression point-estimates per environmental exposure by lag day, Excess.

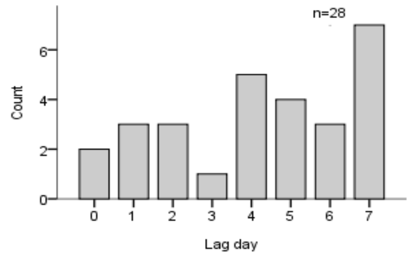


Figure F2. 71: Trent Region Emergency Counts - number of the most significant regression point-estimates per environmental exposure by lag day, Excess.

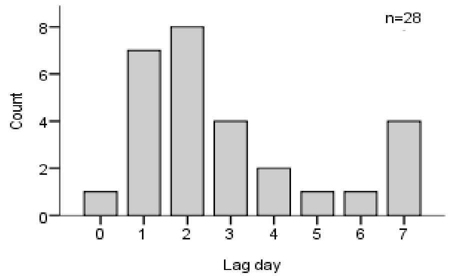


Figure F2. 72: Trent Region Out of Hours Counts - number of the most significant regression point-estimates per environmental exposure by lag day, Excess.

There was no outstanding lag day that the highest numbers of most significant point-estimates (per environmental exposure) cluster on. For All Counts Excess, the highest numbers of most significant point-estimates fall on lag day six.

F2.3. Scotland Multiple Regressions

F2.3.1. Scotland Regressions Asthmatics and Non-asthmatics

Table F. 41: Scotland - F-values (on 8 and 2163 degrees of freedom) and P-values from comparison of null model against model including each predictor lagged by 7 days a) Asthmatics and b) Non-asthmatics.

a) Asthmatics			All Counts		Acute Visits		Casualty Counts		Emergency Consultations		Emergency Counts		Out of Hours Counts	
Exposure			F-value	P-value	F-value	P-value	F-value	P-value	F-value	P-value	F-value	P-value	F-value	P-value
Outdoor air pollutants	Min'	NO	0.73	0.669	0.76	0.638	0.87	0.538	0.37	0.938	1.24	0.272	0.64	0.743
		NO_2	0.76	0.641	0.34	0.950	0.90	0.518	1.10	0.359	0.43	0.903	0.94	0.481
		NOD	1.18	0.306	0.17	0.995	1.94	*0.050	0.62	0.764	1.01	0.423	0.60	0.777
		SO_2	0.64	0.743	0.66	0.727	0.47	0.876	0.42	0.910	0.28	0.973	0.31	0.964
		PM_{10}	0.44	0.899	0.47	0.881	1.59	0.123	0.97	0.461	1.27	0.257	0.71	0.684
		O_3	0.57	0.802	0.64	0.741	1.68	0.098	0.30	0.967	0.40	0.919	0.51	0.852
		CO	0.65	0.734	0.42	0.908	1.49	0.155	0.52	0.839	0.56	0.814	0.53	0.833
	Mean	NO	0.73	0.668	0.59	0.783	0.81	0.590	1.60	0.119	0.57	0.805	0.97	0.456
		NO_2	0.46	0.887	0.10	0.999	0.82	0.588	0.86	0.548	0.44	0.897	1.74	0.084
		NOD	0.74	0.659	0.55	0.818	1.03	0.411	0.79	0.611	0.21	0.989	0.86	0.553
		SO_2	0.89	0.528	0.78	0.624	0.65	0.738	0.30	0.967	0.91	0.505	0.50	0.856
		PM_{10}	2.07	**0.035	0.93	0.490	0.82	0.588	1.41	0.188	1.35	0.213	1.14	0.335
		O_3	0.65	0.737	0.75	0.651	1.97	**0.046	0.47	0.881	0.80	0.602	0.83	0.579
		CO	0.23	0.984	1.42	0.181	1.04	0.401	1.23	0.274	0.51	0.852	1.82	0.069
	Max'	NO	0.78	0.619	0.60	0.774	0.78	0.617	1.25	0.263	0.79	0.614	2.27	*0.021
		NO_2	0.56	0.809	0.28	0.972	0.70	0.688	0.93	0.493	0.85	0.563	1.97	*0.047
		NOD	0.51	0.853	0.91	0.505	1.28	0.247	0.72	0.674	0.71	0.683	2.19	*0.025
		SO_2	0.55	0.818	0.91	0.508	0.50	0.857	0.77	0.632	0.68	0.712	0.36	0.940
		PM_{10}	0.40	0.923	0.86	0.548	0.50	0.860	1.78	0.077	1.52	0.146	1.33	0.226
		O_3	0.92	0.501	0.80	0.600	1.05	0.398	0.89	0.520	0.66	0.731	0.80	0.603
		CO	0.53	0.837	1.49	0.155	0.86	0.551	0.93	0.490	0.44	0.897	1.52	0.144
Weather	Min'	Temperature	1.39	0.197	0.63	0.755	0.67	0.717	1.87	0.060	0.84	0.565	0.67	0.717
	Max'	Temperature	0.69	0.697	0.85	0.559	0.38	0.932	0.89	0.524	1.09	0.367	2.28	*0.020
		Sun	0.19	0.992	0.60	0.778	0.58	0.797	0.36	0.941	0.32	0.959	0.78	0.616
		Rain	0.96	0.464	1.76	0.081	0.44	0.896	0.51	0.847	1.03	0.414	0.85	0.558
		Pressure	0.28	0.973	1.16	0.323	0.97	0.461	2.05	**0.037	0.56	0.810	1.02	0.420
		Wind speed	0.82	0.587	1.21	0.288	0.91	0.509	0.56	0.810	0.63	0.750	0.45	0.890
Pollen		Grass	0.74	0.657	0.50	0.855	0.58	0.795	0.91	0.505	2.65	**0.007	3.59	**<0.001
		Birch	1.34	0.219	0.20	0.991	0.73	0.661	1.51	0.149	1.02	0.420	0.94	0.482
		Oak	0.55	0.820	0.63	0.750	1.02	0.415	1.56	0.131	1.59	0.123	0.84	0.567
		Nettle	0.17	0.995	1.17	0.312	0.81	0.590	0.42	0.908	0.93	0.486	1.61	0.118
Total number of statistically significant models				1		0		2		1		1		5

Table F.50 continued

b) Non-asthmatics			All Counts		Acute Visits		Casualty Counts		Emergency Consultations		Emergency Counts		Out of Hours Counts	
Exposure			F-value	P-value	F-value	P-value	F-value	P-value	F-value	P-value	F-value	P-value	F-value	P-value
Outdoor air pollutants	Min’	NO	0.29	0.971	0.45	0.891	1.49	0.157	2.42	**0.013	1.31	0.232	1.36	0.208
		NO_2	0.63	0.751	0.76	0.638	1.62	0.115	1.45	0.169	0.96	0.462	1.02	0.418
		NOD	1.29	0.243	1.09	0.369	0.48	0.873	1.57	0.127	0.80	0.599	1.25	0.267
		SO_2	2.22	**0.024	0.48	0.869	0.27	0.976	0.33	0.956	0.72	0.672	1.12	0.346
		PM_{10}	0.96	0.468	1.37	0.203	1.12	0.348	0.82	0.585	1.02	0.418	0.86	0.547
		O_3	1.31	0.232	1.15	0.324	0.90	0.515	0.55	0.817	0.75	0.643	1.20	0.295
		CO	0.31	0.961	1.04	0.401	0.83	0.574	0.67	0.718	1.05	0.396	1.22	0.283
	Mean	NO	0.51	0.847	3.97	**<0.001	1.43	0.178	0.45	0.893	1.08	0.372	1.16	0.319
		NO_2	1.18	0.308	1.76	0.081	1.34	0.217	0.70	0.689	1.13	0.341	0.75	0.643
		NOD	0.82	0.587	3.64	*<0.001	1.09	0.370	0.32	0.957	0.69	0.700	0.89	0.522
		SO_2	1.81	0.071	0.94	0.482	0.59	0.789	0.69	0.699	1.04	0.402	0.75	0.644
		PM_{10}	1.02	0.415	1.89	0.058	1.06	0.388	0.77	0.627	0.30	0.967	0.45	0.893
		O_3	0.76	0.635	1.10	0.360	0.26	0.980	1.22	0.282	0.62	0.764	1.26	0.258
		CO	0.20	0.991	3.60	<0.001	1.66	0.104	0.11	0.999	1.00	0.433	1.05	0.395
	Max’	NO	1.08	0.373	1.89	0.058	1.67	0.102	0.49	0.866	0.98	0.448	1.21	0.291
		NO_2	1.48	0.161	0.98	0.447	0.73	0.665	0.25	0.981	0.41	0.917	0.42	0.908
		NOD	1.38	0.200	2.12	*0.031	1.82	0.069	0.68	0.713	0.65	0.738	1.43	0.179
		SO_2	2.17	*0.027	0.96	0.465	0.76	0.634	0.82	0.583	0.91	0.508	0.70	0.695
		PM_{10}	1.47	0.163	1.08	0.376	1.60	0.121	1.14	0.331	0.56	0.807	0.68	0.709
		O_3	0.34	0.952	1.31	0.233	0.69	0.699	1.47	0.162	1.13	0.338	1.59	0.123
		CO	1.13	0.340	3.20	*0.001	2.62	**0.008	0.49	0.862	2.02	**0.041	2.62	**0.007
Weather	Min’	Temperature	0.64	0.743	0.41	0.915	0.92	0.501	1.34	0.218	0.79	0.612	0.35	0.945
	Max’	Temperature	0.75	0.646	1.14	0.335	0.59	0.789	0.55	0.815	0.49	0.867	0.71	0.680
		Sun	1.83	0.067	0.71	0.687	2.03	*0.039	0.53	0.836	1.94	0.051	1.07	0.382
		Rain	1.09	0.369	0.48	0.871	0.60	0.778	0.75	0.645	0.65	0.733	0.85	0.563
		Pressure	1.91	0.055	1.47	0.162	1.18	0.308	0.62	0.764	1.20	0.294	1.94	0.051
		Wind speed	1.58	0.126	0.54	0.824	0.37	0.938	0.84	0.568	0.63	0.754	0.44	0.895
Pollen		Grass	0.50	0.858	1.20	0.297	0.63	0.751	0.56	0.811	0.73	0.669	0.75	0.647
		Birch	0.21	0.990	0.35	0.944	0.30	0.967	0.60	0.778	0.56	0.814	0.53	0.835
		Oak	1.07	0.384	0.97	0.458	1.09	0.365	1.95	*0.049	1.86	0.062	0.79	0.609
		Nettle	0.28	0.972	1.75	0.082	0.49	0.863	0.44	0.895	0.75	0.645	0.69	0.702
Total number of statistically significant models				1		5		2		2		1		1

** Most significant P-value out of 31 triggers.

* Statistically significant trigger.

For All Count asthmatics and non-asthmatics, only one model statistically improved the fit of the data compared to the null model.

Point-estimate statistics

Table F. 42: Scotland - point-estimate descriptive statistics (n=248), asthmatics and non-asthmatics.

Asthmatics or Non-asthmatics	Statistic	All Counts	Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours Counts
Asthmatics	**Mean**	0.00	-0.02	0.02	-0.01	-0.01	0.00
	Median	0.00	0.00	0.00	0.00	0.00	0.00
	Minimum	-6.82	-3.22	-8.29	-7.25	-6.88	-4.04
	Maximum	3.37	3.83	10.12	6.38	4.15	3.40
Non-asthmatics	**Mean**	-0.01	-0.02	0.03	-0.02	0.00	0.00
	Median	0.00	0.00	0.00	0.00	0.00	0.00
	Minimum	-2.49	-7.57	-10.72	-6.93	-7.10	-5.55
	Maximum	3.18	6.88	7.26	6.32	6.47	4.83

Table F. 43: Scotland - number of statistically significant autoregressive point-estimates per environmental exposure (n=8), a) Asthmatics and b) Non-asthmatics.

a) Asthmatics Exposure			All Counts	Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours Counts
Outdoor air pollutants	Min’	**NO**	0	1	1	0	2	0
		NO_2	1	0	1	0	0	0
		NOD	1	0	3	0	1	0
		SO_2	0	0	0	0	0	0
		PM_{10}	0	0	1	0	1	0
		O_3	0	0	1	0	0	0
		CO	0	0	0	0	0	0
	Mean	**NO**	0	0	1	2	1	0
		NO_2	0	0	1	0	0	3
		NOD	0	0	0	0	0	0
		SO_2	1	0	1	0	1	0
		PM_{10}	2	1	0	1	1	2
		O_3	0	0	1	0	0	1
		CO	0	0	0	2	0	2
	Max’	**NO**	1	0	0	1	1	3
		NO_2	0	0	0	0	0	2
		NOD	0	0	1	0	0	3
		SO_2	0	0	1	0	0	0
		PM_{10}	0	0	0	3	2	1
		O_3	0	0	1	0	0	1
		CO	0	0	1	0	0	2
Weather	Min’	**Temperature**	2	0	1	2	1	1
	Max’	**Temperature**	0	1	0	0	1	4
		Sun	0	0	0	0	0	0
		Rain	1	2	0	0	0	0
		Pressure	0	3	0	3	0	0
		Wind speed	0	2	0	0	0	0
Pollen		**Grass**	0	0	0	2	2	3
		Birch	3	0	1	1	2	3
		Oak	2	0	1	5	2	1
		Nettle	0	0	1	0	1	1
Total			14	10	19	22	19	33
Mean			0.45	0.32	0.61	0.71	0.61	1.06

Table F. 43 continued:

b) Non-asthmatics	Exposure		All Counts	Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours Counts
Outdoor air pollutants	Min'	NO	0	0	2	3	2	1
		NO_2	1	0	3	1	0	0
		NOD	0	1	0	1	0	1
		SO_2	1	0	0	0	1	1
		PM_{10}	1	3	1	1	1	0
		O_3	2	0	0	0	0	2
		CO	0	0	1	0	0	0
	Mean	NO	0	1	1	0	1	0
		NO_2	1	1	2	0	1	0
		NOD	0	2	1	0	0	0
		SO_2	1	1	0	0	0	0
		PM_{10}	1	3	2	1	0	0
		O_3	1	0	0	0	0	2
		CO	0	2	2	0	1	1
	Max'	NO	2	0	2	0	1	0
		NO_2	1	1	0	0	0	0
		NOD	1	2	2	0	0	2
		SO_2	2	1	0	1	0	0
		PM_{10}	2	0	3	0	0	0
		O_3	0	1	0	1	0	2
		CO	2	1	4	0	2	2
Weather	Min'	Temperature	0	0	0	2	0	0
	Max'	Temperature	0	0	0	0	0	0
		Sun	3	0	2	0	2	1
		Rain	0	0	0	1	0	0
		Pressure	2	1	2	0	1	2
		Wind speed	2	0	0	0	0	0
Pollen		Grass	0	1	0	0	1	2
		Birch	0	1	0	0	0	0
		Oak	1	2	0	2	1	1
		Nettle	0	1	0	0	1	2
Total			27	26	30	14	16	22
Mean			0.87	0.84	0.97	0.45	0.52	0.71

Out of Hours Counts asthmatics and Casualty counts non-asthmatics had the highest total number of statistically significant point-estimates out of all medical contacts. Birch (asthmatics) and CO maximum (non-asthmatics) had the highest number of statistically significant point-estimates.

Model P-value distributions

a) Asthmatics b) Non-asthmatics

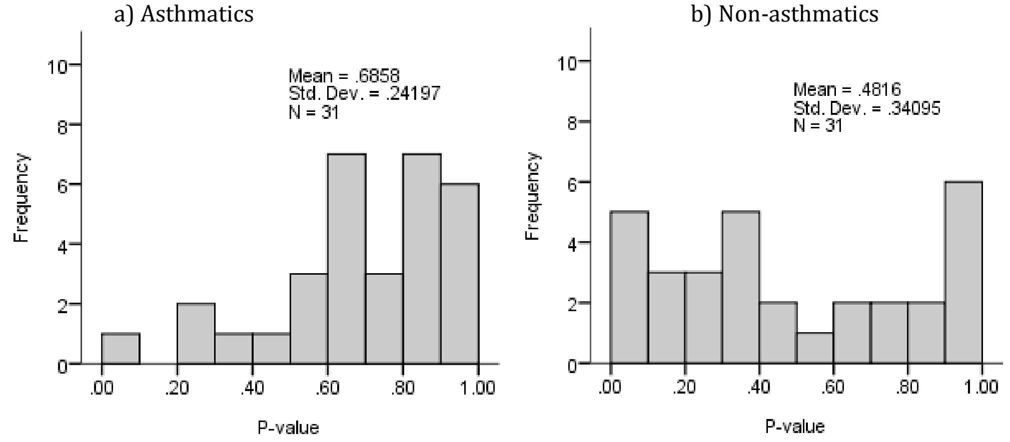


Figure F2. 73: Scotland All Counts - distribution of F-test P-values a) Asthmatics and b) Non-asthmatics.

a) Asthmatics b) Non-asthmatics

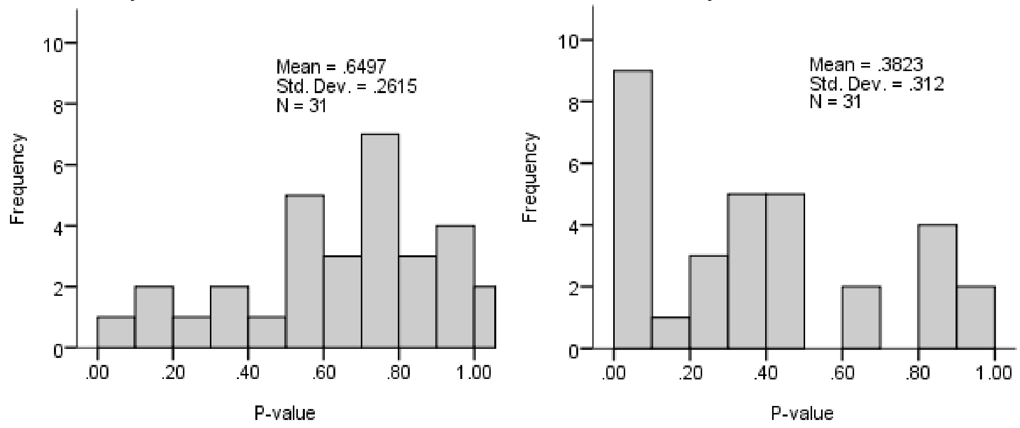


Figure F2. 74: Scotland Acute Visits - distribution of F-test P-values a) Asthmatics and b) Non-asthmatics.

a) Asthmatics b) Non-asthmatics

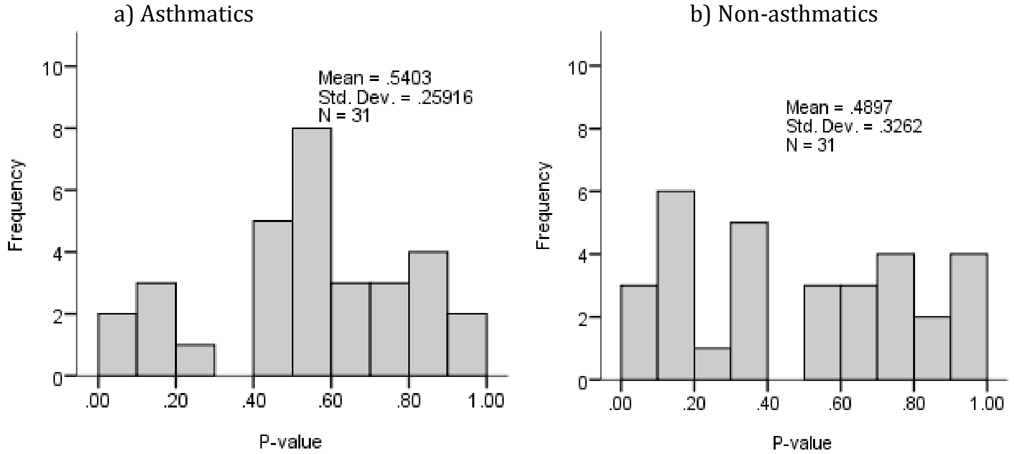


Figure F2. 75: Scotland Casualty Counts - distribution of F-test P-values a) Asthmatics and b) Non-asthmatics.

a) Asthmatics b) Non-asthmatics

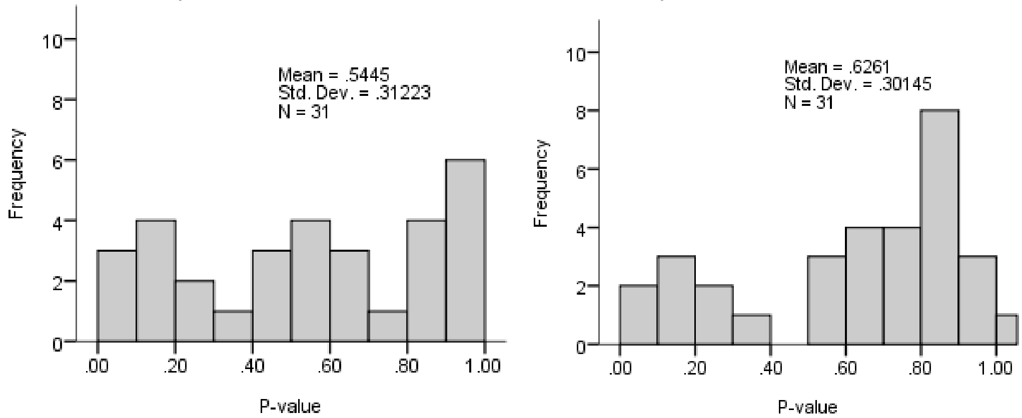


Figure F2. 76: Scotland Emergency Consultations - distribution of F-test P-values a) Asthmatics and b) Non-asthmatics.

a) Asthmatics b) Non-asthmatics

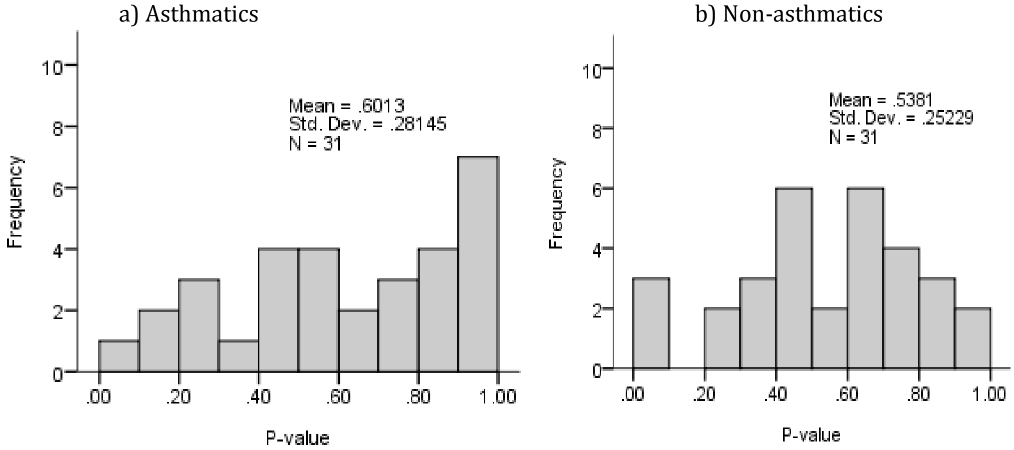


Figure F2. 77: Scotland Emergency Counts - distribution of F-test P-values a) Asthmatics and Non-asthmatics.

a) Asthmatics b) Non-asthmatics

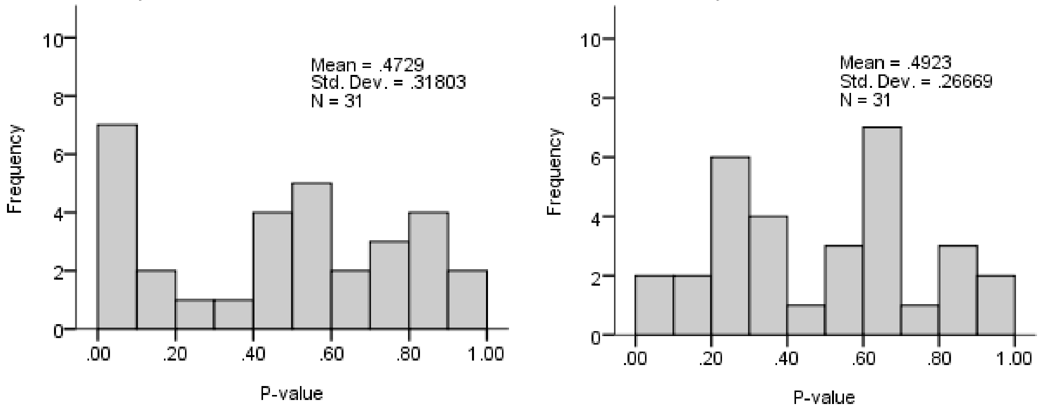


Figure F2. 78: Scotland Out of Hours Counts - distribution of F-test P-values a) Asthmatics and b) Non-asthmatics.

All medical contacts asthmatics and non-asthmatics display uniformed or slight negatively skewed distributions inferring no associations between environmental exposures and daily counts of medical contact.

Asthmatics had lower mean F-test P-values than non-asthmatics in two of the six medical contacts (Emergency Consultations, Out of Hours Counts). Yet more than half of the mean P-values were above the null value set at 0.5.

Table F. 44: Scotland - Mean F-test P-value's distance from the null value (0.5) and difference between asthmatics and non-asthmatics.

Medical Contact	Asthmatics	0.5-Asthmatics	Non-asthmatics	0.5-Non-asthmatics	Difference between Asthmatics-Non-asthmatics
All Counts	0.69	-0.19	0.48	0.02	0.20
Acute Visits	0.65	-0.15	0.38	0.12	0.27
Casualty Counts	0.54	-0.04	0.49	0.01	0.05
Emergency Consultations	0.54	-0.04	0.63	-0.13	-0.08
Emergency Counts	0.60	-0.10	0.54	-0.04	0.06
Out of Hours Counts	0.47	0.03	0.49	0.01	-0.02

Point-estimate P-value distributions

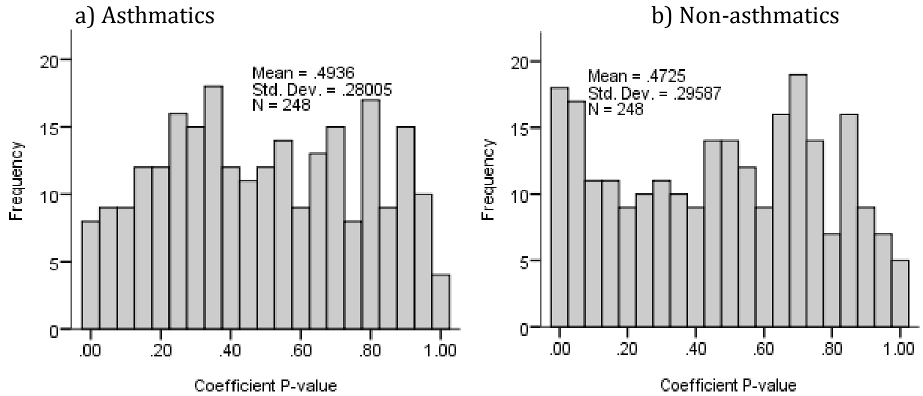


Figure F2. 79: Scotland All Counts - distribution of the regression point-estimate P-values a) Asthmatics and b) Non-asthmatics.

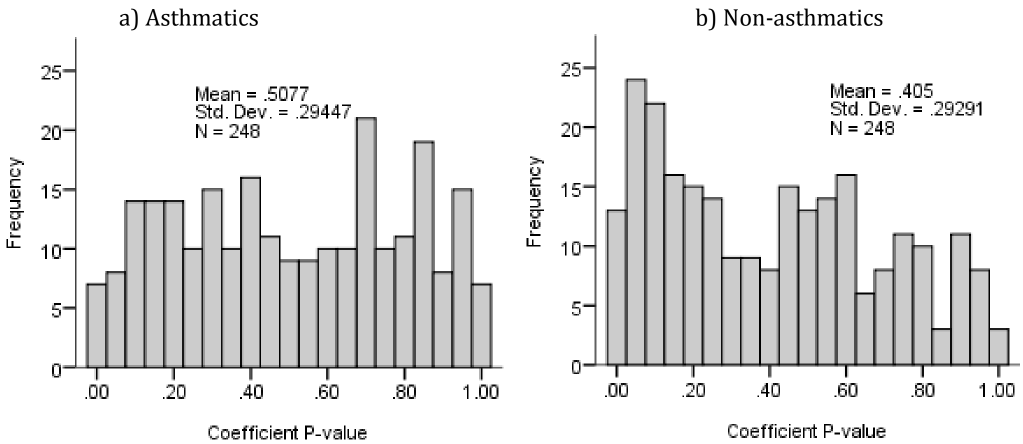


Figure F2. 80: Scotland Acute Visits - distribution of the regression point-estimate P-values a) Asthmatics and b) Non-asthmatics.

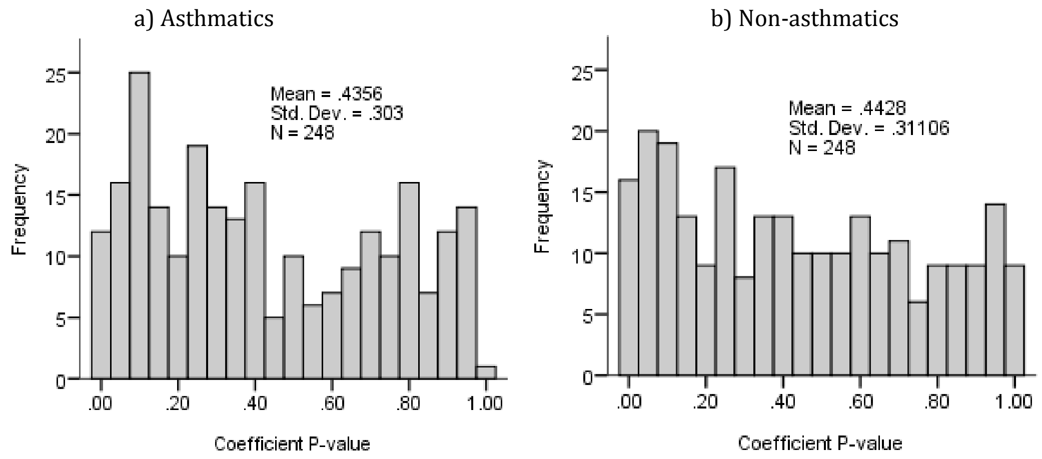


Figure F2. 81: Scotland Casualty Counts - distribution of the regression point-estimate P-values a) Asthmatics and b) Non-asthmatics.

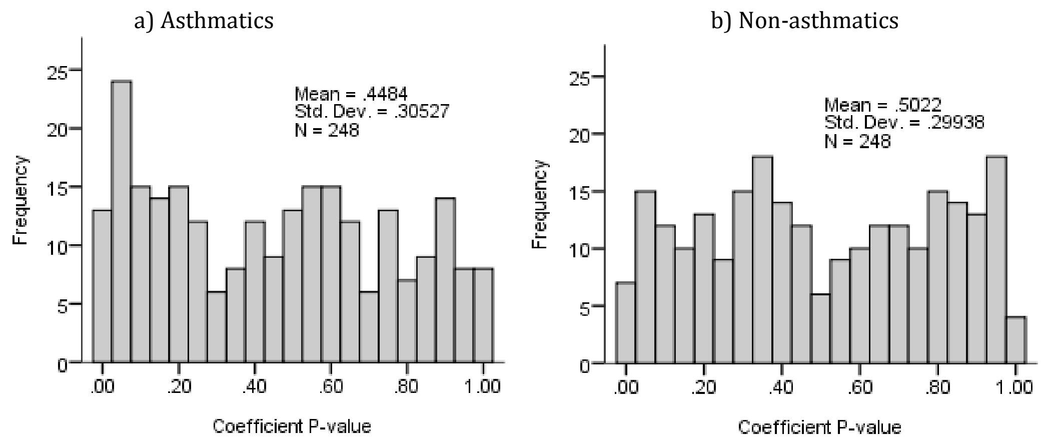


Figure F2. 82: Scotland Emergency Consultations - distribution of the regression point-estimate P-values a) Asthmatics and b) Non-asthmatics.

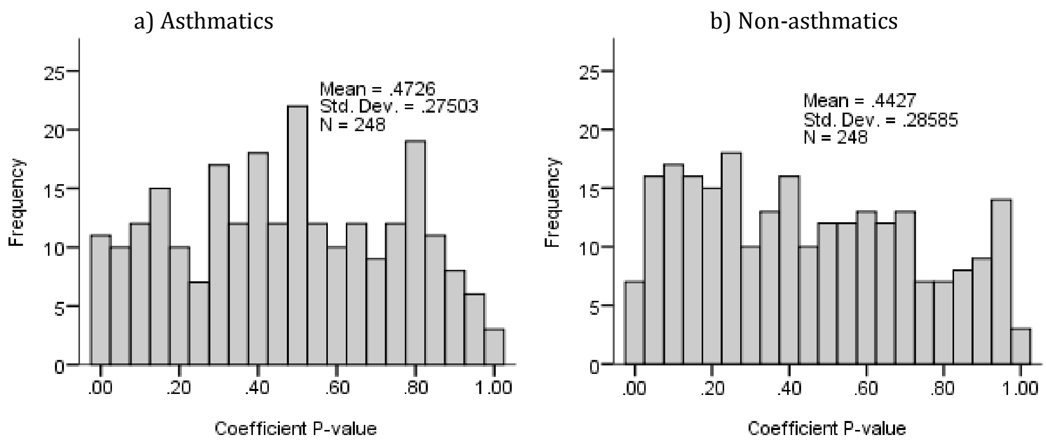


Figure F2. 83: Scotland Emergency Counts - distribution of the regression point-estimate P-values a) Asthmatics and b) Non-asthmatics.

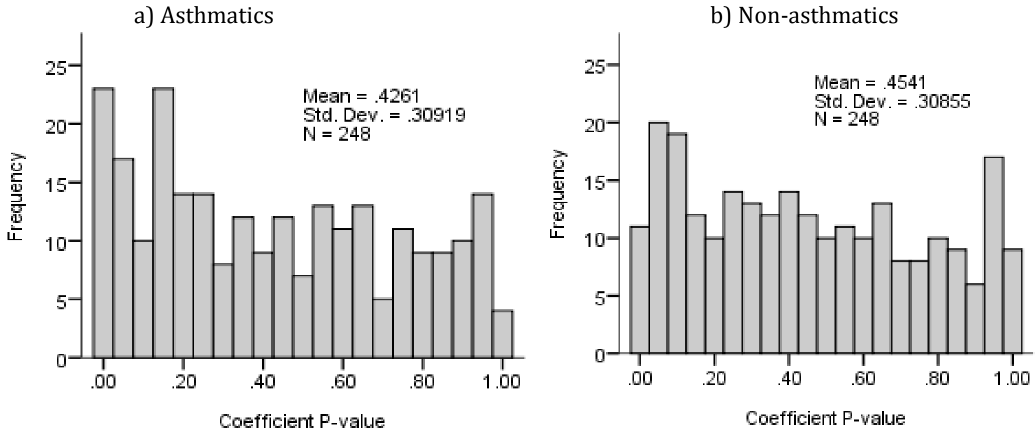


Figure F2. 84: Scotland Out of Hours Counts - distribution of the regression point-estimate P-values a) Asthmatics and b) Non-asthmatics.

The majority of the point-estimate P-value distributions for Scotland's medical contacts exhibit uniform or slight negative distributions inferring weak or no link between environmental triggers and daily counts of medical contact This was supported by Table F.45.

Table F. 45: Scotland – regression mean point-estimate P-value's distance from the null value (n=8), difference between asthmatics and non-asthmatics.

Medical Contact	Asthmatics	0.5-Asthmatics	Non-asthmatics	0.5-Non-asthmatics	Difference between Asthmatics-Non-asthmatics
All Counts	0.49	0.01	0.47	0.03	0.02
Acute Visits	0.51	-0.01	0.41	0.10	0.10
Casualty Counts	0.44	0.06	0.44	0.06	-0.01
Emergency Consultations	0.45	0.05	0.50	0.00	-0.05
Emergency Counts	0.47	0.03	0.44	0.06	0.03
Out of Hours Counts	0.43	0.07	0.45	0.05	-0.03

Lag effects

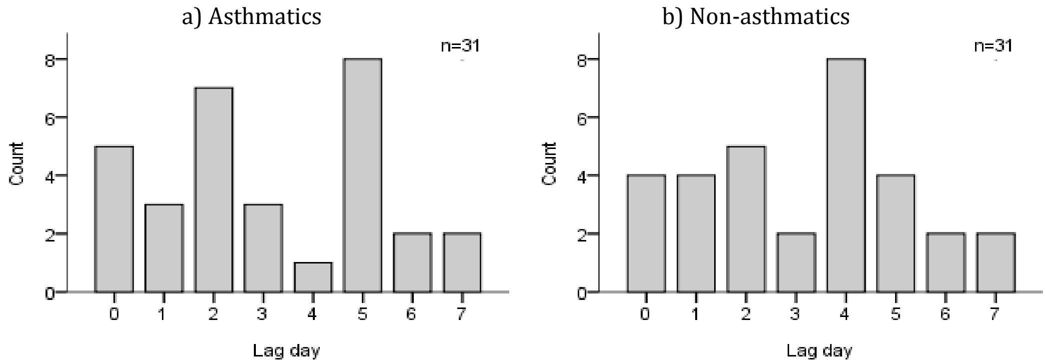


Figure F2. 85: Scotland All Counts - number of the most significant autoregressive point-estimates per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

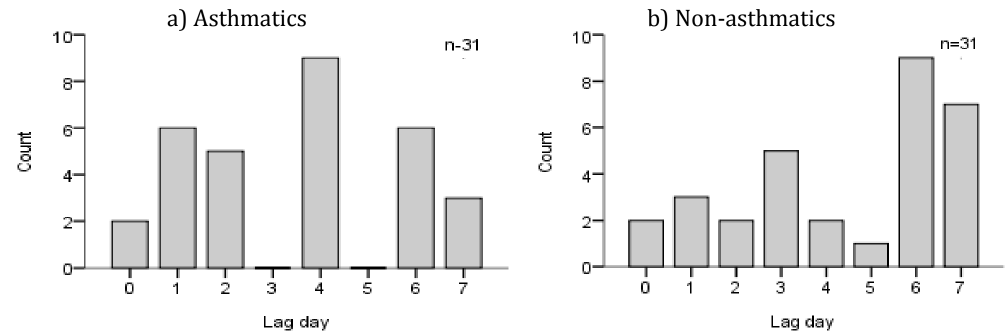


Figure F2. 86: Scotland Acute Visits - number of the most significant regression point-estimates per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

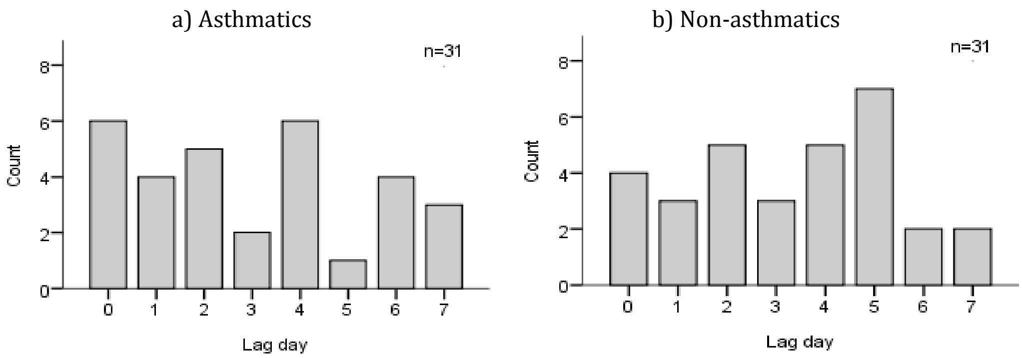


Figure F2. 87: Scotland Casualty Counts - number of the most significant regression point-estimates per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

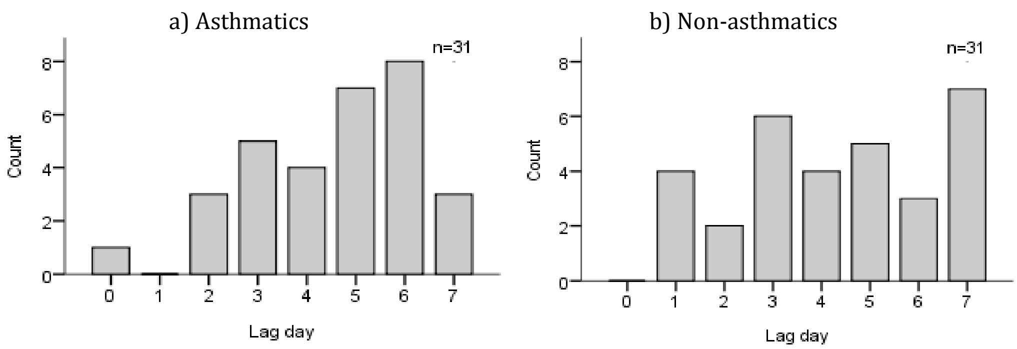


Figure F2. 88: Scotland Emergency Consultations - number of the most significant regression point-estimates per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

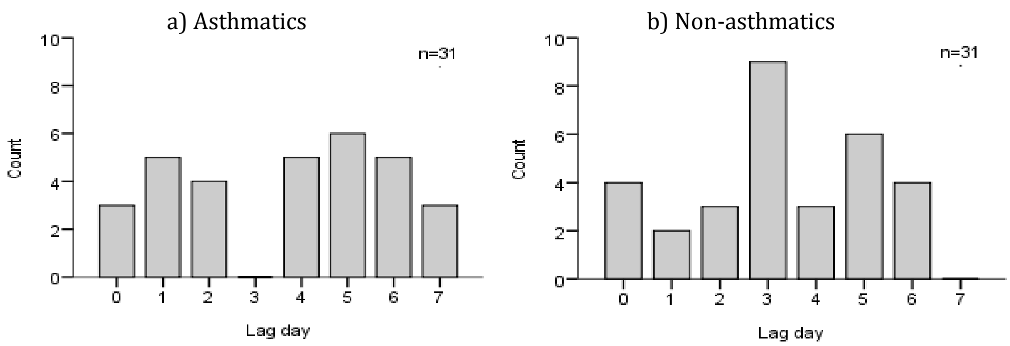


Figure F2. 89: Scotland Emergency Counts - number of the most significant regression point-estimates per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

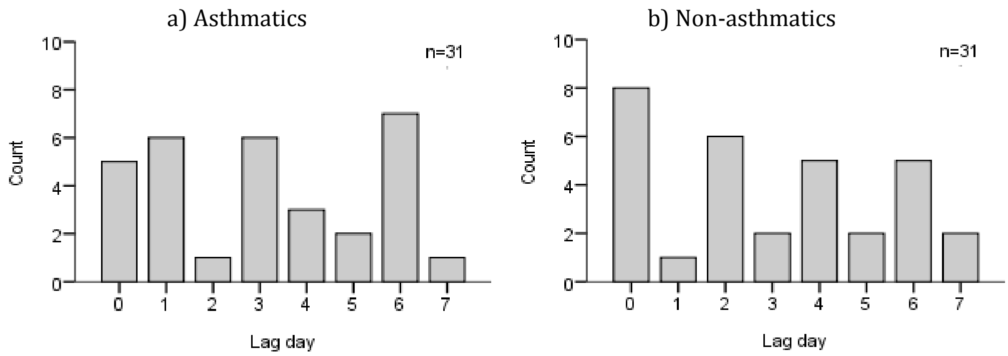


Figure F2. 90: Scotland Out of Hours Counts - number of the most significant regression point-estimates per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

No outstanding lag day whereby the highest number of the most significant point-estimates (per environmental exposure) falls on. For All Counts, the highest number of significant point-estimates fell on lag day five for asthmatics and lag day four for Non-asthmatics.

F2.3.2. Scotland Regressions Excess

Table F. 46: Scotland - F-values (on 8 and 2163 degrees of freedom) and P-values from comparison of null model against model including each predictor lagged by 7 days, Excess.

Exposure			All Counts		Acute Visits		Casualty Counts		Emergency Consultations		Emergency Counts		Out of Hours Counts	
			F-value	P-value	F-value	P-value	F-value	P-value	F-value	P-value	F-value	P-value	F-value	P-value
Outdoor air pollutants	Min'	NO	0.56	0.811	0.40	0.924	0.66	0.726	0.28	0.972	0.72	0.673	1.33	0.224
		NO_2	0.98	0.446	0.40	0.921	1.17	0.314	0.13	0.998	0.34	0.950	0.43	0.902
		NOD	0.91	0.510	0.51	0.847	1.28	0.252	0.13	0.998	1.61	0.117	0.97	0.455
		SO_2	0.31	0.961	0.71	0.685	0.27	0.977	0.43	0.903	0.30	0.965	0.68	0.711
		PM_{10}	0.94	0.480	1.08	0.377	1.97	**0.046	0.40	0.922	1.25	0.264	0.99	0.443
		O_3	0.53	0.835	0.38	0.929	0.98	0.451	0.11	0.999	0.39	0.927	0.47	0.876
		CO	0.91	0.509	0.17	0.995	1.90	0.056	0.58	0.796	1.31	0.235	0.35	0.945
	Mean	NO	0.44	0.899	0.88	0.534	0.88	0.535	1.32	0.227	0.12	0.998	1.09	0.368
		NO_2	0.59	0.787	0.88	0.536	0.86	0.549	0.54	0.824	0.46	0.887	1.01	0.425
		NOD	0.47	0.878	0.67	0.721	0.93	0.492	0.73	0.669	0.07	1.000	0.60	0.780
		SO_2	0.43	0.901	1.04	0.405	0.49	0.861	0.13	0.998	0.21	0.989	0.45	0.889
		PM_{10}	2.87	**0.004	0.74	0.652	1.26	0.258	0.98	0.448	0.79	0.612	1.31	0.235
		O_3	0.57	0.800	0.48	0.868	1.55	0.134	0.23	0.986	0.99	0.444	0.55	0.820
		CO	0.21	0.989	0.19	0.992	1.27	0.254	0.99	0.445	0.71	0.680	1.79	0.075
	Max'	NO	0.32	0.961	0.82	0.589	0.47	0.877	1.13	0.339	0.15	0.997	1.56	0.131
		NO_2	0.41	0.916	0.28	0.971	0.33	0.955	0.73	0.665	0.45	0.891	1.11	0.352
		NOD	0.51	0.850	0.63	0.753	0.96	0.468	0.93	0.489	0.27	0.976	1.09	0.367
		SO_2	0.15	0.996	0.86	0.547	0.39	0.928	0.54	0.826	0.47	0.879	0.26	0.977
		PM_{10}	0.83	0.573	0.84	0.567	0.96	0.468	0.98	0.450	1.84	*0.066	1.51	0.148
		O_3	0.69	0.697	0.30	0.968	1.24	0.270	0.33	0.956	0.89	0.524	0.38	0.930
		CO	0.32	0.959	0.55	0.818	1.43	0.177	1.27	0.256	0.65	0.732	1.40	0.191
Weather	Min'	Temperature	1.33	0.224	0.62	0.760	0.69	0.701	0.87	0.541	0.45	0.894	0.56	0.811
	Max'	Temperature	0.60	0.783	0.88	0.530	0.06	1.000	0.98	0.449	0.88	0.535	1.43	0.178
		Sun	0.64	0.742	0.75	0.649	0.88	0.529	0.48	0.874	1.59	0.123	1.26	0.258
		Rain	0.99	0.442	1.26	0.259	0.69	0.704	0.37	0.936	1.26	0.261	1.05	0.394
		Pressure	1.19	0.304	0.93	0.491	0.47	0.875	1.65	0.107	0.74	0.653	2.04	*0.039
		Wind speed	0.45	0.888	1.27	*0.253	0.79	0.616	0.47	0.876	0.63	0.756	0.43	0.904
Pollen		Grass	1.26	0.261	1.25	0.263	0.34	0.949	0.61	0.767	1.60	0.120	2.29	**0.019
		Birch	1.50	0.153	0.27	0.977	0.48	0.868	1.71	*0.092	0.86	0.550	0.77	0.631
		Oak	0.88	0.531	0.81	0.594	0.76	0.634	1.04	*0.406	1.22	0.285	0.96	0.469
		Nettle	0.39	0.928	0.95	0.470	0.56	0.814	0.27	0.976	1.25	0.264	1.42	0.183
Total number of statistically significant models				2		5		2		2		1		1

** Most significant P-value out of 31 triggers.

* Statistically significant trigger.

For All Counts Excess, two exposures statistically improved the fit of the data compared to the null model.

Point-estimate statistics

Table F. 47: Scotland - point-estimate descriptive statistics (n=248), Excess.

Statistic	All Counts	Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours Counts
Mean	0.01	-0.01	-0.01	0.00	-0.02	0.00
Median	0.00	0.00	0.00	0.00	0.00	0.00
Minimum	-7.20	-2.15	-10.52	-8.69	-14.01	-6.73
Maximum	5.30	4.51	11.09	11.58	15.06	7.11

Table F. 48: Scotland - number of statistically significant autoregressive point-estimates per environmental exposure (n=8), Excess.

Exposure			All Counts	Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours Counts
Outdoor air pollutants	Min'	NO	0	0	1	0	0	1
		NO_2	1	0	2	0	0	0
		NOD	0	0	2	0	2	1
		SO_2	0	0	0	0	0	0
		PM_{10}	2	1	3	0	1	1
		O_3	0	0	0	0	0	0
		CO	0	0	2	0	1	0
	Mean	NO	0	0	0	1	0	1
		NO_2	0	0	0	0	0	0
		NOD	0	0	1	0	0	0
		SO_2	0	0	0	0	0	0
		PM_{10}	4	0	1	1	1	2
		O_3	0	0	1	0	1	0
		CO	0	0	2	1	0	2
	Max'	NO	0	0	0	1	0	2
		NO_2	0	0	0	0	0	2
		NOD	0	0	2	0	0	1
		SO_2	0	0	0	1	0	0
		PM_{10}	0	1	0	0	3	1
		O_3	0	0	1	0	0	0
		CO	0	0	2	1	0	1
Weather	Min'	Temperature	2	0	0	0	0	0
	Max'	Temperature	0	1	0	1	1	2
		Sun	0	1	0	0	1	0
		Rain	1	2	0	0	0	0
		Pressure	2	1	0	2	0	2
		Wind speed	0	2	0	0	0	0
Pollen		Grass	0	0	0	0	1	2
		Birch	2	0	0	3	2	2
		Oak	2	0	0	2	1	1
		Nettle	0	0	0	0	2	2
Total			16	9	20	14	17	26
Mean			0.52	0.29	0.65	0.45	0.55	0.84

Out of Hours Counts has the highest total number of statistically significant point-estimates (Table F.48). Looking at exposures individually, Birch and PM_{10} mean has the highest number of statistically significant point-estimates.

Model P-value distributions

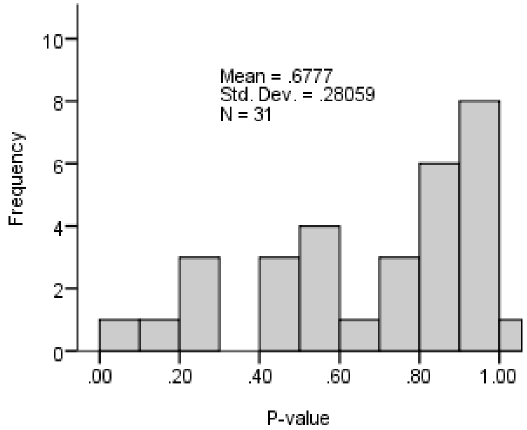


Figure F2. 91: Scotland All Counts - distribution of F-test P-values, Excess.

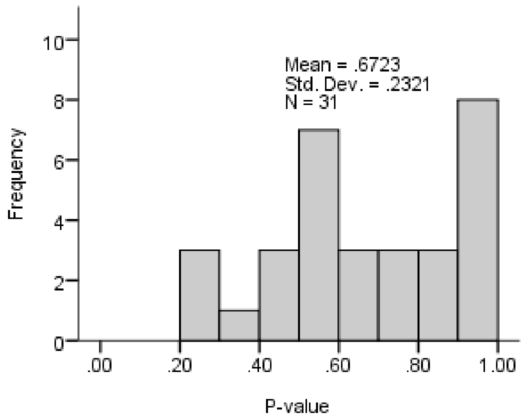


Figure F2. 92: Scotland Acute Visits - distribution of F-test P-values, Excess.

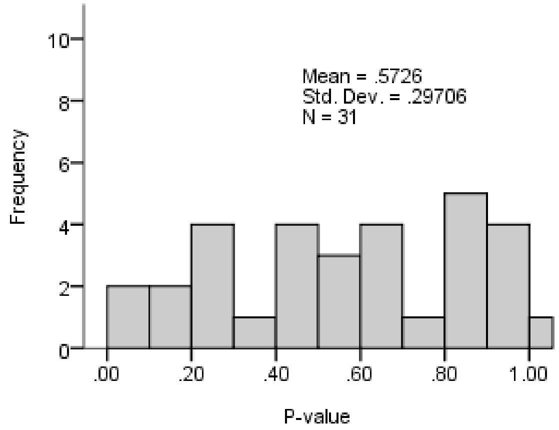


Figure F2. 93: Scotland Casualty Counts - distribution of F-test P-values, Excess.

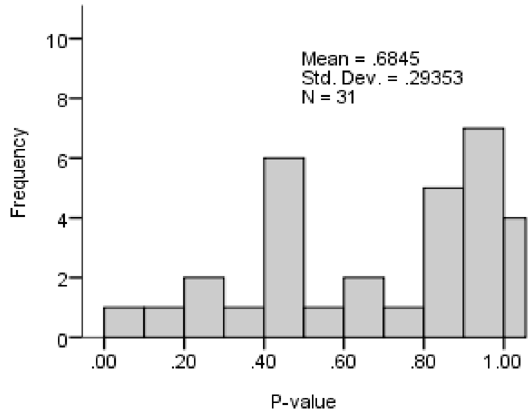


Figure F2. 94: Scotland Emergency Consultations - distribution of F-test P-values, Excess.

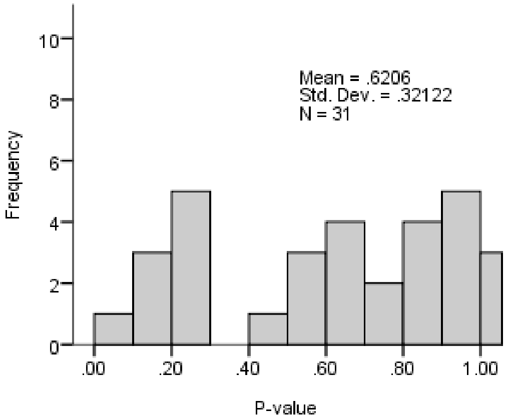


Figure F2. 95: Scotland Emergency Counts - distribution of F-test P-values, Excess.

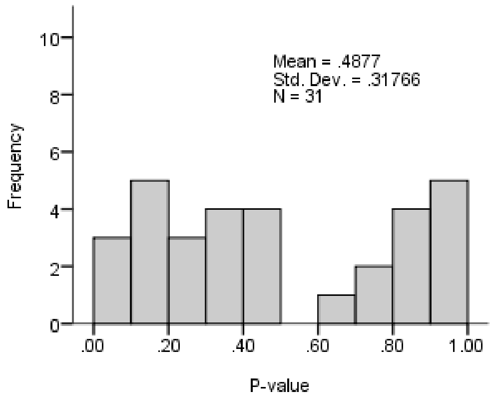


Figure F2. 96: Scotland Out of Hours Counts - distribution of F-test P-values, Excess.

All medical contacts excess had uniformed or slight negatively skewed distributions inferring no all-round association between environmental exposures and daily counts. This was supported by Table F.56.

Table F. 49: Scotland Mean F-test P-value's distance from the null value (n=8), Excess.

Medical Contact	Excess	0.5-Excess
All Counts	0.68	-0.18
Acute Visits	0.67	-0.17
Casualty Counts	0.57	-0.07
Emergency Consultations	0.68	-0.18
Emergency Counts	0.62	-0.12
Out of Hours Counts	0.49	0.01

Point-estimate P-value distributions

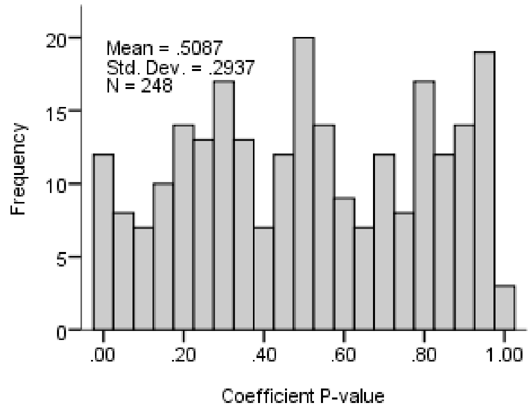


Figure F2. 97: Scotland All Counts - distribution of the regression point-estimate P-values, Excess.

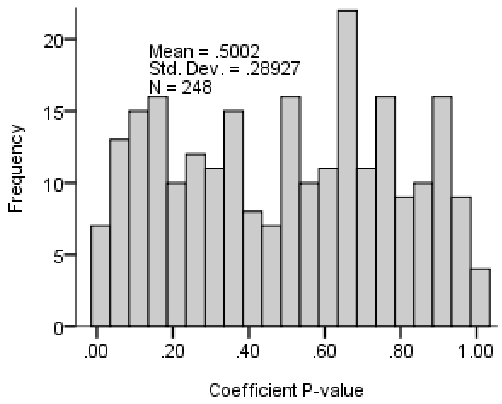


Figure F2. 98: Scotland Acute Visits - distribution of the regression point-estimate P-values, Excess.

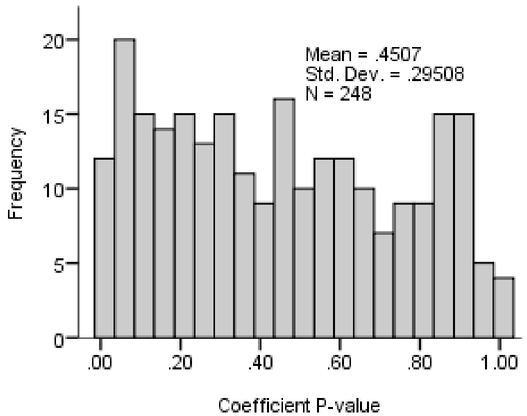


Figure F2. 99: Scotland Casualty Counts - distribution of the regression point-estimate P-values, Excess.

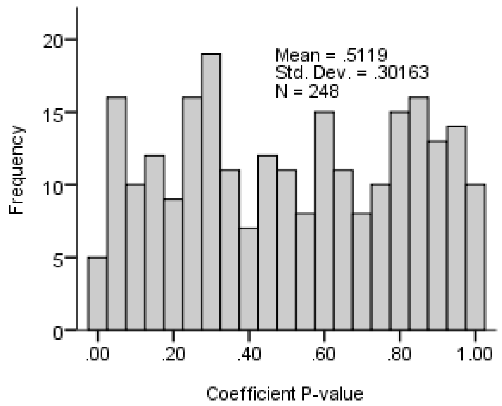


Figure F2. 100: Scotland Emergency Consultations - distribution of the regression point-estimate P-values, Excess.

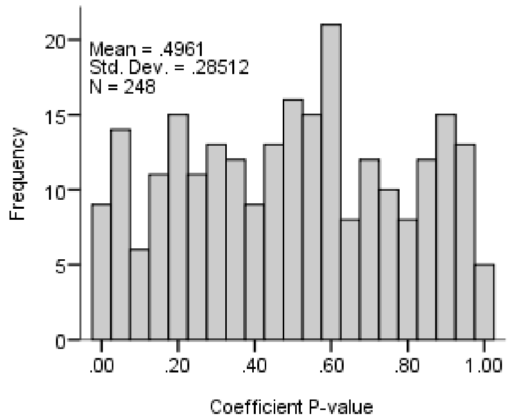


Figure F2. 101: Scotland Emergency Counts - distribution of the regression point-estimate P-values, Excess.

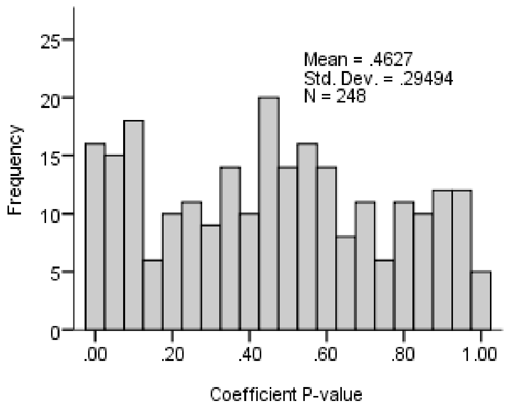


Figure F2. 102: Scotland Out of Hours Counts - distribution of the regression point-estimate P-values, Excess.

Figures F2.97 to F2.102 display fairly uniformed point-estimate P-value distributions. Bar Casualty Counts and Out of Hours Counts all other medical contacts have point-estimate mean P-values of 0.5 or higher inferring no association between environmental triggers and daily counts of excess (see Table F.50 for supporting evidence).

Table F. 50: Scotland - regression mean point-estimate P-value's distance from the null value (0.5), Excess.

Medical Contact	Excess	0.5-Excess
All Counts	0.51	-0.01
Acute Visits	0.50	0.00
Casualty Counts	0.45	-0.05
Emergency Consultations	0.51	-0.01
Emergency Counts	0.50	0.00
Out of Hours Counts	0.46	0.04

Lag effects

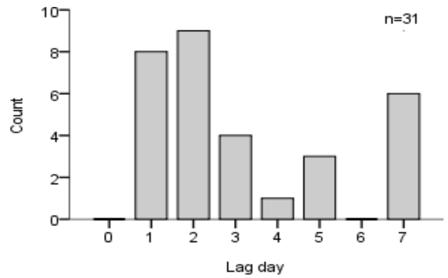


Figure F2. 103: Scotland All Counts - number of the most significant regression point-estimates per environmental exposure by lag day, Excess.

For All Counts excess, lag day two was the lag day with the most significant point-estimates.

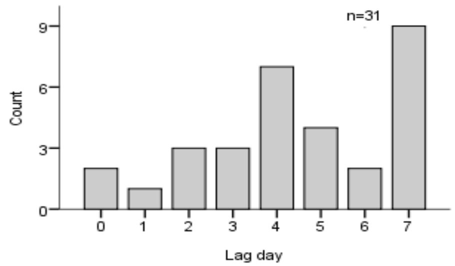


Figure F2. 104: Scotland Acute Visits - number of the most significant regression point-estimates per environmental exposure by lag day, Excess.

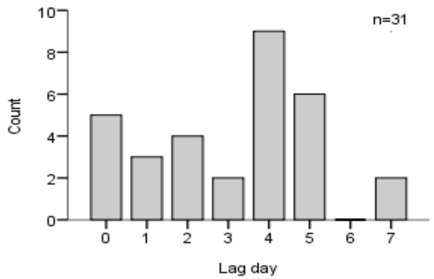


Figure F2. 105: Scotland Casualty Counts - number of the most significant regression point-estimates per environmental exposure by lag day, Excess.

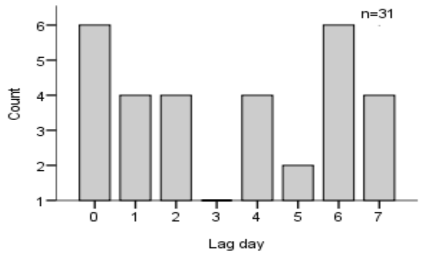


Figure F2. 107: Scotland Emergency Counts - number of the most significant regression point-estimates per environmental exposure by lag day, Excess.

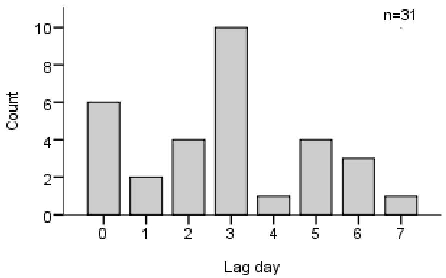


Figure F2. 106: Scotland Emergency Consultations - number of the most significant regression point-estimates per environmental exposure by lag day, Excess.

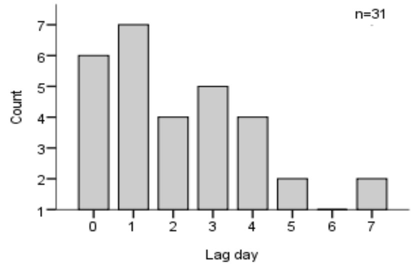


Figure F2. 108: Scotland Out of Hours Counts - number of the most significant regression point-estimates per environmental exposure by lag day, Excess.

F3. Multiple regression point-estimates and P-values.

Point estimates **Not** Standardised. England and Wales, point-estimates reflect change in daily counts. Scotland, Trent Region and Sheffield, daily counts represent percentage change in daily counts.

F3.1. England and Wales Multiple regression point-estimates and P-values.

Table F. 51: England and Wales All Counts Asthmatics – point estimates and P-values by lag day per exposure.

Exposure		Lag0 Est	Lag0 P	Lag1 Est	Lag1 P	Lag2 Est	Lag2 P	Lag3 Est	Lag3 P	Lag4 Est	Lag4 P	Lag5 Est	Lag5 P	Lag6 Est	Lag6 P	Lag7 Est	Lag7 P
Outdoor air pollutants	NO Min'	-0.02	0.94	-0.34	0.31	0.46	0.18	-0.38	0.27	0.31	0.36	0.02	0.96	-0.86	0.01	0.79	0.01
	NO_2 Min'	0.08	0.71	0.18	0.43	0.01	0.97	0.41	0.08	-0.55	0.02	-0.28	0.23	0.09	0.69	0.41	0.05
	NOD Min'	0.02	0.87	0.02	0.89	0.12	0.32	0.01	0.96	-0.08	0.50	-0.10	0.44	-0.15	0.22	0.30	0.01
	SO_2 Min'	-1.45	0.18	2.19	0.06	0.56	0.63	-1.27	0.28	-0.19	0.87	0.48	0.68	0.43	0.71	0.50	0.64
	PM_{10} Min'	0.09	0.74	-0.08	0.79	0.40	0.17	-0.06	0.84	0.20	0.49	-0.39	0.18	-0.05	0.88	0.16	0.55
	O_3 Min'	-0.20	0.17	-0.10	0.52	0.17	0.28	-0.41	0.01	0.29	0.06	0.12	0.45	-0.08	0.61	-0.13	0.36
	CO Min'	11.41	0.56	0.85	0.97	18.73	0.38	-15.25	0.47	23.00	0.28	-41.89	0.05	-21.23	0.31	36.44	0.07
	NO Mean	0.12	0.11	-0.17	0.05	0.14	0.12	0.02	0.83	-0.10	0.23	-0.04	0.68	-0.10	0.26	0.27	0.00
	NO_2 Mean	0.26	0.11	-0.04	0.84	-0.03	0.87	0.40	0.03	-0.34	0.06	-0.16	0.38	-0.21	0.24	0.43	0.01
	NOD Mean	0.07	0.09	-0.07	0.11	0.06	0.21	0.03	0.48	-0.07	0.14	-0.02	0.64	-0.06	0.21	0.14	0.00
	SO_2 Mean	0.03	0.94	0.06	0.89	0.53	0.20	-0.29	0.49	0.46	0.27	-0.66	0.11	-0.35	0.40	0.67	0.08
	PM_{10} Mean	0.14	0.47	-0.17	0.46	0.45	0.05	-0.03	0.89	-0.11	0.63	-0.31	0.18	-0.19	0.39	0.43	0.03
	O_3 Mean	-0.10	0.49	-0.10	0.51	0.11	0.48	-0.25	0.10	0.21	0.18	0.14	0.35	0.00	1.00	-0.22	0.10
	CO Mean	18.83	0.05	-19.16	0.08	13.52	0.22	6.38	0.56	-18.04	0.10	-9.45	0.39	-1.89	0.86	24.02	0.01
	NO Max'	0.03	0.23	-0.01	0.73	0.01	0.63	0.01	0.63	-0.05	0.05	-0.01	0.78	-0.01	0.66	0.07	0.01
	NO_2 Max'	0.12	0.22	-0.03	0.79	0.00	0.97	0.18	0.09	-0.21	0.05	-0.01	0.94	-0.12	0.27	0.23	0.02
	NOD Max'	0.02	0.15	-0.01	0.52	0.01	0.53	0.01	0.58	-0.03	0.04	0.00	0.79	-0.01	0.51	0.04	0.00
	SO_2 Max'	-0.04	0.68	0.05	0.61	0.02	0.82	0.18	0.05	-0.06	0.51	-0.06	0.50	-0.08	0.39	0.08	0.37
	PM_{10} Max'	0.19	0.02	-0.02	0.83	-0.02	0.82	0.09	0.32	-0.03	0.76	-0.25	0.00	0.04	0.68	0.11	0.19
	O_3 Max'	-0.04	0.68	0.19	0.09	-0.28	0.01	0.06	0.58	0.06	0.61	0.02	0.88	0.02	0.88	-0.05	0.66
	CO Max'	7.93	0.03	-7.21	0.07	3.86	0.33	-0.67	0.87	-3.46	0.38	-5.38	0.17	0.72	0.85	10.18	0.01
Weather	Temp Min'	0.81	0.30	-1.67	0.06	0.98	0.27	0.49	0.58	0.29	0.74	-1.53	0.09	-0.33	0.71	0.70	0.36
	Temp Max'	0.97	0.18	-0.67	0.41	0.03	0.98	-0.98	0.24	0.97	0.25	0.16	0.85	-0.58	0.48	-0.24	0.74
	Sun	-0.53	0.32	0.49	0.38	-0.19	0.72	-0.50	0.36	0.10	0.86	0.01	0.99	0.72	0.19	-0.99	0.06
	Rain	0.06	0.86	0.11	0.77	0.08	0.82	-0.16	0.65	0.23	0.52	-0.32	0.38	0.14	0.70	-0.03	0.94
	Pressure	-0.15	0.51	0.24	0.43	-0.06	0.83	0.05	0.87	0.20	0.51	-0.37	0.23	-0.08	0.80	0.10	0.67
	Wind	-0.12	0.45	-1.85	0.02	0.56	0.53	-1.02	0.25	0.30	0.73	2.33	0.01	-0.41	0.64	-1.12	0.15
Pollen	Grass	0.13	0.02	-0.03	0.58	0.03	0.66	-0.08	0.18	0.14	0.03	-0.25	0.00	0.09	0.15	0.04	0.48

Table F. 52: England and Wales All Counts Non-asthmatics – point estimates and P-values by lag day per exposure.

Exposure		Lag0 Est	Lag0 P	Lag1 Est	Lag1 P	Lag2 Est	Lag2 P	Lag3 Est	Lag3 P	Lag4 Est	Lag4 P	Lag5 Est	Lag5 P	Lag6 Est	Lag6 P	Lag7 Est	Lag7 P
Outdoor air pollutants	NO Min'	0.11	0.53	-0.39	0.03	0.38	0.04	-0.27	0.14	0.14	0.43	0.10	0.60	-0.55	0.00	0.44	0.01
	NO_2 Min'	0.14	0.21	-0.06	0.66	0.03	0.83	0.23	0.08	-0.25	0.05	-0.10	0.42	-0.08	0.53	0.26	0.02
	NOD Min'	0.08	0.22	-0.08	0.25	0.09	0.20	0.00	0.98	-0.04	0.56	-0.02	0.80	-0.15	0.03	0.18	0.00
	SO_2 Min'	0.29	0.62	0.53	0.41	-0.27	0.67	-0.31	0.63	-0.28	0.66	0.28	0.67	-0.10	0.88	0.88	0.13
	PM_{10} Min'	0.06	0.67	-0.07	0.67	0.11	0.48	0.07	0.65	0.10	0.52	-0.14	0.39	-0.11	0.50	0.05	0.73
	O_3 Min'	-0.09	0.28	-0.05	0.57	0.08	0.33	-0.18	0.03	0.08	0.35	0.08	0.36	0.05	0.52	-0.13	0.10
	CO Min'	14.85	0.17	-0.21	0.99	-6.37	0.58	-2.80	0.81	15.84	0.17	-15.21	0.19	-21.86	0.06	23.20	0.03
	NO Mean	0.05	0.21	-0.09	0.06	0.08	0.09	-0.01	0.83	-0.01	0.77	-0.05	0.33	-0.07	0.13	0.16	0.00
	NO_2 Mean	0.19	0.03	-0.10	0.31	-0.04	0.66	0.25	0.01	-0.19	0.06	-0.05	0.62	-0.15	0.13	0.24	0.01
	NOD Mean	0.03	0.13	-0.04	0.09	0.03	0.21	0.01	0.68	-0.02	0.47	-0.02	0.39	-0.04	0.10	0.08	0.00
	SO_2 Mean	0.12	0.56	-0.14	0.54	0.37	0.11	-0.19	0.41	0.27	0.24	-0.37	0.10	-0.42	0.06	0.66	0.00
	PM_{10} Mean	0.10	0.35	-0.18	0.15	0.29	0.02	-0.12	0.35	0.03	0.83	-0.10	0.41	-0.22	0.07	0.28	0.01
	O_3 Mean	-0.08	0.26	0.06	0.49	0.00	0.96	-0.15	0.07	0.10	0.23	0.05	0.58	0.13	0.12	-0.20	0.01
	CO Mean	10.19	0.06	-9.23	0.12	5.69	0.34	1.05	0.86	-6.11	0.31	-3.92	0.51	-8.12	0.17	17.94	0.00
	NO Max'	0.01	0.29	0.00	0.75	0.00	0.82	0.01	0.42	-0.02	0.16	-0.01	0.46	-0.02	0.26	0.05	0.00
	NO_2 Max'	0.05	0.33	-0.03	0.66	-0.01	0.84	0.10	0.09	-0.10	0.08	0.01	0.81	-0.10	0.09	0.14	0.01
	NOD Max'	0.01	0.28	0.00	0.69	0.00	0.87	0.01	0.34	-0.01	0.13	-0.01	0.52	-0.01	0.16	0.03	0.00
	SO_2 Max'	0.00	0.96	-0.02	0.64	0.04	0.44	0.10	0.06	-0.04	0.43	-0.01	0.88	-0.12	0.02	0.10	0.04
	PM_{10} Max'	0.10	0.02	-0.05	0.29	0.02	0.63	0.01	0.76	0.01	0.87	-0.09	0.06	-0.03	0.56	0.06	0.14
	O_3 Max'	0.00	0.93	0.12	0.05	-0.12	0.05	-0.06	0.31	0.04	0.55	0.02	0.70	0.08	0.20	-0.08	0.18
	CO Max'	1.88	0.35	-1.87	0.38	1.92	0.37	-0.27	0.90	-1.90	0.37	-1.58	0.46	-2.60	0.22	7.22	0.00
Weather	Temp Min'	0.31	0.46	-0.63	0.19	0.15	0.76	0.44	0.36	-0.11	0.81	-0.37	0.44	0.18	0.71	-0.23	0.59
	Temp Max'	0.63	0.11	-0.71	0.11	0.25	0.58	-0.39	0.39	-0.03	0.95	0.38	0.40	0.05	0.92	-0.45	0.26
	Sun	-0.31	0.28	-0.01	0.97	0.30	0.31	-0.65	0.03	0.56	0.06	-0.22	0.46	0.36	0.23	-0.67	0.02
	Rain	0.04	0.83	-0.12	0.53	0.32	0.10	-0.19	0.33	0.10	0.62	-0.15	0.43	0.01	0.96	0.15	0.45
	Pressure	-0.06	0.66	0.12	0.47	-0.16	0.35	0.17	0.31	0.15	0.36	-0.32	0.05	0.07	0.69	-0.02	0.90
	Wind speed	-0.03	0.70	-0.55	0.21	0.26	0.59	-0.64	0.19	0.06	0.90	0.85	0.08	0.37	0.44	-0.67	0.11
Pollen	Grass	0.08	0.01	-0.02	0.57	0.02	0.64	-0.08	0.02	0.09	0.01	-0.13	0.00	0.04	0.30	0.03	0.29

Table F. 53: England and Wales Acute Visits Asthmatics – point estimates and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	-0.01	0.17	0.02	0.06	-0.01	0.24	-0.01	0.31	0.02	0.06	0.00	0.62	0.00	0.63	0.00	0.60
	NO_2 Min’	0.00	0.81	0.00	0.76	0.00	0.86	0.01	0.34	-0.01	0.18	0.00	0.74	0.00	0.97	0.00	0.98
	NOD Min’	0.00	0.47	0.00	0.23	0.00	0.34	0.00	0.81	0.00	0.68	0.00	0.57	0.00	0.93	0.00	0.64
	SO_2 Min’	-0.03	0.25	0.02	0.47	0.02	0.50	0.01	0.80	-0.03	0.38	-0.02	0.44	0.05	0.14	-0.01	0.60
	PM_{10} Min’	0.00	0.58	-0.01	0.32	0.01	0.47	0.01	0.39	0.00	0.58	0.00	0.82	0.01	0.36	0.00	0.66
	O_3 Min’	-0.01	0.06	0.00	0.48	0.00	0.42	0.00	0.76	0.00	0.39	0.01	0.03	-0.01	0.08	0.00	0.96
	CO Min’	-0.35	0.50	0.20	0.71	-0.26	0.64	0.02	0.98	0.71	0.20	-0.37	0.50	0.73	0.18	-0.96	0.06
	NO Mean	0.00	0.39	0.00	0.49	0.00	0.28	0.00	0.08	0.00	0.51	0.00	0.76	0.00	0.79	0.00	0.68
	NO_2 Mean	0.01	0.14	-0.01	0.07	0.01	0.16	0.00	0.96	-0.01	0.22	0.00	0.52	0.00	0.83	0.00	0.60
	NOD Mean	0.00	0.27	0.00	0.27	0.00	0.17	0.00	0.13	0.00	0.81	0.00	0.65	0.00	0.76	0.00	0.64
	SO_2 Mean	-0.01	0.28	0.00	0.97	0.03	0.02	-0.02	0.06	0.01	0.52	-0.02	0.15	0.00	0.88	0.02	0.02
	PM_{10} Mean	0.01	0.25	-0.01	0.02	0.01	0.04	0.00	0.60	0.00	0.47	0.00	0.75	0.00	0.40	0.00	0.56
	O_3 Mean	0.00	0.35	0.00	0.82	0.00	0.26	0.00	0.51	0.00	0.87	0.01	0.12	0.00	0.26	0.00	0.93
	CO Mean	0.32	0.21	-0.41	0.16	0.46	0.11	-0.47	0.10	0.22	0.44	-0.07	0.81	0.29	0.31	-0.28	0.26
	NO Max’	0.00	0.29	0.00	0.23	0.00	0.23	0.00	0.07	0.00	0.86	0.00	0.38	0.00	0.98	0.00	0.85
	NO_2 Max’	0.00	0.38	0.00	0.93	0.00	0.70	0.00	0.64	0.00	0.20	0.00	0.31	0.00	0.93	0.00	0.83
	NOD Max’	0.00	0.32	0.00	0.35	0.00	0.28	0.00	0.06	0.00	0.80	0.00	0.43	0.00	0.98	0.00	0.97
	SO_2 Max’	0.00	0.31	0.00	0.98	0.00	0.07	0.00	0.46	0.00	0.67	0.00	0.07	0.00	0.56	0.00	0.26
	PM_{10} Max’	0.00	0.32	0.00	0.69	0.00	0.95	0.00	0.83	0.00	0.79	0.00	0.84	0.00	0.35	0.00	0.60
	O_3 Max’	0.00	0.94	0.00	0.18	0.00	0.48	0.00	0.79	0.00	0.80	0.00	0.43	0.00	0.68	0.00	0.92
	CO Max’	0.17	0.08	-0.15	0.14	0.11	0.29	-0.18	0.09	0.03	0.75	0.09	0.36	0.01	0.90	-0.06	0.55
Weather	Temp Min’	0.02	0.24	-0.02	0.46	-0.01	0.69	0.03	0.26	-0.02	0.34	-0.01	0.57	0.02	0.49	0.00	0.87
	Temp Max’	-0.03	0.17	0.02	0.29	0.03	0.11	-0.06	0.00	0.03	0.12	0.02	0.48	-0.05	0.01	0.03	0.07
	Sun	0.02	0.14	-0.02	0.24	0.01	0.65	0.00	0.96	0.01	0.72	0.00	0.85	-0.01	0.58	0.00	0.84
	Rain	0.00	0.78	0.01	0.13	-0.01	0.47	0.00	0.93	-0.01	0.46	0.00	0.66	0.00	0.66	0.00	0.63
	Pressure	-0.01	0.28	0.01	0.10	-0.02	0.02	0.01	0.44	0.02	0.06	-0.02	0.03	0.01	0.28	0.00	0.72
	Wind speed	0.00	0.32	-0.04	0.09	0.03	0.28	-0.01	0.78	-0.02	0.49	0.03	0.14	-0.02	0.36	0.01	0.75
Pollen	Grass	0.00	0.89	0.00	0.89	0.00	0.70	0.00	0.93	0.00	0.74	0.00	0.67	0.00	0.52	0.00	0.98

Table F. 54: England and Wales Acute Visits Non-asthmatics – point estimates and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	0.01	0.14	0.00	0.46	-0.01	0.23	0.00	0.79	0.01	0.04	0.00	0.67	-0.02	0.00	0.00	0.38
	NO_2 Min’	0.00	0.45	0.00	0.89	0.00	0.58	0.00	0.37	0.00	0.48	-0.01	0.05	0.00	0.65	0.00	0.70
	NOD Min’	0.00	0.29	0.00	0.89	0.00	0.17	0.00	0.43	0.00	0.13	0.00	0.57	0.00	0.03	0.00	0.47
	SO_2 Min’	-0.01	0.60	0.03	0.09	-0.04	0.03	0.03	0.20	0.01	0.57	-0.02	0.40	-0.01	0.80	0.00	0.84
	PM_{10} Min’	0.00	0.37	0.00	0.95	0.00	0.69	0.00	0.31	0.01	0.27	-0.01	0.03	0.00	0.38	0.00	0.31
	O_3 Min’	0.00	0.71	0.00	0.76	0.00	0.66	0.00	0.43	0.00	0.10	0.00	0.37	0.00	0.28	0.00	0.93
	CO Min’	0.32	0.34	-0.42	0.24	-0.14	0.69	0.29	0.42	0.32	0.37	0.10	0.77	-0.49	0.16	-0.22	0.51
	NO Mean	0.00	0.25	0.00	0.59	0.00	0.77	0.00	0.33	0.00	0.02	0.00	0.08	0.00	0.38	0.00	0.17
	NO_2 Mean	0.00	0.58	0.00	0.76	0.00	0.60	0.00	0.52	0.00	0.79	-0.01	0.07	0.00	0.23	0.00	0.43
	NOD Mean	0.00	0.28	0.00	0.69	0.00	0.84	0.00	0.44	0.00	0.05	0.00	0.06	0.00	0.29	0.00	0.19
	SO_2 Mean	-0.01	0.28	0.01	0.10	-0.01	0.39	0.00	0.61	0.01	0.23	-0.01	0.41	-0.01	0.09	0.01	0.06
	PM_{10} Mean	0.00	0.23	-0.01	0.01	0.01	0.03	0.00	0.57	0.01	0.09	-0.01	0.01	0.01	0.18	0.00	0.60
	O_3 Mean	0.00	0.23	0.00	0.74	0.00	0.84	0.00	0.50	0.00	0.60	0.00	0.54	0.00	0.95	0.00	0.88
	CO Mean	0.27	0.10	-0.31	0.09	0.20	0.28	-0.25	0.17	0.38	0.04	-0.35	0.06	0.17	0.35	-0.22	0.19
	NO Max’	0.00	0.11	0.00	0.08	0.00	0.50	0.00	0.15	0.00	0.06	0.00	0.03	0.00	0.05	0.00	0.22
	NO_2 Max’	0.00	0.50	0.00	0.58	0.00	0.27	0.00	1.00	0.00	0.13	0.00	0.01	0.00	0.02	0.00	0.13
	NOD Max’	0.00	0.11	0.00	0.15	0.00	0.73	0.00	0.19	0.00	0.05	0.00	0.02	0.00	0.04	0.00	0.16
	SO_2 Max’	0.00	0.02	0.00	0.03	0.00	0.86	0.00	0.37	0.00	0.01	0.00	0.15	0.00	0.23	0.00	0.40
	PM_{10} Max’	0.00	0.23	0.00	0.05	0.00	0.54	0.00	0.42	0.00	0.51	0.00	0.02	0.00	0.07	0.00	0.39
	O_3 Max’	0.00	0.17	0.00	0.98	0.00	0.29	0.00	0.35	0.00	0.98	0.00	0.91	0.00	0.71	0.00	0.33
	CO Max’	0.10	0.10	-0.11	0.10	0.01	0.89	-0.09	0.19	0.18	0.01	-0.16	0.02	0.07	0.27	-0.05	0.40
Weather	Temp Min’	0.02	0.17	-0.02	0.25	0.00	0.81	0.04	0.01	-0.03	0.04	0.00	0.74	0.00	0.89	0.00	0.70
	Temp Max’	0.01	0.30	0.00	0.79	0.00	0.91	0.00	0.92	0.00	0.82	0.00	0.98	0.01	0.71	-0.01	0.42
	Sun	0.01	0.28	0.00	0.75	0.00	0.77	0.00	0.98	-0.01	0.47	0.01	0.19	-0.01	0.43	0.00	0.61
	Rain	0.00	0.69	0.00	0.95	0.01	0.31	-0.01	0.13	0.01	0.18	-0.01	0.07	0.01	0.06	0.00	0.59
	Pressure	0.01	0.11	-0.01	0.19	0.00	0.85	0.00	0.87	0.00	0.95	0.00	0.58	0.00	0.91	0.00	0.51
	Wind speed	0.00	0.75	-0.02	0.21	0.00	0.83	0.00	0.96	0.00	0.82	0.02	0.12	0.00	0.82	-0.01	0.36
Pollen	Grass	0.00	0.20	0.00	0.02	0.00	0.47	0.00	0.76	0.00	0.44	0.00	0.89	0.00	0.46	0.00	0.55

Table F. 55: England and Wales Casualty Counts Asthmatics – point estimates and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	0.00	0.92	-0.02	0.22	0.02	0.25	-0.02	0.28	0.00	0.80	0.03	0.03	-0.05	0.00	0.04	0.02
	NO_2 Min’	0.00	0.74	-0.02	0.12	0.02	0.06	-0.01	0.19	-0.01	0.25	0.02	0.02	-0.02	0.06	0.02	0.09
	NOD Min’	0.00	0.95	-0.01	0.23	0.01	0.13	-0.01	0.19	0.00	0.76	0.01	0.02	-0.02	0.00	0.01	0.02
	SO_2 Min’	0.00	0.94	0.01	0.86	-0.03	0.56	-0.05	0.36	0.08	0.12	0.00	0.98	-0.02	0.71	0.03	0.52
	PM_{10} Min’	0.00	0.73	0.00	0.74	-0.03	0.06	0.01	0.29	0.00	0.76	0.00	0.89	0.00	0.90	0.01	0.41
	O_3 Min’	0.01	0.08	-0.01	0.40	0.01	0.14	-0.01	0.15	0.00	0.64	0.00	0.49	0.00	0.49	0.00	0.71
	CO Min’	0.96	0.30	-0.59	0.55	-0.64	0.51	-0.15	0.87	-0.58	0.56	1.54	0.12	-1.44	0.14	1.37	0.13
	NO Mean	0.00	0.51	0.00	0.81	0.00	0.43	0.00	0.99	-0.01	0.12	0.01	0.04	-0.01	0.06	0.01	0.07
	NO_2 Mean	0.00	0.96	0.00	0.86	0.00	0.74	0.00	0.95	-0.01	0.51	0.01	0.38	0.00	0.67	0.01	0.41
	NOD Mean	0.00	0.64	0.00	0.71	0.00	0.48	0.00	0.93	0.00	0.12	0.00	0.04	0.00	0.09	0.00	0.09
	SO_2 Mean	-0.01	0.46	0.01	0.57	0.00	0.99	0.00	0.87	0.00	0.92	0.00	0.99	-0.01	0.66	0.02	0.27
	PM_{10} Mean	0.00	0.65	0.00	0.95	-0.01	0.20	0.00	0.80	0.00	0.83	0.01	0.40	-0.01	0.57	0.01	0.57
	O_3 Mean	0.01	0.22	0.00	0.90	0.00	0.97	-0.01	0.34	0.01	0.07	-0.01	0.38	0.00	0.68	0.00	0.88
	CO Mean	-0.08	0.86	0.15	0.76	0.10	0.85	-0.23	0.65	-0.53	0.29	0.57	0.26	-0.66	0.19	0.92	0.04
	NO Max’	0.00	0.59	0.00	0.78	0.00	0.54	0.00	0.45	0.00	0.25	0.00	0.12	0.00	0.45	0.00	0.59
	NO_2 Max’	0.00	0.58	0.00	0.46	0.00	0.43	0.00	0.44	0.00	0.69	0.00	0.92	0.00	0.94	0.00	0.44
	NOD Max’	0.00	0.47	0.00	0.55	0.00	0.80	0.00	0.47	0.00	0.30	0.00	0.17	0.00	0.56	0.00	0.56
	SO_2 Max’	0.00	0.34	0.00	0.27	0.00	0.84	0.00	0.74	0.00	0.54	0.00	0.35	0.00	0.84	0.00	0.54
	PM_{10} Max’	0.00	0.91	0.01	0.12	-0.01	0.18	-0.01	0.16	0.00	0.56	0.00	0.29	0.00	0.27	0.00	0.45
	O_3 Max’	0.01	0.11	0.00	0.79	-0.01	0.11	0.01	0.31	0.01	0.28	-0.01	0.05	0.00	0.70	0.00	0.75
	CO Max’	-0.12	0.49	0.04	0.82	0.11	0.55	-0.09	0.64	-0.05	0.80	0.03	0.85	-0.07	0.71	0.13	0.46
Weather	Temp Min’	0.01	0.87	-0.02	0.62	0.00	0.96	0.02	0.64	0.03	0.52	-0.01	0.86	-0.02	0.59	0.00	0.99
	Temp Max’	0.00	0.91	0.00	0.92	-0.05	0.20	0.08	0.03	-0.07	0.09	0.03	0.50	0.04	0.27	-0.02	0.50
	Sun	0.00	0.89	-0.01	0.65	-0.01	0.75	0.01	0.74	0.01	0.60	-0.02	0.42	0.04	0.10	-0.02	0.42
	Rain	0.03	0.11	0.00	0.77	-0.02	0.27	0.02	0.29	-0.01	0.56	0.02	0.31	-0.01	0.64	-0.01	0.55
	Pressure	-0.01	0.57	0.01	0.41	-0.02	0.26	0.02	0.24	-0.03	0.06	0.01	0.44	0.02	0.16	-0.02	0.09
	Wind speed	-0.01	0.44	-0.07	0.06	0.11	0.01	-0.10	0.01	0.10	0.02	-0.07	0.11	0.05	0.20	-0.03	0.38
Pollen	Grass	0.01	0.00	0.00	0.35	-0.01	0.01	0.00	0.70	0.00	0.24	0.00	0.31	0.00	0.11	0.00	0.24

Table F. 56: England and Wales Casualty Counts Non-asthmatics – point estimates and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	0.01	0.57	0.01	0.33	-0.02	0.17	0.00	0.81	0.01	0.65	-0.01	0.44	0.01	0.35	0.00	0.96
	NO_2 Min’	-0.01	0.19	0.02	0.06	-0.01	0.25	0.01	0.42	-0.01	0.40	0.00	0.89	-0.01	0.35	0.02	0.04
	NOD Min’	0.00	0.73	0.01	0.10	-0.01	0.09	0.00	0.48	0.00	0.78	0.00	0.49	0.00	0.99	0.00	0.27
	SO_2 Min’	-0.01	0.88	0.03	0.43	-0.02	0.58	0.01	0.76	-0.01	0.80	-0.01	0.82	-0.01	0.74	0.04	0.36
	PM_{10} Min’	0.00	0.67	-0.01	0.29	0.00	0.70	0.00	0.70	-0.01	0.45	-0.01	0.64	0.01	0.39	0.01	0.48
	O_3 Min’	0.01	0.33	0.00	0.87	-0.01	0.20	-0.01	0.26	0.01	0.02	0.00	0.79	-0.01	0.37	0.00	0.90
	CO Min’	0.35	0.63	1.17	0.14	-1.74	0.03	0.83	0.30	-0.63	0.43	-0.21	0.79	0.58	0.46	-0.01	0.99
	NO Mean	0.00	0.24	0.01	0.04	0.00	0.54	0.00	0.48	0.00	0.92	0.00	0.59	0.00	0.25	0.00	0.25
	NO_2 Mean	-0.01	0.15	0.01	0.03	-0.01	0.27	0.01	0.27	-0.01	0.18	0.01	0.34	-0.01	0.05	0.01	0.02
	NOD Mean	0.00	0.18	0.00	0.02	0.00	0.42	0.00	0.81	0.00	0.74	0.00	0.50	0.00	0.17	0.00	0.14
	SO_2 Mean	-0.02	0.10	0.03	0.06	0.00	0.86	0.00	0.97	0.00	0.77	-0.01	0.69	0.00	0.92	0.01	0.50
	PM_{10} Mean	0.00	0.86	0.00	0.61	0.00	0.81	0.00	0.93	-0.01	0.30	0.00	0.84	0.00	0.66	0.01	0.40
	O_3 Mean	0.01	0.03	-0.01	0.03	0.01	0.11	-0.02	0.00	0.02	0.00	-0.01	0.19	0.00	0.45	-0.01	0.29
	CO Mean	-0.45	0.22	1.02	0.01	-0.48	0.25	0.09	0.82	-0.22	0.59	0.11	0.79	-0.46	0.26	0.62	0.09
	NO Max’	0.00	0.32	0.00	0.01	0.00	0.16	0.00	0.85	0.00	0.64	0.00	0.13	0.00	0.04	0.00	0.14
	NO_2 Max’	0.00	0.31	0.01	0.12	0.00	0.93	0.00	0.56	0.00	0.89	0.00	0.85	-0.01	0.11	0.01	0.02
	NOD Max’	0.00	0.27	0.00	0.01	0.00	0.18	0.00	0.83	0.00	0.65	0.00	0.16	0.00	0.03	0.00	0.07
	SO_2 Max’	-0.01	0.13	0.00	0.20	0.00	0.88	0.00	0.76	0.00	0.76	0.00	0.57	0.00	0.42	0.00	0.52
	PM_{10} Max’	0.00	0.95	0.00	0.16	0.00	0.67	0.00	0.20	0.00	1.00	0.00	0.61	0.00	0.73	0.00	0.44
	O_3 Max’	0.00	0.39	-0.01	0.22	0.01	0.02	-0.01	0.01	0.01	0.17	0.00	0.73	0.00	0.32	0.00	0.22
	CO Max’	-0.17	0.22	0.31	0.03	-0.08	0.59	-0.08	0.60	0.01	0.92	0.05	0.71	-0.08	0.61	0.04	0.74
Weather	Temp Min’	0.01	0.83	0.00	0.90	0.01	0.74	-0.05	0.10	0.04	0.25	0.08	0.02	-0.12	0.00	0.03	0.27
	Temp Max’	0.02	0.35	-0.06	0.05	0.01	0.73	0.07	0.03	-0.10	0.00	0.08	0.01	0.00	0.99	-0.03	0.25
	Sun	0.01	0.74	-0.03	0.14	0.01	0.57	0.02	0.44	-0.01	0.71	-0.01	0.51	0.06	0.01	-0.02	0.36
	Rain	0.00	1.00	0.00	0.88	-0.01	0.47	0.02	0.16	-0.01	0.63	0.02	0.21	-0.02	0.07	-0.01	0.30
	Pressure	-0.01	0.37	0.01	0.57	-0.01	0.31	0.02	0.04	-0.03	0.02	0.02	0.05	-0.01	0.56	0.00	0.60
	Wind speed	-0.01	0.23	-0.04	0.20	0.00	0.93	-0.02	0.64	0.05	0.13	-0.03	0.31	0.00	0.97	0.01	0.62
Pollen	Grass	0.00	0.42	0.00	0.47	0.00	0.90	0.00	0.91	0.00	0.44	0.00	0.86	0.00	0.83	0.00	0.32

Table F. 57: England and Wales Emergency Consultations Asthmatics – point estimates and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	0.00	0.89	-0.05	0.01	0.04	0.04	0.01	0.62	-0.02	0.19	0.01	0.61	0.01	0.77	-0.01	0.73
	NO_2 Min’	0.00	0.87	-0.01	0.52	0.02	0.09	-0.01	0.59	-0.01	0.54	0.00	0.86	-0.01	0.60	0.01	0.23
	NOD Min’	0.00	0.99	-0.01	0.05	0.02	0.01	0.00	0.72	-0.01	0.29	0.00	0.78	0.00	0.66	0.00	0.93
	SO_2 Min’	-0.03	0.64	0.04	0.48	0.04	0.56	0.04	0.50	-0.16	0.01	0.09	0.16	0.03	0.61	-0.04	0.52
	PM_{10} Min’	0.01	0.46	0.00	0.83	-0.01	0.62	-0.01	0.41	0.05	0.00	-0.03	0.05	-0.01	0.60	0.01	0.61
	O_3 Min’	-0.01	0.33	0.01	0.15	-0.02	0.01	0.01	0.12	0.00	0.84	-0.01	0.51	0.01	0.37	-0.01	0.48
	CO Min’	-0.19	0.85	-0.24	0.82	0.06	0.95	-0.26	0.82	1.38	0.21	-1.90	0.09	0.63	0.57	0.61	0.56
	NO Mean	0.00	0.70	-0.01	0.20	0.01	0.04	0.00	0.34	0.01	0.26	-0.01	0.01	0.01	0.05	0.00	0.88
	NO_2 Mean	0.00	0.61	-0.01	0.58	0.01	0.40	-0.01	0.56	0.01	0.56	-0.01	0.21	0.01	0.26	0.00	0.66
	NOD Mean	0.00	0.91	0.00	0.24	0.00	0.06	0.00	0.35	0.00	0.28	-0.01	0.01	0.00	0.05	0.00	0.76
	SO_2 Mean	0.01	0.47	-0.01	0.61	0.02	0.36	0.00	0.98	-0.02	0.49	0.00	0.89	0.00	0.88	-0.01	0.61
	PM_{10} Mean	0.01	0.51	-0.01	0.38	0.00	0.88	0.01	0.67	0.02	0.17	-0.04	0.00	0.03	0.01	-0.01	0.19
	O_3 Mean	-0.01	0.38	0.01	0.11	-0.02	0.01	0.01	0.08	-0.01	0.50	0.01	0.25	0.00	0.98	-0.01	0.26
	CO Mean	-0.30	0.56	0.18	0.75	0.32	0.58	-0.42	0.47	0.35	0.54	-0.79	0.17	0.31	0.59	0.48	0.35
	NO Max’	0.00	0.89	0.00	0.75	0.00	0.09	0.00	0.17	0.00	0.92	0.00	0.57	0.00	0.44	0.00	0.80
	NO_2 Max’	0.00	0.67	0.00	0.90	0.01	0.35	-0.01	0.11	0.00	0.65	0.00	0.51	0.00	0.52	0.00	0.78
	NOD Max’	0.00	0.78	0.00	0.51	0.00	0.05	0.00	0.11	0.00	0.97	0.00	0.63	0.00	0.46	0.00	0.80
	SO_2 Max’	0.00	0.51	0.00	0.36	0.00	0.62	0.00	0.91	0.00	0.66	0.00	0.72	0.00	0.51	0.00	0.84
	PM_{10} Max’	0.01	0.14	-0.01	0.25	0.00	0.96	0.00	0.45	0.00	0.54	0.00	0.41	0.01	0.26	0.00	0.49
	O_3 Max’	0.00	0.93	0.01	0.18	-0.01	0.06	0.00	0.97	0.00	0.65	0.01	0.02	0.00	0.48	-0.01	0.34
	CO Max’	-0.06	0.75	0.03	0.89	0.17	0.42	-0.24	0.26	0.15	0.47	-0.26	0.20	0.17	0.42	0.10	0.61
Weather	Temp Min’	0.03	0.52	-0.04	0.36	-0.03	0.54	0.10	0.03	-0.08	0.07	0.06	0.19	-0.10	0.03	0.06	0.13
	Temp Max’	0.03	0.36	0.02	0.57	-0.13	0.00	0.12	0.01	-0.03	0.43	0.04	0.41	-0.11	0.01	0.07	0.07
	Sun	-0.02	0.47	0.02	0.45	-0.04	0.21	0.03	0.26	0.00	0.90	-0.02	0.58	0.00	0.92	0.01	0.81
	Rain	0.03	0.14	-0.02	0.34	0.02	0.42	-0.03	0.14	0.01	0.53	0.00	0.81	0.03	0.17	-0.01	0.46
	Pressure	0.01	0.56	-0.02	0.12	0.03	0.08	0.00	0.95	0.00	0.99	-0.01	0.55	-0.01	0.74	0.00	0.81
	Wind speed	0.00	0.77	0.04	0.40	-0.05	0.33	0.00	0.95	-0.02	0.74	0.10	0.03	-0.04	0.44	-0.03	0.41
Pollen	Grass	0.00	0.82	0.00	0.35	0.00	0.48	0.00	0.84	0.00	0.59	0.00	0.82	0.00	0.60	0.00	0.77

Table F. 58: England and Wales Emergency Consultations Non-asthmatics – point estimates and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	0.00	0.87	0.01	0.65	-0.01	0.59	-0.02	0.20	0.01	0.24	0.00	0.78	0.00	0.86	0.00	0.90
	NO_2 Min’	-0.01	0.25	0.02	0.07	-0.01	0.39	0.00	0.65	0.00	0.73	0.00	0.86	0.01	0.53	0.00	0.50
	NOD Min’	0.00	0.77	0.00	0.32	0.00	0.54	0.00	0.30	0.00	0.37	0.00	0.93	0.00	0.61	0.00	0.66
	SO_2 Min’	0.00	0.98	0.01	0.74	-0.01	0.81	0.03	0.46	-0.04	0.34	0.02	0.71	0.00	0.98	0.01	0.83
	PM_{10} Min’	0.00	0.84	0.01	0.45	-0.01	0.22	0.00	0.90	0.01	0.22	-0.01	0.33	0.01	0.27	-0.01	0.32
	O_3 Min’	-0.01	0.16	0.01	0.22	0.00	0.94	-0.01	0.12	0.00	0.48	0.00	0.44	-0.01	0.35	0.00	0.68
	CO Min’	0.02	0.98	0.42	0.57	-0.67	0.36	-0.18	0.81	0.68	0.36	-0.18	0.81	0.12	0.87	-0.03	0.97
	NO Mean	0.00	0.35	0.00	0.16	0.00	0.68	0.00	0.18	0.00	0.26	0.00	0.66	0.00	0.49	0.00	0.80
	NO_2 Mean	-0.01	0.37	0.01	0.05	-0.01	0.31	0.00	0.67	0.01	0.26	-0.01	0.31	0.00	0.47	0.00	0.62
	NOD Mean	0.00	0.34	0.00	0.08	0.00	0.47	0.00	0.27	0.00	0.24	0.00	0.54	0.00	0.45	0.00	0.70
	SO_2 Mean	-0.01	0.47	0.02	0.16	-0.01	0.49	-0.01	0.69	0.03	0.02	-0.05	0.00	0.01	0.31	0.01	0.65
	PM_{10} Mean	0.01	0.15	-0.01	0.23	0.00	0.57	0.00	0.53	0.01	0.29	-0.01	0.12	0.01	0.20	0.00	0.65
	O_3 Mean	0.00	0.54	-0.01	0.20	0.01	0.14	-0.01	0.11	0.00	0.60	0.00	0.81	0.00	0.49	0.00	0.39
	CO Mean	-0.12	0.73	0.72	0.06	-0.62	0.11	-0.14	0.71	0.31	0.43	-0.18	0.64	0.13	0.73	-0.01	0.97
	NO Max’	0.00	0.19	0.00	0.01	0.00	0.21	0.00	0.28	0.00	0.47	0.00	0.82	0.00	0.39	0.00	0.30
	NO_2 Max’	0.00	0.84	0.00	0.62	0.00	0.87	0.00	0.56	0.00	0.97	0.00	0.94	0.00	0.72	0.00	0.63
	NOD Max’	0.00	0.29	0.00	0.03	0.00	0.34	0.00	0.23	0.00	0.45	0.00	0.99	0.00	0.55	0.00	0.34
	SO_2 Max’	0.00	0.27	0.00	0.19	0.00	0.89	0.00	0.47	0.01	0.02	-0.01	0.06	0.00	0.92	0.00	0.92
	PM_{10} Max’	0.00	0.17	0.00	0.55	0.00	0.29	-0.01	0.03	0.00	0.70	0.00	0.48	0.00	0.17	0.00	0.25
	O_3 Max’	0.00	0.49	0.00	0.50	0.00	0.44	0.00	0.42	0.00	0.76	0.00	0.54	0.00	0.28	0.00	0.21
	CO Max’	-0.18	0.17	0.37	0.01	-0.17	0.21	-0.18	0.19	0.13	0.35	0.01	0.96	-0.12	0.38	0.15	0.25
Weather	Temp Min’	0.04	0.12	-0.04	0.20	-0.03	0.35	0.05	0.14	-0.04	0.19	0.04	0.17	0.00	0.93	-0.04	0.17
	Temp Max’	-0.02	0.37	0.03	0.24	-0.04	0.17	0.02	0.56	0.00	0.98	-0.01	0.74	0.04	0.13	-0.04	0.11
	Sun	-0.01	0.47	-0.01	0.47	0.04	0.03	-0.04	0.07	0.00	0.91	0.03	0.19	0.01	0.68	-0.03	0.09
	Rain	0.02	0.06	-0.01	0.43	0.00	0.93	-0.01	0.27	0.01	0.40	-0.01	0.68	0.01	0.67	0.00	0.85
	Pressure	0.00	0.74	0.01	0.19	-0.02	0.03	0.01	0.19	0.01	0.35	-0.02	0.07	0.01	0.30	-0.01	0.46
	Wind speed	0.00	0.91	-0.04	0.17	0.03	0.33	0.00	0.88	-0.03	0.35	0.05	0.14	-0.03	0.36	0.00	0.87
Pollen	Grass	0.00	0.46	0.00	0.45	0.00	0.48	0.00	0.03	0.01	0.01	0.00	0.48	0.00	0.18	0.00	0.21

Table F. 59: England and Wales Emergency Counts Asthmatics – point estimates and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	-0.03	0.39	-0.03	0.43	0.01	0.76	0.03	0.43	-0.03	0.41	0.05	0.19	-0.05	0.17	0.03	0.44
	NO_2 Min’	0.01	0.76	-0.04	0.10	0.05	0.03	-0.01	0.56	-0.03	0.16	0.04	0.08	-0.04	0.08	0.04	0.09
	NOD Min’	-0.01	0.60	-0.01	0.38	0.01	0.25	0.00	0.85	-0.01	0.25	0.02	0.16	-0.02	0.17	0.01	0.27
	SO_2 Min’	-0.17	0.12	0.15	0.20	-0.01	0.95	0.03	0.79	-0.04	0.74	0.06	0.62	-0.05	0.65	0.02	0.84
	PM_{10} Min’	-0.02	0.56	0.01	0.77	-0.04	0.19	0.03	0.33	0.05	0.11	-0.04	0.23	0.00	0.97	0.01	0.82
	O_3 Min’	-0.01	0.68	0.02	0.20	-0.03	0.09	0.00	0.92	0.02	0.19	-0.01	0.72	0.01	0.68	-0.02	0.25
	CO Min’	-0.58	0.77	0.20	0.92	-1.41	0.51	0.61	0.77	0.70	0.74	1.19	0.57	-2.39	0.26	1.83	0.36
	NO Mean	-0.01	0.25	0.00	0.83	0.01	0.48	0.00	0.99	0.00	0.92	0.00	0.56	0.00	0.91	0.01	0.49
	NO_2 Mean	0.01	0.64	-0.01	0.55	0.01	0.77	0.01	0.64	-0.02	0.29	0.02	0.27	-0.02	0.30	0.02	0.29
	NOD Mean	0.00	0.46	0.00	0.96	0.00	0.47	0.00	0.92	0.00	0.79	0.00	0.90	0.00	0.89	0.00	0.44
	SO_2 Mean	-0.05	0.23	0.02	0.60	0.05	0.22	0.00	0.92	-0.05	0.24	0.03	0.55	-0.03	0.47	0.04	0.26
	PM_{10} Mean	0.00	0.86	0.00	0.98	-0.03	0.18	0.05	0.03	-0.01	0.65	-0.03	0.16	0.03	0.21	-0.01	0.73
	O_3 Mean	-0.01	0.53	0.02	0.12	-0.03	0.08	0.00	0.86	0.01	0.41	0.00	0.97	0.00	0.79	-0.01	0.28
	CO Mean	-1.24	0.21	1.47	0.18	-0.32	0.77	0.03	0.98	-0.57	0.60	0.64	0.56	-1.26	0.25	1.69	0.08
	NO Max’	0.00	0.44	0.00	0.42	0.00	0.40	0.00	0.32	0.00	0.79	0.00	0.85	0.00	0.66	0.00	0.90
	NO_2 Max’	0.00	0.80	0.00	0.65	0.00	0.92	-0.02	0.15	0.00	0.77	0.01	0.32	-0.01	0.44	0.01	0.41
	NOD Max’	0.00	0.49	0.00	0.49	0.00	0.33	0.00	0.20	0.00	0.85	0.00	0.76	0.00	0.77	0.00	0.93
	SO_2 Max’	-0.02	0.04	0.01	0.21	0.01	0.26	0.00	0.70	-0.01	0.39	0.00	0.81	-0.01	0.46	0.01	0.19
	PM_{10} Max’	0.00	0.55	0.01	0.23	-0.01	0.18	0.00	0.72	-0.01	0.41	0.00	0.82	0.00	0.79	0.00	0.87
	O_3 Max’	0.01	0.54	0.01	0.18	-0.02	0.07	0.00	0.95	0.00	0.66	0.00	0.80	0.00	0.81	0.00	0.75
	CO Max’	-0.40	0.28	0.42	0.29	0.26	0.52	-0.44	0.26	0.21	0.59	-0.14	0.71	0.12	0.75	0.01	0.99
Weather	Temp Min’	0.08	0.32	-0.12	0.20	0.06	0.53	0.04	0.64	-0.02	0.79	0.00	0.98	-0.11	0.20	0.09	0.25
	Temp Max’	-0.01	0.92	0.03	0.68	-0.11	0.18	0.12	0.14	-0.06	0.47	0.01	0.94	-0.04	0.64	0.05	0.48
	Sun	-0.02	0.74	0.01	0.79	-0.08	0.16	0.04	0.47	0.04	0.50	-0.11	0.05	0.13	0.02	-0.06	0.28
	Rain	0.06	0.07	-0.03	0.47	-0.01	0.69	0.00	0.92	-0.02	0.68	0.05	0.13	-0.01	0.71	-0.02	0.64
	Pressure	-0.02	0.48	0.02	0.57	-0.01	0.81	0.02	0.43	-0.04	0.19	0.03	0.38	-0.01	0.86	-0.01	0.69
	Wind speed	-0.01	0.68	-0.03	0.69	0.04	0.63	-0.13	0.14	0.10	0.24	0.07	0.44	0.06	0.47	-0.15	0.05
Pollen	Grass	0.00	0.40	0.01	0.22	-0.01	0.03	0.00	0.82	0.01	0.27	-0.01	0.10	0.01	0.24	0.00	0.85

Table F. 60: England and Wales Emergency Counts Non-asthmatics – point estimates and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	0.01	0.70	0.03	0.21	-0.03	0.25	-0.02	0.30	0.04	0.11	-0.01	0.65	-0.01	0.59	0.01	0.62
	NO_2 Min’	-0.01	0.68	0.02	0.26	0.00	0.83	-0.01	0.64	0.01	0.62	-0.01	0.54	-0.01	0.50	0.02	0.24
	NOD Min’	0.00	0.99	0.01	0.14	-0.01	0.34	-0.01	0.42	0.01	0.16	-0.01	0.35	-0.01	0.45	0.01	0.27
	SO_2 Min’	0.00	0.97	0.12	0.16	-0.10	0.24	0.03	0.74	-0.04	0.59	0.02	0.76	-0.02	0.83	0.03	0.65
	PM_{10} Min’	-0.01	0.70	0.00	0.91	0.00	0.85	0.00	0.86	0.02	0.43	-0.03	0.18	0.03	0.14	-0.02	0.31
	O_3 Min’	0.00	0.96	0.00	0.77	-0.01	0.21	-0.01	0.20	0.03	0.02	0.00	0.98	0.00	0.76	0.00	0.87
	CO Min’	0.40	0.77	1.76	0.23	-2.76	0.06	0.66	0.65	0.92	0.53	-0.42	0.78	0.14	0.93	-0.44	0.75
	NO Mean	-0.01	0.26	0.01	0.02	0.00	0.43	-0.01	0.12	0.01	0.03	-0.01	0.16	0.00	0.90	0.00	0.61
	NO_2 Mean	-0.01	0.21	0.03	0.01	-0.02	0.23	0.00	0.96	0.01	0.43	-0.01	0.27	0.00	0.71	0.01	0.52
	NOD Mean	0.00	0.21	0.01	0.01	0.00	0.37	0.00	0.20	0.01	0.05	0.00	0.14	0.00	0.90	0.00	0.60
	SO_2 Mean	-0.06	0.02	0.08	0.01	-0.01	0.63	-0.01	0.78	0.03	0.30	-0.04	0.15	0.00	0.91	0.02	0.38
	PM_{10} Mean	0.01	0.69	-0.01	0.44	0.03	0.10	-0.02	0.20	0.02	0.14	-0.04	0.02	0.02	0.17	0.00	0.93
	O_3 Mean	0.01	0.20	-0.02	0.09	0.01	0.23	-0.03	0.01	0.03	0.01	-0.01	0.37	0.01	0.30	-0.01	0.45
	CO Mean	-0.59	0.39	2.16	0.00	-1.19	0.12	-0.42	0.58	0.89	0.25	-0.87	0.25	-0.20	0.80	0.49	0.47
	NO Max’	0.00	0.65	0.00	0.01	0.00	0.13	0.00	0.35	0.00	0.17	0.00	0.62	0.00	0.15	0.00	0.13
	NO_2 Max’	0.00	0.74	0.02	0.04	-0.01	0.28	0.00	0.76	0.01	0.48	0.00	0.57	-0.01	0.23	0.01	0.22
	NOD Max’	0.00	0.65	0.00	0.01	0.00	0.11	0.00	0.37	0.00	0.17	0.00	0.56	0.00	0.16	0.00	0.12
	SO_2 Max’	-0.02	0.01	0.02	0.02	0.00	0.76	-0.01	0.25	0.01	0.05	0.00	0.58	-0.01	0.20	0.00	0.55
	PM_{10} Max’	0.00	0.63	0.00	0.49	0.01	0.39	-0.01	0.05	0.00	0.42	0.00	0.49	0.00	0.70	0.01	0.35
	O_3 Max’	0.01	0.27	-0.01	0.21	0.01	0.11	-0.02	0.03	0.00	0.67	0.00	0.59	0.00	0.84	0.00	0.76
	CO Max’	-0.31	0.22	0.74	0.01	-0.31	0.26	-0.34	0.22	0.50	0.07	-0.31	0.25	-0.26	0.33	0.30	0.24
Weather	Temp Min’	0.07	0.17	-0.07	0.28	-0.05	0.41	0.06	0.36	-0.03	0.64	0.09	0.17	-0.05	0.40	-0.04	0.50
	Temp Max’	0.02	0.76	0.00	0.94	-0.11	0.06	0.13	0.03	-0.09	0.11	0.03	0.62	0.07	0.23	-0.06	0.24
	Sun	0.00	1.00	-0.04	0.29	0.04	0.29	-0.02	0.65	0.01	0.87	-0.01	0.86	0.06	0.10	-0.06	0.10
	Rain	0.01	0.60	0.00	0.95	-0.01	0.61	0.00	0.87	0.00	0.90	0.01	0.58	-0.02	0.38	0.01	0.84
	Pressure	-0.01	0.62	0.02	0.35	-0.04	0.03	0.05	0.02	-0.02	0.44	0.01	0.72	-0.01	0.77	-0.01	0.61
	Wind speed	-0.01	0.51	-0.07	0.21	0.06	0.30	-0.10	0.10	0.09	0.17	0.00	0.95	0.05	0.44	-0.05	0.33
Pollen	Grass	0.01	0.01	-0.01	0.04	0.00	0.70	-0.01	0.18	0.01	0.02	0.00	0.74	-0.01	0.05	0.00	0.26

Table F. 61: England and Wales Out of Hours Counts Asthmatics – point estimates and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	-0.01	0.53	0.02	0.29	-0.03	0.09	0.04	0.03	-0.03	0.21	0.01	0.74	0.00	0.83	-0.01	0.64
	NO_2 Min’	0.00	0.78	-0.01	0.41	0.01	0.57	0.00	0.93	-0.01	0.71	0.01	0.35	-0.01	0.30	0.01	0.65
	NOD Min’	0.00	0.62	0.00	0.53	-0.01	0.27	0.01	0.13	-0.01	0.35	0.00	0.54	0.00	0.73	0.00	0.97
	SO_2 Min’	-0.10	0.11	0.08	0.28	-0.03	0.64	0.03	0.65	0.07	0.32	0.00	0.96	-0.11	0.12	0.04	0.53
	PM_{10} Min’	-0.03	0.10	0.02	0.17	-0.01	0.55	0.02	0.24	0.00	0.84	0.00	0.94	0.00	0.94	-0.01	0.61
	O_3 Min’	0.00	0.71	0.01	0.21	-0.02	0.03	0.00	0.97	0.02	0.04	-0.01	0.13	0.01	0.23	-0.01	0.29
	CO Min’	-0.99	0.40	0.83	0.51	-0.58	0.65	1.01	0.43	-0.82	0.52	1.93	0.13	-2.31	0.07	0.81	0.49
	NO Mean	-0.01	0.15	0.01	0.05	-0.01	0.08	0.01	0.10	0.00	0.93	0.00	0.65	0.00	0.97	0.00	0.78
	NO_2 Mean	0.00	0.77	0.00	0.68	-0.01	0.55	0.01	0.22	-0.01	0.21	0.02	0.04	-0.03	0.02	0.01	0.19
	NOD Mean	0.00	0.21	0.00	0.09	0.00	0.11	0.00	0.09	0.00	0.76	0.00	0.87	0.00	0.60	0.00	0.96
	SO_2 Mean	-0.04	0.11	0.02	0.39	0.01	0.82	0.02	0.42	-0.04	0.12	0.04	0.13	-0.02	0.35	0.01	0.65
	PM_{10} Mean	-0.01	0.26	0.02	0.07	-0.03	0.02	0.04	0.00	-0.02	0.14	-0.01	0.70	0.00	0.89	0.00	0.72
	O_3 Mean	-0.01	0.41	0.01	0.17	-0.01	0.30	0.00	0.85	0.01	0.52	-0.01	0.28	0.01	0.22	-0.01	0.37
	CO Mean	-1.19	0.04	1.54	0.02	-1.20	0.07	1.15	0.08	-0.62	0.35	0.93	0.16	-1.20	0.07	0.58	0.32
	NO Max’	0.00	0.15	0.00	0.05	0.00	0.29	0.00	0.36	0.00	0.65	0.00	0.45	0.00	0.53	0.00	0.44
	NO_2 Max’	0.00	0.93	0.00	0.73	0.00	0.83	0.00	0.86	0.00	0.73	0.00	0.58	-0.01	0.41	0.00	0.66
	NOD Max’	0.00	0.20	0.00	0.09	0.00	0.46	0.00	0.53	0.00	0.70	0.00	0.64	0.00	0.75	0.00	0.61
	SO_2 Max’	-0.01	0.09	0.00	0.67	0.00	0.43	0.01	0.26	-0.01	0.08	0.00	0.42	-0.01	0.29	0.01	0.17
	PM_{10} Max’	0.00	0.53	0.01	0.04	-0.01	0.21	0.01	0.27	-0.01	0.24	0.00	0.72	0.00	0.92	0.00	0.60
	O_3 Max’	0.00	0.75	0.01	0.15	0.00	0.64	-0.01	0.44	0.00	0.67	0.00	0.63	0.00	0.92	0.00	0.98
	CO Max’	-0.39	0.07	0.50	0.03	-0.13	0.58	0.05	0.82	0.08	0.74	-0.01	0.97	0.01	0.96	-0.16	0.46
Weather	Temp Min’	0.02	0.65	-0.04	0.51	0.09	0.08	-0.11	0.04	0.06	0.28	-0.04	0.47	-0.01	0.91	0.03	0.52
	Temp Max’	-0.02	0.65	-0.01	0.86	0.04	0.44	-0.02	0.73	0.01	0.91	-0.07	0.16	0.08	0.10	-0.03	0.51
	Sun	-0.01	0.64	0.02	0.52	-0.04	0.22	0.00	0.97	0.02	0.64	-0.07	0.04	0.10	0.00	-0.05	0.14
	Rain	0.01	0.69	-0.03	0.21	0.00	0.83	0.01	0.49	-0.01	0.64	0.05	0.03	-0.04	0.10	0.00	0.90
	Pressure	-0.01	0.44	0.02	0.33	0.00	0.92	0.00	0.89	-0.03	0.11	0.04	0.02	-0.03	0.12	0.01	0.56
	Wind speed	0.00	0.94	0.04	0.43	-0.05	0.38	-0.02	0.66	0.04	0.47	0.00	0.96	0.07	0.19	-0.09	0.05
Pollen	Grass	0.00	0.27	0.01	0.06	0.00	0.24	0.00	0.84	0.00	0.21	-0.01	0.11	0.00	0.59	0.00	0.74

Table F. 62: England and Wales Out of Hours Counts Non-asthmatics – point estimates and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	-0.01	0.55	0.02	0.26	0.00	0.79	-0.01	0.59	0.01	0.68	-0.01	0.64	-0.01	0.62	0.01	0.58
	NO_2 Min’	0.01	0.25	-0.01	0.19	0.02	0.11	-0.01	0.13	0.01	0.32	0.00	0.81	-0.01	0.31	0.01	0.41
	NOD Min’	0.00	0.88	0.00	0.87	0.00	0.33	-0.01	0.15	0.01	0.22	0.00	0.43	0.00	0.44	0.00	0.35
	SO_2 Min’	0.01	0.75	0.03	0.48	-0.02	0.68	-0.04	0.38	0.00	0.92	0.04	0.46	0.00	0.94	-0.01	0.74
	PM_{10} Min’	-0.01	0.40	0.00	0.89	0.01	0.40	-0.01	0.57	0.01	0.60	0.00	0.90	0.01	0.68	-0.01	0.27
	O_3 Min’	0.00	0.71	-0.01	0.42	0.00	0.48	0.00	0.61	0.00	0.58	0.00	0.47	0.01	0.13	0.00	0.44
	CO Min’	-0.29	0.73	0.59	0.50	-0.20	0.82	-0.27	0.75	0.54	0.54	-0.13	0.88	-0.07	0.93	-0.18	0.82
	NO Mean	0.00	0.61	0.00	0.23	0.00	0.78	0.00	0.66	0.01	0.10	-0.01	0.08	0.00	0.92	0.00	0.56
	NO_2 Mean	0.00	0.79	0.00	0.56	0.00	0.94	-0.01	0.42	0.01	0.14	-0.01	0.27	0.00	0.98	0.00	0.78
	NOD Mean	0.00	0.59	0.00	0.29	0.00	0.94	0.00	0.50	0.00	0.08	0.00	0.08	0.00	0.96	0.00	0.70
	SO_2 Mean	-0.02	0.16	0.02	0.29	0.00	0.79	-0.01	0.71	-0.01	0.60	0.02	0.36	-0.01	0.64	0.00	0.76
	PM_{10} Mean	-0.01	0.38	0.00	0.79	0.01	0.23	-0.01	0.18	0.02	0.07	-0.01	0.16	0.00	0.78	0.00	0.75
	O_3 Mean	0.00	0.92	0.00	0.91	0.00	0.44	0.00	0.86	0.00	0.66	0.00	0.45	0.01	0.10	-0.01	0.27
	CO Mean	-0.29	0.48	0.74	0.11	-0.29	0.53	-0.12	0.79	0.42	0.36	-0.45	0.32	-0.04	0.93	0.10	0.81
	NO Max’	0.00	0.57	0.00	0.68	0.00	0.65	0.00	0.91	0.00	0.18	0.00	0.14	0.00	0.55	0.00	0.44
	NO_2 Max’	0.00	0.94	0.01	0.16	-0.01	0.16	0.00	0.61	0.00	0.64	0.00	0.94	-0.01	0.23	0.00	0.95
	NOD Max’	0.00	0.62	0.00	0.48	0.00	0.43	0.00	0.82	0.00	0.20	0.00	0.19	0.00	0.45	0.00	0.45
	SO_2 Max’	-0.01	0.16	0.00	0.38	0.00	0.48	0.00	0.50	0.00	0.93	0.00	0.47	0.00	0.30	0.00	1.00
	PM_{10} Max’	0.00	0.43	0.00	0.24	0.00	0.50	0.00	0.50	0.00	0.45	0.00	0.20	0.00	0.92	0.00	0.80
	O_3 Max’	0.00	0.30	0.00	0.68	0.00	0.57	0.00	0.88	0.00	0.81	0.00	0.51	0.00	0.64	0.00	0.87
	CO Max’	-0.07	0.65	0.16	0.32	-0.07	0.69	0.01	0.95	0.17	0.29	-0.21	0.19	-0.14	0.40	0.16	0.30
Weather	Temp Min’	0.01	0.81	-0.01	0.70	-0.03	0.43	0.02	0.51	0.01	0.89	-0.03	0.37	0.07	0.07	-0.04	0.26
	Temp Max’	0.00	0.98	0.03	0.43	-0.08	0.03	0.04	0.24	0.01	0.78	-0.05	0.18	0.02	0.56	0.02	0.45
	Sun	0.00	0.91	0.01	0.77	-0.01	0.65	0.00	0.92	0.02	0.32	-0.03	0.18	0.01	0.75	-0.01	0.78
	Rain	-0.01	0.56	0.01	0.65	-0.01	0.59	0.01	0.60	-0.02	0.31	0.01	0.38	-0.01	0.32	0.02	0.18
	Pressure	0.00	0.69	0.01	0.65	-0.01	0.37	0.01	0.39	0.00	0.94	0.00	0.89	-0.01	0.38	0.01	0.60
	Wind speed	0.00	0.96	0.02	0.48	0.03	0.47	-0.09	0.01	0.06	0.10	-0.04	0.29	0.08	0.03	-0.06	0.06
Pollen	Grass	0.01	0.02	-0.01	0.01	0.00	0.29	0.00	0.71	0.00	0.57	0.00	0.85	0.00	0.11	0.00	0.13

Table F. 63: England and Wales All Counts Excess – point estimates and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min'	-0.13	0.55	0.04	0.85	0.07	0.75	-0.10	0.66	0.16	0.48	-0.08	0.74	-0.31	0.19	0.35	0.11
	NO_2 Min'	-0.07	0.64	0.24	0.14	-0.02	0.91	0.19	0.25	-0.29	0.07	-0.18	0.27	0.18	0.28	0.15	0.31
	NOD Min'	-0.06	0.46	0.09	0.28	0.04	0.68	0.01	0.92	-0.04	0.61	-0.08	0.36	-0.01	0.95	0.12	0.13
	SO_2 Min'	-1.75	0.02	1.66	0.04	0.83	0.30	-0.96	0.24	0.08	0.92	0.20	0.80	0.53	0.51	-0.38	0.61
	PM_{10} Min'	0.03	0.88	-0.01	0.96	0.29	0.15	-0.13	0.52	0.10	0.62	-0.25	0.21	0.06	0.76	0.11	0.55
	O_3 Min'	-0.12	0.25	-0.05	0.64	0.09	0.42	-0.23	0.03	0.22	0.04	0.04	0.71	-0.13	0.21	0.00	0.99
	CO Min'	-3.45	0.80	1.05	0.94	25.10	0.09	-12.45	0.39	7.17	0.62	-26.68	0.07	0.64	0.97	13.24	0.33
	NO Mean	0.07	0.18	-0.08	0.18	0.06	0.34	0.03	0.63	-0.09	0.13	0.01	0.87	-0.03	0.66	0.11	0.04
	NO_2 Mean	0.07	0.52	0.06	0.62	0.01	0.92	0.16	0.22	-0.15	0.24	-0.11	0.39	-0.06	0.62	0.19	0.09
	NOD Mean	0.04	0.21	-0.03	0.34	0.03	0.42	0.02	0.49	-0.05	0.12	0.00	1.00	-0.02	0.58	0.06	0.04
	SO_2 Mean	-0.09	0.72	0.20	0.49	0.16	0.57	-0.10	0.72	0.19	0.51	-0.29	0.31	0.07	0.82	0.01	0.97
	PM_{10} Mean	0.04	0.77	0.01	0.94	0.15	0.32	0.08	0.59	-0.14	0.38	-0.20	0.19	0.02	0.87	0.15	0.29
	O_3 Mean	-0.01	0.91	-0.16	0.14	0.11	0.29	-0.10	0.34	0.11	0.31	0.10	0.36	-0.13	0.21	-0.03	0.78
	CO Mean	8.64	0.20	-9.93	0.19	7.83	0.30	5.33	0.48	-11.94	0.12	-5.54	0.46	6.23	0.41	6.08	0.37
	NO Max'	0.02	0.37	0.00	0.80	0.01	0.61	0.00	0.95	-0.03	0.08	0.00	0.86	0.00	0.80	0.02	0.19
	NO_2 Max'	0.07	0.31	0.00	0.97	0.01	0.92	0.08	0.26	-0.10	0.15	-0.02	0.76	-0.02	0.79	0.09	0.18
	NOD Max'	0.01	0.22	-0.01	0.53	0.01	0.43	0.00	0.97	-0.02	0.08	0.00	0.90	0.00	0.87	0.01	0.17
	SO_2 Max'	-0.04	0.52	0.07	0.27	-0.02	0.78	0.09	0.19	-0.02	0.74	-0.06	0.39	0.03	0.60	-0.02	0.75
	PM_{10} Max'	0.09	0.12	0.03	0.60	-0.04	0.47	0.07	0.22	-0.03	0.56	-0.16	0.01	0.06	0.29	0.04	0.45
	O_3 Max'	-0.04	0.60	0.08	0.33	-0.16	0.04	0.12	0.11	0.02	0.79	-0.01	0.94	-0.06	0.42	0.03	0.67
	CO Max'	6.05	0.02	-5.33	0.05	1.93	0.48	-0.40	0.88	-1.55	0.57	-3.81	0.16	3.32	0.22	2.96	0.24
Weather	Temp Min'	0.50	0.35	-1.04	0.09	0.84	0.17	0.06	0.93	0.41	0.51	-1.16	0.06	-0.51	0.41	0.93	0.08
	Temp Max'	0.34	0.50	0.04	0.95	-0.22	0.70	-0.60	0.30	0.99	0.08	-0.22	0.70	-0.63	0.27	0.20	0.68
	Sun	-0.22	0.56	0.49	0.19	-0.50	0.19	0.14	0.70	-0.47	0.22	0.23	0.55	0.36	0.33	-0.32	0.39
	Rain	0.02	0.94	0.23	0.36	-0.24	0.34	0.03	0.91	0.14	0.58	-0.16	0.51	0.13	0.61	-0.17	0.48
	Pressure	-0.10	0.55	0.12	0.56	0.09	0.67	-0.12	0.57	0.05	0.82	-0.05	0.81	-0.14	0.50	0.12	0.47
	Wind speed	-0.09	0.43	-1.30	0.02	0.30	0.62	-0.38	0.53	0.24	0.69	1.48	0.02	-0.78	0.20	-0.45	0.40
Pollen	Grass	0.05	0.23	-0.02	0.72	0.01	0.79	-0.01	0.90	0.05	0.26	-0.13	0.00	0.05	0.21	0.01	0.84

Table F. 64: England and Wales Acute Visits Excess – point estimates and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min'	-0.02	0.04	0.02	0.04	0.00	0.71	-0.01	0.29	0.01	0.60	-0.01	0.49	0.02	0.12	0.00	0.97
	NO_2 Min'	0.00	0.82	0.00	0.84	0.00	0.63	0.00	0.74	-0.01	0.11	0.01	0.14	0.00	0.76	0.00	0.84
	NOD Min'	0.00	0.20	0.00	0.24	0.00	0.94	0.00	0.81	0.00	0.60	0.00	0.85	0.00	0.23	0.00	1.00
	SO_2 Min'	-0.02	0.47	-0.01	0.75	0.06	0.06	-0.02	0.60	-0.04	0.26	-0.01	0.84	0.05	0.14	-0.02	0.55
	PM_{10} Min'	0.00	0.98	-0.01	0.39	0.00	0.67	0.00	0.85	-0.01	0.25	0.01	0.30	0.00	0.75	0.00	0.84
	O_3 Min'	-0.01	0.14	0.00	0.65	0.00	0.33	0.00	0.85	-0.01	0.08	0.01	0.15	0.00	0.36	0.00	0.99
	CO Min'	-0.66	0.25	0.62	0.31	-0.11	0.85	-0.27	0.66	0.39	0.52	-0.48	0.43	1.23	0.04	-0.74	0.19
	NO Mean	0.00	0.92	0.00	0.76	0.00	0.25	0.00	0.31	0.00	0.47	0.00	0.20	0.00	0.45	0.00	0.24
	NO_2 Mean	0.00	0.31	-0.01	0.07	0.01	0.12	0.00	0.74	-0.01	0.21	0.01	0.10	0.00	0.37	0.00	0.35
	NOD Mean	0.00	0.71	0.00	0.45	0.00	0.18	0.00	0.37	0.00	0.35	0.00	0.13	0.00	0.37	0.00	0.24
	SO_2 Mean	0.00	0.72	-0.01	0.36	0.03	0.01	-0.02	0.05	0.00	0.90	-0.01	0.41	0.01	0.40	0.01	0.30
	PM_{10} Mean	0.00	0.73	0.00	0.50	0.00	0.55	0.00	0.89	-0.01	0.10	0.01	0.06	0.00	0.98	0.00	0.83
	O_3 Mean	0.00	0.89	0.00	0.69	0.00	0.37	0.00	0.85	0.00	0.65	0.00	0.30	0.00	0.33	0.00	0.87
	CO Mean	0.05	0.87	-0.09	0.77	0.26	0.41	-0.22	0.50	-0.16	0.62	0.28	0.38	0.12	0.71	-0.07	0.81
	NO Max'	0.00	0.98	0.00	0.96	0.00	0.50	0.00	0.43	0.00	0.35	0.00	0.04	0.00	0.28	0.00	0.59
	NO_2 Max'	0.00	0.68	0.00	0.69	0.00	0.32	0.00	0.67	-0.01	0.04	0.01	0.01	0.00	0.19	0.00	0.28
	NOD Max'	0.00	0.98	0.00	0.99	0.00	0.43	0.00	0.35	0.00	0.37	0.00	0.04	0.00	0.22	0.00	0.44
	SO_2 Max'	0.00	0.66	0.00	0.20	0.00	0.12	0.00	0.88	0.00	0.22	0.00	0.41	0.00	0.22	0.00	0.59
	PM_{10} Max'	0.00	0.84	0.00	0.44	0.00	0.68	0.00	0.51	0.00	0.53	0.00	0.25	0.00	0.82	0.00	0.98
	O_3 Max'	0.00	0.39	0.00	0.23	0.00	0.98	0.00	0.43	0.00	0.83	0.00	0.52	0.00	0.56	0.00	0.64
	CO Max'	0.07	0.53	-0.04	0.71	0.10	0.38	-0.09	0.44	-0.15	0.19	0.25	0.03	-0.06	0.60	0.00	0.97
Weather	Temp Min'	0.01	0.79	0.00	0.99	-0.01	0.82	-0.01	0.61	0.01	0.74	-0.01	0.75	0.01	0.58	-0.01	0.71
	Temp Max'	-0.04	0.07	0.03	0.27	0.04	0.13	-0.06	0.01	0.04	0.12	0.01	0.53	-0.06	0.01	0.04	0.04
	Sun	0.01	0.48	-0.01	0.39	0.01	0.56	0.00	0.98	0.01	0.46	-0.01	0.35	0.00	0.97	0.01	0.63
	Rain	0.00	0.63	0.01	0.16	-0.01	0.21	0.01	0.43	-0.02	0.15	0.01	0.50	-0.01	0.47	0.01	0.46
	Pressure	-0.01	0.06	0.02	0.02	-0.02	0.03	0.01	0.43	0.02	0.08	-0.02	0.02	0.01	0.36	0.00	0.95
	Wind speed	-0.01	0.28	-0.02	0.43	0.02	0.39	-0.01	0.78	-0.02	0.45	0.01	0.66	-0.02	0.49	0.02	0.42
Pollen	Grass	0.00	0.53	0.00	0.14	0.00	0.94	0.00	0.80	0.00	0.88	0.00	0.64	0.00	0.88	0.00	0.71

Table F. 65: England and Wales Casualty Counts Excess – point estimates and P-values by lag day per exposure.

	Exposure	Lag0 Est	P	Lag1 Est	P	Lag2 Est	P	Lag3 Est	P	Lag4 Est	P	Lag5 Est	P	Lag6 Est	P	Lag7 Est	P
Outdoor air pollutants	NO Min'	-0.01	0.63	-0.03	0.08	0.04	0.05	-0.01	0.46	0.00	0.92	0.04	0.02	-0.06	0.00	0.04	0.05
	NO_2 Min'	0.01	0.23	-0.03	0.01	0.03	0.01	-0.02	0.09	-0.01	0.69	0.03	0.04	-0.01	0.35	0.00	1.00
	NOD Min'	0.00	0.85	-0.01	0.03	0.02	0.01	-0.01	0.11	0.00	0.95	0.02	0.02	-0.02	0.01	0.01	0.23
	SO_2 Min'	0.00	0.97	-0.03	0.69	-0.01	0.91	-0.06	0.32	0.10	0.13	0.01	0.89	-0.01	0.93	-0.01	0.93
	PM_{10} Min'	0.00	0.99	0.01	0.66	-0.03	0.06	0.01	0.53	0.01	0.43	0.00	0.83	-0.01	0.49	0.00	0.83
	O_3 Min'	0.01	0.41	-0.01	0.41	0.02	0.03	0.00	0.66	-0.01	0.21	0.01	0.44	0.00	0.98	0.00	0.69
	CO Min'	0.60	0.57	-1.76	0.12	1.10	0.34	-0.98	0.39	0.05	0.96	1.75	0.13	-2.02	0.08	1.38	0.20
	NO Mean	0.00	0.80	-0.01	0.10	0.01	0.27	0.00	0.63	-0.01	0.16	0.01	0.17	0.00	0.42	0.00	0.47
	NO_2 Mean	0.01	0.33	-0.02	0.11	0.00	0.64	-0.01	0.48	0.00	0.71	0.00	0.93	0.01	0.33	-0.01	0.37
	NOD Mean	0.00	0.60	0.00	0.06	0.00	0.24	0.00	0.93	0.00	0.28	0.00	0.21	0.00	0.62	0.00	0.68
	SO_2 Mean	0.01	0.62	-0.02	0.42	0.00	0.91	0.00	0.86	0.00	0.91	0.01	0.79	-0.01	0.66	0.01	0.63
	PM_{10} Mean	0.01	0.61	0.00	0.77	-0.02	0.21	0.00	0.78	0.01	0.59	0.01	0.39	-0.01	0.42	0.00	0.92
	O_3 Mean	0.00	0.63	0.01	0.16	-0.01	0.26	0.01	0.16	-0.01	0.38	0.00	0.87	-0.01	0.38	0.01	0.39
	CO Mean	0.37	0.49	-0.86	0.15	0.57	0.33	-0.32	0.59	-0.32	0.60	0.46	0.43	-0.20	0.74	0.30	0.57
	NO Max'	0.00	0.83	0.00	0.11	0.00	0.13	0.00	0.60	0.00	0.51	0.00	0.78	0.00	0.44	0.00	0.57
	NO_2 Max'	0.00	0.81	0.00	0.65	0.00	0.55	0.00	0.80	0.00	0.81	0.00	0.97	0.01	0.24	-0.01	0.31
	NOD Max'	0.00	0.88	0.00	0.17	0.00	0.25	0.00	0.64	0.00	0.57	0.00	0.83	0.00	0.33	0.00	0.46
	SO_2 Max'	0.00	0.82	0.00	0.96	0.00	0.95	0.00	0.94	0.00	0.75	-0.01	0.23	0.00	0.47	0.00	0.93
	PM_{10} Max'	0.00	0.96	0.00	0.73	0.00	0.40	0.00	0.77	0.00	0.62	0.00	0.58	0.00	0.49	0.00	0.91
	O_3 Max'	0.00	0.44	0.01	0.29	-0.02	0.00	0.02	0.01	0.00	0.98	-0.01	0.15	0.00	0.72	0.01	0.26
	CO Max'	0.05	0.79	-0.27	0.20	0.19	0.38	-0.01	0.97	-0.06	0.77	-0.02	0.92	0.01	0.96	0.08	0.68
Weather	Temp Min'	0.00	1.00	-0.02	0.61	-0.01	0.85	0.07	0.13	-0.01	0.81	-0.09	0.07	0.10	0.03	-0.03	0.45
	Temp Max'	-0.02	0.59	0.06	0.20	-0.06	0.18	0.01	0.74	0.03	0.45	-0.06	0.20	0.04	0.34	0.01	0.83
	Sun	-0.01	0.73	0.02	0.53	-0.02	0.51	-0.01	0.80	0.02	0.48	-0.01	0.82	-0.01	0.65	0.00	0.95
	Rain	0.03	0.17	0.00	0.88	-0.01	0.66	0.00	0.95	0.00	0.87	0.00	0.99	0.02	0.40	0.00	0.84
	Pressure	0.00	0.90	0.01	0.76	0.00	0.79	-0.01	0.65	0.00	0.95	-0.01	0.49	0.03	0.11	-0.01	0.29
	Wind speed	0.00	0.86	-0.03	0.47	0.11	0.03	-0.09	0.06	0.05	0.32	-0.03	0.50	0.05	0.26	-0.05	0.27
Pollen	Grass	0.01	0.05	0.00	0.76	-0.01	0.04	0.00	0.80	0.00	0.64	0.00	0.32	0.01	0.13	0.00	0.77

Table F. 66: England and Wales Emergency Consultations Excess – point estimates and P-values by lag day per exposure.

	Exposure	Lag0 Est	P	Lag1 Est	P	Lag2 Est	P	Lag3 Est	P	Lag4 Est	P	Lag5 Est	P	Lag6 Est	P	Lag7 Est	P
Outdoor air pollutants	NO Min'	0.00	0.80	-0.05	0.01	0.04	0.02	0.02	0.18	-0.04	0.04	0.01	0.75	0.00	0.86	0.00	0.80
	NO_2 Min'	0.01	0.55	-0.02	0.07	0.03	0.03	0.00	0.82	-0.01	0.41	0.00	0.95	-0.01	0.35	0.02	0.11
	NOD Min'	0.00	0.86	-0.02	0.01	0.02	0.00	0.00	0.74	-0.01	0.10	0.00	0.83	0.00	0.92	0.00	0.84
	SO_2 Min'	-0.03	0.66	0.03	0.63	0.05	0.46	0.01	0.86	-0.13	0.05	0.07	0.25	0.03	0.61	-0.04	0.44
	PM_{10} Min'	0.01	0.56	-0.01	0.48	0.00	0.76	-0.01	0.37	0.04	0.01	-0.02	0.19	-0.02	0.22	0.02	0.25
	O_3 Min'	0.00	0.98	0.01	0.54	-0.02	0.02	0.02	0.01	0.00	0.79	-0.01	0.25	0.01	0.14	-0.01	0.34
	CO Min'	-0.21	0.84	-0.66	0.56	0.74	0.51	-0.08	0.95	0.70	0.54	-1.72	0.13	0.50	0.66	0.64	0.55
	NO Mean	0.00	0.82	-0.01	0.03	0.01	0.02	0.00	0.95	0.00	0.71	-0.01	0.03	0.01	0.14	0.00	0.98
	NO_2 Mean	0.01	0.28	-0.02	0.07	0.01	0.14	0.00	0.77	0.00	0.87	-0.01	0.57	0.01	0.53	0.00	0.92
	NOD Mean	0.00	0.60	-0.01	0.02	0.01	0.02	0.00	0.85	0.00	0.78	0.00	0.05	0.00	0.15	0.00	0.97
	SO_2 Mean	0.02	0.24	-0.03	0.16	0.03	0.18	0.01	0.82	-0.05	0.03	0.05	0.03	-0.01	0.60	-0.02	0.43
	PM_{10} Mean	0.00	0.76	0.00	0.95	0.00	0.82	0.01	0.41	0.01	0.53	-0.02	0.04	0.02	0.08	-0.01	0.33
	O_3 Mean	-0.01	0.20	0.02	0.02	-0.03	0.00	0.02	0.01	-0.01	0.31	0.01	0.33	0.00	0.63	-0.01	0.09
	CO Mean	-0.18	0.73	-0.53	0.36	0.94	0.11	-0.27	0.64	0.05	0.93	-0.61	0.30	0.17	0.77	0.49	0.35
	NO Max'	0.00	0.33	0.00	0.05	0.00	0.01	0.00	0.52	0.00	0.56	0.00	0.48	0.00	0.18	0.00	0.67
	NO_2 Max'	0.00	0.78	0.00	0.65	0.00	0.42	-0.01	0.24	0.00	0.64	0.00	0.55	0.00	0.70	0.00	0.96
	NOD Max'	0.00	0.33	0.00	0.04	0.00	0.01	0.00	0.43	0.00	0.60	0.00	0.63	0.00	0.27	0.00	0.71
	SO_2 Max'	0.00	0.94	0.00	0.98	0.00	0.57	0.00	0.56	-0.01	0.05	0.01	0.11	0.00	0.48	0.00	0.80
	PM_{10} Max'	0.00	0.60	0.00	0.46	0.00	0.52	0.01	0.03	0.00	0.40	-0.01	0.20	0.01	0.04	-0.01	0.15
	O_3 Max'	0.00	0.71	0.01	0.08	-0.01	0.02	0.00	0.63	0.00	0.81	0.01	0.05	0.00	0.99	-0.01	0.08
	CO Max'	0.11	0.56	-0.34	0.10	0.34	0.11	-0.05	0.80	0.02	0.92	-0.27	0.20	0.29	0.17	-0.05	0.81
Weather	Temp Min'	-0.02	0.70	0.00	0.95	0.00	0.99	0.06	0.23	-0.04	0.36	0.02	0.71	-0.10	0.03	0.10	0.02
	Temp Max'	0.06	0.14	-0.01	0.83	-0.09	0.03	0.10	0.02	-0.03	0.45	0.05	0.31	-0.15	0.00	0.11	0.01
	Sun	-0.01	0.81	0.04	0.22	-0.08	0.01	0.07	0.02	0.01	0.84	-0.04	0.16	-0.01	0.71	0.04	0.18
	Rain	0.00	0.85	-0.01	0.67	0.02	0.40	-0.01	0.46	0.00	0.95	0.00	0.97	0.02	0.29	-0.02	0.40
	Pressure	0.01	0.43	-0.04	0.02	0.05	0.00	-0.02	0.36	-0.01	0.54	0.01	0.56	-0.02	0.31	0.01	0.47
	Wind speed	0.00	0.72	0.07	0.09	-0.08	0.11	0.00	0.97	0.01	0.77	0.05	0.27	-0.01	0.87	-0.04	0.36
Pollen	Grass	0.00	0.79	0.00	0.67	0.00	0.81	0.00	0.22	-0.01	0.03	0.00	0.82	0.00	0.16	0.00	0.60

Table F. 67: England and Wales Emergency Counts Excess – point estimates and P-values by lag day per exposure.

Exposure		Lag0 Est	Lag0 P	Lag1 Est	Lag1 P	Lag2 Est	Lag2 P	Lag3 Est	Lag3 P	Lag4 Est	Lag4 P	Lag5 Est	Lag5 P	Lag6 Est	Lag6 P	Lag7 Est	Lag7 P
Outdoor air pollutants	NO Min’	-0.04	0.28	-0.06	0.11	0.04	0.29	0.05	0.14	-0.07	0.07	0.06	0.12	-0.03	0.34	0.01	0.68
	NO_2 Min’	0.01	0.57	-0.06	0.02	0.05	0.03	-0.01	0.80	-0.04	0.09	0.05	0.03	-0.03	0.21	0.02	0.41
	NOD Min’	-0.01	0.61	-0.02	0.07	0.02	0.08	0.01	0.47	-0.03	0.04	0.03	0.05	-0.01	0.42	0.00	0.74
	SO_2 Min’	-0.16	0.14	0.04	0.77	0.09	0.47	0.00	0.97	0.01	0.96	0.03	0.78	-0.04	0.77	-0.01	0.91
	PM_{10} Min’	-0.01	0.76	0.01	0.72	-0.04	0.17	0.02	0.41	0.03	0.31	-0.01	0.79	-0.03	0.30	0.03	0.37
	O_3 Min’	-0.01	0.72	0.02	0.30	-0.01	0.41	0.02	0.35	-0.01	0.73	-0.01	0.72	0.01	0.55	-0.02	0.32
	CO Min’	-0.98	0.64	-1.56	0.48	1.35	0.54	-0.05	0.98	-0.22	0.92	1.61	0.47	-2.52	0.25	2.27	0.27
	NO Mean	0.00	0.72	-0.01	0.16	0.01	0.23	0.01	0.30	-0.01	0.18	0.00	0.70	0.00	0.85	0.00	0.75
	NO_2 Mean	0.02	0.20	-0.04	0.02	0.02	0.28	0.01	0.68	-0.03	0.12	0.03	0.07	-0.01	0.45	0.01	0.55
	NOD Mean	0.00	0.89	-0.01	0.07	0.01	0.20	0.00	0.35	-0.01	0.12	0.00	0.40	0.00	0.96	0.00	0.69
	SO_2 Mean	0.02	0.68	-0.06	0.18	0.06	0.14	0.00	0.93	-0.08	0.07	0.07	0.13	-0.03	0.53	0.02	0.61
	PM_{10} Mean	0.00	0.93	0.01	0.59	-0.06	0.02	0.07	0.00	-0.03	0.16	0.01	0.80	0.01	0.77	-0.01	0.78
	O_3 Mean	-0.02	0.15	0.04	0.01	-0.04	0.01	0.03	0.04	-0.01	0.36	0.01	0.58	-0.01	0.66	-0.01	0.60
	CO Mean	-0.66	0.52	-0.68	0.55	0.87	0.45	0.46	0.69	-1.46	0.20	1.51	0.19	-1.06	0.35	1.20	0.24
	NO Max’	0.00	0.67	0.00	0.36	0.01	0.07	0.00	0.73	0.00	0.24	0.00	0.61	0.00	0.17	0.00	0.26
	NO_2 Max’	0.00	0.65	-0.01	0.35	0.01	0.41	-0.01	0.24	0.00	0.85	0.01	0.18	0.00	0.95	0.00	0.97
	NOD Max’	0.00	0.72	0.00	0.28	0.00	0.04	0.00	0.52	0.00	0.27	0.00	0.49	0.00	0.23	0.00	0.34
	SO_2 Max’	0.00	0.91	0.00	0.68	0.01	0.39	0.01	0.26	-0.02	0.03	0.00	0.89	0.00	0.88	0.01	0.40
	PM_{10} Max’	0.00	0.80	0.01	0.48	-0.02	0.06	0.01	0.10	-0.01	0.18	0.01	0.50	0.00	0.61	0.00	0.64
	O_3 Max’	0.00	0.89	0.02	0.03	-0.03	0.00	0.02	0.13	0.00	0.89	0.00	0.90	0.00	0.92	-0.01	0.61
	CO Max’	-0.09	0.81	-0.32	0.43	0.57	0.17	-0.11	0.80	-0.29	0.49	0.17	0.68	0.39	0.34	-0.29	0.45
Weather	Temp Min’	0.00	0.97	-0.05	0.60	0.11	0.25	-0.01	0.88	0.00	0.96	-0.08	0.37	-0.06	0.51	0.12	0.12
	Temp Max’	-0.02	0.76	0.04	0.65	-0.01	0.95	0.00	0.97	0.03	0.70	-0.02	0.80	-0.11	0.21	0.11	0.15
	Sun	-0.02	0.75	0.05	0.33	-0.12	0.04	0.06	0.32	0.03	0.58	-0.10	0.08	0.07	0.22	0.00	0.96
	Rain	0.05	0.16	-0.02	0.52	0.00	0.96	0.00	0.99	-0.01	0.75	0.04	0.27	0.01	0.82	-0.02	0.56
	Pressure	-0.01	0.73	0.00	0.94	0.04	0.24	-0.02	0.46	-0.02	0.47	0.02	0.55	0.00	0.98	0.00	0.97
	Wind speed	0.00	0.97	0.04	0.65	-0.02	0.82	-0.03	0.74	0.02	0.84	0.07	0.43	0.02	0.85	-0.10	0.22
Pollen	Grass	0.00	0.40	0.02	0.01	-0.02	0.02	0.01	0.27	0.00	0.66	-0.01	0.17	0.02	0.02	-0.01	0.35

Table F. 68: England and Wales Out of Hours Counts Excess – point estimates and P-values by lag day per exposure.

Exposure		Lag0 Est	Lag0 P	Lag1 Est	Lag1 P	Lag2 Est	Lag2 P	Lag3 Est	Lag3 P	Lag4 Est	Lag4 P	Lag5 Est	Lag5 P	Lag6 Est	Lag6 P	Lag7 Est	Lag7 P
Outdoor air pollutants	NO Min’	0.00	0.85	0.01	0.80	-0.04	0.08	0.05	0.02	-0.03	0.16	0.01	0.55	0.01	0.61	-0.02	0.43
	NO_2 Min’	-0.01	0.63	0.00	0.94	-0.01	0.61	0.02	0.30	-0.01	0.33	0.02	0.31	0.00	0.76	0.00	0.92
	NOD Min’	0.00	0.58	0.00	0.63	-0.01	0.10	0.02	0.02	-0.01	0.10	0.01	0.28	0.00	0.86	0.00	0.52
	SO_2 Min’	-0.12	0.09	0.04	0.58	-0.01	0.86	0.07	0.33	0.07	0.33	-0.04	0.60	-0.11	0.14	0.06	0.43
	PM_{10} Min’	-0.02	0.33	0.02	0.24	-0.02	0.28	0.03	0.15	-0.01	0.60	0.00	0.99	0.00	0.85	0.00	0.81
	O_3 Min’	-0.01	0.55	0.02	0.10	-0.02	0.12	0.00	0.77	0.01	0.13	-0.01	0.35	0.00	0.90	0.00	0.64
	CO Min’	-0.71	0.58	0.24	0.86	-0.37	0.79	1.28	0.35	-1.36	0.32	2.07	0.13	-2.23	0.10	1.00	0.44
	NO Mean	-0.01	0.31	0.01	0.30	-0.01	0.16	0.01	0.07	-0.01	0.33	0.00	0.47	0.00	0.92	0.00	0.52
	NO_2 Mean	0.00	0.92	0.00	0.99	-0.01	0.55	0.02	0.10	-0.03	0.04	0.03	0.01	-0.03	0.03	0.01	0.17
	NOD Mean	0.00	0.42	0.00	0.37	0.00	0.16	0.01	0.05	0.00	0.15	0.00	0.20	0.00	0.65	0.00	0.84
	SO_2 Mean	-0.01	0.58	0.00	0.91	0.00	0.97	0.03	0.33	-0.03	0.27	0.02	0.42	-0.02	0.57	0.01	0.54
	PM_{10} Mean	-0.01	0.64	0.02	0.14	-0.04	0.00	0.06	0.00	-0.04	0.01	0.01	0.59	0.00	0.76	0.01	0.59
	O_3 Mean	-0.01	0.41	0.01	0.23	0.00	0.65	0.00	0.95	0.00	0.76	-0.01	0.61	0.00	0.95	0.00	0.91
	CO Mean	-0.90	0.16	0.81	0.26	-0.91	0.20	1.27	0.07	-1.03	0.15	1.38	0.05	-1.15	0.10	0.49	0.44
	NO Max’	0.00	0.09	0.00	0.13	0.00	0.50	0.00	0.44	0.00	0.65	0.00	0.80	0.00	0.33	0.00	0.23
	NO_2 Max’	0.00	0.90	0.00	0.56	0.00	0.48	0.00	0.62	0.00	0.99	0.00	0.58	0.00	0.99	0.00	0.72
	NOD Max’	0.00	0.14	0.00	0.26	0.00	0.86	0.00	0.66	0.00	0.65	0.00	0.68	0.00	0.44	0.00	0.34
	SO_2 Max’	0.00	0.52	0.00	0.86	0.00	0.78	0.01	0.14	-0.01	0.12	0.00	0.78	0.00	0.75	0.01	0.20
	PM_{10} Max’	0.00	0.94	0.01	0.26	-0.01	0.11	0.01	0.15	-0.01	0.12	0.01	0.25	0.00	0.88	0.00	0.75
	O_3 Max’	-0.01	0.34	0.01	0.11	0.00	0.95	0.00	0.54	0.00	0.59	-0.01	0.38	0.00	0.69	0.00	0.93
	CO Max’	-0.33	0.17	0.34	0.19	-0.07	0.80	0.04	0.87	-0.10	0.70	0.21	0.42	0.15	0.56	-0.32	0.18
Weather	Temp Min’	0.01	0.79	-0.02	0.71	0.12	0.04	-0.13	0.02	0.05	0.37	-0.01	0.93	-0.07	0.20	0.07	0.19
	Temp Max’	-0.02	0.66	-0.04	0.51	0.11	0.03	-0.06	0.29	0.00	0.94	-0.02	0.65	0.06	0.25	-0.05	0.28
	Sun	-0.01	0.73	0.01	0.68	-0.03	0.41	0.00	0.92	-0.01	0.84	-0.04	0.30	0.09	0.01	-0.04	0.23
	Rain	0.02	0.46	-0.03	0.15	0.00	0.88	0.01	0.77	0.01	0.83	0.03	0.15	-0.02	0.38	-0.02	0.46
	Pressure	-0.01	0.64	0.01	0.55	0.01	0.63	-0.01	0.67	-0.03	0.13	0.04	0.04	-0.02	0.37	0.00	0.84
	Wind speed	0.00	0.92	0.01	0.79	-0.07	0.20	0.07	0.23	-0.02	0.70	0.04	0.47	-0.01	0.85	-0.03	0.51
Pollen	Grass	-0.01	0.01	0.01	0.00	-0.01	0.08	0.00	0.67	0.00	0.42	-0.01	0.17	0.01	0.13	0.00	0.52

F3.2. Trent Region Multiple regression point-estimates and P-values.

Table F. 69: Trent Region All Counts Asthmatics – percentage change and P-values by lag day per exposure.

Exposure		Lag0 Est	Lag0 P	Lag1 Est	Lag1 P	Lag2 Est	Lag2 P	Lag3 Est	Lag3 P	Lag4 Est	Lag4 P	Lag5 Est	Lag5 P	Lag6 Est	Lag6 P	Lag7 Est	Lag7 P
Outdoor air pollutants	NO Min’	-0.03	0.58	-0.03	0.77	0.03	0.61	-0.02	0.73	0.15	0.02	-0.09	0.17	-0.01	0.86	0.00	0.97
	NO_2 Min’	-0.03	0.48	0.06	0.19	0.03	0.51	-0.03	0.40	0.06	0.13	-0.12	0.00	0.06	0.12	-0.01	0.81
	NOD Min’	-0.02	0.28	0.02	0.38	0.01	0.55	-0.02	0.43	0.05	0.01	-0.06	0.01	0.01	0.60	0.00	0.87
	SO_2 Min’	-0.16	0.36	0.08	0.72	0.09	0.67	0.00	1.00	-0.18	0.33	0.04	0.85	0.23	0.24	0.00	0.99
	PM_{10} Min’	0.00	0.99	-0.01	0.79	0.02	0.62	-0.05	0.30	0.13	0.01	-0.06	0.25	-0.02	0.69	-0.02	0.62
	O_3 Min’	-0.04	0.13	0.01	0.77	0.00	0.95	-0.04	0.20	0.02	0.59	0.02	0.36	-0.01	0.68	0.00	0.88
	CO Min’	-2.20	0.52	2.24	0.58	4.65	0.19	-4.24	0.21	8.15	0.02	-10.97	0.00	1.36	0.71	2.29	0.55
	NO Mean	0.00	0.88	-0.01	0.49	0.02	0.24	0.01	0.39	-0.01	0.58	0.01	0.72	-0.02	0.24	0.02	0.31
	NO_2 Mean	0.00	1.00	0.03	0.34	-0.02	0.47	0.02	0.51	0.03	0.37	-0.05	0.08	-0.01	0.86	0.02	0.46
	NOD Mean	0.00	0.94	0.00	0.76	0.01	0.46	0.01	0.43	0.00	0.80	0.00	0.97	-0.01	0.29	0.01	0.31
	SO_2 Mean	-0.08	0.17	0.12	0.08	-0.08	0.22	0.11	0.09	-0.02	0.77	-0.08	0.26	0.06	0.39	-0.02	0.75
	PM_{10} Mean	-0.01	0.75	-0.01	0.74	0.03	0.45	0.00	0.92	0.03	0.38	-0.02	0.59	-0.04	0.43	0.02	0.68
	O_3 Mean	0.00	0.92	0.00	0.97	-0.03	0.33	-0.01	0.82	0.00	0.97	0.06	0.04	-0.05	0.05	0.01	0.53
	CO Mean	0.94	0.58	-2.07	0.28	3.45	0.05	-1.37	0.45	1.31	0.47	-2.28	0.23	0.65	0.74	0.23	0.90
	NO Max’	0.00	0.29	0.00	0.35	0.00	0.38	0.00	0.65	0.00	0.54	0.00	0.90	0.00	0.38	0.00	0.30
	NO_2 Max’	0.01	0.67	0.00	0.83	0.00	1.00	0.01	0.72	0.00	0.90	-0.01	0.62	-0.01	0.65	0.01	0.46
	NOD Max’	0.00	0.46	0.00	0.47	0.00	0.43	0.00	0.63	0.00	0.53	0.00	0.88	0.00	0.39	0.00	0.28
	SO_2 Max’	-0.02	0.14	0.04	0.02	-0.02	0.21	0.03	0.04	-0.01	0.44	-0.02	0.19	0.02	0.29	-0.01	0.60
	PM_{10} Max’	0.01	0.60	-0.01	0.71	0.00	0.99	0.01	0.38	0.00	0.76	0.00	0.88	-0.03	0.06	0.02	0.24
	O_3 Max’	-0.01	0.53	0.02	0.24	-0.03	0.18	0.00	0.86	0.01	0.59	0.01	0.60	-0.01	0.58	0.00	0.84
	CO Max’	0.44	0.47	-0.58	0.41	0.28	0.67	0.85	0.18	-0.62	0.33	-0.25	0.72	0.03	0.97	0.24	0.73
Weather	Temp Min’	0.02	0.89	-0.06	0.69	-0.05	0.76	0.22	0.16	-0.05	0.73	-0.14	0.36	0.13	0.36	-0.13	0.32
	Temp Max’	0.09	0.44	-0.23	0.09	0.27	0.05	-0.20	0.14	-0.03	0.79	0.18	0.16	-0.03	0.84	-0.08	0.50
	Sun	-0.01	0.88	-0.13	0.15	0.20	0.03	-0.11	0.26	-0.09	0.34	0.14	0.14	-0.01	0.89	-0.01	0.90
	Rain	-0.02	0.80	0.11	0.11	-0.07	0.32	-0.03	0.59	0.08	0.15	0.01	0.79	-0.14	0.00	0.08	0.20
	Pressure	-0.02	0.66	0.02	0.68	0.05	0.41	-0.04	0.47	0.00	0.97	0.00	0.99	-0.05	0.33	0.05	0.19
	Wind speed	0.00	0.95	-0.14	0.30	0.10	0.50	-0.18	0.22	0.03	0.83	0.15	0.34	0.04	0.78	-0.04	0.75
Pollen	Grass	0.00	0.92	0.01	0.16	0.00	0.66	-0.03	0.02	0.02	0.05	-0.02	0.06	-0.01	0.41	0.01	0.14

Table F. 70: Trent Region All Counts Non-asthmatics – percentage change and P-values by lag day per exposure.

Exposure		Lag0 Est	Lag0 P	Lag1 Est	Lag1 P	Lag2 Est	Lag2 P	Lag3 Est	Lag3 P	Lag4 Est	Lag4 P	Lag5 Est	Lag5 P	Lag6 Est	Lag6 P	Lag7 Est	Lag7 P
Outdoor air pollutants	NO Min’	-0.03	0.66	0.00	0.93	0.11	0.02	-0.12	0.04	0.05	0.42	-0.08	0.18	0.19	0.13	-0.09	0.51
	NO_2 Min’	-0.09	0.05	0.08	0.09	0.05	0.32	-0.02	0.67	-0.04	0.43	-0.02	0.60	0.04	0.37	0.01	0.90
	NOD Min’	-0.04	0.11	0.04	0.13	0.04	0.08	-0.04	0.12	0.00	0.90	-0.02	0.32	0.04	0.26	-0.01	0.80
	SO_2 Min’	-0.02	0.93	0.14	0.56	0.07	0.76	-0.40	0.09	0.46	0.04	-0.23	0.31	0.13	0.57	0.05	0.82
	PM_{10} Min’	-0.05	0.35	-0.01	0.93	0.13	0.03	-0.11	0.04	0.06	0.26	-0.02	0.70	0.04	0.58	0.00	0.97
	O_3 Min’	-0.02	0.57	0.01	0.84	0.01	0.73	-0.05	0.12	0.01	0.64	0.06	0.05	-0.02	0.61	-0.04	0.14
	CO Min’	-7.52	0.05	7.35	0.06	1.54	0.69	-4.54	0.26	5.41	0.19	-3.47	0.37	-1.68	0.71	3.68	0.42
	NO Mean	-0.05	0.01	0.04	0.04	0.01	0.39	-0.02	0.36	0.01	0.60	-0.02	0.17	0.02	0.27	0.00	0.84
	NO_2 Mean	-0.04	0.18	0.04	0.24	-0.01	0.84	0.03	0.39	-0.02	0.66	-0.03	0.46	0.01	0.69	0.01	0.82
	NOD Mean	-0.02	0.01	0.02	0.04	0.01	0.56	0.00	0.61	0.00	0.70	-0.01	0.15	0.01	0.27	0.00	0.88
	SO_2 Mean	-0.05	0.51	0.08	0.37	-0.02	0.79	-0.07	0.34	0.11	0.19	0.00	0.96	-0.10	0.23	0.09	0.21
	PM_{10} Mean	-0.06	0.10	0.04	0.35	0.03	0.48	0.01	0.90	-0.02	0.71	0.00	0.92	0.03	0.55	-0.02	0.74
	O_3 Mean	0.02	0.37	-0.02	0.59	0.00	0.90	-0.04	0.21	0.02	0.64	0.07	0.03	-0.02	0.50	-0.04	0.16
	CO Mean	-2.79	0.17	1.20	0.57	3.90	0.07	-3.63	0.09	0.86	0.69	-0.12	0.95	-0.13	0.96	1.20	0.60
	NO Max’	-0.01	0.00	0.01	0.01	0.00	0.64	0.00	0.43	0.00	0.70	0.00	0.49	0.00	0.58	0.00	0.74
	NO_2 Max’	-0.03	0.11	0.04	0.04	-0.02	0.35	0.02	0.36	-0.01	0.60	0.01	0.80	0.00	0.84	0.00	0.81
	NOD Max’	-0.01	0.01	0.01	0.01	0.00	0.86	0.00	0.61	0.00	0.83	0.00	0.56	0.00	0.71	0.00	0.64
	SO_2 Max’	-0.01	0.43	0.02	0.30	-0.01	0.72	-0.01	0.55	0.03	0.09	-0.01	0.69	0.00	0.95	-0.01	0.77
	PM_{10} Max’	-0.01	0.62	0.02	0.31	0.00	0.91	0.02	0.22	-0.02	0.15	0.00	0.99	0.01	0.41	-0.01	0.79
	O_3 Max’	0.02	0.27	-0.01	0.66	-0.01	0.69	-0.03	0.25	0.01	0.73	0.05	0.03	-0.02	0.43	-0.02	0.34
	CO Max’	-1.01	0.16	1.31	0.09	-0.22	0.78	-0.03	0.96	-0.04	0.95	-0.31	0.69	0.21	0.78	0.57	0.44
Weather	Temp Min’	0.11	0.48	-0.09	0.60	-0.01	0.95	0.16	0.34	-0.17	0.31	0.01	0.96	0.01	0.96	0.05	0.75
	Temp Max’	-0.05	0.74	0.06	0.72	-0.04	0.77	0.22	0.14	-0.16	0.29	-0.02	0.90	0.14	0.37	-0.15	0.29
	Sun	0.00	0.97	-0.11	0.31	0.12	0.24	0.13	0.23	-0.09	0.41	0.03	0.80	0.01	0.96	-0.13	0.23
	Rain	-0.03	0.61	0.08	0.23	0.02	0.81	-0.13	0.08	0.04	0.48	0.04	0.46	-0.13	0.04	0.10	0.12
	Pressure	0.02	0.71	-0.03	0.64	-0.05	0.41	0.12	0.05	0.00	0.95	-0.04	0.50	-0.04	0.48	0.04	0.42
	Wind speed	0.00	0.91	-0.08	0.63	0.24	0.20	-0.38	0.05	0.09	0.60	0.15	0.39	0.00	0.98	-0.04	0.81
Pollen	Grass	0.01	0.52	0.02	0.14	-0.01	0.48	-0.01	0.68	-0.02	0.17	0.02	0.22	-0.01	0.63	0.00	0.91

Table F. 71: Trent Region Acute Visits Asthmatics – percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	-0.09	0.40	0.01	0.88	0.03	0.50	0.00	0.93	0.01	0.81	-0.05	0.41	0.06	0.20	-0.02	0.75
	NO_2 Min’	0.00	0.98	-0.02	0.61	0.05	0.27	-0.04	0.31	0.03	0.46	-0.03	0.49	0.03	0.39	-0.01	0.78
	NOD Min’	-0.01	0.67	-0.01	0.82	0.01	0.44	-0.01	0.60	0.02	0.44	-0.03	0.20	0.03	0.13	-0.01	0.68
	SO_2 Min’	-0.17	0.28	0.23	0.17	-0.14	0.50	0.41	0.07	-0.35	0.11	-0.14	0.49	0.30	0.11	-0.07	0.69
	PM_{10} Min’	0.05	0.29	-0.09	0.07	0.11	0.02	-0.11	0.02	0.06	0.27	-0.09	0.11	0.15	0.01	-0.05	0.37
	O_3 Min’	-0.04	0.09	0.00	0.86	0.03	0.24	0.01	0.78	-0.06	0.05	0.04	0.15	-0.04	0.16	0.05	0.04
	CO Min’	0.58	0.87	-0.78	0.84	0.82	0.83	-2.76	0.42	7.66	0.05	-7.67	0.07	5.11	0.17	-1.23	0.70
	NO Mean	0.02	0.26	-0.03	0.15	0.01	0.57	-0.01	0.51	0.02	0.15	-0.02	0.17	0.04	0.00	-0.03	0.01
	NO_2 Mean	0.04	0.22	-0.03	0.39	0.03	0.40	-0.07	0.04	0.06	0.06	-0.03	0.27	0.06	0.04	-0.05	0.07
	NOD Mean	0.01	0.23	-0.01	0.17	0.01	0.47	-0.01	0.27	0.01	0.10	-0.01	0.15	0.02	0.00	-0.02	0.01
	SO_2 Mean	-0.06	0.37	0.10	0.17	-0.01	0.92	-0.06	0.37	0.10	0.14	-0.18	0.01	0.15	0.02	-0.02	0.78
	PM_{10} Mean	0.06	0.10	-0.06	0.09	0.02	0.53	-0.05	0.13	0.11	0.02	-0.13	0.00	0.13	0.00	-0.05	0.15
	O_3 Mean	-0.02	0.39	0.02	0.43	-0.02	0.47	0.03	0.30	-0.05	0.10	0.03	0.23	-0.03	0.17	0.03	0.11
	CO Mean	3.01	0.17	-5.12	0.04	4.59	0.02	-4.80	0.02	5.29	0.01	-4.12	0.03	5.39	0.00	-3.90	0.01
	NO Max’	0.01	0.07	-0.01	0.04	0.00	0.39	0.00	0.91	0.00	0.71	0.00	0.76	0.01	0.02	-0.01	0.01
	NO_2 Max’	0.03	0.08	-0.01	0.64	-0.01	0.64	-0.02	0.38	0.00	0.79	0.01	0.44	0.03	0.10	-0.04	0.02
	NOD Max’	0.01	0.07	-0.01	0.05	0.00	0.44	0.00	0.83	0.00	0.75	0.00	0.90	0.01	0.02	-0.01	0.00
	SO_2 Max’	-0.01	0.58	0.04	0.04	-0.02	0.19	0.00	0.81	0.02	0.36	-0.03	0.07	0.02	0.22	0.01	0.69
	PM_{10} Max’	0.02	0.09	-0.01	0.23	0.00	0.97	0.01	0.65	0.01	0.66	-0.03	0.07	0.05	0.00	-0.03	0.02
	O_3 Max’	0.01	0.50	-0.01	0.40	0.00	0.80	0.01	0.74	-0.03	0.08	0.03	0.10	0.00	0.99	-0.01	0.39
	CO Max’	1.58	0.08	-1.90	0.07	0.62	0.46	-0.14	0.86	0.32	0.69	-0.33	0.63	1.57	0.03	-1.70	0.01
Weather	Temp Min’	0.13	0.33	-0.15	0.34	-0.09	0.58	0.33	0.05	-0.19	0.28	-0.06	0.67	0.02	0.87	-0.02	0.89
	Temp Max’	-0.01	0.90	-0.20	0.14	0.13	0.34	-0.01	0.94	0.23	0.10	-0.19	0.17	0.01	0.93	-0.02	0.85
	Sun	-0.03	0.71	0.01	0.95	-0.07	0.48	0.07	0.44	-0.09	0.30	0.12	0.21	0.09	0.33	-0.13	0.17
	Rain	0.00	0.96	0.11	0.06	0.06	0.44	-0.05	0.52	-0.03	0.60	-0.10	0.14	0.00	0.93	0.07	0.19
	Pressure	-0.02	0.66	0.04	0.44	-0.01	0.85	-0.06	0.29	0.10	0.08	-0.18	0.00	0.19	0.00	-0.08	0.08
	Wind speed	0.00	0.93	0.03	0.87	-0.06	0.75	0.16	0.34	-0.33	0.06	0.26	0.14	-0.10	0.52	0.01	0.96
Pollen	Grass	-0.01	0.59	0.01	0.62	0.00	0.97	0.00	0.94	0.00	0.87	-0.01	0.57	0.00	0.72	0.01	0.43

Table F. 72: Trent Region Acute Visits Non-asthmatics – percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	-0.12	0.25	0.06	0.18	0.01	0.88	0.10	0.18	-0.18	0.02	0.14	0.03	-0.11	0.07	0.05	0.18
	NO_2 Min’	0.03	0.43	-0.05	0.13	0.07	0.10	-0.03	0.48	-0.03	0.41	0.02	0.59	0.00	0.94	0.00	0.96
	NOD Min’	-0.02	0.56	0.00	0.97	0.02	0.35	0.01	0.71	-0.04	0.08	0.04	0.12	-0.03	0.26	0.01	0.46
	SO_2 Min’	0.10	0.52	0.05	0.77	-0.26	0.09	0.29	0.06	-0.09	0.51	-0.07	0.67	-0.02	0.88	0.02	0.90
	PM_{10} Min’	-0.03	0.44	-0.01	0.86	0.04	0.19	0.03	0.52	-0.07	0.19	0.02	0.61	0.02	0.50	-0.02	0.59
	O_3 Min’	-0.02	0.31	0.04	0.10	-0.03	0.17	0.01	0.78	0.03	0.19	-0.02	0.24	0.00	0.92	0.00	0.83
	CO Min’	2.23	0.54	-3.83	0.19	0.89	0.78	4.80	0.27	-5.23	0.21	-0.10	0.97	2.74	0.31	-2.62	0.33
	NO Mean	0.01	0.69	-0.02	0.16	0.01	0.59	0.01	0.40	-0.01	0.33	0.00	0.92	0.00	0.70	0.01	0.29
	NO_2 Mean	0.02	0.35	-0.04	0.10	0.02	0.42	0.04	0.10	-0.06	0.01	0.02	0.27	0.01	0.65	-0.01	0.70
	NOD Mean	0.00	0.59	-0.01	0.13	0.00	0.56	0.01	0.29	-0.01	0.17	0.00	0.78	0.00	0.84	0.01	0.43
	SO_2 Mean	0.02	0.80	0.10	0.37	-0.15	0.15	0.08	0.18	-0.13	0.02	0.19	0.00	-0.14	0.04	0.04	0.52
	PM_{10} Mean	0.00	0.93	-0.01	0.72	0.01	0.78	0.05	0.15	-0.08	0.04	0.03	0.31	-0.01	0.71	0.01	0.61
	O_3 Mean	-0.07	0.01	0.07	0.00	-0.03	0.18	0.00	0.84	0.02	0.20	-0.02	0.21	0.02	0.36	-0.02	0.43
	CO Mean	0.88	0.67	-2.07	0.22	-0.40	0.81	3.56	0.04	-3.77	0.05	0.42	0.80	1.16	0.46	0.00	1.00
	NO Max’	0.01	0.25	-0.01	0.06	0.00	0.54	0.00	0.65	-0.01	0.21	0.00	0.92	0.00	0.41	0.00	0.66
	NO_2 Max’	0.01	0.49	-0.01	0.41	0.00	0.74	0.03	0.04	-0.03	0.02	0.01	0.59	0.01	0.66	0.00	0.89
	NOD Max’	0.00	0.28	0.00	0.07	0.00	0.53	0.00	0.60	0.00	0.19	0.00	1.00	0.00	0.36	0.00	0.68
	SO_2 Max’	-0.01	0.29	0.04	0.06	-0.02	0.26	0.00	0.98	-0.02	0.09	0.04	0.00	-0.03	0.01	0.01	0.32
	PM_{10} Max’	0.00	0.72	0.00	0.72	0.00	0.97	0.01	0.33	-0.01	0.39	0.00	0.84	-0.01	0.60	0.01	0.49
	O_3 Max’	-0.03	0.04	0.02	0.16	0.00	0.83	0.00	0.88	0.01	0.64	-0.02	0.31	0.01	0.39	-0.01	0.52
	CO Max’	1.05	0.15	-1.30	0.06	-0.21	0.74	1.10	0.06	-1.46	0.02	0.43	0.44	0.47	0.39	0.02	0.97
Weather	Temp Min’	-0.18	0.09	0.15	0.15	0.10	0.34	-0.03	0.76	-0.05	0.65	-0.09	0.50	0.13	0.32	-0.05	0.66
	Temp Max’	0.01	0.94	-0.11	0.28	0.13	0.20	0.09	0.33	-0.15	0.15	0.13	0.20	-0.04	0.64	-0.06	0.45
	Sun	0.01	0.84	-0.05	0.51	-0.01	0.94	-0.04	0.59	0.06	0.35	0.11	0.11	-0.14	0.04	0.00	0.96
	Rain	-0.01	0.73	0.10	0.13	-0.09	0.22	-0.01	0.80	0.02	0.64	-0.04	0.23	-0.03	0.30	0.05	0.12
	Pressure	0.02	0.57	-0.06	0.09	0.06	0.11	0.00	0.97	-0.08	0.10	0.11	0.02	-0.08	0.11	0.03	0.39
	Wind speed	0.01	0.80	0.16	0.14	-0.11	0.31	-0.14	0.25	0.25	0.04	0.02	0.87	-0.25	0.04	0.14	0.23
Pollen	Grass	0.00	0.76	-0.01	0.54	0.01	0.22	-0.02	0.03	0.02	0.01	0.00	0.84	-0.01	0.06	0.00	0.39

Table F. 73: Trent Region Casualty Counts Asthmatics – percentage change and P-values by lag day per exposure.

Exposure		Lag0 Est	Lag0 P	Lag1 Est	Lag1 P	Lag2 Est	Lag2 P	Lag3 Est	Lag3 P	Lag4 Est	Lag4 P	Lag5 Est	Lag5 P	Lag6 Est	Lag6 P	Lag7 Est	Lag7 P
Outdoor air pollutants	NO Min’	-0.02	0.71	0.01	0.83	-0.03	0.57	-0.01	0.84	0.03	0.59	0.08	0.27	-0.16	0.03	0.08	0.09
	NO_2 Min’	0.03	0.49	0.00	0.98	0.02	0.58	-0.09	0.02	0.10	0.02	-0.08	0.06	0.02	0.69	0.01	0.73
	NOD Min’	0.01	0.59	0.00	0.96	0.00	0.97	-0.03	0.14	0.04	0.09	-0.01	0.73	-0.03	0.18	0.02	0.23
	SO_2 Min’	0.07	0.68	-0.20	0.29	0.14	0.44	0.07	0.74	0.09	0.67	-0.28	0.18	0.03	0.89	0.14	0.46
	PM_{10} Min’	0.01	0.88	0.05	0.36	-0.09	0.06	0.07	0.12	-0.08	0.11	0.04	0.48	0.02	0.69	-0.02	0.69
	O_3 Min’	0.01	0.70	-0.01	0.74	0.03	0.38	-0.03	0.31	-0.01	0.75	0.04	0.20	-0.03	0.28	0.03	0.29
	CO Min’	-0.30	0.93	6.58	0.07	-6.51	0.06	0.02	1.00	1.62	0.65	-2.12	0.54	-2.85	0.40	4.92	0.13
	NO Mean	-0.02	0.15	0.03	0.01	-0.03	0.02	0.01	0.63	0.01	0.52	0.00	0.90	-0.01	0.43	0.00	0.88
	NO_2 Mean	-0.02	0.43	0.09	0.01	-0.07	0.02	-0.01	0.79	0.07	0.04	-0.08	0.01	0.04	0.17	-0.02	0.51
	NOD Mean	-0.01	0.17	0.02	0.01	-0.02	0.02	0.00	0.79	0.01	0.28	0.00	0.61	0.00	0.83	0.00	0.89
	SO_2 Mean	-0.07	0.22	0.06	0.40	-0.02	0.75	0.06	0.35	0.03	0.62	-0.16	0.02	0.08	0.22	0.02	0.77
	PM_{10} Mean	-0.03	0.36	0.11	0.01	-0.09	0.01	-0.02	0.59	0.03	0.46	0.03	0.42	-0.04	0.32	0.02	0.56
	O_3 Mean	0.03	0.19	-0.06	0.02	0.06	0.04	-0.01	0.62	-0.04	0.18	0.07	0.02	-0.06	0.03	0.05	0.05
	CO Mean	-1.98	0.21	4.53	0.01	-3.39	0.05	-0.91	0.59	2.05	0.21	-0.09	0.96	-2.27	0.19	1.57	0.30
	NO Max’	0.00	0.43	0.01	0.10	-0.01	0.08	0.00	0.84	0.00	0.32	0.00	0.80	0.00	0.26	0.00	0.92
	NO_2 Max’	0.00	0.93	0.04	0.04	-0.04	0.04	0.00	0.90	0.02	0.21	-0.03	0.12	0.01	0.61	0.00	0.95
	NOD Max’	0.00	0.48	0.00	0.07	-0.01	0.05	0.00	0.99	0.00	0.41	0.00	0.86	0.00	0.36	0.00	1.00
	SO_2 Max’	-0.01	0.51	0.02	0.32	-0.01	0.73	0.01	0.67	0.01	0.62	-0.03	0.02	0.02	0.10	-0.01	0.70
	PM_{10} Max’	-0.01	0.29	0.05	0.00	-0.05	0.00	-0.02	0.06	0.03	0.02	0.01	0.37	-0.03	0.07	0.02	0.25
	O_3 Max’	0.02	0.22	-0.03	0.13	0.01	0.76	0.01	0.65	0.00	1.00	0.01	0.77	-0.03	0.14	0.03	0.05
	CO Max’	-0.86	0.16	1.30	0.05	-1.06	0.10	-0.07	0.90	0.83	0.15	-0.27	0.64	-0.51	0.34	0.20	0.69
Weather	Temp Min’	0.33	0.02	-0.33	0.06	0.18	0.29	-0.16	0.31	0.09	0.57	0.06	0.70	-0.06	0.73	-0.04	0.79
	Temp Max’	0.19	0.18	-0.28	0.11	0.25	0.12	-0.17	0.27	-0.09	0.53	0.24	0.10	-0.06	0.71	-0.01	0.97
	Sun	0.01	0.92	-0.08	0.45	-0.16	0.12	0.29	0.00	-0.19	0.05	0.15	0.11	0.01	0.95	-0.02	0.85
	Rain	0.07	0.31	-0.04	0.66	0.00	0.98	-0.04	0.54	0.16	0.03	-0.21	0.00	0.07	0.15	0.01	0.83
	Pressure	-0.01	0.71	0.01	0.81	-0.04	0.43	0.04	0.45	-0.07	0.25	0.13	0.02	-0.10	0.07	0.03	0.43
	Wind speed	-0.03	0.31	-0.34	0.03	0.35	0.03	-0.20	0.23	0.04	0.81	-0.08	0.61	0.16	0.29	-0.03	0.85
Pollen	Grass	0.00	0.97	-0.01	0.46	0.01	0.56	0.00	0.93	-0.01	0.42	0.02	0.05	-0.02	0.10	0.01	0.50

Table F. 74: Trent Region Casualty Counts Non-asthmatics – percentage change and P-values by lag day per exposure.

Exposure		Lag0 Est	Lag0 P	Lag1 Est	Lag1 P	Lag2 Est	Lag2 P	Lag3 Est	Lag3 P	Lag4 Est	Lag4 P	Lag5 Est	Lag5 P	Lag6 Est	Lag6 P	Lag7 Est	Lag7 P
Outdoor air pollutants	NO Min’	0.00	0.95	0.04	0.58	-0.05	0.37	-0.02	0.64	0.11	0.06	-0.13	0.08	0.08	0.25	0.00	0.96
	NO_2 Min’	-0.05	0.18	0.04	0.29	-0.01	0.77	0.00	0.95	0.01	0.72	-0.03	0.45	0.03	0.40	-0.03	0.40
	NOD Min’	-0.03	0.28	0.03	0.23	-0.02	0.46	0.00	0.82	0.03	0.14	-0.04	0.09	0.03	0.23	-0.02	0.92
	SO_2 Min’	-0.09	0.64	0.23	0.32	-0.27	0.20	0.09	0.61	0.01	0.97	-0.10	0.63	0.19	0.35	0.00	0.96
	PM_{10} Min’	-0.08	0.15	0.06	0.29	-0.03	0.52	0.07	0.11	-0.02	0.62	-0.09	0.06	0.08	0.13	0.00	0.96
	O_3 Min’	-0.03	0.26	0.02	0.50	0.02	0.51	-0.03	0.30	0.02	0.46	-0.02	0.49	0.01	0.63	0.01	0.65
	CO Min’	-1.32	0.71	-0.59	0.87	0.10	0.98	3.21	0.37	-0.59	0.87	-6.02	0.09	7.16	0.06	-3.55	0.33
	NO Mean	-0.02	0.16	0.03	0.08	-0.02	0.16	0.01	0.45	-0.01	0.26	0.02	0.22	-0.01	0.38	0.01	0.51
	NO_2 Mean	-0.01	0.71	0.03	0.40	-0.03	0.30	0.04	0.20	-0.05	0.09	0.02	0.57	0.01	0.75	-0.01	0.78
	NOD Mean	-0.01	0.20	0.01	0.09	-0.01	0.14	0.01	0.32	-0.01	0.17	0.01	0.28	0.00	0.56	0.00	0.66
	SO_2 Mean	-0.04	0.58	0.02	0.71	-0.01	0.94	-0.02	0.77	0.08	0.21	-0.10	0.09	0.18	0.00	-0.14	0.02
	PM_{10} Mean	-0.07	0.06	0.09	0.02	-0.06	0.12	0.05	0.17	-0.03	0.47	-0.03	0.41	0.04	0.28	-0.02	0.69
	O_3 Mean	-0.01	0.64	-0.02	0.52	0.06	0.06	-0.06	0.05	0.03	0.23	0.00	0.84	0.01	0.71	0.00	0.91
	CO Mean	-1.66	0.28	1.92	0.27	-0.56	0.76	0.92	0.61	-1.66	0.31	0.80	0.64	-1.26	0.50	1.26	0.46
	NO Max’	-0.01	0.11	0.01	0.07	-0.01	0.20	0.00	0.86	0.00	0.33	0.01	0.10	0.00	0.50	0.00	0.74
	NO_2 Max’	-0.02	0.30	0.02	0.22	-0.02	0.25	0.02	0.29	-0.03	0.10	0.03	0.09	-0.01	0.49	0.00	0.86
	NOD Max’	0.00	0.11	0.01	0.07	0.00	0.20	0.00	0.74	0.00	0.16	0.00	0.04	0.00	0.35	0.00	0.65
	SO_2 Max’	-0.01	0.39	0.00	0.94	-0.01	0.58	0.02	0.14	0.00	0.77	0.00	0.83	0.01	0.45	-0.02	0.19
	PM_{10} Max’	-0.03	0.04	0.02	0.10	-0.01	0.69	0.01	0.38	0.00	0.77	-0.01	0.38	0.02	0.11	-0.02	0.20
	O_3 Max’	-0.02	0.27	0.01	0.77	0.01	0.56	-0.02	0.25	0.03	0.13	-0.02	0.37	0.01	0.62	0.00	0.93
	CO Max’	-1.27	0.04	1.37	0.03	-0.86	0.17	0.71	0.26	-0.79	0.17	0.27	0.61	0.21	0.74	-0.04	0.95
Weather	Temp Min’	0.06	0.68	0.18	0.30	-0.02	0.91	-0.19	0.20	-0.02	0.90	0.36	0.01	-0.30	0.04	-0.02	0.90
	Temp Max’	0.17	0.19	-0.24	0.12	0.17	0.29	0.03	0.87	-0.15	0.26	0.02	0.85	0.25	0.06	-0.21	0.09
	Sun	0.12	0.21	-0.25	0.01	0.09	0.34	0.15	0.14	-0.22	0.02	0.04	0.66	0.25	0.01	-0.09	0.28
	Rain	-0.11	0.05	0.10	0.15	-0.05	0.58	0.00	0.99	0.00	0.94	0.02	0.70	-0.11	0.03	0.06	0.15
	Pressure	0.06	0.13	-0.06	0.22	-0.07	0.13	0.14	0.00	-0.11	0.02	0.08	0.11	-0.03	0.50	0.01	0.88
	Wind speed	0.00	0.89	-0.29	0.03	0.47	0.00	-0.31	0.03	0.15	0.29	0.04	0.78	-0.20	0.16	0.17	0.17
Pollen	Grass	0.02	0.12	-0.02	0.30	0.01	0.28	-0.03	0.09	0.01	0.52	0.02	0.14	-0.04	0.01	0.02	0.03

Table F. 75: Trent Region Emergency Consultations Asthmatics – percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	0.02	0.78	-0.06	0.40	-0.04	0.43	0.09	0.01	-0.02	0.65	-0.05	0.38	0.03	0.58	-0.01	0.79
	NO_2 Min’	-0.01	0.71	0.01	0.85	-0.01	0.89	0.04	0.37	-0.06	0.15	0.06	0.12	-0.02	0.60	-0.02	0.60
	NOD Min’	0.00	0.91	-0.01	0.74	-0.01	0.66	0.03	0.11	-0.02	0.25	0.01	0.52	-0.01	0.76	-0.01	0.73
	SO_2 Min’	-0.37	0.04	0.49	0.01	-0.26	0.15	0.17	0.36	0.07	0.69	-0.22	0.25	0.13	0.42	-0.04	0.82
	PM_{10} Min’	-0.02	0.66	-0.03	0.59	0.07	0.13	-0.08	0.10	0.01	0.75	0.03	0.48	0.00	0.94	-0.03	0.49
	O_3 Min’	0.01	0.72	0.01	0.76	-0.05	0.02	0.04	0.07	-0.01	0.82	0.01	0.59	0.00	0.85	0.00	0.98
	CO Min’	8.78	0.01	-8.19	0.04	4.21	0.24	-2.21	0.50	-4.27	0.18	5.55	0.08	-2.87	0.41	-0.05	0.99
	NO Mean	0.00	0.94	0.00	0.92	0.00	0.97	0.01	0.59	-0.01	0.68	-0.01	0.24	0.03	0.04	-0.02	0.14
	NO_2 Mean	0.02	0.38	-0.04	0.23	0.04	0.16	-0.03	0.37	0.01	0.71	-0.03	0.37	0.04	0.19	-0.02	0.39
	NOD Mean	0.00	0.78	0.00	0.65	0.00	0.62	0.00	0.89	0.00	0.84	-0.01	0.25	0.01	0.05	-0.01	0.18
	SO_2 Mean	-0.01	0.79	0.00	0.98	0.00	0.94	0.05	0.31	-0.03	0.54	-0.04	0.44	0.13	0.01	-0.12	0.02
	PM_{10} Mean	0.00	0.97	0.00	0.97	0.00	0.93	-0.01	0.78	-0.01	0.86	-0.03	0.33	0.09	0.01	-0.07	0.04
	O_3 Mean	-0.02	0.32	0.03	0.26	-0.02	0.47	0.01	0.74	0.02	0.49	0.00	0.97	-0.04	0.10	0.03	0.19
	CO Mean	0.78	0.57	-1.32	0.39	2.77	0.08	-0.94	0.57	-1.66	0.31	-0.40	0.78	1.60	0.30	-0.79	0.58
	NO Max’	0.00	0.80	0.00	0.59	0.01	0.07	-0.01	0.12	0.00	0.67	0.00	0.19	0.01	0.06	0.00	0.24
	NO_2 Max’	0.00	0.89	-0.02	0.23	0.04	0.00	-0.03	0.07	0.02	0.23	-0.03	0.04	0.02	0.20	-0.01	0.56
	NOD Max’	0.00	0.85	0.00	0.52	0.01	0.03	0.00	0.09	0.00	0.56	0.00	0.08	0.00	0.03	0.00	0.22
	SO_2 Max’	0.00	0.99	-0.01	0.53	0.01	0.37	-0.01	0.55	0.01	0.39	-0.01	0.39	0.02	0.12	-0.02	0.13
	PM_{10} Max’	0.01	0.58	-0.01	0.42	0.01	0.51	-0.01	0.47	0.00	0.95	-0.01	0.40	0.02	0.04	-0.02	0.09
	O_3 Max’	0.00	0.97	0.00	0.88	0.00	0.91	0.01	0.54	0.00	0.88	-0.01	0.41	-0.01	0.48	0.02	0.35
	CO Max’	0.18	0.71	-0.50	0.39	1.55	0.01	-1.15	0.06	0.15	0.80	-0.69	0.17	1.09	0.03	-0.67	0.15
Weather	Temp Min’	-0.20	0.12	0.14	0.33	-0.05	0.69	0.03	0.83	0.05	0.72	0.02	0.91	0.02	0.85	-0.06	0.59
	Temp Max’	0.06	0.53	-0.21	0.09	0.21	0.10	0.00	0.97	-0.09	0.42	-0.17	0.14	0.41	0.00	-0.22	0.06
	Sun	0.01	0.94	-0.09	0.31	0.13	0.11	-0.04	0.62	-0.10	0.27	-0.02	0.80	0.08	0.36	-0.01	0.94
	Rain	0.06	0.20	-0.08	0.12	0.21	0.01	-0.19	0.06	-0.01	0.82	0.04	0.50	0.00	0.95	0.00	0.95
	Pressure	0.04	0.20	-0.11	0.02	0.14	0.00	-0.09	0.06	0.00	0.95	0.03	0.55	0.02	0.63	-0.04	0.31
	Wind speed	0.00	0.90	0.07	0.51	-0.19	0.11	0.13	0.34	0.13	0.31	-0.09	0.47	-0.21	0.10	0.21	0.09
Pollen	Grass	-0.01	0.65	0.02	0.31	0.00	0.94	-0.03	0.04	0.03	0.01	-0.02	0.12	0.01	0.54	0.00	0.87

Table F. 76: Trent Region Emergency Consultations Non-asthmatics – percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	0.04	0.43	-0.05	0.26	-0.02	0.53	0.03	0.21	-0.02	0.34	0.02	0.64	0.00	0.92	0.02	0.55
	NO_2 Min’	0.04	0.09	-0.03	0.22	-0.01	0.73	-0.01	0.57	0.02	0.36	-0.01	0.80	0.00	0.95	0.01	0.65
	NOD Min’	0.02	0.15	-0.02	0.23	-0.01	0.63	0.00	0.90	0.00	0.99	0.00	0.95	0.00	0.90	0.01	0.67
	SO_2 Min’	-0.01	0.95	0.19	0.21	-0.35	0.00	0.27	0.01	-0.09	0.37	-0.15	0.22	0.22	0.09	-0.05	0.70
	PM_{10} Min’	0.03	0.50	-0.02	0.60	-0.03	0.45	0.00	0.95	0.01	0.74	0.00	0.96	0.00	1.00	0.02	0.62
	O_3 Min’	0.00	0.92	0.00	0.97	-0.01	0.69	0.03	0.22	-0.02	0.33	0.05	0.01	-0.05	0.00	0.01	0.74
	CO Min’	4.05	0.12	-5.70	0.03	0.21	0.92	2.54	0.20	-3.55	0.11	4.00	0.09	-2.06	0.34	0.42	0.85
	NO Mean	0.01	0.24	-0.02	0.01	0.02	0.03	-0.01	0.41	0.00	0.81	0.00	0.55	0.00	0.88	0.00	0.71
	NO_2 Mean	0.01	0.71	0.00	0.99	0.01	0.45	-0.05	0.01	0.04	0.03	-0.04	0.04	0.05	0.01	-0.02	0.24
	NOD Mean	0.01	0.28	-0.01	0.04	0.01	0.04	-0.01	0.16	0.00	0.71	0.00	0.95	0.00	0.54	0.00	0.51
	SO_2 Mean	0.03	0.32	-0.02	0.57	-0.04	0.27	0.05	0.13	-0.03	0.26	-0.01	0.62	0.04	0.18	-0.01	0.72
	PM_{10} Mean	0.04	0.18	-0.03	0.31	0.01	0.79	-0.03	0.21	0.01	0.60	0.02	0.52	0.00	0.89	0.00	0.85
	O_3 Mean	-0.01	0.52	0.01	0.46	0.00	0.81	0.02	0.26	-0.02	0.28	0.02	0.21	-0.02	0.23	0.00	0.80
	CO Mean	0.92	0.40	-1.44	0.24	0.52	0.63	0.32	0.77	-1.16	0.26	0.85	0.40	-0.01	0.99	-0.38	0.64
	NO Max’	0.00	0.87	0.00	0.07	0.01	0.00	-0.01	0.04	0.00	0.76	0.00	0.77	0.00	0.85	0.00	0.62
	NO_2 Max’	-0.01	0.51	0.01	0.33	0.02	0.15	-0.04	0.00	0.02	0.05	-0.02	0.10	0.02	0.08	-0.01	0.61
	NOD Max’	0.00	0.87	0.00	0.13	0.00	0.00	0.00	0.02	0.00	0.60	0.00	0.98	0.00	0.86	0.00	0.46
	SO_2 Max’	0.00	0.59	0.00	0.60	-0.01	0.40	0.00	0.86	0.00	0.46	0.00	0.71	0.00	0.82	0.00	0.84
	PM_{10} Max’	0.00	0.84	0.02	0.09	-0.01	0.27	-0.01	0.29	0.00	0.75	0.02	0.09	0.00	0.67	-0.01	0.31
	O_3 Max’	-0.02	0.16	0.01	0.34	0.02	0.12	-0.01	0.59	-0.01	0.20	0.01	0.64	0.01	0.27	-0.02	0.18
	CO Max’	0.03	0.94	-0.44	0.30	0.88	0.02	-0.66	0.09	-0.06	0.87	0.31	0.39	-0.47	0.15	0.18	0.49
Weather	Temp Min’	0.11	0.20	-0.08	0.40	-0.10	0.29	0.19	0.04	-0.19	0.04	0.13	0.15	0.05	0.58	-0.12	0.14
	Temp Max’	-0.03	0.69	0.12	0.11	-0.15	0.05	0.01	0.91	0.14	0.14	-0.08	0.37	-0.10	0.20	0.12	0.10
	Sun	-0.01	0.83	0.01	0.79	0.01	0.89	-0.02	0.78	0.04	0.57	-0.04	0.51	0.04	0.55	-0.08	0.15
	Rain	0.03	0.33	0.00	0.92	-0.01	0.90	-0.02	0.55	0.00	0.89	0.00	0.88	-0.01	0.64	0.07	0.11
	Pressure	0.01	0.66	0.02	0.44	0.00	0.94	-0.09	0.02	0.10	0.02	-0.09	0.04	0.08	0.03	-0.03	0.16
	Wind speed	0.01	0.68	-0.15	0.06	0.07	0.43	0.18	0.05	-0.14	0.12	0.08	0.41	-0.10	0.30	0.08	0.32
Pollen	Grass	0.01	0.47	0.01	0.25	-0.02	0.14	-0.02	0.05	0.02	0.03	-0.02	0.16	0.02	0.07	-0.01	0.18

Table F. 77: Trent Region Emergency Counts Asthmatics – percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
	Exposure	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min'	-0.07	0.56	-0.01	0.96	-0.08	0.42	0.15	0.06	-0.08	0.42	0.09	0.37	-0.07	0.49	-0.04	0.65
	NO_2 Min'	0.07	0.22	-0.13	0.05	0.10	0.15	-0.02	0.72	0.03	0.65	-0.07	0.31	0.05	0.45	-0.06	0.32
	NOD Min'	0.02	0.59	-0.04	0.29	0.00	0.96	0.03	0.39	0.00	0.90	0.00	0.95	0.00	0.95	-0.03	0.32
	SO_2 Min'	-0.32	0.30	-0.05	0.86	0.42	0.17	0.17	0.58	-0.17	0.60	-0.34	0.29	0.41	0.20	-0.21	0.49
	PM_{10} Min'	0.04	0.61	-0.02	0.80	-0.08	0.31	0.08	0.28	-0.03	0.66	-0.04	0.60	0.12	0.14	-0.10	0.20
	O_3 Min'	-0.05	0.18	0.05	0.21	-0.03	0.44	0.02	0.65	-0.06	0.18	0.11	0.01	-0.07	0.09	0.06	0.16
	CO Min'	7.19	0.20	-2.96	0.62	-5.71	0.33	6.27	0.27	-2.31	0.68	-1.94	0.74	-0.24	0.97	0.58	0.91
	NO Mean	-0.01	0.55	0.01	0.62	-0.02	0.34	0.03	0.24	0.01	0.82	0.00	0.85	0.00	1.00	-0.03	0.25
	NO_2 Mean	0.03	0.54	0.00	0.99	-0.01	0.81	-0.01	0.80	0.08	0.11	-0.13	0.01	0.08	0.10	-0.04	0.42
	NOD Mean	0.00	0.78	0.00	0.73	-0.01	0.43	0.01	0.37	0.01	0.62	-0.01	0.48	0.01	0.67	-0.01	0.25
	SO_2 Mean	-0.21	0.04	0.11	0.35	0.09	0.47	0.02	0.88	0.07	0.51	-0.29	0.03	0.23	0.03	-0.09	0.36
	PM_{10} Mean	0.00	0.95	0.05	0.40	-0.12	0.05	0.08	0.23	0.00	0.96	-0.09	0.18	0.12	0.06	-0.06	0.27
	O_3 Mean	-0.03	0.45	0.04	0.34	-0.04	0.35	0.02	0.58	-0.06	0.12	0.11	0.01	-0.12	0.00	0.10	0.01
	CO Mean	-0.50	0.86	0.35	0.91	-0.19	0.94	1.18	0.69	-0.28	0.92	0.05	0.99	-1.24	0.68	-0.05	0.99
	NO Max'	0.00	0.99	0.00	0.55	0.01	0.40	0.00	0.73	0.01	0.20	-0.01	0.31	0.00	0.61	-0.01	0.10
	NO_2 Max'	0.03	0.37	-0.01	0.66	0.01	0.65	-0.02	0.53	0.04	0.16	-0.07	0.02	0.03	0.23	-0.01	0.74
	NOD Max'	0.00	0.92	0.00	0.59	0.00	0.38	0.00	0.70	0.00	0.25	-0.01	0.25	0.00	0.47	-0.01	0.11
	SO_2 Max'	-0.03	0.29	0.01	0.78	0.03	0.24	-0.01	0.53	0.03	0.19	-0.06	0.02	0.03	0.19	0.00	0.98
	PM_{10} Max'	0.00	0.93	0.02	0.33	-0.01	0.74	-0.03	0.16	0.03	0.12	-0.04	0.08	0.03	0.13	-0.01	0.52
	O_3 Max'	-0.01	0.65	0.05	0.11	-0.05	0.10	0.03	0.35	-0.03	0.28	0.02	0.47	-0.05	0.11	0.07	0.02
	CO Max'	0.08	0.94	-0.17	0.88	0.53	0.59	-0.10	0.93	0.45	0.68	-0.58	0.58	0.11	0.91	-0.74	0.45
Weather	Temp Min'	0.39	0.07	-0.32	0.22	0.00	0.99	-0.07	0.78	0.13	0.62	0.15	0.54	-0.34	0.15	0.13	0.53
	Temp Max'	-0.03	0.88	-0.37	0.10	0.71	0.00	-0.58	0.01	0.10	0.66	-0.03	0.89	0.32	0.16	-0.19	0.33
	Sun	-0.05	0.71	-0.18	0.24	0.03	0.84	0.33	0.03	-0.40	0.01	0.17	0.25	0.11	0.46	0.01	0.96
	Rain	0.15	0.10	-0.11	0.23	0.07	0.48	-0.12	0.26	0.14	0.16	-0.17	0.08	0.09	0.31	-0.03	0.71
	Pressure	-0.03	0.67	0.00	0.98	0.06	0.47	-0.10	0.23	0.02	0.80	0.11	0.16	-0.09	0.25	0.01	0.92
	Wind speed	-0.03	0.58	-0.04	0.86	-0.23	0.32	0.25	0.29	-0.22	0.34	0.26	0.29	-0.32	0.20	0.27	0.22
Pollen	Grass	0.00	0.88	0.00	0.99	0.02	0.34	-0.04	0.05	0.03	0.21	0.00	0.86	-0.02	0.21	0.02	0.23

Table F. 78: Trent Region Emergency Counts Non-asthmatics – percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
	Exposure	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min'	-0.13	0.16	0.12	0.14	-0.11	0.21	0.04	0.61	0.03	0.75	-0.02	0.86	-0.07	0.44	0.12	0.13
	NO_2 Min'	-0.01	0.84	0.01	0.88	-0.03	0.66	0.01	0.89	0.03	0.56	-0.04	0.55	0.00	0.96	0.00	0.97
	NOD Min'	-0.04	0.18	0.05	0.10	-0.04	0.23	0.01	0.86	0.02	0.54	-0.01	0.71	-0.02	0.56	0.03	0.37
	SO_2 Min'	-0.03	0.91	0.39	0.20	-0.52	0.06	0.18	0.48	0.03	0.90	-0.17	0.55	0.09	0.76	0.07	0.81
	PM_{10} Min'	-0.06	0.43	0.00	0.96	0.03	0.68	-0.01	0.85	0.02	0.77	-0.07	0.40	0.04	0.62	0.06	0.46
	O_3 Min'	-0.05	0.18	0.04	0.23	0.01	0.74	-0.03	0.48	0.02	0.62	0.05	0.20	-0.09	0.01	0.04	0.20
	CO Min'	0.85	0.86	-0.96	0.85	-6.86	0.20	10.06	0.05	-4.58	0.38	-3.90	0.45	4.51	0.38	-1.73	0.73
	NO Mean	-0.03	0.17	0.02	0.32	-0.02	0.26	0.03	0.14	-0.03	0.18	0.02	0.37	-0.03	0.30	0.02	0.30
	NO_2 Mean	0.01	0.80	0.01	0.90	-0.03	0.41	0.04	0.30	-0.03	0.42	-0.03	0.46	0.07	0.10	-0.05	0.22
	NOD Mean	-0.01	0.26	0.01	0.36	-0.01	0.25	0.02	0.14	-0.01	0.18	0.01	0.56	-0.01	0.64	0.01	0.61
	SO_2 Mean	-0.07	0.50	0.13	0.23	-0.17	0.08	0.09	0.31	-0.04	0.62	0.05	0.63	0.07	0.50	-0.07	0.46
	PM_{10} Mean	-0.02	0.73	0.04	0.51	-0.03	0.57	0.02	0.69	-0.04	0.43	0.05	0.36	-0.05	0.42	0.03	0.54
	O_3 Mean	-0.05	0.16	0.02	0.66	0.07	0.04	-0.10	0.01	0.05	0.13	0.01	0.84	-0.01	0.83	-0.01	0.84
	CO Mean	-2.01	0.40	1.73	0.49	-3.02	0.23	5.66	0.02	-5.37	0.03	2.42	0.39	-2.33	0.40	1.95	0.42
	NO Max'	-0.01	0.13	0.00	0.49	0.00	0.61	0.00	0.78	0.00	0.42	0.01	0.26	-0.01	0.45	0.00	0.57
	NO_2 Max'	-0.02	0.42	0.02	0.35	-0.02	0.44	0.01	0.69	-0.02	0.45	0.01	0.72	0.02	0.48	-0.02	0.35
	NOD Max'	-0.01	0.12	0.00	0.41	0.00	0.54	0.00	0.69	0.00	0.33	0.01	0.24	0.00	0.48	0.00	0.62
	SO_2 Max'	-0.02	0.32	0.02	0.39	-0.04	0.10	0.03	0.14	-0.01	0.76	0.02	0.28	-0.02	0.50	0.00	0.99
	PM_{10} Max'	-0.02	0.26	0.03	0.11	0.00	0.92	-0.01	0.62	-0.02	0.25	0.03	0.24	0.00	0.87	-0.01	0.53
	O_3 Max'	-0.01	0.66	0.00	0.92	0.03	0.23	-0.05	0.07	0.03	0.30	-0.02	0.43	0.04	0.18	-0.03	0.33
	CO Max'	-1.42	0.11	0.78	0.38	-0.34	0.71	1.12	0.22	-1.76	0.04	0.80	0.41	-0.29	0.77	0.48	0.59
Weather	Temp Min'	0.17	0.35	0.11	0.58	-0.22	0.30	0.17	0.41	-0.27	0.18	0.35	0.08	-0.19	0.34	-0.07	0.69
	Temp Max'	-0.09	0.61	0.05	0.81	-0.02	0.91	0.12	0.51	0.13	0.47	-0.29	0.10	0.17	0.35	-0.07	0.65
	Sun	0.12	0.34	-0.32	0.01	0.19	0.16	0.06	0.66	-0.07	0.57	-0.08	0.53	0.26	0.03	-0.14	0.24
	Rain	-0.06	0.40	0.21	0.02	-0.15	0.13	-0.04	0.62	0.02	0.83	0.04	0.58	-0.21	0.00	0.17	0.01
	Pressure	0.08	0.15	-0.07	0.30	-0.11	0.10	0.20	0.01	-0.12	0.09	0.01	0.93	0.02	0.79	0.01	0.78
	Wind speed	0.02	0.62	-0.12	0.49	0.29	0.15	-0.13	0.52	-0.03	0.89	0.37	0.06	-0.40	0.04	0.11	0.53
Pollen	Grass	0.02	0.08	0.00	0.92	0.00	0.80	-0.04	0.01	0.05	0.00	-0.01	0.52	-0.02	0.33	0.01	0.42

Table F. 79: Trent Region Out of Hours Counts Asthmatics – percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	-0.04	0.61	0.02	0.82	-0.06	0.53	0.14	0.09	-0.14	0.07	0.10	0.28	0.03	0.74	-0.13	0.08
	NO_2 Min’	0.08	0.14	-0.17	0.01	0.09	0.18	0.07	0.25	-0.05	0.47	-0.03	0.61	0.05	0.43	-0.07	0.18
	NOD Min’	0.02	0.45	-0.04	0.23	0.00	0.96	0.06	0.07	-0.04	0.18	0.01	0.74	0.03	0.41	-0.05	0.05
	SO_2 Min’	-0.14	0.65	-0.37	0.24	0.71	0.02	-0.22	0.49	-0.19	0.53	0.12	0.69	0.26	0.37	-0.40	0.16
	PM_{10} Min’	0.03	0.65	-0.01	0.83	-0.12	0.09	0.16	0.04	-0.01	0.93	-0.08	0.31	0.05	0.45	-0.06	0.40
	O_3 Min’	-0.07	0.08	0.08	0.05	-0.06	0.18	0.02	0.60	-0.03	0.43	0.07	0.07	-0.04	0.39	0.02	0.70
	CO Min’	3.01	0.53	-5.02	0.39	-4.08	0.48	12.17	0.03	-6.41	0.24	-0.03	1.00	2.37	0.67	-4.31	0.39
	NO Mean	-0.01	0.64	-0.01	0.76	0.00	0.90	0.03	0.18	-0.01	0.62	0.01	0.57	-0.03	0.21	0.00	0.84
	NO_2 Mean	0.03	0.56	-0.06	0.24	0.03	0.59	0.05	0.26	-0.02	0.71	-0.05	0.34	0.00	0.96	0.02	0.67
	NOD Mean	0.00	0.88	-0.01	0.58	0.00	0.87	0.02	0.15	-0.01	0.53	0.00	0.72	-0.01	0.30	0.00	0.98
	SO_2 Mean	-0.17	0.09	0.03	0.83	0.16	0.20	-0.05	0.62	0.02	0.82	-0.07	0.58	0.04	0.74	-0.04	0.69
	PM_{10} Mean	0.01	0.83	-0.01	0.80	-0.07	0.26	0.17	0.01	-0.09	0.20	-0.06	0.35	0.06	0.33	-0.02	0.64
	O_3 Mean	-0.05	0.18	0.10	0.02	-0.10	0.02	0.03	0.51	-0.03	0.44	0.06	0.12	-0.04	0.28	0.04	0.30
	CO Mean	-0.77	0.77	-0.83	0.80	-1.21	0.68	6.32	0.04	-4.71	0.13	2.97	0.34	-3.58	0.26	1.04	0.70
	NO Max’	0.00	0.79	-0.01	0.40	0.01	0.25	0.00	0.67	0.01	0.47	-0.01	0.36	0.00	0.85	-0.01	0.46
	NO_2 Max’	0.02	0.52	-0.04	0.13	0.04	0.19	0.00	0.87	0.01	0.76	-0.04	0.12	0.00	0.95	0.02	0.42
	NOD Max’	0.00	0.86	0.00	0.37	0.01	0.20	0.00	0.75	0.00	0.54	0.00	0.33	0.00	0.91	0.00	0.58
	SO_2 Max’	-0.02	0.40	-0.03	0.33	0.05	0.05	-0.02	0.44	0.01	0.54	-0.02	0.40	-0.01	0.64	0.02	0.49
	PM_{10} Max’	0.00	0.95	-0.01	0.57	0.04	0.07	-0.01	0.64	0.01	0.69	-0.04	0.04	0.03	0.18	0.00	0.92
	O_3 Max’	-0.05	0.06	0.11	0.00	-0.08	0.01	0.01	0.63	-0.02	0.34	0.02	0.56	-0.02	0.44	0.05	0.07
	CO Max’	0.05	0.96	-0.26	0.82	0.38	0.71	0.94	0.38	-0.67	0.55	0.27	0.81	-1.07	0.34	0.29	0.78
Weather	Temp Min’	0.22	0.29	-0.07	0.76	-0.12	0.61	-0.13	0.59	0.15	0.52	0.16	0.47	-0.44	0.05	0.28	0.15
	Temp Max’	-0.32	0.10	0.11	0.59	0.45	0.03	-0.59	0.00	0.18	0.41	-0.07	0.74	0.18	0.40	-0.07	0.71
	Sun	-0.07	0.61	-0.09	0.54	0.16	0.25	0.10	0.48	-0.19	0.21	0.00	0.98	0.03	0.83	0.11	0.43
	Rain	0.07	0.39	-0.11	0.21	-0.10	0.20	0.06	0.43	0.04	0.63	0.04	0.63	0.04	0.67	-0.10	0.20
	Pressure	-0.05	0.48	0.06	0.50	0.03	0.70	-0.07	0.33	0.05	0.53	0.09	0.25	-0.15	0.07	0.05	0.47
	Wind speed	0.00	0.97	0.27	0.18	-0.56	0.02	0.39	0.09	-0.27	0.25	0.38	0.11	-0.41	0.10	0.23	0.27
Pollen	Grass	0.00	0.82	-0.01	0.70	0.02	0.27	-0.03	0.12	0.03	0.19	-0.02	0.43	-0.01	0.53	0.01	0.34

Table F. 80: Trent Region Out of Hours Counts Non-asthmatics – percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	-0.10	0.08	0.11	0.03	-0.07	0.29	-0.01	0.86	0.05	0.34	0.01	0.89	-0.09	0.12	0.09	0.08
	NO_2 Min’	-0.01	0.82	0.02	0.56	-0.05	0.22	0.03	0.42	0.02	0.59	-0.02	0.71	-0.03	0.51	0.02	0.59
	NOD Min’	-0.03	0.14	0.04	0.04	-0.04	0.14	0.00	0.84	0.02	0.42	0.00	0.88	-0.03	0.15	0.03	0.21
	SO_2 Min’	0.00	0.99	0.05	0.82	0.08	0.70	-0.26	0.24	0.16	0.46	0.05	0.83	-0.24	0.37	0.13	0.59
	PM_{10} Min’	0.01	0.90	-0.03	0.51	0.06	0.24	-0.11	0.05	0.08	0.15	0.00	0.98	-0.05	0.40	0.06	0.27
	O_3 Min’	-0.02	0.60	0.02	0.62	0.02	0.52	-0.03	0.31	0.00	0.88	0.05	0.08	-0.08	0.01	0.04	0.17
	CO Min’	-2.25	0.50	6.26	0.12	-9.07	0.04	4.01	0.33	1.07	0.77	-1.84	0.65	-1.79	0.69	2.73	0.47
	NO Mean	-0.03	0.08	0.03	0.11	-0.02	0.17	0.02	0.13	-0.01	0.68	0.00	0.86	-0.01	0.54	0.01	0.57
	NO_2 Mean	0.00	0.95	0.01	0.88	-0.03	0.32	0.03	0.35	0.01	0.68	-0.04	0.32	0.03	0.40	-0.03	0.40
	NOD Mean	-0.01	0.14	0.01	0.16	-0.01	0.18	0.01	0.16	0.00	0.80	0.00	0.98	0.00	0.73	0.00	0.80
	SO_2 Mean	-0.09	0.27	0.09	0.22	-0.08	0.22	0.04	0.55	-0.02	0.73	0.05	0.60	-0.04	0.58	0.05	0.49
	PM_{10} Mean	0.01	0.70	-0.02	0.67	0.01	0.73	-0.03	0.48	0.01	0.80	0.06	0.19	-0.09	0.04	0.05	0.19
	O_3 Mean	0.00	0.93	-0.01	0.63	0.05	0.08	-0.07	0.01	0.04	0.22	0.01	0.71	-0.01	0.65	0.00	0.98
	CO Mean	-2.01	0.29	2.54	0.23	-3.24	0.12	3.49	0.08	-1.58	0.44	1.17	0.62	-2.24	0.32	1.39	0.46
	NO Max’	-0.01	0.13	0.01	0.30	-0.01	0.28	0.01	0.32	0.00	0.96	0.00	0.71	-0.01	0.46	0.00	0.62
	NO_2 Max’	-0.01	0.75	0.00	0.85	-0.01	0.52	0.01	0.59	0.01	0.71	0.00	0.83	0.01	0.57	-0.02	0.19
	NOD Max’	0.00	0.13	0.00	0.25	0.00	0.21	0.00	0.26	0.00	0.97	0.00	0.76	0.00	0.52	0.00	0.74
	SO_2 Max’	-0.01	0.65	0.00	0.82	-0.02	0.29	0.01	0.38	0.01	0.49	0.00	0.89	-0.01	0.60	0.01	0.48
	PM_{10} Max’	0.00	0.93	0.00	0.99	0.02	0.28	-0.02	0.25	-0.02	0.32	0.03	0.13	-0.01	0.56	0.00	0.86
	O_3 Max’	0.04	0.03	-0.02	0.23	0.01	0.68	-0.03	0.14	0.01	0.57	0.00	0.87	0.01	0.52	-0.01	0.60
	CO Max’	-1.09	0.14	0.69	0.37	-0.14	0.86	0.51	0.50	-0.39	0.58	0.17	0.84	-0.47	0.58	0.47	0.55
Weather	Temp Min’	0.17	0.25	-0.07	0.66	-0.22	0.16	0.26	0.11	-0.12	0.43	0.02	0.92	-0.04	0.81	0.06	0.67
	Temp Max’	-0.26	0.05	0.26	0.07	-0.16	0.26	0.06	0.65	0.28	0.04	-0.39	0.01	0.07	0.64	0.06	0.61
	Sun	0.03	0.79	-0.11	0.27	0.13	0.24	-0.05	0.64	0.07	0.52	-0.17	0.08	0.12	0.18	-0.01	0.91
	Rain	0.02	0.75	0.10	0.09	-0.08	0.22	-0.03	0.68	0.01	0.82	0.06	0.37	-0.11	0.08	0.06	0.31
	Pressure	0.02	0.69	-0.01	0.90	-0.10	0.06	0.17	0.00	-0.07	0.28	-0.07	0.22	0.04	0.49	0.02	0.61
	Wind speed	0.01	0.76	0.16	0.27	-0.11	0.52	0.09	0.59	-0.22	0.16	0.33	0.03	-0.05	0.76	-0.19	0.18
Pollen	Grass	0.00	0.83	0.01	0.48	-0.01	0.24	0.00	0.92	0.02	0.10	-0.02	0.06	0.01	0.21	0.00	0.65

Table F. 81: Trent Region All Counts Excess – percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	-0.02	0.85	-0.03	0.79	-0.05	0.46	0.06	0.37	0.14	0.06	-0.06	0.50	-0.16	0.06	0.07	0.32
	NO_2 Min’	0.03	0.52	0.01	0.89	-0.01	0.92	-0.02	0.63	0.10	0.05	-0.13	0.01	0.05	0.36	-0.02	0.76
	NOD Min’	0.00	0.97	0.00	0.95	-0.01	0.60	0.01	0.79	0.06	0.02	-0.06	0.05	-0.02	0.60	0.01	0.59
	SO_2 Min’	-0.19	0.45	0.00	1.00	0.05	0.84	0.30	0.23	-0.57	0.02	0.22	0.39	0.19	0.46	-0.03	0.90
	PM_{10} Min’	0.04	0.53	-0.01	0.86	-0.07	0.27	0.03	0.65	0.11	0.07	-0.06	0.38	-0.05	0.43	-0.03	0.63
	O_3 Min’	-0.04	0.27	0.00	0.89	0.00	0.90	-0.01	0.86	0.01	0.79	-0.01	0.67	0.00	0.90	0.03	0.28
	CO Min’	2.89	0.53	-2.81	0.57	4.77	0.29	-2.04	0.65	6.19	0.20	-11.30	0.02	2.96	0.53	0.32	0.94
	NO Mean	0.03	0.13	-0.04	0.06	0.01	0.63	0.03	0.19	-0.02	0.39	0.02	0.24	-0.04	0.07	0.02	0.33
	NO_2 Mean	0.03	0.39	0.01	0.86	-0.02	0.59	0.00	0.96	0.04	0.26	-0.05	0.22	-0.02	0.68	0.02	0.54
	NOD Mean	0.02	0.13	-0.02	0.13	0.00	0.78	0.01	0.31	-0.01	0.61	0.01	0.40	-0.02	0.09	0.01	0.32
	SO_2 Mean	-0.06	0.41	0.09	0.32	-0.09	0.33	0.19	0.03	-0.11	0.23	-0.10	0.28	0.14	0.11	-0.09	0.31
	PM_{10} Mean	0.03	0.49	-0.05	0.36	0.01	0.79	0.00	0.99	0.05	0.27	-0.02	0.66	-0.07	0.24	0.03	0.48
	O_3 Mean	-0.02	0.51	0.01	0.73	-0.03	0.40	0.02	0.54	-0.01	0.80	0.02	0.57	-0.05	0.14	0.05	0.13
	CO Mean	3.18	0.19	-3.44	0.19	1.40	0.58	0.92	0.72	0.95	0.69	-2.80	0.25	0.99	0.72	-0.51	0.83
	NO Max’	0.00	0.45	0.00	0.47	0.00	0.66	0.01	0.36	0.00	0.39	0.00	0.73	-0.01	0.24	0.01	0.41
	NO_2 Max’	0.03	0.16	-0.03	0.27	0.02	0.56	-0.01	0.77	0.01	0.68	-0.01	0.53	-0.01	0.77	0.01	0.55
	NOD Max’	0.00	0.33	0.00	0.36	0.00	0.58	0.00	0.45	0.00	0.45	0.00	0.79	0.00	0.30	0.00	0.42
	SO_2 Max’	-0.02	0.40	0.03	0.18	-0.02	0.37	0.05	0.02	-0.04	0.06	-0.02	0.33	0.02	0.34	-0.01	0.79
	PM_{10} Max’	0.02	0.38	-0.02	0.34	0.00	0.97	0.00	0.87	0.02	0.28	0.00	0.87	-0.05	0.02	0.03	0.16
	O_3 Max’	-0.03	0.17	0.04	0.16	-0.03	0.28	0.02	0.50	0.01	0.79	-0.02	0.33	0.00	0.99	0.01	0.66
	CO Max’	1.28	0.13	-1.70	0.08	0.48	0.61	1.07	0.25	-0.77	0.38	-0.06	0.94	-0.11	0.90	-0.06	0.94
Weather	Temp Min’	-0.05	0.76	-0.01	0.94	-0.05	0.82	0.15	0.45	0.06	0.73	-0.19	0.35	0.16	0.40	-0.19	0.26
	Temp Max’	0.16	0.31	-0.33	0.06	0.36	0.04	-0.41	0.02	0.08	0.64	0.24	0.17	-0.14	0.44	0.01	0.97
	Sun	-0.01	0.91	-0.09	0.48	0.16	0.19	-0.23	0.05	-0.04	0.73	0.15	0.19	-0.02	0.85	0.08	0.49
	Rain	0.00	0.95	0.08	0.35	-0.09	0.27	0.05	0.49	0.06	0.35	-0.02	0.79	-0.08	0.18	0.03	0.74
	Pressure	-0.04	0.48	0.05	0.48	0.10	0.19	-0.14	0.04	0.00	0.95	0.03	0.64	-0.03	0.64	0.04	0.44
	Wind speed	-0.01	0.87	-0.12	0.51	-0.05	0.81	0.05	0.80	-0.02	0.92	0.08	0.67	0.04	0.82	-0.03	0.85
Pollen	Grass	-0.01	0.59	0.00	0.79	0.01	0.27	-0.03	0.05	0.04	0.00	-0.04	0.00	-0.01	0.66	0.02	0.17

Table F. 82: Trent Region Acute Visits Excess – percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	0.03	0.85	-0.05	0.46	0.02	0.76	-0.10	0.30	0.19	0.04	-0.19	0.04	0.17	0.01	-0.07	0.24
	NO_2 Min’	-0.02	0.64	0.03	0.56	-0.02	0.69	-0.01	0.81	0.06	0.27	-0.05	0.39	0.03	0.59	-0.01	0.87
	NOD Min’	0.00	0.92	-0.01	0.84	0.00	0.87	-0.02	0.54	0.06	0.08	-0.06	0.05	0.05	0.05	-0.02	0.40
	SO_2 Min’	-0.28	0.23	0.18	0.46	0.12	0.63	0.12	0.64	-0.25	0.33	-0.07	0.79	0.32	0.19	-0.09	0.70
	PM_{10} Min’	0.07	0.18	-0.08	0.15	0.07	0.23	-0.14	0.04	0.13	0.09	-0.11	0.12	0.13	0.05	-0.03	0.66
	O_3 Min’	-0.02	0.43	-0.03	0.37	0.06	0.08	0.00	0.95	-0.09	0.02	0.06	0.07	-0.04	0.28	0.06	0.07
	CO Min’	-1.65	0.75	3.05	0.54	-0.06	0.99	-7.58	0.17	12.82	0.03	-7.53	0.14	2.38	0.60	1.37	0.73
	NO Mean	0.01	0.58	-0.01	0.67	0.00	0.94	-0.02	0.29	0.04	0.09	-0.02	0.28	0.04	0.02	-0.04	0.01
	NO_2 Mean	0.01	0.76	0.01	0.80	0.01	0.83	-0.11	0.01	0.13	0.00	-0.05	0.13	0.05	0.17	-0.04	0.27
	NOD Mean	0.01	0.61	0.00	0.76	0.00	0.86	-0.02	0.13	0.02	0.04	-0.01	0.21	0.02	0.02	-0.02	0.02
	SO_2 Mean	-0.08	0.40	0.00	0.99	0.14	0.24	-0.14	0.11	0.23	0.01	-0.38	0.00	0.29	0.00	-0.05	0.52
	PM_{10} Mean	0.05	0.24	-0.05	0.28	0.01	0.75	-0.10	0.04	0.19	0.00	-0.16	0.00	0.14	0.00	-0.07	0.11
	O_3 Mean	0.04	0.23	-0.05	0.19	0.01	0.87	0.03	0.34	-0.07	0.04	0.05	0.09	-0.05	0.12	0.05	0.09
	CO Mean	2.12	0.49	-3.03	0.32	5.00	0.05	-8.41	0.00	9.02	0.00	-4.52	0.08	4.23	0.08	-3.90	0.08
	NO Max’	0.00	0.66	0.00	0.61	0.00	0.76	0.00	0.71	0.01	0.27	0.00	0.77	0.01	0.20	-0.01	0.03
	NO_2 Max’	0.02	0.43	0.00	0.85	0.00	0.86	-0.05	0.05	0.04	0.10	0.01	0.76	0.02	0.27	-0.04	0.08
	NOD Max’	0.00	0.64	0.00	0.68	0.00	0.83	0.00	0.62	0.00	0.28	0.00	0.92	0.00	0.23	-0.01	0.03
	SO_2 Max’	0.00	0.84	0.00	0.96	0.00	0.99	0.00	0.87	0.04	0.09	-0.07	0.00	0.05	0.01	-0.01	0.77
	PM_{10} Max’	0.02	0.34	-0.01	0.56	0.00	0.96	0.00	0.86	0.02	0.40	-0.03	0.16	0.06	0.00	-0.04	0.03
	O_3 Max’	0.04	0.06	-0.03	0.12	0.00	0.94	0.00	0.85	-0.04	0.10	0.04	0.07	-0.01	0.57	0.00	0.82
	CO Max’	0.53	0.68	-0.59	0.65	0.83	0.44	-1.25	0.22	1.75	0.08	-0.76	0.40	1.11	0.22	-1.72	0.05
Weather	Temp Min’	0.32	0.07	-0.30	0.11	-0.19	0.33	0.36	0.08	-0.14	0.50	0.03	0.89	-0.11	0.57	0.03	0.85
	Temp Max’	-0.02	0.89	-0.09	0.58	0.00	1.00	-0.10	0.55	0.38	0.03	-0.32	0.06	0.06	0.73	0.04	0.78
	Sun	-0.05	0.68	0.05	0.65	-0.06	0.62	0.11	0.36	-0.16	0.17	0.01	0.96	0.23	0.04	-0.13	0.25
	Rain	0.02	0.78	0.01	0.87	0.14	0.09	-0.04	0.69	-0.05	0.50	-0.05	0.46	0.03	0.65	0.03	0.67
	Pressure	-0.03	0.49	0.10	0.11	-0.07	0.26	-0.06	0.39	0.18	0.02	-0.29	0.00	0.27	0.00	-0.10	0.05
	Wind speed	-0.01	0.82	-0.13	0.48	0.06	0.79	0.30	0.15	-0.59	0.01	0.24	0.29	0.15	0.47	-0.13	0.47
Pollen	Grass	-0.01	0.44	0.01	0.34	-0.01	0.36	0.02	0.15	-0.01	0.24	-0.01	0.54	0.01	0.27	0.00	0.80

Table F. 83: Trent Region Casualty Counts Excess – percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min'	-0.02	0.82	-0.02	0.76	0.02	0.78	0.01	0.85	-0.06	0.32	0.18	0.02	-0.23	0.01	0.08	0.18
	NO_2 Min'	0.07	0.16	-0.04	0.47	0.03	0.52	-0.10	0.07	0.09	0.09	-0.05	0.32	-0.01	0.81	0.04	0.42
	NOD Min'	0.03	0.25	-0.03	0.36	0.01	0.59	-0.03	0.30	0.01	0.63	0.03	0.33	-0.05	0.08	0.03	0.21
	SO_2 Min'	0.15	0.53	-0.39	0.14	0.37	0.13	-0.01	0.96	0.08	0.74	-0.20	0.42	-0.13	0.62	0.16	0.51
	PM_{10} Min'	0.07	0.23	0.00	1.00	-0.06	0.29	0.01	0.85	-0.06	0.34	0.12	0.07	-0.05	0.51	-0.02	0.73
	O_3 Min'	0.03	0.31	-0.02	0.49	0.01	0.78	-0.01	0.86	-0.03	0.48	0.05	0.15	-0.04	0.24	0.02	0.55
	CO Min'	0.79	0.85	7.06	0.12	-6.60	0.14	-2.66	0.55	2.12	0.63	2.90	0.50	-8.88	0.05	7.87	0.04
	NO Mean	0.00	0.86	0.01	0.61	-0.01	0.58	0.00	0.86	0.02	0.24	-0.01	0.50	0.00	0.99	-0.01	0.66
	NO_2 Mean	-0.01	0.71	0.06	0.11	-0.05	0.24	-0.04	0.33	0.11	0.01	-0.09	0.02	0.04	0.35	-0.01	0.72
	NOD Mean	0.00	0.84	0.01	0.44	-0.01	0.50	0.00	0.64	0.02	0.10	-0.01	0.27	0.00	0.80	0.00	0.65
	SO_2 Mean	-0.04	0.65	0.04	0.60	-0.02	0.80	0.07	0.32	-0.03	0.73	-0.08	0.29	-0.07	0.35	0.13	0.10
	PM_{10} Mean	0.02	0.62	0.03	0.58	-0.04	0.39	-0.06	0.18	0.05	0.29	0.06	0.24	-0.08	0.13	0.03	0.46
	O_3 Mean	0.04	0.17	-0.05	0.16	0.01	0.82	0.04	0.35	-0.06	0.08	0.07	0.04	-0.07	0.04	0.05	0.11
	CO Mean	-0.60	0.78	2.93	0.21	-2.92	0.20	-1.68	0.44	3.41	0.11	-0.74	0.74	-1.23	0.57	0.52	0.78
	NO Max'	0.00	0.62	0.00	0.94	0.00	0.75	0.00	0.79	0.01	0.17	0.00	0.42	0.00	0.70	0.00	0.84
	NO_2 Max'	0.01	0.54	0.02	0.40	-0.02	0.37	-0.01	0.59	0.04	0.04	-0.05	0.02	0.02	0.40	0.00	0.87
	NOD Max'	0.00	0.57	0.00	0.85	0.00	0.62	0.00	0.81	0.00	0.14	0.00	0.27	0.00	0.96	0.00	0.71
	SO_2 Max'	0.00	0.88	0.02	0.42	0.00	0.94	-0.01	0.47	0.01	0.52	-0.04	0.04	0.02	0.40	0.01	0.63
	PM_{10} Max'	0.01	0.62	0.03	0.06	-0.04	0.02	-0.03	0.04	0.03	0.06	0.02	0.21	-0.04	0.02	0.03	0.06
	O_3 Max'	0.04	0.10	-0.03	0.18	-0.01	0.83	0.03	0.28	-0.02	0.35	0.02	0.45	-0.04	0.14	0.03	0.12
	CO Max'	0.19	0.82	0.16	0.84	-0.34	0.68	-0.66	0.38	1.47	0.05	-0.50	0.51	-0.69	0.32	0.24	0.73
Weather	Temp Min'	0.29	0.11	-0.47	0.03	0.20	0.36	0.00	0.99	0.10	0.59	-0.23	0.25	0.20	0.32	-0.03	0.89
	Temp Max'	0.05	0.76	-0.08	0.69	0.10	0.62	-0.19	0.34	0.04	0.84	0.22	0.22	-0.27	0.14	0.17	0.31
	Sun	-0.09	0.45	0.13	0.29	-0.23	0.08	0.17	0.21	-0.01	0.94	0.12	0.35	-0.20	0.10	0.06	0.62
	Rain	0.16	0.04	-0.12	0.32	0.04	0.72	-0.04	0.63	0.16	0.05	-0.23	0.01	0.16	0.00	-0.04	0.54
	Pressure	-0.06	0.22	0.06	0.36	0.01	0.83	-0.07	0.29	0.03	0.69	0.06	0.40	-0.07	0.34	0.03	0.61
	Wind speed	-0.04	0.38	-0.10	0.58	-0.04	0.84	0.06	0.75	-0.09	0.66	-0.12	0.57	0.33	0.10	-0.17	0.32
Pollen	Grass	-0.02	0.26	0.00	0.79	-0.01	0.76	0.02	0.17	-0.02	0.30	0.01	0.74	0.01	0.46	-0.01	0.43

Table F. 84: Trent Region Emergency Consultations Excess – percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min'	-0.02	0.84	-0.01	0.94	-0.02	0.67	0.06	0.17	0.00	0.96	-0.06	0.34	0.03	0.63	-0.03	0.55
	NO_2 Min'	-0.06	0.20	0.04	0.39	0.00	0.95	0.05	0.29	-0.08	0.08	0.07	0.12	-0.02	0.67	-0.03	0.46
	NOD Min'	-0.02	0.50	0.01	0.70	0.00	0.87	0.03	0.20	-0.02	0.31	0.01	0.61	-0.01	0.74	-0.01	0.58
	SO_2 Min'	-0.36	0.08	0.30	0.19	0.08	0.68	-0.10	0.64	0.16	0.43	-0.07	0.76	-0.09	0.68	0.01	0.95
	PM_{10} Min'	-0.05	0.42	0.00	0.94	0.10	0.07	-0.08	0.20	0.00	0.96	0.03	0.56	0.00	0.95	-0.05	0.37
	O_3 Min'	0.01	0.72	0.01	0.79	-0.05	0.10	0.02	0.60	0.02	0.63	-0.04	0.21	0.05	0.10	0.00	0.87
	CO Min'	4.74	0.26	-2.48	0.58	4.00	0.32	-4.78	0.21	-0.72	0.85	1.55	0.68	-0.81	0.84	-0.47	0.91
	NO Mean	-0.01	0.51	0.02	0.11	-0.02	0.25	0.01	0.37	0.00	0.81	-0.02	0.18	0.03	0.06	-0.01	0.24
	NO_2 Mean	0.02	0.56	-0.03	0.29	0.02	0.49	0.03	0.44	-0.03	0.39	0.01	0.69	-0.01	0.75	0.00	0.99
	NOD Mean	0.00	0.68	0.01	0.35	-0.01	0.50	0.01	0.38	0.00	0.71	-0.01	0.34	0.01	0.19	-0.01	0.40
	SO_2 Mean	-0.05	0.44	0.02	0.72	0.03	0.56	0.00	0.94	0.00	1.00	-0.02	0.65	0.09	0.08	-0.11	0.05
	PM_{10} Mean	-0.04	0.37	0.03	0.57	0.00	0.95	0.02	0.60	-0.02	0.62	-0.05	0.20	0.10	0.02	-0.06	0.11
	O_3 Mean	-0.01	0.63	0.01	0.63	-0.01	0.68	-0.01	0.68	0.04	0.21	-0.02	0.42	-0.02	0.48	0.03	0.30
	CO Mean	-0.14	0.93	0.13	0.95	2.26	0.23	-1.27	0.52	-0.49	0.79	-1.26	0.45	1.61	0.35	-0.41	0.80
	NO Max'	0.00	0.75	0.00	0.56	0.00	0.97	0.00	0.92	0.00	0.82	-0.01	0.20	0.01	0.09	0.00	0.43
	NO_2 Max'	0.01	0.60	-0.03	0.10	0.03	0.16	0.02	0.42	0.00	0.87	-0.01	0.49	0.00	0.99	0.00	0.88
	NOD Max'	0.00	0.79	0.00	0.74	0.00	0.83	0.00	0.95	0.00	0.81	0.00	0.15	0.00	0.09	0.00	0.46
	SO_2 Max'	0.00	0.79	-0.01	0.41	0.02	0.15	-0.01	0.52	0.01	0.24	-0.01	0.37	0.02	0.25	-0.02	0.21
	PM_{10} Max'	0.01	0.69	-0.03	0.10	0.02	0.22	0.00	0.91	0.00	0.90	-0.03	0.07	0.03	0.05	-0.01	0.35
	O_3 Max'	0.02	0.38	-0.01	0.62	-0.02	0.34	0.02	0.36	0.02	0.39	-0.02	0.32	-0.03	0.20	0.03	0.11
	CO Max'	0.15	0.81	-0.06	0.93	0.67	0.33	-0.48	0.47	0.21	0.74	-1.00	0.09	1.56	0.01	-0.86	0.09
Weather	Temp Min'	-0.31	0.04	0.22	0.18	0.05	0.75	-0.17	0.29	0.23	0.13	-0.11	0.45	-0.02	0.87	0.06	0.63
	Temp Max'	0.09	0.42	-0.33	0.01	0.36	0.01	-0.01	0.93	-0.23	0.09	-0.09	0.55	0.52	0.00	-0.34	0.01
	Sun	0.02	0.85	-0.10	0.28	0.12	0.20	-0.02	0.80	-0.13	0.18	0.02	0.83	0.05	0.66	0.08	0.46
	Rain	0.03	0.59	-0.07	0.27	0.21	0.03	-0.17	0.12	-0.01	0.90	0.04	0.49	0.02	0.82	-0.07	0.29
	Pressure	0.03	0.43	-0.14	0.02	0.13	0.02	0.00	0.94	-0.10	0.10	0.12	0.07	-0.06	0.35	0.00	0.96
	Wind speed	-0.01	0.86	0.23	0.09	-0.26	0.07	-0.05	0.74	0.28	0.06	-0.16	0.26	-0.12	0.43	0.12	0.37
Pollen	Grass	-0.01	0.45	0.01	0.79	0.01	0.45	-0.01	0.50	0.00	0.82	0.00	0.92	-0.01	0.38	0.01	0.43

Table F. 85: Trent Region Emergency Counts Excess – percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	0.03	0.77	-0.09	0.30	0.02	0.86	0.10	0.16	-0.09	0.34	0.09	0.36	-0.01	0.90	-0.12	0.13
	NO_2 Min’	0.07	0.25	-0.12	0.08	0.10	0.12	-0.03	0.70	0.00	0.99	-0.03	0.64	0.04	0.54	-0.05	0.42
	NOD Min’	0.05	0.16	-0.07	0.05	0.03	0.40	0.02	0.51	-0.02	0.61	0.01	0.84	0.01	0.65	-0.04	0.17
	SO_2 Min’	-0.26	0.42	-0.34	0.33	0.75	0.02	0.01	0.97	-0.17	0.61	-0.17	0.63	0.29	0.39	-0.24	0.45
	PM_{10} Min’	0.07	0.30	-0.02	0.79	-0.09	0.27	0.08	0.30	-0.05	0.57	0.01	0.89	0.08	0.41	-0.13	0.15
	O_3 Min’	-0.01	0.79	0.01	0.79	-0.04	0.41	0.04	0.43	-0.07	0.17	0.06	0.20	0.01	0.91	0.02	0.64
	CO Min’	5.64	0.31	-1.86	0.76	0.15	0.98	-2.08	0.72	1.41	0.81	1.24	0.84	-3.58	0.54	1.80	0.75
	NO Mean	0.01	0.76	-0.01	0.83	0.00	0.99	0.00	0.94	0.02	0.29	-0.02	0.46	0.02	0.42	-0.04	0.08
	NO_2 Mean	0.02	0.71	0.00	0.94	0.01	0.78	-0.04	0.40	0.09	0.07	-0.09	0.08	0.02	0.71	0.00	0.94
	NOD Mean	0.01	0.67	0.00	0.78	0.00	0.92	0.00	0.87	0.02	0.21	-0.01	0.33	0.01	0.48	-0.02	0.17
	SO_2 Mean	-0.13	0.19	0.01	0.96	0.20	0.04	-0.06	0.58	0.10	0.37	-0.29	0.02	0.15	0.17	-0.03	0.79
	PM_{10} Mean	0.02	0.77	0.02	0.76	-0.08	0.22	0.05	0.45	0.04	0.60	-0.11	0.09	0.14	0.04	-0.08	0.20
	O_3 Mean	0.01	0.82	0.02	0.59	-0.09	0.04	0.10	0.03	-0.10	0.03	0.09	0.03	-0.10	0.03	0.09	0.03
	CO Mean	1.06	0.73	-0.98	0.76	2.09	0.48	-3.23	0.29	3.76	0.21	-1.77	0.58	0.66	0.82	-1.50	0.56
	NO Max’	0.01	0.39	-0.01	0.37	0.01	0.32	0.00	0.64	0.01	0.10	-0.01	0.14	0.01	0.34	-0.01	0.07
	NO_2 Max’	0.04	0.22	-0.03	0.36	0.03	0.40	-0.02	0.44	0.05	0.10	-0.07	0.03	0.02	0.57	0.01	0.76
	NOD Max’	0.00	0.35	0.00	0.35	0.00	0.27	0.00	0.55	0.01	0.10	-0.01	0.11	0.01	0.28	-0.01	0.09
	SO_2 Max’	-0.01	0.78	-0.01	0.72	0.05	0.03	-0.04	0.12	0.03	0.18	-0.07	0.01	0.04	0.11	0.00	0.97
	PM_{10} Max’	0.02	0.46	0.00	0.93	-0.01	0.75	-0.02	0.50	0.05	0.05	-0.05	0.03	0.03	0.28	0.00	0.98
	O_3 Max’	0.00	0.92	0.04	0.22	-0.07	0.04	0.06	0.06	-0.05	0.13	0.03	0.27	-0.07	0.03	0.08	0.01
	CO Max’	1.11	0.35	-0.73	0.55	0.73	0.49	-0.92	0.39	1.68	0.11	-1.10	0.32	0.32	0.76	-1.01	0.28
Weather	Temp Min’	0.21	0.35	-0.36	0.17	0.16	0.55	-0.19	0.49	0.31	0.24	-0.13	0.62	-0.16	0.51	0.17	0.45
	Temp Max’	0.04	0.85	-0.36	0.14	0.64	0.01	-0.60	0.01	-0.01	0.98	0.19	0.39	0.15	0.51	-0.11	0.58
	Sun	-0.14	0.36	0.09	0.58	-0.11	0.48	0.25	0.12	-0.29	0.07	0.21	0.19	-0.10	0.53	0.11	0.48
	Rain	0.17	0.06	-0.26	0.02	0.17	0.13	-0.07	0.53	0.11	0.25	-0.18	0.07	0.23	0.00	-0.15	0.07
	Pressure	-0.08	0.23	0.05	0.54	0.14	0.12	-0.24	0.01	0.11	0.24	0.09	0.29	-0.10	0.29	-0.01	0.94
	Wind speed	-0.04	0.46	0.06	0.79	-0.42	0.09	0.32	0.22	-0.18	0.47	-0.05	0.85	0.02	0.95	0.15	0.50
Pollen	Grass	-0.02	0.26	0.00	0.94	0.02	0.35	0.00	0.85	-0.01	0.57	0.01	0.80	-0.01	0.66	0.01	0.62

Table F. 86: Trent Region Out of Hours Counts Excess – percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	0.05	0.52	-0.06	0.38	0.01	0.93	0.11	0.12	-0.13	0.04	0.07	0.36	0.08	0.21	-0.16	0.02
	NO_2 Min’	0.06	0.18	-0.14	0.01	0.10	0.07	0.03	0.62	-0.05	0.36	-0.01	0.84	0.06	0.29	-0.07	0.17
	NOD Min’	0.04	0.13	-0.06	0.03	0.03	0.35	0.04	0.17	-0.04	0.12	0.01	0.84	0.04	0.11	-0.06	0.02
	SO_2 Min’	-0.10	0.70	-0.30	0.25	0.45	0.07	0.03	0.90	-0.25	0.35	0.05	0.86	0.36	0.19	-0.38	0.13
	PM_{10} Min’	0.02	0.76	0.01	0.83	-0.13	0.03	0.19	0.00	-0.06	0.36	-0.06	0.41	0.07	0.26	-0.08	0.18
	O_3 Min’	-0.04	0.31	0.04	0.23	-0.05	0.14	0.04	0.30	-0.03	0.47	0.02	0.60	0.03	0.40	-0.02	0.65
	CO Min’	3.77	0.35	-8.10	0.09	3.55	0.48	5.85	0.24	-5.33	0.26	1.29	0.80	2.95	0.55	-5.03	0.26
	NO Mean	0.01	0.57	-0.02	0.25	0.02	0.36	0.01	0.77	0.00	0.85	0.01	0.71	-0.01	0.52	-0.01	0.59
	NO_2 Mean	0.02	0.66	-0.05	0.29	0.04	0.31	0.01	0.72	-0.02	0.56	-0.01	0.86	-0.02	0.59	0.03	0.39
	NOD Mean	0.01	0.49	-0.01	0.21	0.01	0.35	0.00	0.68	0.00	0.68	0.00	0.74	-0.01	0.50	0.00	0.85
	SO_2 Mean	-0.06	0.46	-0.04	0.64	0.17	0.07	-0.07	0.43	0.03	0.70	-0.09	0.41	0.06	0.54	-0.06	0.48
	PM_{10} Mean	0.00	0.95	0.00	0.95	-0.06	0.25	0.14	0.01	-0.07	0.20	-0.08	0.10	0.11	0.05	-0.05	0.25
	O_3 Mean	-0.04	0.26	0.08	0.03	-0.11	0.00	0.07	0.04	-0.05	0.17	0.04	0.29	-0.02	0.54	0.03	0.42
	CO Mean	0.88	0.72	-2.41	0.38	1.45	0.57	2.04	0.42	-2.24	0.36	1.29	0.59	-0.95	0.69	-0.25	0.91
	NO Max’	0.00	0.55	-0.01	0.19	0.01	0.10	0.00	0.80	0.00	0.53	-0.01	0.35	0.00	0.67	-0.01	0.35
	NO_2 Max’	0.02	0.49	-0.03	0.18	0.03	0.15	0.00	0.84	0.00	0.97	-0.03	0.27	-0.01	0.76	0.03	0.15
	NOD Max’	0.00	0.51	-0.01	0.15	0.01	0.06	0.00	0.68	0.00	0.60	0.00	0.35	0.00	0.69	0.00	0.50
	SO_2 Max’	-0.01	0.63	-0.02	0.44	0.05	0.02	-0.03	0.25	0.00	0.93	-0.01	0.54	0.00	0.95	0.00	0.86
	PM_{10} Max’	0.00	0.93	-0.01	0.62	0.01	0.50	0.01	0.69	0.02	0.34	-0.05	0.01	0.03	0.14	0.00	0.85
	O_3 Max’	-0.06	0.00	0.09	0.00	-0.06	0.01	0.03	0.19	-0.03	0.27	0.01	0.55	-0.03	0.29	0.04	0.07
	CO Max’	0.80	0.41	-0.68	0.50	0.37	0.67	0.32	0.73	-0.20	0.81	0.07	0.94	-0.43	0.64	-0.13	0.87
Weather	Temp Min’	0.04	0.84	0.00	0.99	0.07	0.73	-0.28	0.17	0.19	0.33	0.11	0.59	-0.29	0.13	0.16	0.34
	Temp Max’	-0.04	0.79	-0.11	0.54	0.44	0.02	-0.47	0.01	-0.07	0.71	0.23	0.22	0.08	0.65	-0.09	0.55
	Sun	-0.07	0.56	0.02	0.88	0.03	0.83	0.11	0.38	-0.18	0.15	0.12	0.31	-0.07	0.57	0.09	0.46
	Rain	0.04	0.59	-0.15	0.04	-0.02	0.80	0.06	0.40	0.02	0.80	-0.01	0.87	0.10	0.17	-0.11	0.09
	Pressure	-0.05	0.40	0.04	0.51	0.10	0.16	-0.18	0.01	0.08	0.25	0.11	0.10	-0.13	0.07	0.02	0.77
	Wind speed	-0.01	0.88	0.08	0.66	-0.32	0.11	0.21	0.30	-0.03	0.86	0.03	0.86	-0.26	0.21	0.30	0.10
Pollen	Grass	0.00	0.94	-0.01	0.47	0.03	0.10	-0.02	0.13	0.01	0.70	0.00	0.83	-0.02	0.28	0.01	0.29

F3.3. Scotland Multiple regression point-estimates and P-values.

Table F. 87: Scotland All Counts Asthmatics – percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
	Exposure	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	0.00	0.35	0.00	0.30	0.00	0.21	0.00	0.81	0.00	0.34	0.00	0.14	0.00	0.32	0.00	0.67
	NO_2 Min’	0.02	0.63	0.01	0.89	0.01	0.77	-0.01	0.85	0.02	0.68	-0.10	0.02	0.05	0.22	0.02	0.57
	NOD Min’	0.01	0.83	0.03	0.43	-0.07	0.02	0.06	0.10	0.03	0.46	-0.07	0.09	0.01	0.83	0.02	0.55
	SO_2 Min’	-0.05	0.64	0.10	0.37	-0.12	0.32	0.05	0.67	-0.03	0.79	-0.16	0.23	0.18	0.26	0.11	0.35
	PM_{10} Min’	-0.06	0.17	0.06	0.35	-0.01	0.83	0.01	0.82	0.02	0.71	-0.03	0.53	0.05	0.35	-0.06	0.23
	O_3 Min’	0.03	0.22	-0.03	0.23	0.01	0.62	0.00	0.92	-0.02	0.35	0.01	0.61	-0.01	0.78	0.01	0.64
	CO Min’	0.46	0.89	2.96	0.41	-4.16	0.29	1.56	0.66	1.44	0.68	1.53	0.68	-6.82	0.09	3.37	0.38
	NO Mean	0.01	0.62	0.03	0.15	-0.02	0.37	0.00	0.85	0.01	0.75	-0.03	0.11	0.03	0.13	0.00	0.99
	NO_2 Mean	0.02	0.34	-0.01	0.56	0.03	0.28	-0.03	0.35	0.00	0.95	-0.02	0.46	0.01	0.65	0.02	0.42
	NOD Mean	0.01	0.56	0.01	0.29	-0.02	0.07	0.01	0.13	0.00	0.91	-0.01	0.29	0.01	0.54	0.00	0.86
	SO_2 Mean	0.01	0.78	0.05	0.39	-0.14	0.03	0.03	0.58	0.03	0.63	-0.06	0.34	0.05	0.49	0.06	0.32
	PM_{10} Mean	-0.04	0.22	0.03	0.46	0.01	0.89	-0.01	0.74	0.04	0.22	-0.11	0.01	0.12	0.00	-0.06	0.05
	O_3 Mean	0.02	0.31	-0.02	0.25	0.02	0.46	-0.02	0.50	-0.02	0.42	0.02	0.30	-0.01	0.59	0.01	0.55
	CO Mean	0.38	0.82	2.02	0.23	-1.54	0.42	0.32	0.86	0.07	0.97	-1.15	0.53	0.11	0.95	0.21	0.90
	NO Max’	0.00	0.71	0.00	0.26	0.00	0.95	0.00	0.54	0.01	0.19	-0.01	0.05	0.01	0.21	0.00	0.66
	NO_2 Max’	0.00	0.81	0.00	0.94	0.02	0.13	-0.02	0.12	0.01	0.50	-0.01	0.46	0.01	0.64	0.00	0.70
	NOD Max’	0.00	0.82	0.00	0.32	0.00	0.38	0.00	0.48	0.00	0.36	0.00	0.17	0.00	0.61	0.00	0.96
	SO_2 Max’	0.01	0.54	0.01	0.73	-0.04	0.06	0.01	0.75	0.01	0.69	-0.01	0.69	0.02	0.43	0.01	0.77
	PM_{10} Max’	-0.02	0.14	0.01	0.23	0.01	0.45	-0.01	0.47	0.01	0.61	-0.01	0.70	0.00	0.99	0.00	0.78
	O_3 Max’	0.03	0.15	-0.02	0.34	0.01	0.60	-0.02	0.28	0.00	0.92	0.02	0.36	-0.03	0.24	0.01	0.49
	CO Max’	-0.33	0.52	0.81	0.13	-0.67	0.27	0.25	0.65	0.49	0.35	-0.76	0.20	0.27	0.64	-0.15	0.79
Weather	Temp Min’	-0.01	0.91	-0.05	0.69	0.10	0.40	-0.14	0.21	-0.04	0.73	0.15	0.17	-0.26	0.02	0.28	0.01
	Temp Max’	-0.03	0.78	0.20	0.15	-0.17	0.24	-0.01	0.93	-0.01	0.93	-0.10	0.49	-0.03	0.81	0.19	0.08
	Sun	0.05	0.57	-0.02	0.82	-0.07	0.42	0.00	0.98	0.03	0.70	0.02	0.81	0.00	0.98	-0.06	0.47
	Rain	0.08	0.25	-0.08	0.30	-0.01	0.89	-0.03	0.58	-0.03	0.69	0.15	0.04	-0.06	0.41	-0.03	0.56
	Pressure	0.00	0.97	0.01	0.78	0.01	0.78	0.01	0.89	-0.05	0.40	0.01	0.86	0.02	0.73	-0.02	0.56
	Wind speed	-0.06	0.51	-0.08	0.37	0.13	0.18	-0.06	0.52	-0.13	0.20	0.15	0.12	-0.02	0.80	-0.01	0.92
Pollen	Grass	-0.01	0.36	0.02	0.27	0.02	0.32	-0.03	0.08	0.02	0.27	-0.01	0.52	0.00	0.91	-0.01	0.43
	Birch	0.03	0.26	-0.03	0.04	0.05	0.00	-0.05	0.04	0.03	0.11	0.00	0.91	-0.04	0.38	0.03	0.28
	Oak	0.04	0.69	0.07	0.67	-0.21	0.03	0.19	0.02	-0.12	0.19	0.06	0.53	0.03	0.69	-0.10	0.24
	Nettle	-0.02	0.36	0.00	0.88	0.01	0.69	0.00	0.92	0.00	0.84	-0.01	0.51	0.01	0.49	0.00	0.95

Table F. 88: Scotland All Counts Non-asthmatics – percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
	Exposure	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	0.11	0.25	0.00	0.99	-0.04	0.76	0.06	0.68	0.07	0.60	-0.14	0.32	0.00	0.98	0.05	0.70
	NO_2 Min’	0.08	0.04	-0.03	0.49	-0.03	0.42	0.03	0.50	0.01	0.77	-0.02	0.70	-0.01	0.84	0.00	0.90
	NOD Min’	0.04	0.21	-0.02	0.56	-0.04	0.23	0.05	0.15	0.03	0.35	-0.01	0.69	-0.07	0.07	0.03	0.28
	SO_2 Min’	0.08	0.43	0.11	0.29	-0.20	0.09	0.02	0.87	-0.06	0.60	-0.22	0.07	0.44	0.02	-0.06	0.67
	PM_{10} Min’	0.06	0.18	-0.13	0.02	0.05	0.42	0.02	0.64	0.02	0.69	-0.05	0.36	0.04	0.46	-0.05	0.30
	O_3 Min’	0.02	0.27	0.00	0.84	-0.02	0.28	0.02	0.19	-0.04	0.02	0.04	0.04	-0.01	0.56	-0.01	0.75
	CO Min’	-0.87	0.79	-2.39	0.47	3.18	0.35	2.36	0.47	-2.26	0.49	1.41	0.69	-2.49	0.50	-0.63	0.85
	NO Mean	0.02	0.32	0.00	0.87	-0.01	0.57	0.01	0.71	0.01	0.45	-0.03	0.19	0.02	0.26	0.00	0.97
	NO_2 Mean	0.05	0.02	-0.02	0.34	-0.01	0.72	-0.01	0.85	0.03	0.21	-0.05	0.07	0.04	0.14	-0.02	0.45
	NOD Mean	0.01	0.38	0.00	0.75	-0.01	0.32	0.01	0.37	0.01	0.20	-0.02	0.13	0.00	0.87	0.00	0.65
	SO_2 Mean	0.09	0.10	0.00	0.93	-0.16	0.01	0.05	0.47	0.00	0.98	-0.06	0.38	0.15	0.10	-0.01	0.84
	PM_{10} Mean	0.05	0.14	-0.09	0.02	0.05	0.18	-0.01	0.71	-0.02	0.58	0.01	0.82	0.03	0.32	-0.03	0.31
	O_3 Mean	0.01	0.48	-0.01	0.73	-0.01	0.50	0.01	0.51	-0.03	0.08	0.04	0.03	-0.01	0.55	0.00	0.99
	CO Mean	-0.30	0.85	0.53	0.72	-0.78	0.64	1.77	0.28	-0.52	0.76	-1.33	0.49	0.70	0.68	-0.31	0.85
	NO Max’	0.00	0.25	0.00	0.75	0.00	0.91	0.00	0.41	0.01	0.04	-0.01	0.05	0.00	0.36	0.00	0.48
	NO_2 Max’	0.02	0.09	-0.01	0.56	0.01	0.62	-0.02	0.07	0.03	0.01	-0.02	0.12	0.00	0.71	0.00	0.74
	NOD Max’	0.00	0.45	0.00	0.65	0.00	0.86	0.00	0.33	0.01	0.01	-0.01	0.06	0.00	0.75	0.00	0.25
	SO_2 Max’	0.04	0.02	0.00	0.87	-0.05	0.00	0.02	0.46	0.01	0.74	-0.01	0.62	0.04	0.13	-0.01	0.64
	PM_{10} Max’	0.00	0.92	-0.01	0.53	0.00	0.77	-0.01	0.35	0.03	0.01	-0.02	0.40	-0.03	0.02	0.02	0.07
	O_3 Max’	0.03	0.12	-0.01	0.72	0.00	0.96	-0.01	0.63	-0.01	0.74	0.01	0.52	-0.01	0.73	0.00	0.94
	CO Max’	-0.19	0.72	-0.02	0.97	-0.26	0.63	-0.02	0.98	1.15	0.04	-1.43	0.05	0.83	0.12	-0.16	0.80
Weather	Temp Min’	-0.05	0.62	-0.01	0.90	0.20	0.11	-0.16	0.17	-0.06	0.55	0.04	0.70	-0.02	0.86	0.05	0.66
	Temp Max’	0.08	0.48	0.06	0.64	-0.10	0.50	0.12	0.40	-0.25	0.07	0.08	0.53	-0.09	0.45	0.15	0.16
	Sun	-0.02	0.85	0.06	0.47	-0.19	0.02	0.05	0.53	-0.01	0.89	0.19	0.02	-0.18	0.03	0.09	0.27
	Rain	0.14	0.09	-0.12	0.08	0.02	0.70	0.01	0.93	-0.07	0.22	0.01	0.87	0.03	0.63	0.03	0.58
	Pressure	-0.02	0.65	0.03	0.45	0.04	0.30	-0.15	0.00	0.14	0.00	-0.04	0.42	-0.01	0.90	-0.02	0.63
	Wind speed	-0.02	0.80	-0.04	0.63	0.06	0.51	0.11	0.26	-0.30	0.00	0.19	0.05	-0.02	0.79	-0.01	0.91
Pollen	Grass	0.00	0.70	0.02	0.14	-0.02	0.16	0.01	0.53	-0.02	0.20	0.02	0.15	-0.02	0.36	0.00	0.84
	Birch	0.02	0.45	-0.01	0.67	0.01	0.52	-0.01	0.59	0.01	0.53	0.00	0.82	0.00	0.91	-0.02	0.26
	Oak	-0.04	0.72	0.07	0.62	0.06	0.65	-0.14	0.16	-0.04	0.72	0.14	0.34	0.18	0.25	-0.30	0.02
	Nettle	0.00	0.75	0.01	0.41	-0.03	0.06	0.01	0.46	-0.01	0.55	0.00	0.81	0.00	0.93	0.00	0.88

Table F. 89: Scotland Acute Visits Asthmatics – percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	-0.02	0.86	-0.14	0.24	0.21	0.08	-0.23	0.06	0.29	0.03	-0.20	0.21	0.06	0.70	0.06	0.72
	NO_2 Min’	0.01	0.70	-0.03	0.38	0.01	0.80	-0.03	0.44	0.06	0.14	-0.02	0.71	0.00	0.97	0.00	0.93
	NOD Min’	-0.01	0.72	-0.01	0.63	0.03	0.39	-0.02	0.56	0.00	0.95	0.01	0.74	0.01	0.87	0.00	0.99
	SO_2 Min’	-0.17	0.14	0.20	0.11	0.02	0.90	-0.03	0.82	-0.02	0.84	-0.11	0.29	-0.02	0.85	0.03	0.79
	PM_{10} Min’	0.05	0.24	-0.08	0.06	0.04	0.40	0.01	0.87	-0.01	0.86	-0.04	0.41	0.01	0.78	0.03	0.52
	O_3 Min’	0.02	0.28	-0.03	0.12	0.02	0.17	0.00	0.95	-0.02	0.34	0.01	0.65	0.00	0.82	0.00	0.98
	CO Min’	-1.40	0.72	-1.77	0.67	1.24	0.73	-1.03	0.77	-2.63	0.49	3.15	0.39	3.36	0.38	-3.21	0.37
	NO Mean	-0.02	0.34	0.00	0.98	0.01	0.68	-0.01	0.61	0.02	0.30	-0.02	0.33	0.03	0.24	-0.01	0.69
	NO_2 Mean	-0.01	0.71	0.01	0.78	-0.01	0.60	0.00	0.95	0.00	0.98	0.00	0.90	0.00	0.98	0.01	0.62
	NOD Mean	-0.01	0.19	0.01	0.59	0.00	0.89	0.00	0.99	0.00	0.75	0.00	0.96	0.01	0.24	-0.01	0.58
	SO_2 Mean	-0.09	0.12	0.10	0.12	0.03	0.67	0.00	0.95	-0.06	0.30	-0.02	0.70	-0.02	0.64	0.01	0.90
	PM_{10} Mean	0.01	0.60	-0.03	0.31	0.00	0.85	0.04	0.16	-0.07	0.02	0.00	0.90	0.04	0.17	0.02	0.55
	O_3 Mean	0.02	0.32	-0.03	0.15	0.03	0.16	-0.01	0.69	-0.01	0.41	0.01	0.57	-0.01	0.47	0.01	0.74
	CO Mean	-1.37	0.46	-1.51	0.44	2.19	0.23	0.10	0.96	-2.55	0.19	0.33	0.86	3.83	0.08	-3.22	0.11
	NO Max’	0.00	0.34	0.00	1.00	0.00	0.52	0.00	0.38	0.01	0.21	0.00	0.38	0.01	0.22	0.00	0.72
	NO_2 Max’	-0.01	0.42	0.01	0.48	0.00	0.73	0.00	0.95	0.00	0.86	0.00	0.82	0.01	0.38	0.00	0.73
	NOD Max’	0.00	0.13	0.00	0.36	0.00	0.85	0.00	0.70	0.00	0.96	0.00	0.74	0.01	0.08	0.00	0.39
	SO_2 Max’	-0.03	0.12	0.04	0.05	0.00	0.96	0.00	0.94	-0.02	0.30	0.00	0.92	-0.01	0.61	-0.01	0.44
	PM_{10} Max’	0.00	0.84	0.00	0.84	0.01	0.32	-0.02	0.25	-0.01	0.30	-0.01	0.38	0.01	0.53	0.02	0.07
	O_3 Max’	0.02	0.29	-0.03	0.11	0.02	0.19	-0.01	0.64	-0.01	0.34	0.00	0.87	-0.01	0.69	0.01	0.40
	CO Max’	-0.63	0.30	-0.57	0.36	0.74	0.18	0.25	0.66	-0.70	0.26	-0.04	0.95	1.26	0.07	-1.00	0.18
Weather	Temp Min’	-0.02	0.83	0.14	0.18	-0.16	0.13	0.03	0.79	-0.06	0.49	-0.02	0.87	0.11	0.25	0.04	0.71
	Temp Max’	-0.01	0.95	-0.03	0.81	0.09	0.48	0.06	0.62	-0.31	0.01	0.10	0.35	0.09	0.43	0.02	0.86
	Sun	-0.07	0.35	0.04	0.65	0.06	0.46	0.01	0.87	-0.05	0.55	-0.03	0.66	0.11	0.16	-0.10	0.18
	Rain	0.03	0.58	-0.01	0.79	0.03	0.62	-0.08	0.19	0.10	0.11	-0.04	0.49	-0.12	0.04	0.17	0.00
	Pressure	-0.01	0.68	0.02	0.69	-0.05	0.28	0.09	0.03	-0.11	0.01	0.09	0.02	-0.03	0.42	-0.01	0.77
	Wind speed	0.06	0.45	-0.01	0.95	0.05	0.56	-0.10	0.23	0.21	0.01	-0.20	0.01	0.07	0.41	-0.06	0.45
Pollen	Grass	0.01	0.48	-0.02	0.17	0.02	0.13	0.00	0.82	-0.01	0.45	0.01	0.53	0.01	0.70	-0.01	0.21
	Birch	0.00	0.91	0.01	0.68	-0.02	0.30	0.00	0.74	0.02	0.09	-0.01	0.22	0.01	0.18	0.00	0.69
	Oak	-0.01	0.88	0.10	0.48	-0.06	0.63	0.11	0.54	-0.25	0.16	0.11	0.29	0.02	0.84	-0.02	0.87
	Nettle	0.02	0.16	-0.03	0.10	0.03	0.10	-0.03	0.24	0.03	0.45	0.01	0.71	-0.02	0.28	-0.01	0.53

Table F. 90: Scotland Acute Visits Non-asthmatics – percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	0.07	0.48	-0.21	0.05	0.20	0.08	-0.12	0.34	0.12	0.34	-0.02	0.89	0.00	0.97	-0.07	0.56
	NO_2 Min’	0.00	0.92	-0.04	0.26	0.01	0.77	0.01	0.74	0.02	0.62	-0.04	0.37	0.06	0.14	-0.06	0.14
	NOD Min’	0.00	0.85	-0.03	0.19	0.02	0.49	0.05	0.09	-0.06	0.05	0.04	0.24	0.01	0.73	-0.04	0.22
	SO_2 Min’	-0.06	0.52	0.05	0.63	-0.08	0.43	0.03	0.70	0.04	0.65	0.04	0.71	0.08	0.39	-0.18	0.05
	PM_{10} Min’	0.02	0.56	-0.01	0.91	-0.03	0.55	0.05	0.25	-0.10	0.01	0.13	0.00	-0.10	0.01	0.03	0.43
	O_3 Min’	0.03	0.12	-0.03	0.26	0.01	0.55	-0.02	0.13	0.01	0.49	0.00	0.89	-0.02	0.26	0.02	0.23
	CO Min’	-1.18	0.73	-1.07	0.78	1.69	0.60	0.20	0.95	-1.81	0.62	0.44	0.90	5.88	0.19	-7.57	0.08
	NO Mean	-0.02	0.28	0.01	0.60	-0.01	0.44	0.01	0.49	0.00	0.94	-0.03	0.18	0.09	0.01	-0.07	0.06
	NO_2 Mean	-0.01	0.80	-0.01	0.71	-0.01	0.67	0.01	0.59	0.01	0.62	-0.04	0.11	0.08	0.01	-0.05	0.09
	NOD Mean	-0.01	0.26	0.01	0.43	-0.01	0.31	0.02	0.03	-0.02	0.06	-0.01	0.56	0.04	0.01	-0.03	0.08
	SO_2 Mean	-0.05	0.21	0.02	0.60	-0.01	0.89	-0.03	0.46	0.09	0.06	0.01	0.87	0.03	0.48	-0.11	0.03
	PM_{10} Mean	0.04	0.10	0.00	0.94	-0.06	0.03	0.06	0.04	-0.08	0.00	0.05	0.08	0.03	0.33	-0.04	0.13
	O_3 Mean	0.03	0.25	-0.02	0.55	0.00	0.93	-0.02	0.14	0.01	0.59	0.00	1.00	-0.03	0.09	0.03	0.07
	CO Mean	-1.09	0.54	-0.93	0.62	1.32	0.42	0.48	0.79	-2.38	0.17	0.04	0.98	6.88	0.01	-6.14	0.05
	NO Max’	-0.01	0.29	0.00	0.57	-0.01	0.13	0.01	0.11	0.00	0.55	0.00	0.74	0.01	0.07	-0.01	0.17
	NO_2 Max’	-0.01	0.60	0.00	0.95	-0.01	0.40	0.01	0.35	0.00	0.77	-0.01	0.47	0.03	0.04	-0.01	0.38
	NOD Max’	0.00	0.31	0.00	0.51	0.00	0.26	0.01	0.02	-0.01	0.03	0.00	0.74	0.01	0.09	0.00	0.24
	SO_2 Max’	-0.02	0.14	0.01	0.69	0.00	0.74	-0.01	0.46	0.02	0.12	0.01	0.57	0.00	0.80	-0.04	0.02
	PM_{10} Max’	0.01	0.27	-0.02	0.18	0.02	0.09	0.00	0.69	-0.02	0.10	0.01	0.61	0.02	0.21	-0.01	0.45
	O_3 Max’	0.03	0.19	-0.02	0.45	0.01	0.43	-0.03	0.08	0.01	0.68	-0.01	0.52	-0.02	0.20	0.03	0.03
	CO Max’	-0.50	0.39	0.38	0.58	-0.31	0.65	0.46	0.39	-0.65	0.21	-0.14	0.81	2.24	0.01	-1.67	0.13
Weather	Temp Min’	-0.01	0.90	-0.01	0.91	0.01	0.92	-0.11	0.29	0.03	0.72	-0.02	0.82	-0.04	0.70	0.13	0.21
	Temp Max’	0.06	0.54	-0.20	0.10	0.26	0.05	-0.22	0.08	0.04	0.75	-0.08	0.50	0.08	0.48	0.10	0.28
	Sun	-0.12	0.08	0.06	0.37	0.06	0.36	-0.04	0.57	0.05	0.46	-0.05	0.49	-0.02	0.76	0.08	0.24
	Rain	0.03	0.55	0.01	0.79	0.01	0.82	0.03	0.66	-0.04	0.49	0.05	0.39	-0.10	0.07	0.04	0.33
	Pressure	0.03	0.29	-0.02	0.60	-0.06	0.19	0.11	0.02	-0.07	0.08	-0.03	0.46	0.07	0.07	-0.04	0.13
	Wind speed	0.02	0.79	0.01	0.89	0.08	0.30	-0.12	0.14	0.00	0.96	0.07	0.38	-0.09	0.20	0.05	0.45
Pollen	Grass	-0.01	0.57	0.01	0.62	0.02	0.13	-0.04	0.04	0.02	0.10	-0.02	0.12	0.02	0.25	0.00	0.99
	Birch	0.02	0.19	-0.03	0.04	0.01	0.49	-0.02	0.26	0.02	0.17	-0.01	0.43	0.01	0.61	0.00	0.87
	Oak	-0.26	0.03	0.24	0.02	-0.04	0.63	-0.07	0.45	0.03	0.79	-0.01	0.88	0.10	0.18	-0.09	0.17
	Nettle	0.00	0.75	-0.01	0.62	0.03	0.07	-0.05	0.03	0.05	0.13	-0.03	0.29	0.00	0.97	0.02	0.33

Table F. 91: Scotland Casualty Counts Asthmatics – percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	-0.33	0.10	0.53	0.01	-0.27	0.23	0.06	0.76	0.21	0.36	-0.35	0.10	-0.07	0.72	0.16	0.34
	NO_2 Min’	-0.16	0.01	0.08	0.24	-0.05	0.41	0.11	0.11	-0.01	0.93	0.00	0.96	0.01	0.93	-0.02	0.80
	NOD Min’	-0.16	0.00	0.17	0.00	-0.12	0.04	0.06	0.25	0.05	0.37	-0.06	0.27	0.03	0.63	-0.03	0.56
	SO_2 Min’	0.04	0.81	-0.26	0.09	0.16	0.32	0.07	0.71	0.26	0.12	-0.15	0.42	0.05	0.75	-0.05	0.77
	PM_{10} Min’	-0.02	0.82	0.09	0.38	-0.12	0.24	0.11	0.26	-0.17	0.08	-0.02	0.78	0.26	0.01	-0.12	0.25
	O_3 Min’	0.00	0.91	0.02	0.59	-0.03	0.45	0.04	0.21	-0.11	0.01	0.06	0.10	0.01	0.77	0.00	0.92
	CO Min’	-7.95	0.13	10.12	0.05	-8.29	0.15	8.20	0.16	-6.65	0.23	5.18	0.33	-7.72	0.15	9.91	0.09
	NO Mean	-0.03	0.42	0.03	0.47	-0.02	0.49	0.02	0.36	-0.01	0.85	0.01	0.73	-0.06	0.06	0.05	0.02
	NO_2 Mean	-0.09	0.02	0.03	0.50	0.00	0.91	0.03	0.37	0.00	0.92	0.02	0.57	-0.05	0.24	0.04	0.27
	NOD Mean	-0.03	0.12	0.03	0.16	-0.01	0.30	0.01	0.51	0.01	0.57	0.00	0.96	-0.03	0.12	0.02	0.13
	SO_2 Mean	-0.10	0.28	-0.12	0.12	0.20	0.01	-0.02	0.78	0.04	0.65	-0.02	0.79	0.03	0.72	0.01	0.94
	PM_{10} Mean	0.03	0.59	-0.02	0.70	0.01	0.88	0.02	0.72	-0.09	0.11	0.02	0.76	0.12	0.05	-0.08	0.18
	O_3 Mean	0.04	0.27	-0.03	0.47	-0.03	0.42	0.06	0.11	-0.11	0.01	0.05	0.15	0.01	0.78	0.01	0.80
	CO Mean	-3.33	0.36	3.41	0.35	-3.64	0.16	4.37	0.09	-2.75	0.30	3.24	0.24	-4.63	0.13	4.05	0.11
	NO Max’	-0.01	0.26	0.01	0.35	-0.01	0.10	0.01	0.06	0.00	0.81	0.00	0.59	-0.01	0.49	0.01	0.13
	NO_2 Max’	-0.03	0.10	0.01	0.53	-0.01	0.50	0.03	0.12	0.00	0.93	-0.02	0.38	0.00	0.81	0.02	0.30
	NOD Max’	-0.01	0.14	0.01	0.09	-0.01	0.03	0.01	0.07	0.00	0.78	0.00	0.31	0.00	0.58	0.00	0.34
	SO_2 Max’	-0.03	0.34	-0.03	0.24	0.05	0.04	-0.01	0.66	0.00	0.93	-0.01	0.80	0.02	0.59	0.01	0.75
	PM_{10} Max’	-0.01	0.64	-0.01	0.80	0.04	0.26	-0.03	0.47	0.02	0.65	-0.02	0.70	-0.01	0.80	0.00	0.89
	O_3 Max’	-0.01	0.86	0.01	0.84	0.00	0.92	0.02	0.50	-0.08	0.03	0.05	0.14	-0.01	0.74	0.03	0.37
	CO Max’	-0.89	0.50	0.52	0.68	-0.75	0.32	1.42	0.08	-0.75	0.39	0.64	0.51	-1.68	0.10	1.62	0.04
Weather	Temp Min’	-0.07	0.70	-0.08	0.66	0.37	0.04	-0.22	0.22	-0.09	0.65	0.14	0.46	-0.15	0.42	0.15	0.39
	Temp Max’	0.07	0.73	0.04	0.86	-0.23	0.31	0.14	0.52	-0.06	0.78	0.20	0.34	-0.30	0.19	0.20	0.32
	Sun	0.24	0.08	-0.01	0.96	-0.12	0.41	-0.09	0.56	-0.05	0.71	0.08	0.55	0.10	0.49	-0.02	0.86
	Rain	0.10	0.28	0.00	0.97	0.00	0.97	-0.04	0.69	0.02	0.84	-0.05	0.61	0.11	0.29	-0.16	0.10
	Pressure	0.09	0.13	-0.09	0.26	-0.09	0.22	0.08	0.30	0.00	0.97	0.10	0.18	-0.09	0.20	0.01	0.92
	Wind speed	0.13	0.32	0.16	0.28	-0.18	0.26	0.12	0.40	-0.25	0.10	0.00	0.98	0.20	0.18	-0.11	0.42
Pollen	Grass	-0.01	0.77	0.00	0.91	-0.02	0.66	0.01	0.67	-0.05	0.08	0.04	0.15	-0.01	0.71	0.03	0.42
	Birch	0.06	0.02	-0.04	0.07	-0.01	0.83	0.00	0.95	0.04	0.27	-0.06	0.06	0.00	0.93	0.05	0.07
	Oak	0.16	0.25	-0.01	0.97	-0.05	0.81	0.02	0.90	-0.52	0.02	0.31	0.06	0.25	0.21	-0.19	0.38
	Nettle	-0.03	0.42	0.00	0.89	0.00	0.92	-0.02	0.68	-0.02	0.58	0.07	0.04	-0.06	0.18	0.03	0.41

Table F. 92: Scotland Casualty Counts Non-asthmatics – percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	-0.13	0.55	0.22	0.25	0.03	0.88	-0.59	0.00	0.58	0.00	-0.36	0.06	0.33	0.12	-0.21	0.25
	NO_2 Min’	-0.06	0.30	0.09	0.12	0.00	0.99	-0.13	0.04	0.17	0.00	-0.11	0.04	0.05	0.36	-0.01	0.83
	NOD Min’	0.00	0.93	0.00	0.93	0.01	0.79	-0.06	0.19	0.07	0.10	-0.04	0.35	0.04	0.36	-0.04	0.40
	SO_2 Min’	-0.10	0.47	0.06	0.72	-0.02	0.90	0.03	0.86	0.16	0.29	-0.20	0.21	0.03	0.85	0.06	0.68
	PM_{10} Min’	0.06	0.38	0.07	0.37	-0.02	0.81	-0.16	0.05	0.14	0.08	-0.05	0.52	-0.04	0.62	0.05	0.51
	O_3 Min’	-0.04	0.17	0.05	0.08	-0.03	0.35	0.00	0.98	-0.01	0.72	0.03	0.31	-0.02	0.67	0.02	0.51
	CO Min’	2.72	0.55	-1.05	0.82	1.53	0.74	-1.92	0.67	5.27	0.24	-10.72	0.02	7.26	0.13	1.24	0.80
	NO Mean	0.01	0.63	0.00	1.00	-0.04	0.10	0.04	0.11	0.05	0.08	-0.07	0.01	0.01	0.74	0.02	0.41
	NO_2 Mean	-0.04	0.23	0.07	0.06	-0.05	0.19	-0.01	0.85	0.09	0.01	-0.08	0.02	0.01	0.73	0.01	0.86
	NOD Mean	0.01	0.40	0.00	0.80	-0.02	0.13	0.02	0.04	0.01	0.37	-0.02	0.05	0.00	0.93	0.00	0.72
	SO_2 Mean	0.04	0.62	-0.06	0.48	0.00	0.98	-0.01	0.84	0.12	0.13	-0.13	0.07	0.08	0.25	0.03	0.68
	PM_{10} Mean	0.08	0.04	0.01	0.90	-0.04	0.48	-0.05	0.24	0.09	0.04	-0.06	0.19	-0.01	0.86	0.02	0.59
	O_3 Mean	-0.03	0.33	0.03	0.41	0.00	0.99	-0.01	0.77	0.00	0.99	0.01	0.86	-0.01	0.78	0.02	0.49
	CO Mean	3.71	0.12	-1.93	0.42	-4.57	0.03	3.86	0.08	4.58	0.06	-4.99	0.04	-0.92	0.65	3.09	0.17
	NO Max’	0.00	0.61	0.00	0.70	-0.01	0.11	0.01	0.05	0.01	0.16	-0.02	0.01	0.00	0.62	0.01	0.09
	NO_2 Max’	0.00	0.95	0.01	0.57	-0.02	0.30	0.01	0.54	0.02	0.13	-0.03	0.08	-0.01	0.59	0.01	0.44
	NOD Max’	0.01	0.12	0.00	0.33	-0.01	0.17	0.01	0.02	0.00	0.46	-0.01	0.05	0.00	0.45	0.01	0.17
	SO_2 Max’	0.01	0.76	-0.01	0.64	0.01	0.64	-0.01	0.61	0.04	0.17	-0.04	0.08	0.04	0.09	0.00	0.91
	PM_{10} Max’	0.04	0.04	-0.05	0.03	0.02	0.39	0.02	0.46	0.00	0.99	0.01	0.49	-0.05	0.01	0.02	0.34
	O_3 Max’	-0.03	0.22	0.03	0.32	0.02	0.63	-0.03	0.49	0.02	0.61	-0.02	0.43	0.00	0.89	0.02	0.37
	CO Max’	1.30	0.11	-0.73	0.38	-1.83	0.01	1.57	0.02	1.97	0.02	-2.27	0.01	-0.25	0.70	0.81	0.27
Weather	Temp Min’	-0.17	0.24	0.09	0.56	0.19	0.22	-0.09	0.56	0.00	0.99	-0.12	0.46	0.19	0.24	-0.28	0.07
	Temp Max’	0.11	0.55	-0.05	0.78	-0.27	0.16	0.19	0.32	0.07	0.71	0.09	0.64	-0.25	0.22	0.12	0.46
	Sun	0.19	0.12	-0.03	0.78	-0.19	0.14	-0.11	0.36	0.26	0.04	0.02	0.88	-0.19	0.14	0.27	0.03
	Rain	-0.08	0.36	-0.01	0.93	0.10	0.24	-0.01	0.91	0.11	0.26	-0.12	0.25	-0.04	0.65	0.05	0.60
	Pressure	0.14	0.00	-0.16	0.01	0.03	0.59	0.00	0.93	0.05	0.39	-0.02	0.71	-0.04	0.53	0.04	0.43
	Wind speed	0.10	0.40	-0.16	0.20	0.07	0.54	0.00	0.97	-0.09	0.49	0.13	0.33	-0.11	0.41	-0.01	0.92
Pollen	Grass	0.02	0.38	-0.01	0.63	-0.02	0.58	0.00	0.93	-0.01	0.87	0.04	0.32	-0.03	0.28	0.00	0.96
	Birch	0.03	0.26	0.00	1.00	0.02	0.46	0.01	0.80	-0.02	0.71	-0.02	0.61	0.00	0.96	-0.01	0.62
	Oak	0.16	0.41	-0.33	0.23	0.44	0.09	-0.21	0.27	-0.20	0.25	-0.02	0.94	0.13	0.57	0.01	0.93
	Nettle	0.00	0.97	0.04	0.19	-0.04	0.25	-0.02	0.51	0.01	0.75	0.02	0.70	-0.01	0.88	0.00	0.97

Table F. 93: Scotland Emergency Consultations Asthmatics – percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	0.14	0.63	-0.10	0.72	0.08	0.75	-0.03	0.91	0.09	0.76	-0.33	0.16	0.05	0.84	0.20	0.42
	NO_2 Min’	0.08	0.23	0.00	0.98	-0.08	0.21	0.06	0.36	-0.04	0.63	-0.12	0.06	0.12	0.06	-0.02	0.81
	NOD Min’	0.05	0.40	0.02	0.77	-0.04	0.47	0.02	0.78	-0.01	0.90	-0.08	0.14	0.03	0.65	0.05	0.38
	SO_2 Min’	-0.04	0.81	0.00	0.98	0.19	0.25	-0.03	0.88	-0.05	0.76	0.14	0.40	-0.30	0.08	0.09	0.55
	PM_{10} Min’	0.04	0.66	-0.04	0.68	-0.09	0.37	-0.12	0.19	0.18	0.06	-0.05	0.57	0.05	0.58	-0.01	0.92
	O_3 Min’	-0.02	0.59	0.02	0.62	-0.01	0.73	0.03	0.46	0.00	0.96	0.02	0.55	-0.01	0.70	-0.02	0.49
	CO Min’	-2.76	0.61	6.38	0.25	-7.25	0.21	0.63	0.91	1.75	0.76	-4.04	0.49	6.16	0.25	-0.12	0.98
	NO Mean	-0.01	0.80	0.00	0.92	-0.03	0.31	0.05	0.10	-0.01	0.83	-0.07	0.03	0.08	0.00	-0.05	0.13
	NO_2 Mean	0.02	0.61	-0.01	0.89	-0.02	0.53	0.05	0.18	-0.05	0.24	-0.03	0.39	0.07	0.05	-0.05	0.20
	NOD Mean	0.00	0.98	0.00	0.99	-0.01	0.55	0.02	0.23	-0.01	0.63	-0.02	0.17	0.03	0.05	-0.02	0.29
	SO_2 Mean	-0.06	0.45	-0.05	0.48	0.04	0.60	0.04	0.61	0.04	0.61	-0.11	0.13	0.04	0.56	0.03	0.72
	PM_{10} Mean	-0.01	0.78	0.04	0.52	-0.13	0.02	-0.04	0.46	0.10	0.06	-0.04	0.49	0.07	0.22	0.00	0.97
	O_3 Mean	0.01	0.64	-0.02	0.46	0.02	0.62	0.00	0.99	0.00	0.91	0.03	0.38	0.00	0.95	-0.05	0.16
	CO Mean	-0.61	0.83	1.66	0.60	-3.06	0.31	1.81	0.51	2.27	0.41	-5.82	0.04	6.25	0.02	-4.79	0.09
	NO Max’	-0.01	0.50	0.01	0.34	-0.01	0.23	0.02	0.04	-0.01	0.13	-0.01	0.38	0.01	0.11	-0.01	0.30
	NO_2 Max’	0.00	0.97	0.00	0.90	0.00	0.87	0.03	0.15	-0.04	0.07	-0.01	0.74	0.02	0.19	-0.02	0.21
	NOD Max’	0.00	0.67	0.00	0.53	0.00	0.49	0.01	0.10	-0.01	0.13	0.00	0.74	0.00	0.42	0.00	0.58
	SO_2 Max’	0.01	0.66	-0.04	0.15	-0.02	0.55	0.04	0.09	0.01	0.83	-0.05	0.07	0.01	0.56	0.02	0.53
	PM_{10} Max’	-0.03	0.20	0.02	0.43	-0.06	0.01	0.01	0.48	0.04	0.05	-0.03	0.14	0.04	0.04	-0.01	0.54
	O_3 Max’	0.02	0.50	-0.04	0.17	0.02	0.46	0.01	0.74	0.01	0.81	0.03	0.50	0.02	0.64	-0.06	0.05
	CO Max’	-1.13	0.27	0.99	0.33	-0.82	0.40	0.85	0.35	0.39	0.66	-1.71	0.07	1.11	0.20	-1.01	0.31
Weather	Temp Min’	0.28	0.12	-0.12	0.53	-0.12	0.51	0.22	0.20	-0.51	0.01	0.47	0.01	-0.22	0.24	0.13	0.44
	Temp Max’	0.28	0.11	-0.24	0.22	0.00	0.99	0.33	0.17	-0.35	0.12	0.11	0.59	-0.24	0.24	0.19	0.32
	Sun	-0.08	0.54	-0.01	0.95	0.05	0.67	0.08	0.50	-0.04	0.75	-0.03	0.83	-0.14	0.25	0.14	0.22
	Rain	-0.08	0.36	0.09	0.40	-0.01	0.90	-0.01	0.95	-0.05	0.64	0.02	0.86	0.16	0.09	-0.09	0.34
	Pressure	-0.15	0.01	0.13	0.07	0.04	0.62	-0.05	0.47	0.13	0.08	-0.20	0.00	0.14	0.04	-0.07	0.21
	Wind speed	0.14	0.26	-0.05	0.75	0.01	0.93	0.03	0.83	-0.25	0.09	0.18	0.22	-0.02	0.89	0.05	0.73
Pollen	Grass	-0.01	0.76	-0.01	0.61	0.04	0.04	-0.02	0.33	0.00	0.85	-0.04	0.07	0.06	0.00	-0.03	0.14
	Birch	0.03	0.12	0.00	0.93	0.07	0.07	-0.12	0.01	0.07	0.09	-0.06	0.05	-0.01	0.59	0.02	0.40
	Oak	-0.02	0.90	-0.33	0.05	0.52	0.01	-0.44	0.01	-0.02	0.91	0.36	0.02	0.10	0.55	-0.31	0.04
	Nettle	0.00	0.91	-0.01	0.81	0.00	0.98	0.01	0.69	-0.01	0.55	-0.01	0.69	0.05	0.07	-0.04	0.09

Table F. 94: Scotland Emergency Consultations Non-asthmatics – percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	0.53	0.01	-0.17	0.44	-0.02	0.92	-0.09	0.72	0.11	0.63	-0.71	0.00	0.39	0.03	0.06	0.69
	NO_2 Min’	0.11	0.06	-0.02	0.74	-0.05	0.38	0.00	0.98	-0.04	0.47	-0.10	0.07	0.13	0.02	-0.02	0.70
	NOD Min’	0.08	0.10	0.01	0.88	-0.06	0.19	0.00	0.97	-0.02	0.73	-0.10	0.06	0.10	0.03	0.00	0.91
	SO_2 Min’	-0.06	0.64	-0.03	0.81	-0.03	0.85	0.01	0.93	0.24	0.09	-0.14	0.32	-0.08	0.56	0.06	0.66
	PM_{10} Min’	-0.05	0.47	-0.05	0.57	0.06	0.42	-0.12	0.11	0.15	0.03	-0.06	0.40	0.04	0.64	0.01	0.94
	O_3 Min’	-0.03	0.32	0.00	0.97	0.01	0.69	0.01	0.76	0.00	0.90	0.03	0.29	0.00	0.95	-0.04	0.21
	CO Min’	3.49	0.43	-5.00	0.29	0.52	0.92	5.05	0.33	-1.83	0.75	-3.14	0.58	6.32	0.21	-6.93	0.21
	NO Mean	0.00	0.94	-0.01	0.71	0.02	0.66	-0.01	0.79	-0.01	0.81	-0.03	0.32	0.00	0.96	0.03	0.25
	NO_2 Mean	0.04	0.28	-0.02	0.47	0.02	0.51	-0.04	0.23	0.02	0.51	-0.05	0.12	0.06	0.09	-0.03	0.33
	NOD Mean	0.00	0.97	0.00	0.92	0.00	0.80	-0.01	0.51	0.00	0.89	-0.01	0.37	0.00	0.96	0.01	0.35
	SO_2 Mean	-0.02	0.74	-0.11	0.11	0.10	0.15	-0.06	0.36	0.11	0.11	-0.09	0.19	0.02	0.79	0.01	0.85
	PM_{10} Mean	-0.04	0.38	-0.02	0.71	0.05	0.29	-0.10	0.02	0.06	0.14	0.02	0.71	0.00	0.95	0.01	0.93
	O_3 Mean	-0.04	0.11	-0.01	0.60	0.04	0.17	0.00	0.97	0.01	0.86	0.05	0.10	-0.01	0.86	-0.04	0.16
	CO Mean	-0.54	0.86	-0.10	0.97	1.43	0.63	-1.73	0.50	-0.26	0.92	-0.43	0.87	-0.08	0.98	-0.54	0.82
	NO Max’	0.00	0.84	0.00	0.59	0.00	0.84	0.00	0.89	0.00	0.60	-0.01	0.29	0.00	0.84	0.01	0.23
	NO_2 Max’	0.01	0.66	-0.01	0.70	0.00	0.79	0.00	0.82	0.01	0.75	-0.02	0.19	0.01	0.57	0.00	0.89
	NOD Max’	0.00	0.93	0.00	0.64	0.00	1.00	0.00	0.76	0.00	0.92	0.00	0.43	0.00	0.68	0.01	0.06
	SO_2 Max’	0.02	0.30	-0.05	0.04	0.02	0.39	-0.03	0.28	0.03	0.22	-0.02	0.35	0.01	0.82	0.01	0.79
	PM_{10} Max’	-0.03	0.11	0.02	0.37	-0.01	0.71	-0.01	0.74	0.02	0.19	-0.04	0.06	0.00	0.83	0.03	0.07
	O_3 Max’	-0.03	0.36	-0.02	0.39	0.04	0.13	-0.02	0.41	0.03	0.21	0.03	0.28	0.02	0.50	-0.06	0.02
	CO Max’	-0.23	0.84	-0.71	0.45	0.88	0.36	-0.53	0.55	-0.71	0.36	0.36	0.63	-0.79	0.37	0.58	0.43
Weather	Temp Min’	-0.05	0.77	-0.08	0.62	0.16	0.33	0.04	0.81	-0.31	0.05	0.40	0.01	-0.17	0.27	-0.12	0.43
	Temp Max’	0.08	0.59	-0.01	0.94	0.17	0.32	-0.29	0.10	-0.06	0.71	0.18	0.31	0.02	0.90	-0.10	0.53
	Sun	-0.11	0.33	0.13	0.27	0.05	0.66	-0.17	0.15	0.09	0.45	0.00	0.99	-0.03	0.78	-0.02	0.83
	Rain	-0.07	0.42	0.00	0.97	-0.09	0.30	0.17	0.04	-0.10	0.23	0.05	0.59	0.07	0.40	0.01	0.86
	Pressure	0.02	0.61	0.02	0.77	-0.08	0.22	-0.03	0.56	0.10	0.09	-0.05	0.34	0.02	0.72	-0.01	0.82
	Wind speed	-0.15	0.19	0.15	0.19	-0.11	0.36	0.19	0.14	-0.24	0.07	0.10	0.42	0.07	0.57	-0.03	0.80
Pollen	Grass	-0.02	0.23	0.03	0.14	0.00	0.89	-0.01	0.61	-0.02	0.44	0.02	0.37	0.02	0.42	-0.02	0.28
	Birch	0.03	0.51	0.00	0.93	-0.03	0.44	0.04	0.13	-0.01	0.61	0.02	0.33	-0.05	0.14	0.01	0.84
	Oak	-0.23	0.07	0.19	0.18	0.50	0.01	-0.63	0.04	0.05	0.81	0.13	0.42	-0.10	0.39	0.05	0.65
	Nettle	-0.02	0.39	0.03	0.23	0.00	0.94	-0.01	0.63	-0.01	0.53	0.03	0.33	0.02	0.53	-0.03	0.24

Table F. 95: Scotland Emergency Counts Asthmatics – percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min'	0.03	0.85	0.16	0.41	-0.10	0.56	-0.20	0.21	0.39	0.03	-0.36	0.04	-0.12	0.47	0.19	0.12
	NO_2 Min'	-0.07	0.16	0.04	0.45	-0.01	0.92	-0.02	0.67	0.03	0.51	-0.05	0.32	0.02	0.71	0.02	0.67
	NOD Min'	-0.05	0.19	0.10	0.02	-0.06	0.14	-0.01	0.79	0.03	0.52	-0.02	0.62	-0.02	0.57	0.03	0.36
	SO_2 Min'	-0.08	0.62	-0.05	0.74	0.15	0.28	-0.09	0.48	0.11	0.43	0.04	0.75	-0.08	0.53	0.03	0.82
	PM_{10} Min'	0.06	0.29	0.00	0.99	-0.06	0.42	-0.08	0.23	0.05	0.42	-0.05	0.43	0.15	0.02	-0.07	0.29
	O_3 Min'	0.01	0.82	0.01	0.74	-0.01	0.67	0.01	0.52	-0.02	0.32	0.01	0.80	0.02	0.36	-0.02	0.41
	CO Min'	-1.63	0.70	2.73	0.53	-6.88	0.09	4.00	0.37	-1.67	0.71	4.15	0.33	-1.20	0.78	0.83	0.85
	NO Mean	-0.01	0.79	0.00	0.93	0.01	0.80	0.00	0.93	0.03	0.13	-0.05	0.05	0.02	0.41	-0.01	0.69
	NO_2 Mean	-0.01	0.67	-0.03	0.38	0.05	0.14	-0.03	0.45	0.00	0.97	-0.01	0.84	0.03	0.41	-0.01	0.67
	NOD Mean	-0.01	0.60	0.00	0.80	0.00	0.82	0.00	0.89	0.01	0.48	-0.01	0.39	0.01	0.51	-0.01	0.55
	SO_2 Mean	-0.12	0.12	-0.05	0.40	0.14	0.03	-0.04	0.52	0.03	0.59	-0.06	0.33	0.04	0.56	0.03	0.67
	PM_{10} Mean	0.03	0.40	-0.01	0.87	-0.04	0.39	-0.07	0.10	0.06	0.14	-0.04	0.33	0.09	0.03	-0.03	0.49
	O_3 Mean	0.03	0.16	-0.03	0.26	0.01	0.65	-0.01	0.73	-0.02	0.53	0.00	0.85	0.04	0.15	-0.03	0.20
	CO Mean	-0.66	0.76	-2.64	0.25	1.66	0.44	1.03	0.66	0.13	0.95	0.28	0.90	1.11	0.62	-3.09	0.14
	NO Max'	0.00	0.91	0.00	0.75	0.00	0.82	0.00	0.68	0.01	0.30	-0.01	0.02	0.01	0.11	0.00	0.35
	NO_2 Max'	0.00	0.97	-0.02	0.29	0.02	0.21	0.01	0.70	-0.01	0.51	-0.01	0.32	0.03	0.09	-0.02	0.30
	NOD Max'	0.00	0.87	0.00	0.97	0.00	0.81	0.00	0.36	0.00	0.65	-0.01	0.13	0.01	0.14	0.00	0.22
	SO_2 Max'	-0.03	0.17	-0.02	0.36	0.03	0.22	0.02	0.40	-0.01	0.58	-0.02	0.32	0.02	0.30	0.01	0.79
	PM_{10} Max'	-0.01	0.44	0.01	0.60	0.00	0.90	-0.04	0.03	0.04	0.01	-0.02	0.20	0.02	0.15	-0.01	0.68
	O_3 Max'	0.02	0.35	-0.02	0.51	0.01	0.49	-0.01	0.68	-0.02	0.39	0.01	0.79	0.03	0.17	-0.02	0.25
	CO Max'	-0.56	0.44	-0.50	0.51	0.35	0.63	0.48	0.52	0.63	0.35	-0.56	0.44	0.01	0.99	-0.59	0.40
Weather	Temp Min'	0.08	0.52	0.04	0.77	-0.03	0.82	0.04	0.78	-0.30	0.04	0.18	0.20	0.11	0.42	-0.05	0.72
	Temp Max'	0.19	0.17	-0.35	0.03	0.16	0.32	0.17	0.27	-0.29	0.08	0.04	0.78	0.17	0.27	-0.10	0.44
	Sun	0.10	0.32	-0.07	0.51	0.03	0.76	0.02	0.84	-0.06	0.51	0.03	0.77	0.06	0.56	-0.09	0.38
	Rain	0.00	0.99	0.12	0.14	-0.08	0.30	-0.05	0.52	-0.02	0.84	0.02	0.83	0.13	0.10	-0.13	0.10
	Pressure	-0.03	0.44	0.02	0.77	0.01	0.82	0.04	0.43	-0.01	0.89	-0.08	0.12	0.07	0.18	-0.02	0.59
	Wind speed	0.10	0.32	0.12	0.27	-0.06	0.61	-0.08	0.51	-0.05	0.66	-0.02	0.87	0.07	0.50	-0.03	0.75
Pollen	Grass	0.03	0.11	-0.09	0.00	0.06	0.00	-0.01	0.42	-0.02	0.29	-0.01	0.74	0.03	0.08	-0.01	0.60
	Birch	0.03	0.06	-0.01	0.79	-0.01	0.86	-0.03	0.20	0.05	0.07	-0.02	0.49	-0.05	0.02	0.05	0.01
	Oak	0.11	0.31	-0.10	0.63	0.13	0.53	-0.11	0.56	-0.43	0.00	0.44	0.00	0.01	0.92	-0.06	0.57
	Nettle	0.02	0.33	-0.06	0.01	0.01	0.57	0.02	0.41	-0.02	0.48	0.02	0.51	0.00	0.91	-0.01	0.79

Table F. 96: Scotland Emergency Counts Non-asthmatics – percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min'	0.02	0.89	-0.07	0.61	0.36	0.03	-0.51	0.00	0.32	0.10	-0.33	0.13	0.15	0.37	0.00	0.97
	NO_2 Min'	-0.03	0.51	0.02	0.67	0.04	0.44	-0.06	0.27	0.05	0.29	-0.07	0.15	0.09	0.05	-0.07	0.13
	NOD Min'	0.03	0.45	-0.04	0.34	0.06	0.15	-0.05	0.16	0.00	0.98	-0.02	0.60	0.06	0.13	-0.04	0.29
	SO_2 Min'	-0.30	0.01	0.11	0.40	0.12	0.34	0.02	0.87	0.06	0.65	-0.05	0.72	0.04	0.77	-0.10	0.47
	PM_{10} Min'	-0.05	0.38	0.09	0.24	0.01	0.93	-0.13	0.05	0.07	0.24	-0.01	0.93	-0.05	0.38	0.07	0.27
	O_3 Min'	-0.04	0.08	0.03	0.13	0.00	0.85	0.00	0.94	-0.01	0.58	0.02	0.35	0.01	0.66	-0.01	0.76
	CO Min'	6.47	0.10	-7.10	0.08	2.78	0.48	2.48	0.55	2.13	0.61	-7.09	0.09	2.40	0.59	-1.50	0.72
	NO Mean	-0.03	0.14	0.02	0.46	-0.01	0.52	0.00	1.00	0.04	0.08	-0.05	0.05	0.03	0.18	-0.01	0.54
	NO_2 Mean	-0.03	0.24	0.02	0.55	0.01	0.79	-0.02	0.46	0.05	0.11	-0.05	0.06	0.06	0.04	-0.05	0.10
	NOD Mean	-0.01	0.59	0.00	0.93	0.00	0.66	0.00	0.90	0.01	0.26	-0.02	0.09	0.02	0.10	-0.01	0.34
	SO_2 Mean	-0.09	0.13	-0.01	0.81	0.11	0.08	-0.07	0.30	0.09	0.16	-0.08	0.22	0.07	0.23	-0.06	0.38
	PM_{10} Mean	0.02	0.56	0.02	0.58	-0.02	0.56	-0.03	0.38	0.03	0.38	-0.01	0.79	-0.02	0.68	0.01	0.72
	O_3 Mean	-0.04	0.11	0.02	0.27	0.02	0.43	-0.01	0.51	-0.01	0.83	0.00	0.85	0.01	0.55	0.00	0.83
	CO Mean	1.14	0.55	-1.17	0.54	-2.32	0.26	0.80	0.69	4.44	0.02	-3.69	0.07	0.88	0.66	-0.31	0.89
	NO Max'	-0.01	0.33	0.00	0.89	0.00	0.48	0.00	0.52	0.01	0.18	-0.01	0.04	0.01	0.31	0.00	0.81
	NO_2 Max'	-0.01	0.68	0.00	0.93	0.00	0.99	0.00	0.97	0.01	0.39	-0.02	0.15	0.02	0.27	-0.01	0.66
	NOD Max'	0.00	0.75	0.00	0.38	0.00	0.65	0.00	0.71	0.00	0.29	-0.01	0.08	0.00	0.35	0.00	0.94
	SO_2 Max'	-0.02	0.35	-0.01	0.70	0.03	0.09	-0.02	0.34	0.02	0.26	-0.02	0.39	0.02	0.24	-0.03	0.22
	PM_{10} Max'	0.01	0.68	-0.01	0.47	0.01	0.63	0.01	0.68	0.00	0.89	0.01	0.52	-0.03	0.06	0.02	0.27
	O_3 Max'	-0.03	0.22	0.03	0.12	0.02	0.19	-0.03	0.18	0.01	0.55	-0.02	0.45	0.02	0.21	-0.02	0.28
	CO Max'	0.05	0.94	-0.05	0.94	-0.99	0.14	-0.04	0.94	2.09	0.00	-1.89	0.01	0.76	0.29	-0.26	0.74
Weather	Temp Min'	-0.12	0.31	0.08	0.52	0.13	0.27	-0.01	0.96	-0.21	0.09	0.07	0.57	0.02	0.89	-0.09	0.42
	Temp Max'	0.15	0.25	-0.18	0.26	0.11	0.49	-0.19	0.19	0.16	0.29	-0.10	0.52	0.02	0.87	0.06	0.68
	Sun	-0.09	0.35	0.09	0.36	0.01	0.91	-0.25	0.01	0.21	0.03	0.05	0.60	-0.11	0.21	0.17	0.07
	Rain	-0.01	0.93	0.04	0.56	-0.02	0.80	0.12	0.07	-0.09	0.21	-0.04	0.59	-0.05	0.42	0.05	0.49
	Pressure	0.03	0.42	0.02	0.67	-0.12	0.01	0.07	0.19	0.05	0.34	-0.07	0.18	0.06	0.22	-0.04	0.27
	Wind speed	-0.01	0.93	0.03	0.78	0.04	0.68	-0.02	0.86	-0.15	0.15	0.16	0.13	-0.15	0.15	0.08	0.38
Pollen	Grass	0.00	0.91	-0.01	0.66	0.03	0.16	-0.04	0.04	0.01	0.78	0.01	0.42	0.01	0.62	-0.01	0.57
	Birch	0.04	0.09	0.01	0.84	-0.02	0.48	0.01	0.61	-0.02	0.39	0.02	0.43	-0.02	0.46	-0.02	0.35
	Oak	0.05	0.76	-0.09	0.61	0.41	0.06	-0.40	0.04	-0.09	0.68	-0.06	0.60	0.13	0.32	0.04	0.73
	Nettle	-0.01	0.74	0.00	0.88	0.03	0.18	-0.05	0.03	0.02	0.38	-0.01	0.66	0.02	0.25	-0.01	0.64

Table F. 97: Scotland Out of Hours Counts Asthmatics – percentage change and P-values by lag day per exposure.

Exposure		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	0.11	0.42	0.04	0.75	-0.09	0.43	-0.12	0.24	0.14	0.17	-0.01	0.96	-0.12	0.17	0.00	0.95
	NO_2 Min’	-0.05	0.15	0.02	0.55	0.04	0.18	-0.06	0.06	0.02	0.62	0.02	0.55	-0.02	0.43	0.00	0.88
	NOD Min’	-0.01	0.68	0.03	0.26	-0.01	0.67	-0.03	0.30	0.01	0.79	0.03	0.22	-0.04	0.15	0.01	0.80
	SO_2 Min’	-0.04	0.75	-0.01	0.92	0.02	0.88	-0.11	0.29	0.06	0.61	0.09	0.33	-0.02	0.85	0.03	0.76
	PM_{10} Min’	0.04	0.28	0.01	0.85	0.00	0.96	-0.07	0.09	0.03	0.53	0.01	0.82	0.03	0.47	-0.04	0.34
	O_3 Min’	0.00	0.94	0.01	0.48	-0.01	0.64	0.00	0.74	0.01	0.49	-0.02	0.21	0.02	0.16	-0.01	0.53
	CO Min’	3.40	0.23	-2.68	0.34	-1.76	0.51	0.33	0.91	1.95	0.48	2.27	0.40	-2.58	0.34	-0.67	0.81
	NO Mean	0.02	0.11	-0.02	0.20	0.02	0.19	-0.02	0.23	0.03	0.08	-0.01	0.73	-0.01	0.55	-0.01	0.56
	NO_2 Mean	0.02	0.42	-0.04	0.04	0.06	0.00	-0.06	0.01	0.02	0.40	0.01	0.49	0.00	0.86	-0.01	0.45
	NOD Mean	0.01	0.12	-0.01	0.16	0.01	0.18	-0.01	0.23	0.01	0.30	0.00	0.64	0.00	0.74	-0.01	0.37
	SO_2 Mean	-0.03	0.55	-0.03	0.46	0.06	0.26	-0.06	0.24	0.04	0.47	0.00	0.98	0.00	0.94	0.02	0.62
	PM_{10} Mean	0.03	0.16	-0.01	0.66	0.01	0.69	-0.07	0.01	0.06	0.03	-0.01	0.78	0.00	0.88	0.00	0.98
	O_3 Mean	0.00	0.95	0.01	0.67	0.00	0.98	-0.02	0.25	0.02	0.28	-0.02	0.17	0.03	0.03	-0.02	0.25
	CO Mean	1.50	0.27	-4.04	0.01	3.15	0.03	-1.46	0.40	1.37	0.32	1.67	0.24	-1.43	0.27	-1.40	0.24
	NO Max’	0.01	0.01	-0.01	0.02	0.01	0.05	-0.01	0.13	0.01	0.02	-0.01	0.08	0.00	0.20	-0.01	0.06
	NO_2 Max’	0.02	0.08	-0.03	0.01	0.02	0.02	-0.02	0.11	0.01	0.59	0.00	0.93	0.01	0.24	-0.02	0.08
	NOD Max’	0.01	0.00	-0.01	0.01	0.00	0.15	0.00	0.36	0.00	0.07	0.00	0.32	0.00	0.16	0.00	0.02
	SO_2 Max’	-0.02	0.19	0.00	0.71	0.01	0.38	0.00	0.91	0.00	0.85	0.00	0.86	0.01	0.46	0.00	0.98
	PM_{10} Max’	0.01	0.61	0.00	0.96	0.01	0.53	-0.03	0.03	0.03	0.07	0.00	0.95	0.01	0.64	-0.01	0.35
	O_3 Max’	0.01	0.55	0.01	0.59	-0.01	0.50	-0.01	0.64	0.00	0.89	-0.01	0.34	0.03	0.05	-0.01	0.21
	CO Max’	0.55	0.15	-0.99	0.04	0.69	0.17	-0.52	0.35	1.09	0.01	-0.09	0.84	-0.19	0.66	-0.55	0.14
Weather	Temp Min’	-0.01	0.93	0.08	0.34	-0.05	0.52	0.00	0.97	-0.03	0.76	-0.05	0.54	0.17	0.05	-0.12	0.14
	Temp Max’	0.05	0.62	-0.24	0.02	0.20	0.05	-0.04	0.71	-0.01	0.92	-0.10	0.34	0.34	0.00	-0.27	0.00
	Sun	0.06	0.31	-0.08	0.18	0.03	0.63	0.02	0.75	-0.02	0.73	0.03	0.68	0.06	0.36	-0.12	0.06
	Rain	-0.02	0.79	0.10	0.09	-0.08	0.15	-0.03	0.55	0.01	0.90	0.02	0.74	0.03	0.60	-0.04	0.47
	Pressure	0.01	0.80	-0.02	0.63	0.05	0.14	0.00	0.89	-0.03	0.45	-0.05	0.13	0.04	0.21	0.01	0.76
	Wind speed	-0.03	0.67	0.11	0.13	-0.07	0.38	-0.06	0.44	0.04	0.53	-0.03	0.67	0.00	0.97	0.01	0.85
Pollen	Grass	0.03	0.01	-0.07	0.00	0.04	0.00	-0.01	0.16	0.01	0.65	-0.01	0.47	0.02	0.18	-0.01	0.59
	Birch	0.00	0.96	0.01	0.56	-0.03	0.01	0.01	0.16	0.00	0.87	0.03	0.07	-0.05	0.00	0.03	0.02
	Oak	0.05	0.58	0.01	0.93	-0.06	0.43	0.02	0.81	-0.14	0.09	0.16	0.03	-0.14	0.18	0.12	0.16
	Nettle	0.02	0.20	-0.05	0.00	0.01	0.42	0.02	0.15	-0.01	0.59	0.00	0.82	0.01	0.42	0.00	0.83

Table F. 98: Scotland Out of Hours Counts Non-asthmatics – percentage change and P-values by lag day per exposure.

Exposure		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	-0.15	0.43	-0.07	0.60	0.34	0.02	-0.22	0.07	0.00	0.99	0.09	0.61	-0.12	0.38	0.08	0.47
	NO_2 Min’	-0.05	0.14	0.00	0.99	0.06	0.11	-0.01	0.71	-0.02	0.59	0.04	0.30	0.00	0.95	-0.05	0.16
	NOD Min’	0.00	0.96	-0.04	0.14	0.08	0.00	-0.05	0.06	0.00	0.98	0.02	0.43	0.00	0.94	-0.02	0.47
	SO_2 Min’	-0.22	0.03	0.09	0.39	0.17	0.09	0.01	0.94	-0.14	0.23	0.07	0.50	0.05	0.66	-0.10	0.39
	PM_{10} Min’	-0.07	0.09	0.09	0.18	0.00	0.94	-0.04	0.43	-0.01	0.75	0.00	0.98	-0.02	0.57	0.04	0.33
	O_3 Min’	-0.03	0.04	0.02	0.09	0.00	0.86	0.01	0.51	-0.02	0.18	-0.01	0.65	0.03	0.04	-0.01	0.53
	CO Min’	4.83	0.10	-4.35	0.15	0.46	0.89	1.94	0.56	1.79	0.53	-2.20	0.48	-5.55	0.07	3.68	0.21
	NO Mean	-0.03	0.05	0.02	0.27	0.00	0.78	-0.02	0.20	0.02	0.23	0.01	0.65	-0.01	0.71	-0.01	0.35
	NO_2 Mean	-0.03	0.12	0.00	0.95	0.03	0.26	-0.01	0.56	0.00	0.97	0.02	0.39	0.00	0.86	-0.02	0.29
	NOD Mean	-0.01	0.32	0.00	0.99	0.01	0.40	-0.01	0.07	0.01	0.12	0.00	0.97	0.00	0.58	-0.01	0.21
	SO_2 Mean	-0.08	0.10	0.05	0.30	0.08	0.13	-0.03	0.57	-0.02	0.66	0.00	0.98	0.02	0.67	-0.04	0.45
	PM_{10} Mean	-0.02	0.42	0.03	0.40	0.00	0.91	0.01	0.83	0.00	0.87	0.00	0.98	-0.04	0.15	0.03	0.31
	O_3 Mean	-0.02	0.12	0.03	0.04	0.00	0.89	0.00	0.87	-0.02	0.24	-0.02	0.34	0.03	0.03	-0.01	0.51
	CO Mean	0.16	0.91	0.01	1.00	-1.63	0.30	-0.41	0.78	3.98	0.01	-1.58	0.30	-1.21	0.44	0.58	0.67
	NO Max’	-0.01	0.09	0.00	0.87	0.00	0.49	0.00	0.34	0.01	0.12	0.00	0.62	0.00	0.54	-0.01	0.06
	NO_2 Max’	-0.01	0.45	0.00	0.97	0.01	0.36	-0.01	0.39	0.00	0.73	0.00	0.74	0.01	0.59	-0.01	0.36
	NOD Max’	0.00	0.63	0.00	0.58	0.00	0.32	0.00	0.03	0.01	0.03	0.00	0.47	0.00	0.23	0.00	0.09
	SO_2 Max’	-0.02	0.10	0.02	0.22	0.02	0.24	0.00	0.86	-0.01	0.63	0.00	0.79	0.00	0.97	-0.02	0.25
	PM_{10} Max’	-0.01	0.54	0.01	0.42	0.00	0.67	0.00	0.79	0.00	0.80	0.02	0.12	-0.02	0.07	0.00	0.94
	O_3 Max’	-0.02	0.25	0.03	0.00	-0.01	0.60	0.00	0.71	-0.01	0.30	-0.01	0.36	0.03	0.04	-0.02	0.13
	CO Max’	-0.30	0.52	0.43	0.34	-0.47	0.36	-0.80	0.09	2.01	0.00	-1.11	0.03	0.41	0.54	-0.33	0.56
Weather	Temp Min’	-0.02	0.80	0.06	0.49	0.00	0.97	0.06	0.51	-0.12	0.20	-0.03	0.71	0.01	0.92	0.04	0.59
	Temp Max’	0.06	0.52	-0.10	0.37	0.11	0.32	-0.15	0.14	0.18	0.10	-0.19	0.09	0.09	0.42	0.00	0.97
	Sun	-0.09	0.15	0.03	0.66	0.08	0.21	-0.16	0.01	0.05	0.43	0.07	0.29	0.00	0.99	0.00	0.97
	Rain	0.07	0.24	0.02	0.75	-0.02	0.71	0.06	0.25	-0.09	0.07	-0.04	0.40	-0.02	0.67	0.01	0.91
	Pressure	-0.06	0.08	0.11	0.01	-0.11	0.00	0.06	0.13	0.01	0.82	-0.03	0.47	0.06	0.13	-0.05	0.08
	Wind speed	0.01	0.87	0.03	0.68	0.02	0.82	-0.02	0.76	-0.06	0.40	0.06	0.47	-0.10	0.20	0.08	0.25
Pollen	Grass	0.00	0.78	-0.01	0.68	0.03	0.01	-0.03	0.02	0.00	0.67	0.00	0.75	0.01	0.39	-0.01	0.36
	Birch	0.01	0.63	0.02	0.40	-0.03	0.15	0.00	0.93	-0.01	0.25	0.02	0.07	0.00	0.93	-0.01	0.29
	Oak	0.17	0.04	-0.12	0.29	0.05	0.70	-0.06	0.58	-0.03	0.80	-0.10	0.27	0.11	0.19	0.01	0.87
	Nettle	0.00	0.97	-0.01	0.49	0.03	0.01	-0.03	0.03	0.00	0.76	0.00	0.73	0.01	0.34	-0.01	0.53

Table F. 99: Scotland All Counts Excess – percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	0.08	0.64	0.17	0.30	-0.21	0.27	-0.09	0.61	0.14	0.50	-0.19	0.36	0.16	0.32	0.03	0.81
	NO_2 Min’	-0.03	0.45	0.03	0.55	0.04	0.43	-0.03	0.54	0.01	0.76	-0.11	0.01	0.07	0.11	0.03	0.49
	NOD Min’	-0.02	0.69	0.05	0.27	-0.06	0.08	0.04	0.31	0.01	0.78	-0.07	0.10	0.06	0.24	0.00	0.94
	SO_2 Min’	-0.12	0.35	0.05	0.72	-0.02	0.90	0.05	0.74	0.00	0.98	-0.05	0.72	-0.08	0.57	0.18	0.14
	PM_{10} Min’	-0.12	0.02	0.15	0.01	-0.05	0.44	0.00	0.98	0.01	0.84	-0.01	0.85	0.04	0.56	-0.04	0.50
	O_3 Min’	0.02	0.42	-0.03	0.21	0.03	0.29	-0.02	0.44	0.00	0.94	-0.01	0.67	0.00	0.97	0.01	0.51
	CO Min’	1.02	0.80	5.30	0.20	-7.20	0.10	0.32	0.94	3.30	0.41	0.96	0.82	-6.73	0.14	4.63	0.28
	NO Mean	0.00	0.99	0.03	0.15	-0.01	0.56	0.00	0.96	0.00	0.89	-0.02	0.33	0.02	0.32	0.00	0.95
	NO_2 Mean	-0.01	0.81	0.00	0.91	0.04	0.18	-0.03	0.35	-0.02	0.51	0.01	0.84	-0.01	0.75	0.04	0.18
	NOD Mean	0.00	0.87	0.01	0.24	-0.01	0.19	0.01	0.24	-0.01	0.37	0.00	0.81	0.01	0.56	0.00	0.97
	SO_2 Mean	-0.04	0.48	0.05	0.39	-0.07	0.35	0.01	0.90	0.03	0.60	-0.04	0.52	-0.04	0.58	0.08	0.18
	PM_{10} Mean	-0.08	0.03	0.10	0.05	-0.03	0.58	-0.01	0.85	0.07	0.11	-0.14	0.00	0.12	0.00	-0.05	0.13
	O_3 Mean	0.02	0.45	-0.03	0.28	0.03	0.26	-0.03	0.27	0.00	0.97	0.00	0.95	-0.01	0.78	0.01	0.52
	CO Mean	0.64	0.74	2.13	0.30	-1.34	0.56	-0.83	0.69	0.43	0.83	-0.53	0.79	-0.36	0.86	0.48	0.81
	NO Max’	0.00	0.80	0.01	0.20	0.00	0.90	0.00	0.90	0.00	0.92	-0.01	0.30	0.00	0.41	0.00	0.97
	NO_2 Max’	-0.01	0.52	0.01	0.68	0.02	0.19	-0.01	0.53	-0.01	0.49	0.00	0.96	0.00	0.76	0.00	0.81
	NOD Max’	0.00	0.87	0.00	0.23	0.00	0.29	0.00	0.17	0.00	0.52	0.00	0.69	0.00	0.45	0.00	0.43
	SO_2 Max’	-0.01	0.50	0.01	0.63	-0.01	0.67	0.00	0.90	0.01	0.81	0.00	0.86	-0.01	0.77	0.01	0.49
	PM_{10} Max’	-0.02	0.11	0.02	0.08	0.01	0.51	-0.01	0.73	-0.02	0.31	0.00	0.93	0.02	0.31	-0.02	0.19
	O_3 Max’	0.01	0.47	-0.02	0.37	0.01	0.52	-0.02	0.30	0.01	0.80	0.02	0.51	-0.03	0.34	0.02	0.43
	CO Max’	-0.28	0.65	1.00	0.13	-0.64	0.37	0.31	0.62	-0.17	0.79	0.02	0.97	-0.24	0.71	-0.08	0.90
Weather	Temp Min’	0.02	0.89	-0.05	0.71	-0.01	0.97	-0.07	0.57	-0.01	0.96	0.16	0.21	-0.32	0.01	0.32	0.00
	Temp Max’	-0.09	0.47	0.21	0.19	-0.15	0.35	-0.10	0.54	0.15	0.37	-0.18	0.26	0.02	0.89	0.13	0.30
	Sun	0.07	0.47	-0.07	0.48	0.04	0.65	-0.04	0.70	0.05	0.62	-0.11	0.23	0.13	0.19	-0.14	0.14
	Rain	0.01	0.93	-0.01	0.89	-0.03	0.69	-0.05	0.49	0.02	0.82	0.17	0.04	-0.09	0.23	-0.07	0.35
	Pressure	0.01	0.77	0.00	0.94	-0.01	0.81	0.11	0.04	-0.15	0.01	0.04	0.53	0.03	0.62	-0.02	0.69
	Wind speed	-0.06	0.54	-0.07	0.49	0.12	0.28	-0.15	0.14	0.04	0.71	0.06	0.57	-0.01	0.90	0.00	0.96
Pollen	Grass	-0.01	0.40	0.01	0.54	0.03	0.05	-0.04	0.05	0.03	0.07	-0.03	0.20	0.01	0.41	-0.02	0.29
	Birch	0.02	0.25	-0.04	0.02	0.06	0.00	-0.06	0.06	0.03	0.17	0.00	0.94	-0.04	0.28	0.05	0.13
	Oak	0.08	0.58	0.03	0.86	-0.32	0.01	0.34	0.00	-0.11	0.36	-0.03	0.84	-0.08	0.58	0.07	0.50
	Nettle	-0.02	0.23	0.00	0.79	0.03	0.21	-0.01	0.67	0.00	0.88	-0.02	0.46	0.02	0.42	0.00	0.86

Table F. 100: Scotland Acute Visits Excess – percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	-0.12	0.61	0.03	0.88	0.09	0.68	-0.22	0.35	0.32	0.17	-0.29	0.24	0.09	0.71	0.16	0.52
	NO_2 Min’	0.02	0.78	0.00	0.97	0.00	0.96	-0.06	0.37	0.07	0.33	0.02	0.81	-0.08	0.31	0.07	0.28
	NOD Min’	-0.02	0.66	0.01	0.80	0.02	0.65	-0.09	0.09	0.07	0.17	-0.02	0.68	0.00	0.95	0.05	0.35
	SO_2 Min’	-0.20	0.32	0.27	0.19	0.12	0.57	-0.09	0.67	-0.09	0.66	-0.22	0.28	-0.13	0.49	0.25	0.16
	PM_{10} Min’	0.05	0.48	-0.12	0.13	0.09	0.27	-0.05	0.56	0.11	0.17	-0.21	0.01	0.14	0.07	0.01	0.87
	O_3 Min’	-0.01	0.76	-0.01	0.65	0.02	0.39	0.03	0.30	-0.04	0.17	0.01	0.73	0.01	0.65	-0.02	0.50
	CO Min’	-0.81	0.89	-1.55	0.80	-0.05	0.99	-1.89	0.75	-2.03	0.76	4.51	0.47	-1.67	0.77	3.93	0.50
	NO Mean	0.00	0.94	-0.01	0.75	0.03	0.44	-0.03	0.41	0.03	0.31	0.00	0.95	-0.06	0.11	0.06	0.07
	NO_2 Mean	-0.01	0.87	0.02	0.61	-0.01	0.83	-0.01	0.78	-0.01	0.75	0.06	0.23	-0.09	0.05	0.08	0.07
	NOD Mean	-0.01	0.64	0.00	0.98	0.01	0.47	-0.02	0.20	0.01	0.42	0.01	0.71	-0.02	0.21	0.02	0.15
	SO_2 Mean	-0.08	0.43	0.13	0.20	0.05	0.62	0.04	0.66	-0.20	0.05	-0.04	0.67	-0.08	0.39	0.13	0.11
	PM_{10} Mean	-0.03	0.59	-0.05	0.34	0.07	0.17	-0.01	0.88	-0.01	0.85	-0.06	0.22	0.03	0.56	0.08	0.10
	O_3 Mean	0.00	1.00	-0.03	0.37	0.04	0.20	0.01	0.65	-0.03	0.26	0.02	0.62	0.01	0.71	-0.03	0.42
	CO Mean	-0.88	0.77	-1.30	0.71	1.93	0.54	-0.41	0.90	-1.21	0.72	0.47	0.89	-2.15	0.50	2.17	0.51
	NO Max’	0.00	0.96	0.00	0.72	0.01	0.19	-0.01	0.10	0.01	0.13	0.00	0.51	0.00	0.67	0.01	0.38
	NO_2 Max’	-0.01	0.73	0.01	0.50	0.00	0.83	-0.01	0.52	0.00	0.98	0.01	0.80	-0.01	0.52	0.02	0.34
	NOD Max’	0.00	0.50	0.00	0.76	0.00	0.37	-0.01	0.07	0.01	0.16	0.00	0.58	0.00	0.77	0.00	0.81
	SO_2 Max’	-0.02	0.50	0.05	0.08	0.00	0.89	0.01	0.64	-0.06	0.07	-0.01	0.67	-0.02	0.54	0.03	0.35
	PM_{10} Max’	-0.01	0.58	0.02	0.29	0.00	0.92	-0.02	0.42	0.00	0.93	-0.02	0.27	-0.01	0.61	0.05	0.02
	O_3 Max’	0.00	0.98	-0.02	0.36	0.02	0.48	0.02	0.48	-0.03	0.27	0.01	0.76	0.01	0.64	-0.01	0.64
	CO Max’	-0.39	0.70	-1.37	0.27	1.53	0.16	-0.15	0.88	-0.34	0.75	0.10	0.92	-0.68	0.51	0.40	0.73
Weather	Temp Min’	-0.02	0.90	0.23	0.17	-0.27	0.13	0.18	0.33	-0.14	0.41	0.00	1.00	0.23	0.18	-0.10	0.56
	Temp Max’	-0.09	0.65	0.20	0.38	-0.16	0.50	0.37	0.11	-0.54	0.01	0.25	0.21	0.05	0.81	-0.09	0.62
	Sun	0.04	0.78	-0.02	0.89	0.02	0.88	0.06	0.62	-0.14	0.32	0.00	0.99	0.20	0.14	-0.27	0.04
	Rain	0.02	0.84	-0.04	0.71	0.04	0.77	-0.17	0.14	0.20	0.04	-0.12	0.25	-0.07	0.52	0.22	0.02
	Pressure	-0.06	0.31	0.05	0.52	-0.01	0.91	0.02	0.78	-0.09	0.26	0.18	0.01	-0.14	0.06	0.04	0.55
	Wind speed	0.08	0.59	-0.02	0.89	-0.01	0.93	-0.02	0.89	0.33	0.03	-0.40	0.01	0.22	0.13	-0.16	0.27
Pollen	Grass	0.02	0.36	-0.04	0.10	0.00	0.93	0.05	0.10	-0.05	0.08	0.04	0.08	-0.01	0.65	-0.02	0.38
	Birch	-0.02	0.46	0.05	0.22	-0.05	0.25	0.02	0.34	0.00	0.93	0.00	0.92	0.01	0.65	0.00	0.88
	Oak	0.27	0.10	-0.12	0.67	-0.05	0.84	0.27	0.38	-0.44	0.16	0.19	0.31	-0.09	0.55	0.08	0.61
	Nettle	0.04	0.10	-0.04	0.12	0.01	0.60	0.01	0.82	-0.02	0.68	0.06	0.18	-0.04	0.32	-0.04	0.16

Table F. 101: Scotland Casualty Counts Excess – percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min'	-0.14	0.52	0.22	0.32	-0.21	0.29	0.44	0.02	-0.26	0.22	0.01	0.96	-0.28	0.17	0.26	0.10
	NO_2 Min'	-0.07	0.19	-0.01	0.90	-0.04	0.54	0.16	0.01	-0.13	0.04	0.07	0.17	-0.03	0.60	0.00	0.96
	NOD Min'	-0.11	0.02	0.12	0.01	-0.09	0.07	0.09	0.07	-0.02	0.74	-0.01	0.80	-0.01	0.85	0.00	0.94
	SO_2 Min'	0.10	0.54	-0.23	0.16	0.13	0.44	0.03	0.85	0.07	0.63	0.04	0.82	0.02	0.91	-0.08	0.63
	PM_{10} Min'	-0.06	0.50	0.01	0.91	-0.07	0.50	0.19	0.03	-0.22	0.01	0.02	0.82	0.21	0.02	-0.12	0.21
	O_3 Min'	0.03	0.36	-0.02	0.51	0.01	0.89	0.03	0.37	-0.07	0.07	0.02	0.54	0.02	0.62	-0.02	0.62
	CO Min'	-7.46	0.13	7.83	0.10	-6.86	0.21	7.07	0.16	-8.38	0.09	11.09	0.02	-10.52	0.04	6.12	0.25
	NO Mean	-0.03	0.25	0.02	0.47	0.02	0.44	-0.01	0.68	-0.04	0.20	0.06	0.07	-0.05	0.07	0.02	0.29
	NO_2 Mean	-0.04	0.26	-0.03	0.47	0.04	0.32	0.03	0.44	-0.06	0.07	0.07	0.06	-0.04	0.25	0.02	0.47
	NOD Mean	-0.03	0.04	0.02	0.13	0.00	0.72	-0.01	0.37	0.00	0.88	0.02	0.27	-0.02	0.18	0.01	0.39
	SO_2 Mean	-0.10	0.28	-0.04	0.60	0.14	0.07	-0.01	0.93	-0.06	0.42	0.08	0.28	-0.04	0.60	-0.02	0.84
	PM_{10} Mean	-0.04	0.46	-0.02	0.69	0.03	0.56	0.05	0.30	-0.13	0.01	0.06	0.28	0.09	0.11	-0.07	0.18
	O_3 Mean	0.05	0.14	-0.04	0.30	-0.02	0.56	0.05	0.17	-0.08	0.03	0.03	0.32	0.01	0.70	-0.01	0.80
	CO Mean	-4.95	0.07	3.70	0.16	0.65	0.77	0.35	0.88	-5.15	0.05	5.72	0.03	-2.60	0.32	0.70	0.77
	NO Max'	-0.01	0.16	0.01	0.29	0.00	0.90	0.00	0.89	-0.01	0.30	0.01	0.29	0.00	0.79	0.00	0.89
	NO_2 Max'	-0.02	0.18	0.00	0.92	0.00	0.83	0.01	0.47	-0.02	0.37	0.01	0.66	0.00	0.88	0.00	0.77
	NOD Max'	-0.01	0.02	0.01	0.04	0.00	0.49	0.00	0.91	0.00	0.80	0.00	0.67	0.00	0.99	0.00	0.81
	SO_2 Max'	-0.03	0.38	-0.01	0.66	0.03	0.32	0.00	0.99	-0.02	0.36	0.03	0.33	-0.02	0.44	0.00	0.89
	PM_{10} Max'	-0.04	0.06	0.03	0.21	0.02	0.62	-0.03	0.41	0.01	0.72	-0.02	0.57	0.03	0.28	-0.01	0.61
	O_3 Max'	0.02	0.59	-0.02	0.64	-0.01	0.63	0.04	0.21	-0.07	0.04	0.05	0.14	-0.01	0.85	0.00	0.90
	CO Max'	-1.54	0.11	0.87	0.34	0.74	0.26	-0.12	0.87	-1.92	0.04	1.99	0.04	-1.01	0.23	0.58	0.46
Weather	Temp Min'	0.07	0.64	-0.12	0.49	0.13	0.46	-0.09	0.58	-0.06	0.74	0.18	0.29	-0.24	0.17	0.30	0.07
	Temp Max'	-0.03	0.87	0.07	0.75	0.03	0.88	-0.04	0.86	-0.09	0.66	0.07	0.71	-0.04	0.87	0.05	0.77
	Sun	0.04	0.78	0.02	0.88	0.05	0.70	0.02	0.88	-0.22	0.09	0.05	0.73	0.20	0.13	-0.21	0.12
	Rain	0.13	0.17	0.01	0.93	-0.07	0.46	-0.02	0.81	-0.06	0.52	0.04	0.67	0.10	0.28	-0.14	0.13
	Pressure	-0.04	0.48	0.05	0.45	-0.09	0.20	0.06	0.39	-0.04	0.58	0.08	0.21	-0.04	0.58	-0.02	0.66
	Wind speed	0.02	0.85	0.22	0.11	-0.17	0.20	0.09	0.51	-0.11	0.42	-0.09	0.52	0.21	0.13	-0.07	0.58
Pollen	Grass	-0.02	0.28	0.01	0.75	0.00	1.00	0.01	0.68	-0.03	0.19	0.00	0.95	0.01	0.63	0.02	0.43
	Birch	0.02	0.54	-0.03	0.23	-0.02	0.36	0.00	0.89	0.04	0.05	-0.03	0.26	0.00	0.97	0.04	0.10
	Oak	0.00	0.99	0.22	0.38	-0.36	0.11	0.17	0.40	-0.20	0.36	0.22	0.29	0.09	0.56	-0.14	0.39
	Nettle	-0.02	0.46	-0.02	0.42	0.03	0.43	0.00	0.90	-0.02	0.50	0.04	0.23	-0.04	0.23	0.02	0.45

Table F. 102: Scotland Emergency Consultations Excess – percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min'	-0.32	0.28	0.03	0.94	0.11	0.75	0.03	0.93	0.01	0.99	0.21	0.49	-0.28	0.34	0.18	0.58
	NO_2 Min'	0.00	1.00	0.02	0.83	-0.05	0.52	0.07	0.43	0.00	0.96	-0.05	0.54	0.03	0.73	0.00	0.99
	NOD Min'	-0.02	0.83	0.01	0.87	0.01	0.91	0.02	0.80	0.01	0.93	-0.01	0.90	-0.05	0.47	0.05	0.44
	SO_2 Min'	0.01	0.95	0.03	0.90	0.24	0.24	-0.04	0.84	-0.27	0.25	0.29	0.17	-0.27	0.20	0.05	0.79
	PM_{10} Min'	0.08	0.43	-0.01	0.96	-0.15	0.23	-0.03	0.80	0.08	0.52	-0.01	0.96	0.03	0.80	-0.02	0.89
	O_3 Min'	0.00	0.97	0.02	0.65	-0.02	0.58	0.02	0.61	0.00	0.97	0.00	0.93	-0.02	0.72	0.01	0.89
	CO Min'	-6.20	0.35	11.58	0.11	-8.69	0.23	-3.65	0.61	3.61	0.64	-1.92	0.80	1.62	0.82	5.78	0.41
	NO Mean	-0.01	0.76	0.01	0.78	-0.05	0.37	0.06	0.10	0.00	0.96	-0.05	0.18	0.10	0.01	-0.09	0.07
	NO_2 Mean	-0.01	0.87	0.01	0.79	-0.05	0.35	0.10	0.06	-0.08	0.15	0.01	0.84	0.04	0.48	-0.03	0.56
	NOD Mean	0.00	1.00	0.00	0.96	-0.01	0.58	0.03	0.14	-0.01	0.61	-0.01	0.49	0.03	0.09	-0.03	0.17
	SO_2 Mean	-0.05	0.62	0.03	0.74	-0.04	0.72	0.10	0.32	-0.05	0.64	-0.06	0.56	0.04	0.70	0.02	0.82
	PM_{10} Mean	0.02	0.81	0.06	0.44	-0.19	0.01	0.04	0.51	0.06	0.36	-0.06	0.41	0.08	0.31	0.00	0.98
	O_3 Mean	0.05	0.19	-0.02	0.73	-0.01	0.73	0.00	1.00	0.00	0.99	-0.01	0.90	0.01	0.89	-0.02	0.67
	CO Mean	-0.22	0.95	1.99	0.61	-4.71	0.32	3.52	0.32	2.82	0.43	-6.31	0.07	7.20	0.04	-5.02	0.19
	NO Max'	-0.01	0.44	0.01	0.23	-0.01	0.31	0.02	0.05	-0.01	0.27	0.00	0.85	0.01	0.23	-0.02	0.11
	NO_2 Max'	-0.01	0.83	0.00	0.92	0.00	1.00	0.04	0.15	-0.05	0.06	0.01	0.61	0.02	0.43	-0.03	0.25
	NOD Max'	0.00	0.65	0.01	0.41	0.00	0.60	0.01	0.10	-0.01	0.19	0.00	0.86	0.01	0.32	-0.01	0.14
	SO_2 Max'	-0.01	0.87	-0.01	0.87	-0.04	0.31	0.07	0.04	-0.02	0.60	-0.04	0.31	0.01	0.69	0.01	0.69
	PM_{10} Max'	0.00	0.86	0.01	0.86	-0.06	0.07	0.02	0.43	0.03	0.31	-0.01	0.82	0.05	0.07	-0.04	0.13
	O_3 Max'	0.04	0.28	-0.03	0.49	-0.01	0.68	0.03	0.41	-0.02	0.68	0.01	0.87	0.01	0.90	-0.02	0.59
	CO Max'	-1.09	0.37	1.72	0.16	-1.69	0.29	1.41	0.23	1.04	0.34	-2.28	0.04	1.93	0.10	-1.66	0.21
Weather	Temp Min'	0.35	0.12	-0.06	0.80	-0.28	0.26	0.22	0.36	-0.32	0.18	0.19	0.43	-0.11	0.66	0.25	0.26
	Temp Max'	0.25	0.26	-0.27	0.31	-0.15	0.61	0.62	0.04	-0.35	0.24	-0.02	0.93	-0.29	0.28	0.30	0.22
	Sun	0.00	0.99	-0.12	0.50	0.02	0.91	0.24	0.15	-0.12	0.47	-0.03	0.86	-0.14	0.40	0.18	0.25
	Rain	-0.04	0.76	0.10	0.48	0.06	0.65	-0.15	0.31	0.03	0.82	-0.02	0.87	0.12	0.38	-0.11	0.34
	Pressure	-0.20	0.01	0.13	0.17	0.11	0.26	-0.03	0.74	0.05	0.56	-0.18	0.05	0.15	0.11	-0.07	0.30
	Wind speed	0.29	0.08	-0.18	0.32	0.11	0.54	-0.13	0.51	-0.08	0.68	0.12	0.51	-0.08	0.66	0.08	0.66
Pollen	Grass	0.01	0.82	-0.04	0.26	0.05	0.16	-0.02	0.56	0.01	0.73	-0.06	0.08	0.05	0.14	-0.02	0.63
	Birch	0.02	0.75	-0.01	0.91	0.11	0.01	-0.18	0.00	0.09	0.07	-0.09	0.05	0.03	0.36	0.01	0.61
	Oak	0.19	0.29	-0.58	0.03	0.16	0.61	0.04	0.89	-0.07	0.79	0.29	0.19	0.22	0.28	-0.41	0.03
	Nettle	0.02	0.64	-0.03	0.46	0.00	0.98	0.02	0.54	0.00	0.90	-0.03	0.37	0.04	0.38	-0.02	0.57

Table F. 103: Scotland Emergency Counts Excess – percentage change and P-values by lag day per exposure.

Exposure		Lag0 Est	Lag0 P	Lag1 Est	Lag1 P	Lag2 Est	Lag2 P	Lag3 Est	Lag3 P	Lag4 Est	Lag4 P	Lag5 Est	Lag5 P	Lag6 Est	Lag6 P	Lag7 Est	Lag7 P
Outdoor air pollutants	NO Min’	0.02	0.96	0.33	0.35	-0.60	0.11	0.30	0.34	0.20	0.55	-0.14	0.70	-0.38	0.25	0.29	0.20
	NO_2 Min’	-0.07	0.46	0.04	0.69	-0.05	0.58	0.04	0.71	-0.01	0.94	0.01	0.89	-0.09	0.33	0.12	0.14
	NOD Min’	-0.12	0.14	0.20	0.01	-0.16	0.03	0.05	0.48	0.04	0.59	-0.01	0.93	-0.11	0.16	0.10	0.13
	SO_2 Min’	0.25	0.39	-0.21	0.43	0.08	0.74	-0.17	0.51	0.09	0.74	0.13	0.59	-0.17	0.45	0.16	0.46
	PM_{10} Min’	0.15	0.19	-0.12	0.35	-0.11	0.38	0.03	0.79	0.00	0.98	-0.07	0.54	0.30	0.01	-0.19	0.07
	O_3 Min’	0.06	0.18	-0.03	0.55	-0.01	0.83	0.03	0.57	-0.02	0.66	-0.02	0.71	0.02	0.62	-0.02	0.63
	CO Min’	-10.51	0.20	12.92	0.09	-14.01	0.06	3.11	0.70	-5.20	0.50	15.06	0.05	-4.80	0.53	3.12	0.68
	NO Mean	0.03	0.49	-0.02	0.61	0.03	0.56	0.00	0.95	0.01	0.89	-0.01	0.81	-0.01	0.84	0.00	0.90
	NO_2 Mean	0.02	0.71	-0.07	0.25	0.06	0.28	-0.01	0.88	-0.06	0.34	0.06	0.28	-0.04	0.51	0.04	0.46
	NOD Mean	0.00	0.90	0.00	0.88	0.01	0.65	0.00	0.86	0.00	0.94	0.01	0.74	-0.01	0.64	0.00	0.87
	SO_2 Mean	-0.07	0.61	-0.06	0.58	0.09	0.45	0.02	0.86	-0.06	0.62	0.00	0.99	-0.03	0.77	0.11	0.28
	PM_{10} Mean	0.02	0.73	-0.04	0.58	-0.03	0.70	-0.06	0.39	0.05	0.47	-0.05	0.49	0.17	0.02	-0.06	0.36
	O_3 Mean	0.10	0.02	-0.07	0.11	-0.01	0.90	0.01	0.90	-0.02	0.71	0.00	0.97	0.04	0.41	-0.04	0.36
	CO Mean	-2.43	0.54	-2.60	0.51	5.38	0.18	0.59	0.89	-5.29	0.18	4.92	0.23	0.61	0.88	-4.36	0.21
	NO Max’	0.01	0.58	0.00	0.85	0.01	0.54	0.00	0.99	0.00	0.95	0.00	0.67	0.01	0.59	-0.01	0.56
	NO_2 Max’	0.01	0.81	-0.03	0.33	0.03	0.29	0.01	0.74	-0.03	0.29	0.00	0.90	0.02	0.50	-0.02	0.55
	NOD Max’	0.00	0.74	0.00	0.58	0.00	0.93	0.00	0.59	0.00	0.79	0.00	0.86	0.00	0.58	-0.01	0.27
	SO_2 Max’	-0.03	0.52	-0.02	0.61	0.00	0.93	0.05	0.20	-0.05	0.26	-0.01	0.83	0.00	0.91	0.04	0.26
	PM_{10} Max’	-0.03	0.38	0.03	0.37	-0.01	0.88	-0.07	0.05	0.07	0.03	-0.05	0.15	0.07	0.01	-0.03	0.27
	O_3 Max’	0.06	0.14	-0.07	0.22	-0.01	0.84	0.02	0.57	-0.05	0.29	0.03	0.47	0.02	0.59	-0.01	0.73
	CO Max’	-0.92	0.49	-0.70	0.59	1.73	0.20	0.79	0.58	-1.65	0.21	1.42	0.30	-0.94	0.55	-0.60	0.60
Weather	Temp Min’	0.28	0.23	-0.04	0.88	-0.21	0.40	0.06	0.79	-0.20	0.46	0.19	0.46	0.15	0.57	0.04	0.86
	Temp Max’	0.11	0.66	-0.32	0.28	0.12	0.70	0.51	0.10	-0.64	0.04	0.19	0.52	0.23	0.43	-0.23	0.38
	Sun	0.26	0.15	-0.21	0.26	0.03	0.85	0.34	0.06	-0.35	0.05	-0.02	0.93	0.23	0.19	-0.34	0.06
	Rain	0.01	0.95	0.14	0.37	-0.10	0.48	-0.23	0.11	0.08	0.54	0.07	0.61	0.26	0.06	-0.25	0.07
	Pressure	-0.09	0.23	0.00	0.98	0.17	0.09	-0.02	0.87	-0.07	0.50	-0.04	0.68	0.03	0.78	0.02	0.80
	Wind speed	0.16	0.39	0.15	0.48	-0.14	0.48	-0.09	0.67	0.11	0.58	-0.22	0.28	0.30	0.16	-0.15	0.43
Pollen	Grass	0.05	0.13	-0.13	0.00	0.05	0.30	0.03	0.47	-0.04	0.22	-0.03	0.41	0.04	0.24	0.00	0.96
	Birch	0.00	0.99	-0.02	0.80	0.02	0.75	-0.06	0.19	0.09	0.03	-0.05	0.28	-0.05	0.22	0.09	0.01
	Oak	0.11	0.68	-0.05	0.88	-0.33	0.33	0.32	0.31	-0.54	0.16	0.70	0.00	-0.12	0.64	-0.14	0.50
	Nettle	0.04	0.31	-0.10	0.02	-0.02	0.75	0.09	0.03	-0.05	0.17	0.04	0.33	-0.02	0.57	0.00	0.95

Table F. 104: Scotland Out of Hours Counts Excess – percentage change and P-values by lag day per exposure.

Exposure		Lag0 Est	Lag0 P	Lag1 Est	Lag1 P	Lag2 Est	Lag2 P	Lag3 Est	Lag3 P	Lag4 Est	Lag4 P	Lag5 Est	Lag5 P	Lag6 Est	Lag6 P	Lag7 Est	Lag7 P
Outdoor air pollutants	NO Min’	0.35	0.27	0.15	0.59	-0.57	0.03	0.05	0.84	0.25	0.32	-0.12	0.69	-0.05	0.79	-0.09	0.63
	NO_2 Min’	-0.03	0.67	0.03	0.58	0.01	0.93	-0.09	0.24	0.05	0.46	-0.01	0.86	-0.04	0.51	0.06	0.25
	NOD Min’	-0.02	0.77	0.10	0.06	-0.11	0.03	0.02	0.72	0.01	0.84	0.03	0.61	-0.06	0.22	0.03	0.49
	SO_2 Min’	0.19	0.38	-0.12	0.58	-0.17	0.43	-0.20	0.43	0.26	0.31	0.07	0.71	-0.08	0.63	0.16	0.36
	PM_{10} Min’	0.14	0.04	-0.08	0.27	-0.01	0.89	-0.08	0.37	0.06	0.43	0.02	0.83	0.08	0.33	-0.11	0.12
	O_3 Min’	0.03	0.22	-0.01	0.72	-0.01	0.61	-0.02	0.51	0.04	0.19	-0.02	0.46	0.00	0.94	0.00	0.90
	CO Min’	0.04	1.00	0.61	0.91	-3.47	0.54	-1.70	0.77	1.17	0.83	6.36	0.25	2.16	0.69	-5.41	0.34
	NO Mean	0.07	0.01	-0.05	0.08	0.03	0.34	-0.02	0.68	0.02	0.61	-0.02	0.57	-0.01	0.82	0.00	0.83
	NO_2 Mean	0.06	0.09	-0.07	0.06	0.07	0.10	-0.08	0.08	0.03	0.46	0.00	0.99	0.00	0.98	0.00	0.93
	NOD Mean	0.03	0.07	-0.02	0.22	0.01	0.51	0.00	0.89	0.00	0.89	0.01	0.69	-0.01	0.52	0.00	0.90
	SO_2 Mean	0.04	0.69	-0.12	0.22	0.01	0.95	-0.06	0.58	0.09	0.40	0.00	0.99	-0.02	0.82	0.08	0.33
	PM_{10} Mean	0.08	0.10	-0.06	0.27	0.03	0.61	-0.12	0.03	0.10	0.04	-0.01	0.78	0.04	0.42	-0.03	0.46
	O_3 Mean	0.03	0.30	-0.02	0.40	0.00	0.92	-0.03	0.32	0.05	0.13	-0.02	0.61	0.01	0.63	-0.02	0.57
	CO Mean	2.31	0.40	-6.73	0.02	7.11	0.01	-1.98	0.57	-2.37	0.40	4.60	0.11	-0.97	0.72	-3.01	0.21
	NO Max’	0.02	0.00	-0.02	0.03	0.01	0.24	-0.01	0.53	0.01	0.47	-0.01	0.33	0.00	0.60	0.00	0.88
	NO_2 Max’	0.04	0.05	-0.04	0.02	0.03	0.18	-0.02	0.44	0.00	0.82	0.00	0.88	0.01	0.55	-0.02	0.34
	NOD Max’	0.01	0.01	-0.01	0.06	0.00	0.54	0.00	0.69	0.00	0.86	0.00	0.75	0.00	0.83	0.00	0.52
	SO_2 Max’	-0.01	0.84	-0.03	0.28	0.00	0.93	0.00	0.97	0.00	0.91	0.00	0.97	0.02	0.49	0.02	0.40
	PM_{10} Max’	0.02	0.45	-0.01	0.56	0.02	0.41	-0.06	0.03	0.05	0.06	-0.02	0.46	0.03	0.09	-0.02	0.37
	O_3 Max’	0.03	0.21	-0.03	0.29	-0.01	0.78	-0.02	0.56	0.02	0.51	-0.01	0.78	0.02	0.53	0.00	0.93
	CO Max’	1.27	0.10	-2.17	0.02	1.67	0.08	0.06	0.95	-0.55	0.56	1.13	0.26	-0.80	0.48	-0.53	0.50
Weather	Temp Min’	0.01	0.93	0.06	0.72	-0.09	0.58	-0.07	0.66	0.09	0.61	-0.05	0.77	0.28	0.11	-0.25	0.12
	Temp Max’	0.00	0.98	-0.28	0.15	0.21	0.27	0.11	0.58	-0.23	0.24	0.05	0.78	0.46	0.02	-0.45	0.01
	Sun	0.21	0.08	-0.17	0.16	-0.04	0.76	0.22	0.08	-0.09	0.44	-0.04	0.77	0.10	0.43	-0.21	0.09
	Rain	-0.11	0.32	0.15	0.11	-0.11	0.25	-0.12	0.20	0.11	0.22	0.07	0.43	0.07	0.49	-0.07	0.48
	Pressure	0.08	0.13	-0.16	0.02	0.21	0.00	-0.06	0.37	-0.05	0.45	-0.06	0.43	0.01	0.92	0.07	0.17
	Wind speed	-0.06	0.65	0.14	0.29	-0.13	0.35	-0.07	0.64	0.14	0.28	-0.11	0.40	0.11	0.44	-0.07	0.58
Pollen	Grass	0.06	0.00	-0.11	0.00	0.03	0.09	0.00	0.83	0.01	0.82	-0.02	0.46	0.02	0.49	0.00	0.96
	Birch	-0.01	0.55	-0.01	0.80	-0.01	0.64	0.02	0.43	0.01	0.57	0.02	0.54	-0.08	0.03	0.06	0.01
	Oak	-0.11	0.51	0.15	0.41	-0.16	0.43	0.10	0.53	-0.20	0.36	0.38	0.03	-0.36	0.12	0.19	0.34
	Nettle	0.04	0.16	-0.07	0.02	-0.02	0.33	0.06	0.01	-0.02	0.55	0.00	0.96	0.01	0.79	0.00	0.92

F4. Diagnostics for multiple regressions.

F4.1. England and Wales Multiple Regression Diagnostics

Linear Regressions. Diagnostics include histogram of residuals, Normal Probability Plot, scatter plot of the predicted and standardised residuals and autocorrelation plot. For each medical contacts, diagnostics only illustrated for the null model and three alternative models because diagnostics for the remaining alternative models (total alternative models n=28) were similar to those illustrated.

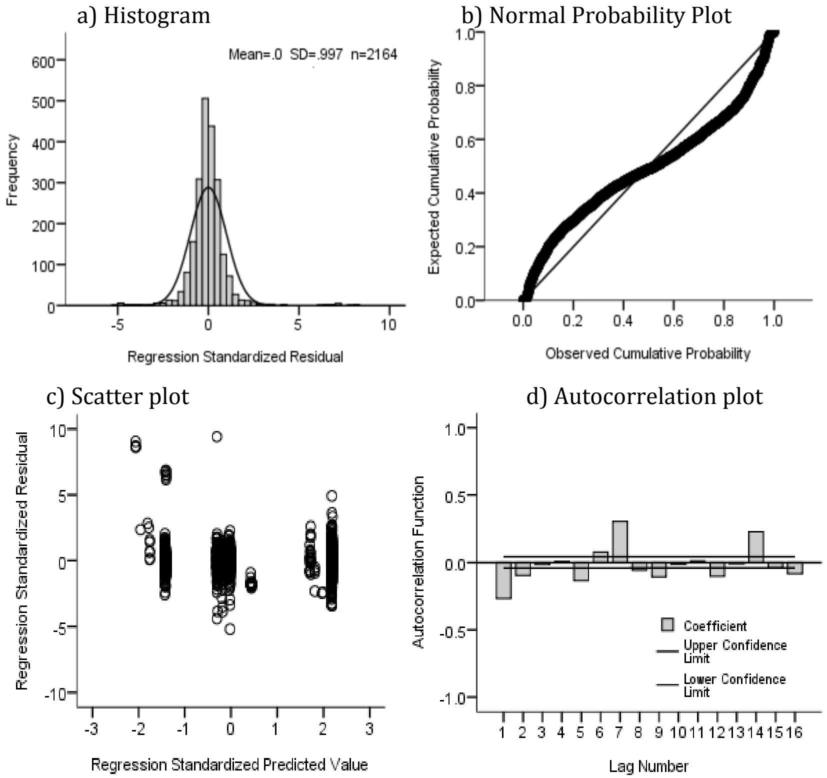


Figure F4. 1: England and Wales All Counts Asthmatics first order difference linear regression base model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

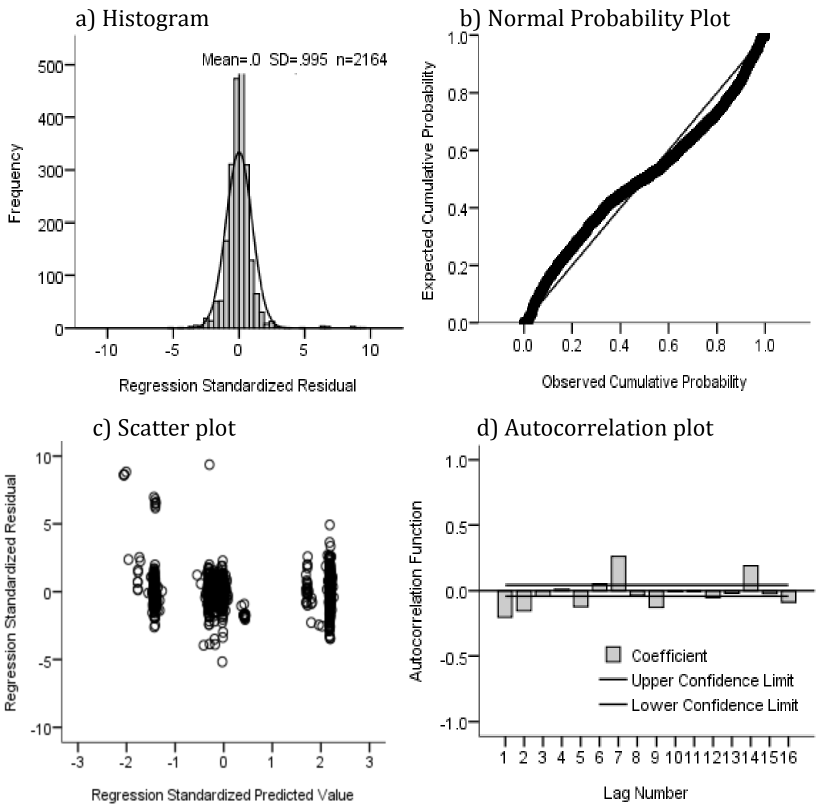


Figure F4. 2: England and Wales All Counts Asthmatics first order difference linear regression with NOD Minimum L0-7, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

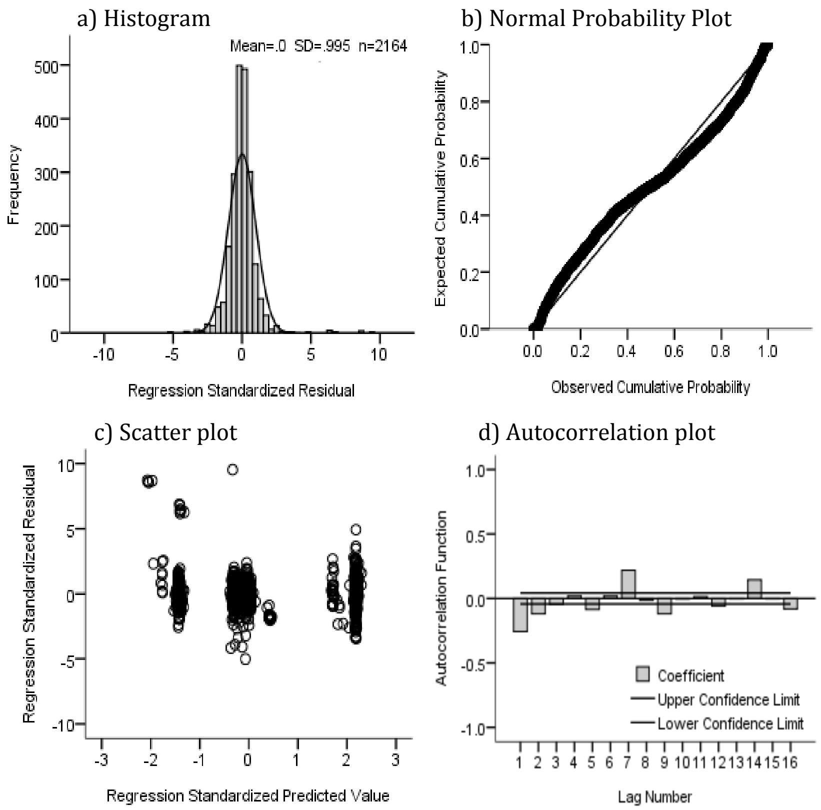


Figure F4. 3: England and Wales All Counts Asthmatics first order difference linear regression with NO_2 mean L0-7, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

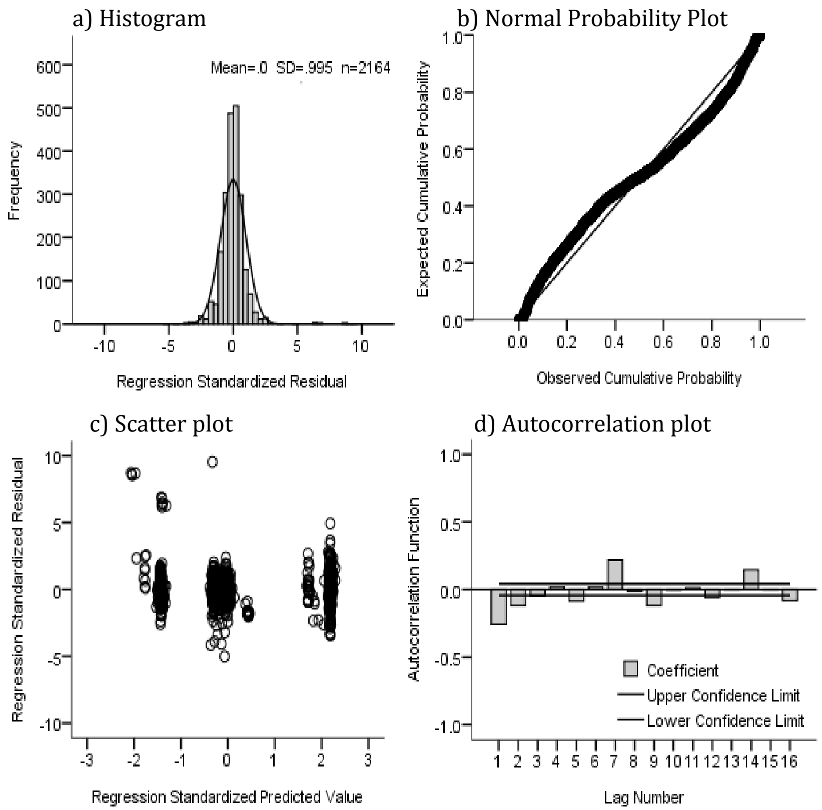


Figure F4. 4: England and Wales All Counts Asthmatics first order difference linear regression with temperature Minimum L0-7, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

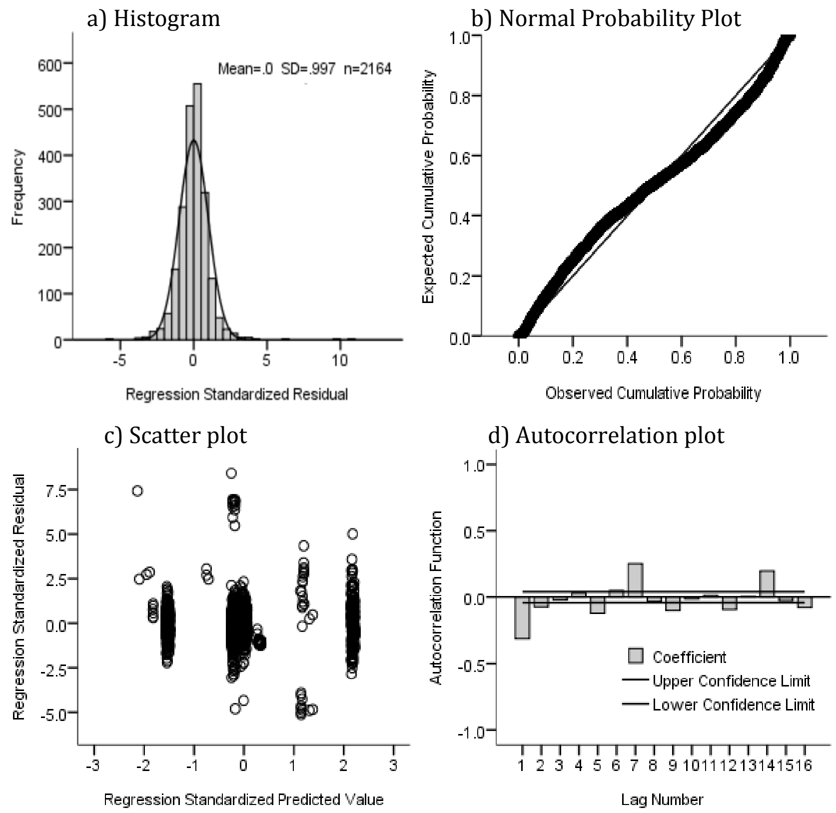


Figure F4. 5: England and Wales All Counts Non-asthmatics first order difference linear regression base model, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

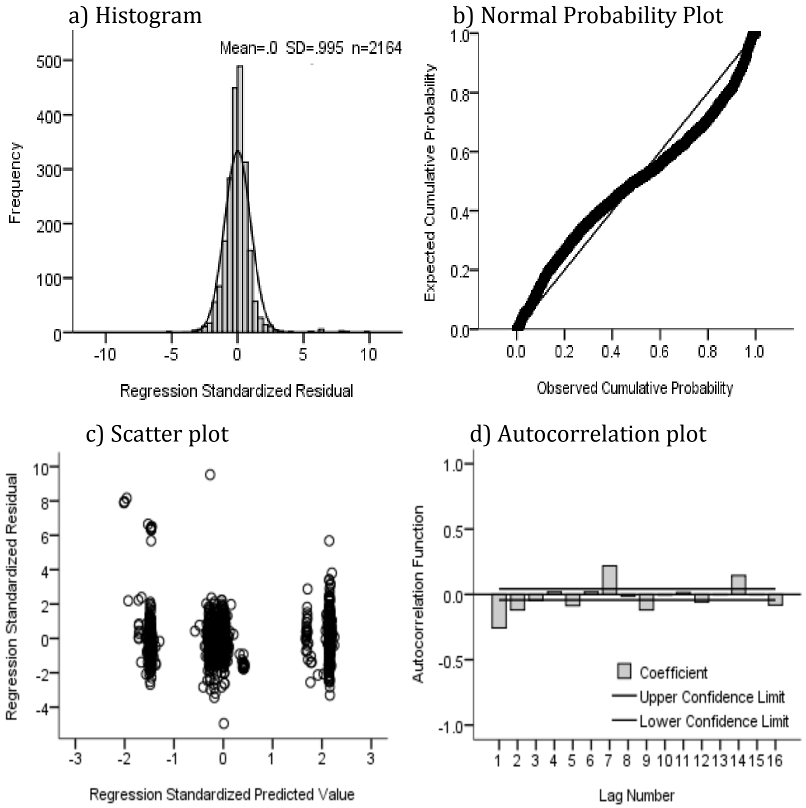


Figure F4. 6: England and Wales All Counts Non-asthmatics first order difference linear regression with NOD Minimum L0-7, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

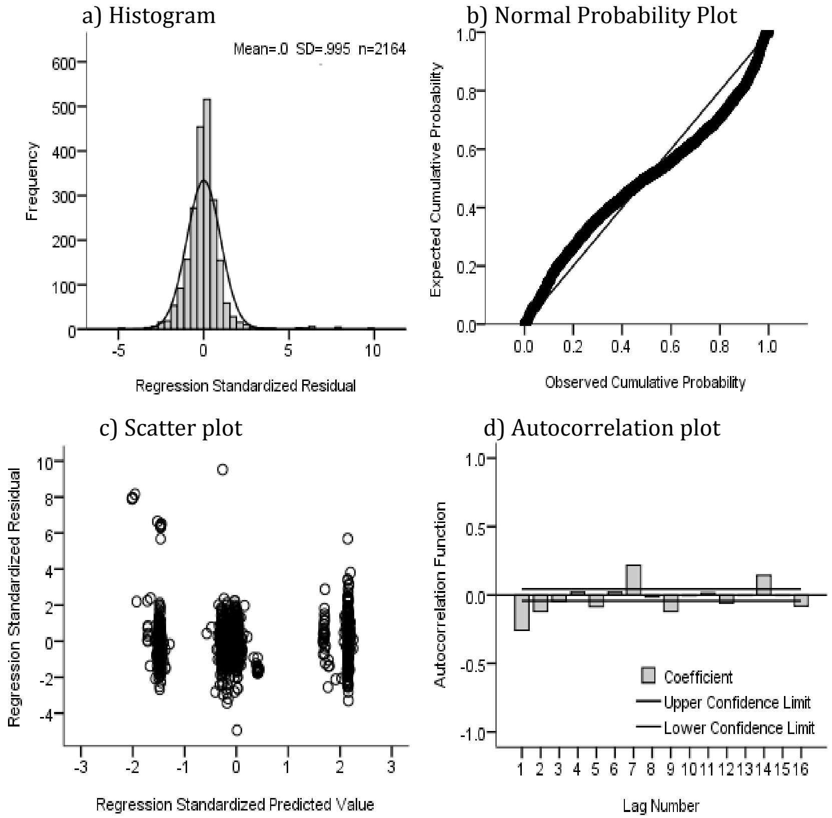


Figure F4. 7: England and Wales All Counts Non-asthmatics first order difference linear regression with NO_2 mean L0-7, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

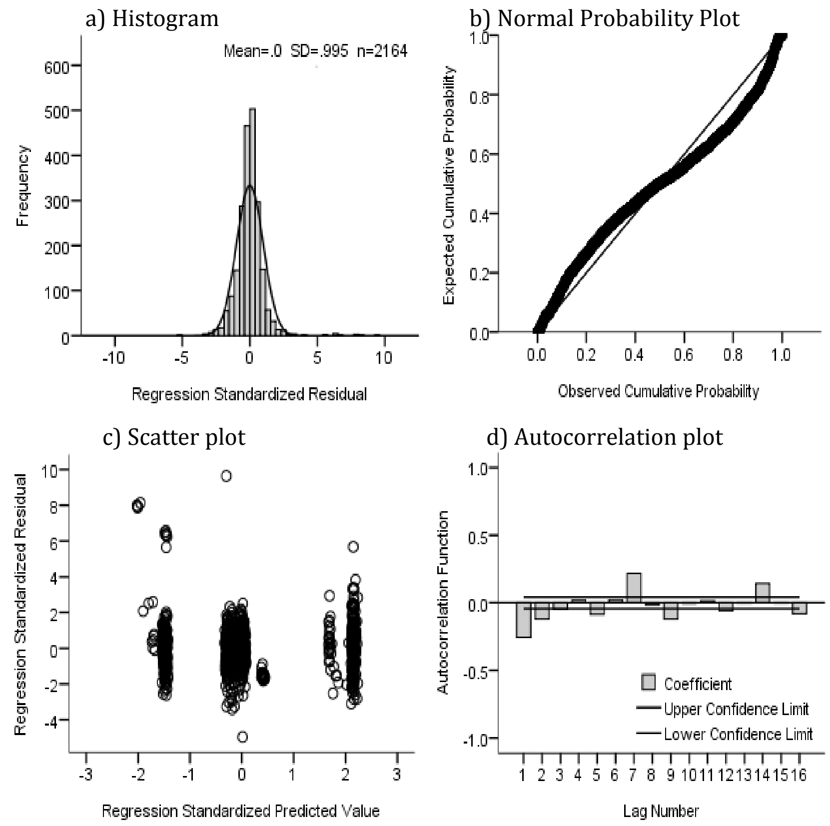


Figure F4. 8: England and Wales All Counts Non-asthmatics first order difference linear regression with temperature Minimum L0-7, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

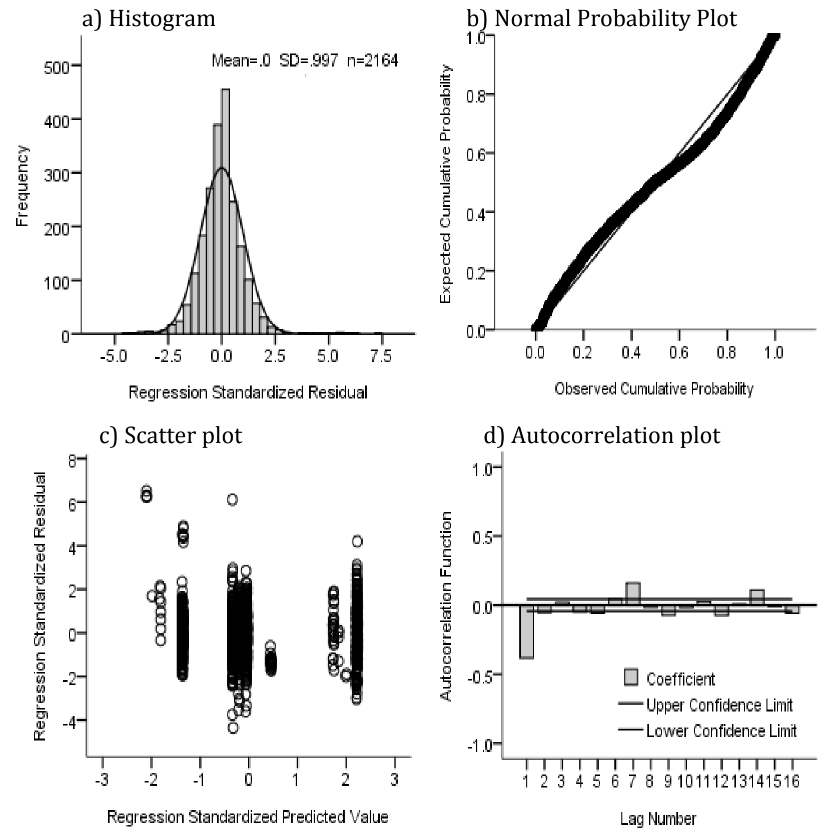


Figure F4. 9: England and Wales All Counts Excess first order difference linear regression base model lag bank holiday, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

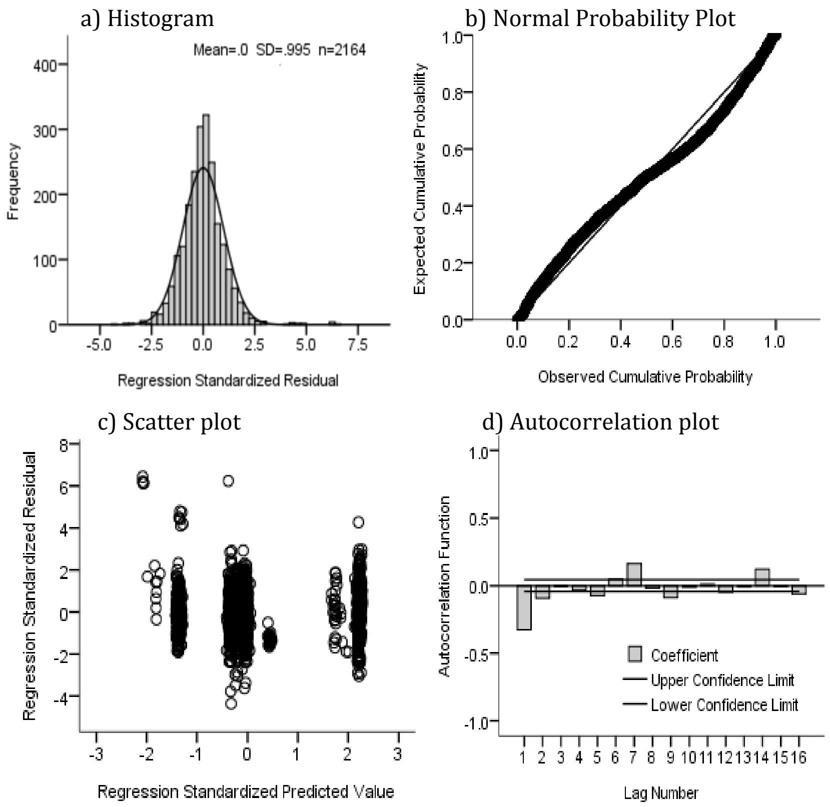


Figure F4. 10: England and Wales All Counts Excess first order difference linear regression with NOD Minimum L0-7, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

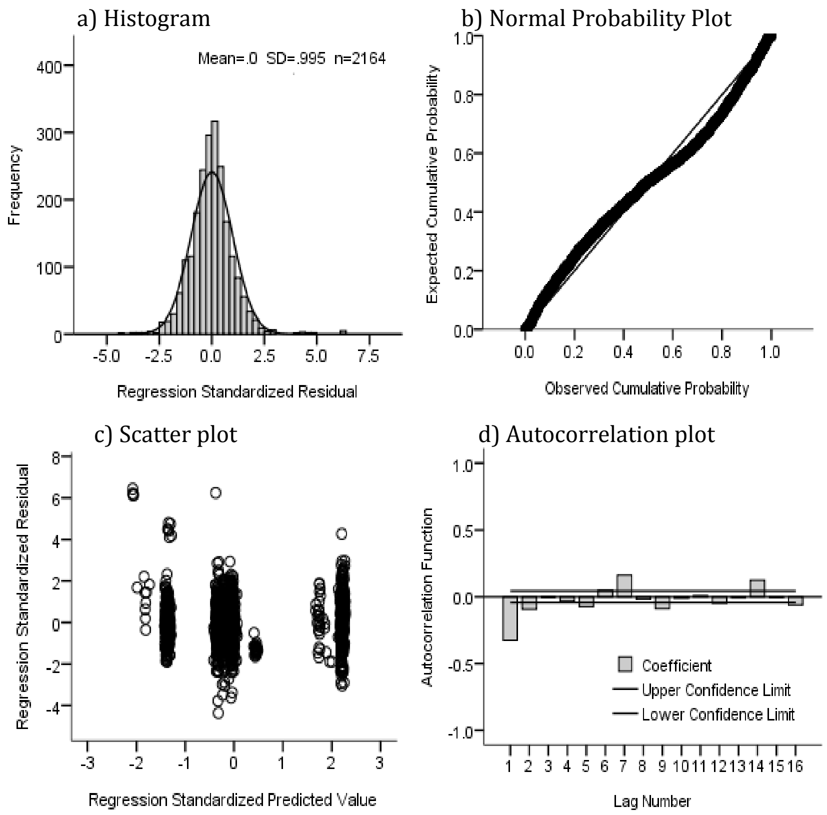


Figure F4. 11: England and Wales All Counts Excess first order difference linear regression with NO_2 mean L0-7, a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

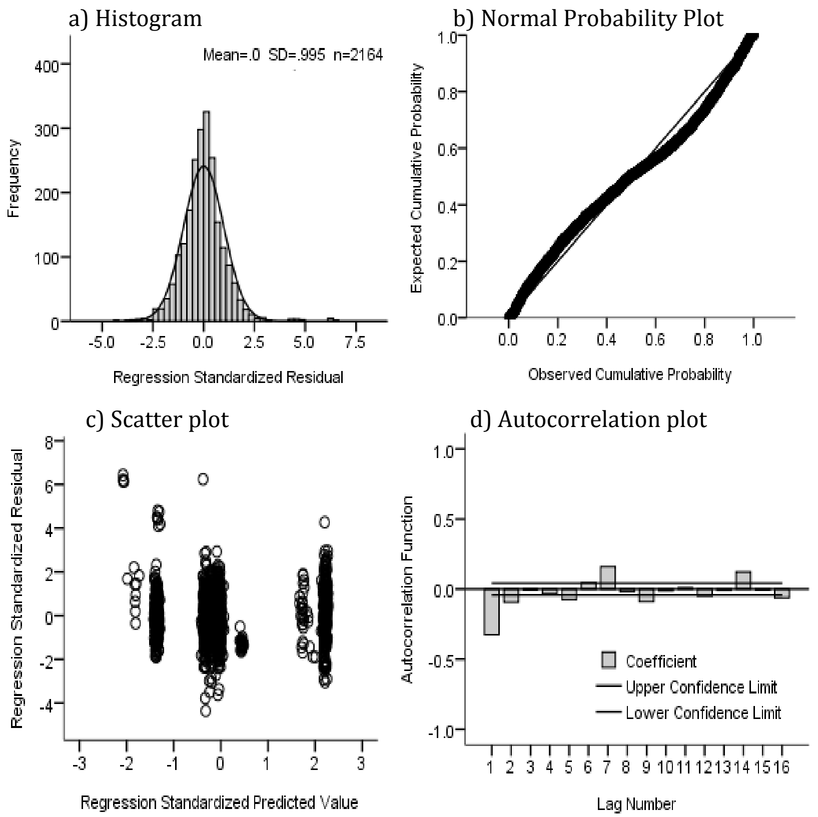


Figure F4. 12: England and Wales All Counts Excess first order difference linear regression with Temperature Minimum L0-7 a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

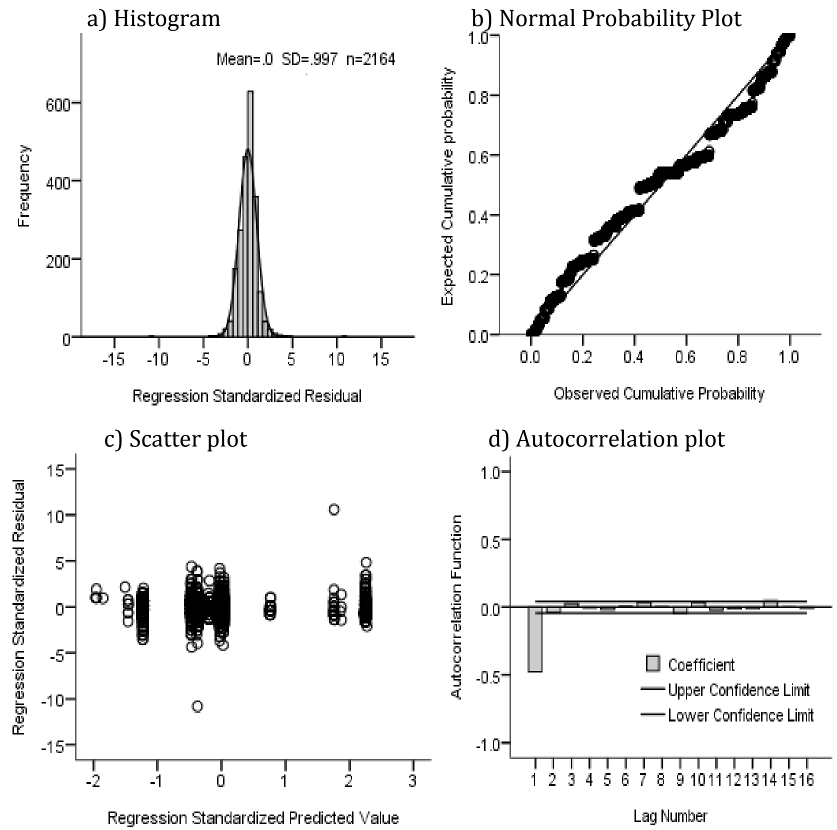


Figure F4. 13: England and Wales Acute Visits Asthmatics first order difference linear regression base model a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

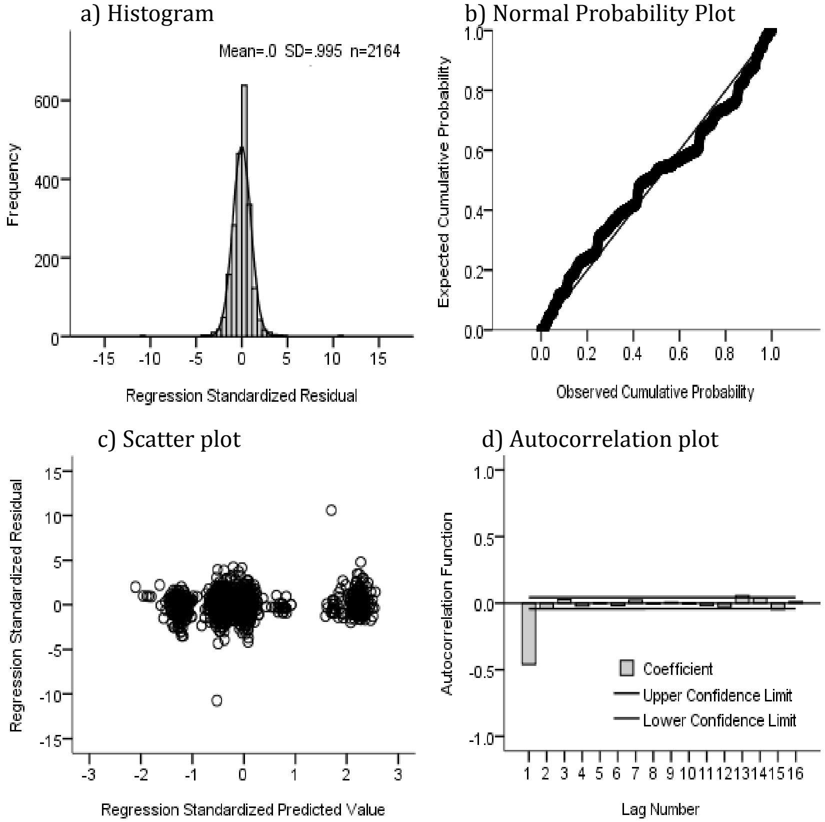


Figure F4. 14: England and Wales Acute Visits Asthmatics first order difference linear regression with SO_2 Minimum L0-7 a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

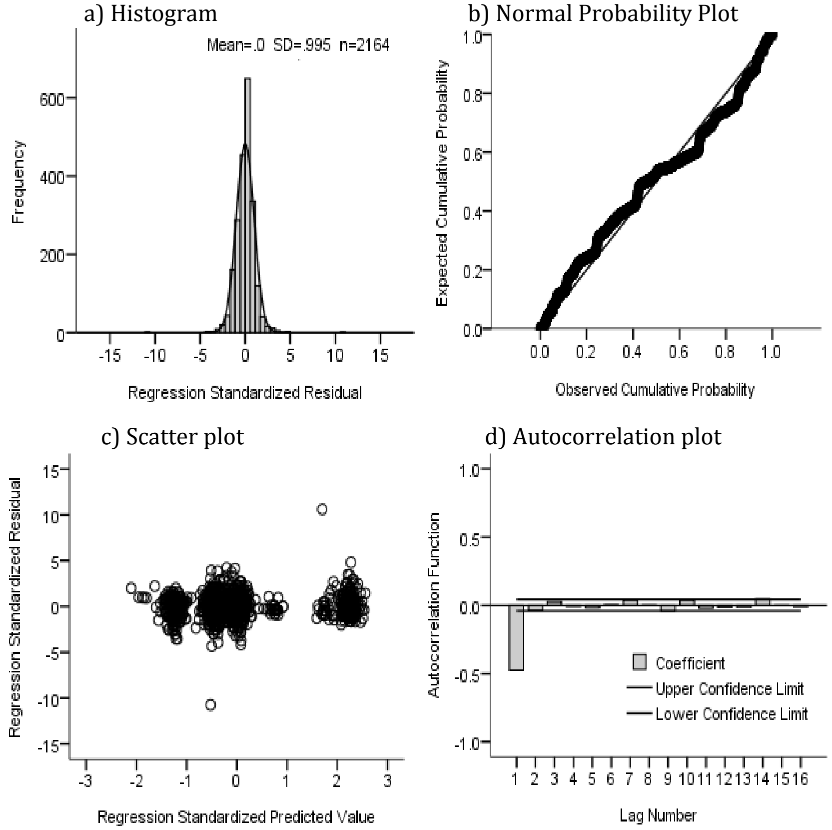


Figure F4. 15: England and Wales Acute Visits Asthmatics first order difference linear regression with PM_{10} mean L0-7 a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

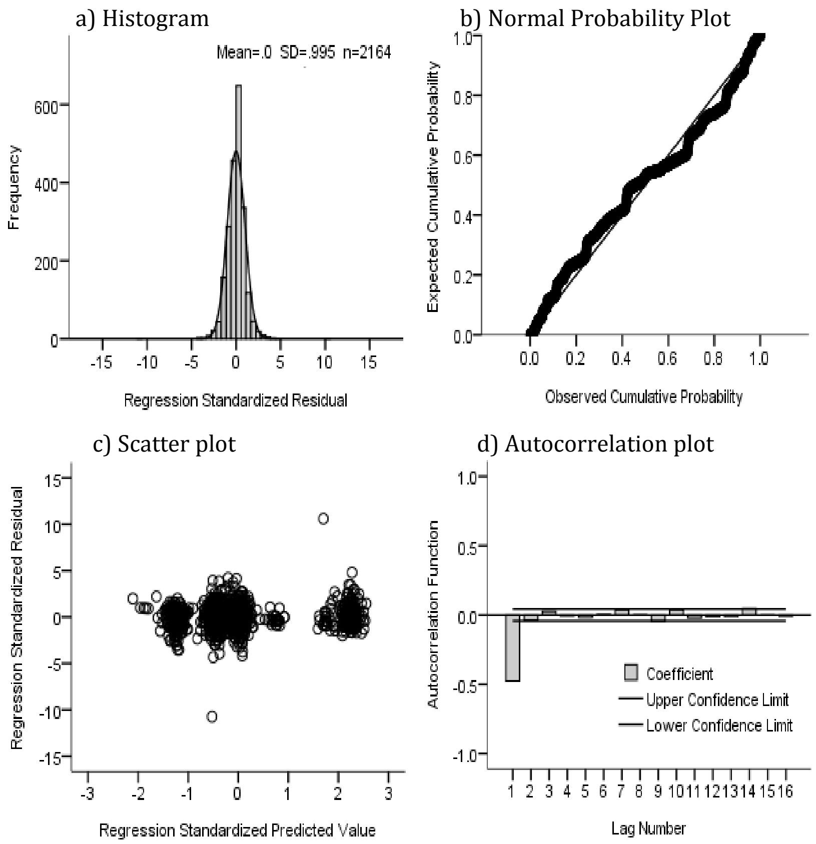


Figure F4. 16: England and Wales Acute Visits Asthmatics first order difference linear regression with NO_2 maximum L0-7 a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot

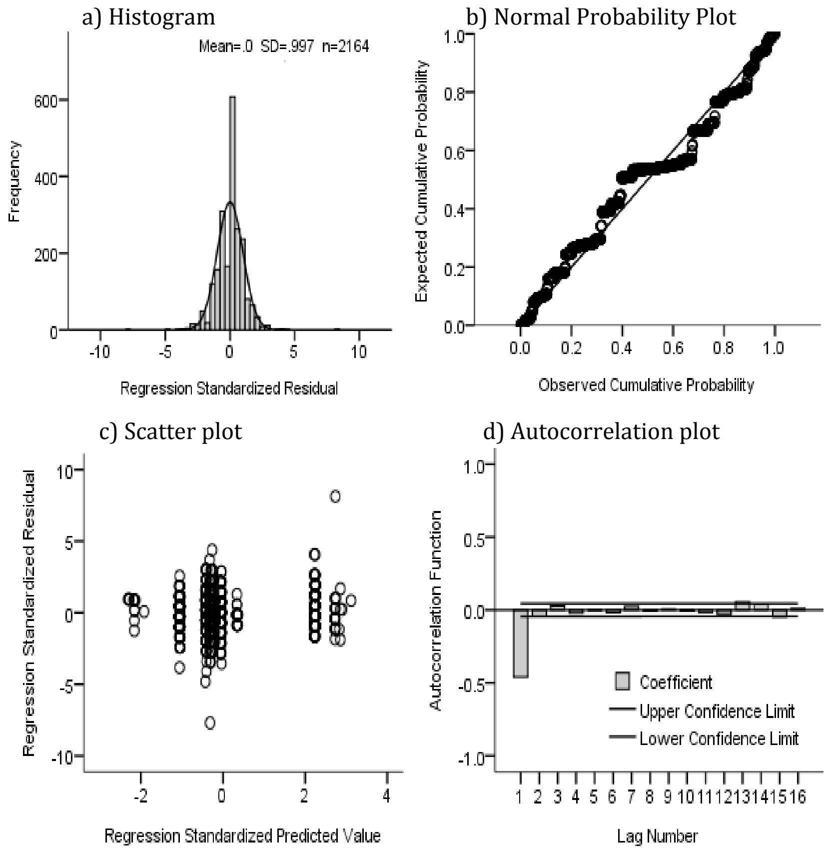


Figure F4. 17: England and Wales Acute Visits Non-asthmatics first order difference linear regression base model a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

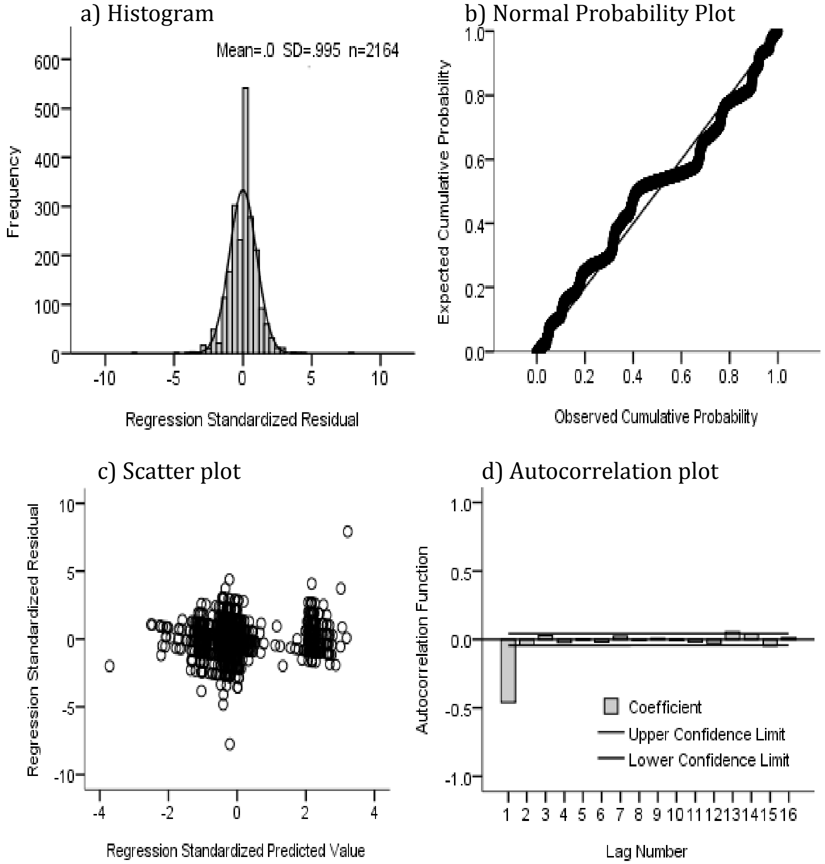


Figure F4. 18: England and Wales Acute Visits Non-asthmatics first order difference linear regression with SO_2 Minimum L0-7 a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

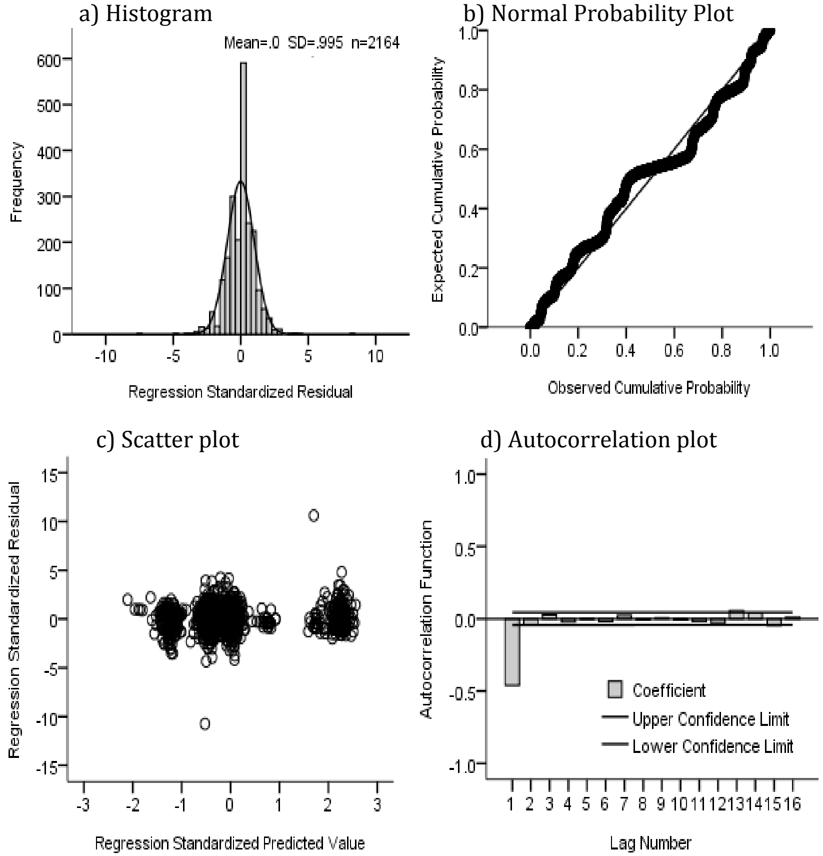


Figure F4. 19: England and Wales Acute Visits Non-asthmatics first order difference linear regression with PM_{10} mean L0-7 a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

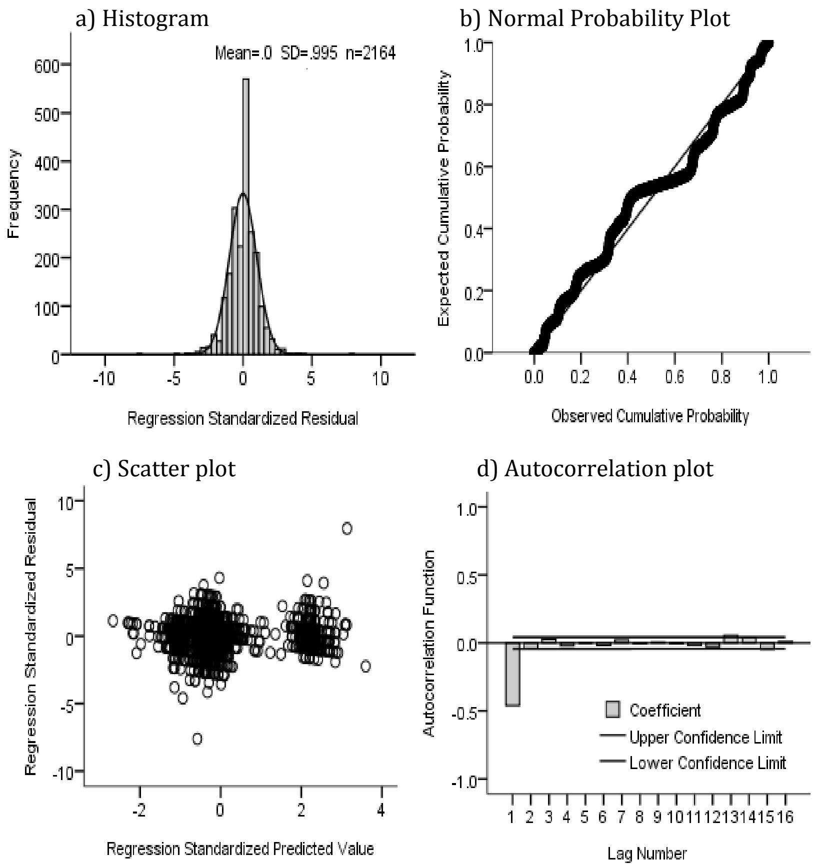


Figure F4. 20: England and Wales Acute Visits Non-asthmatics first order difference linear regression with NO_2 maximum L0-7 a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

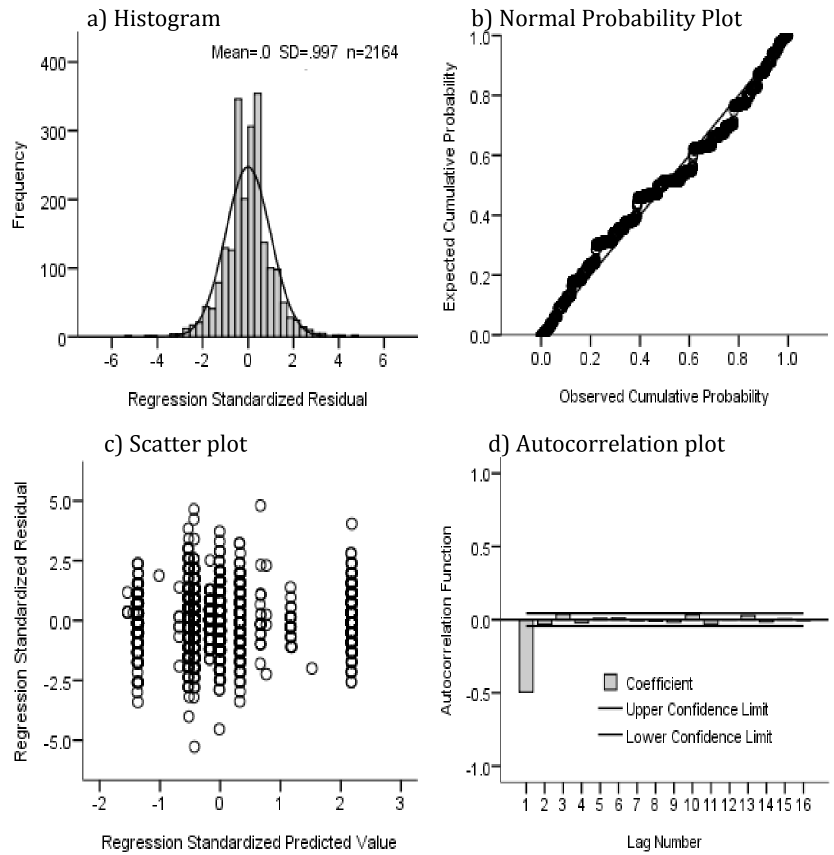


Figure F4. 21: England and Wales Acute Visits Excess first order difference linear regression base model a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot

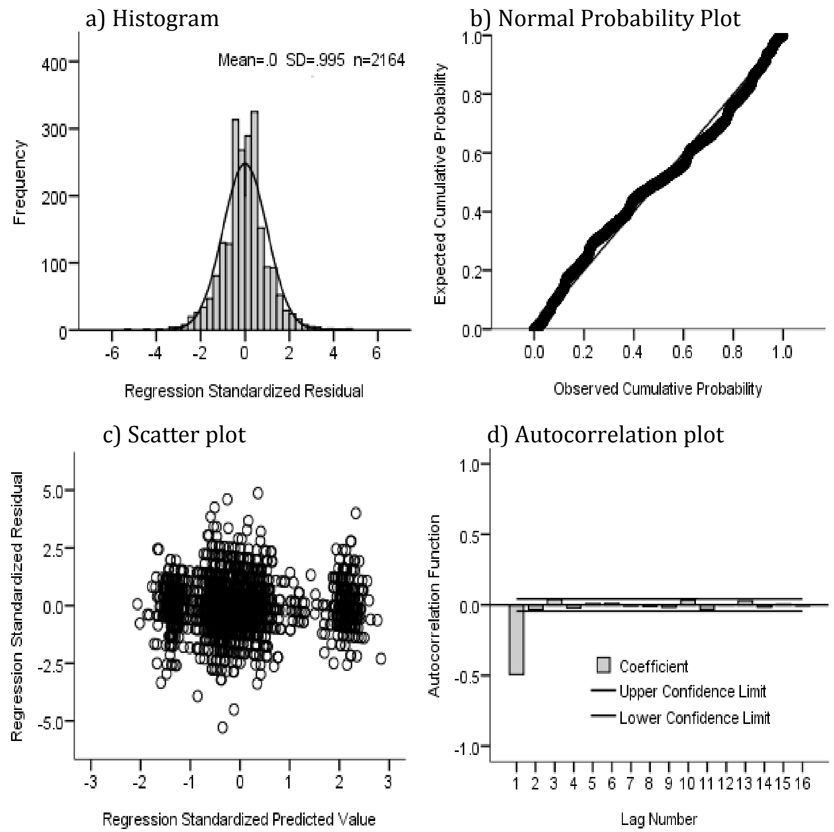


Figure F4. 22: England and Wales Acute Visits Excess first order difference linear regression with SO_2 Minimum L0-7 a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

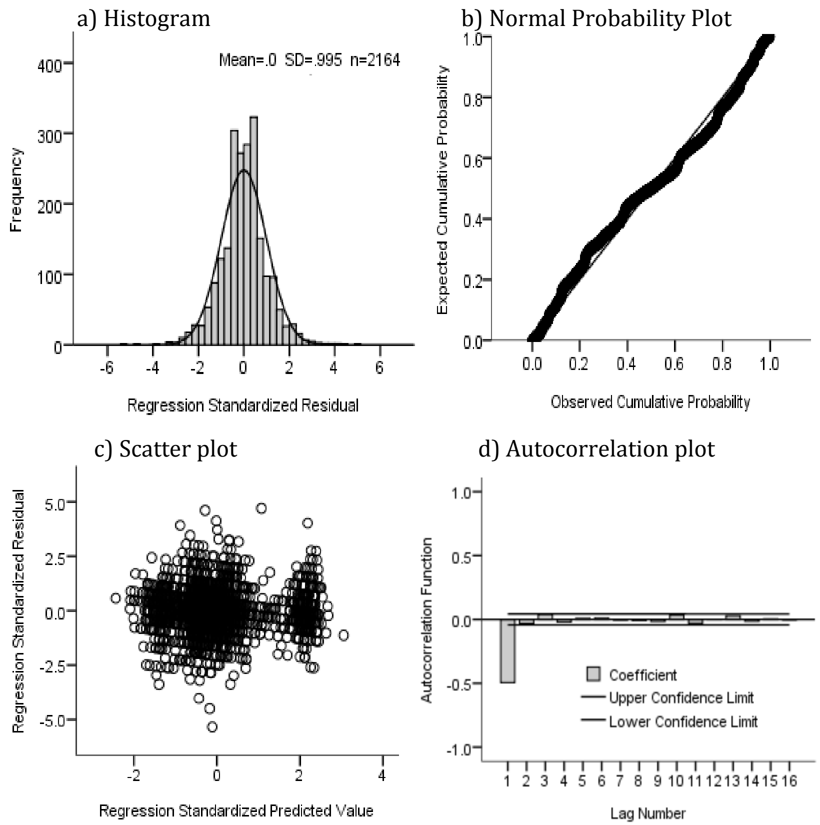


Figure F4. 23: England and Wales Acute Visits Excess first order difference linear regression with PM_{10} mean L0-7 a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

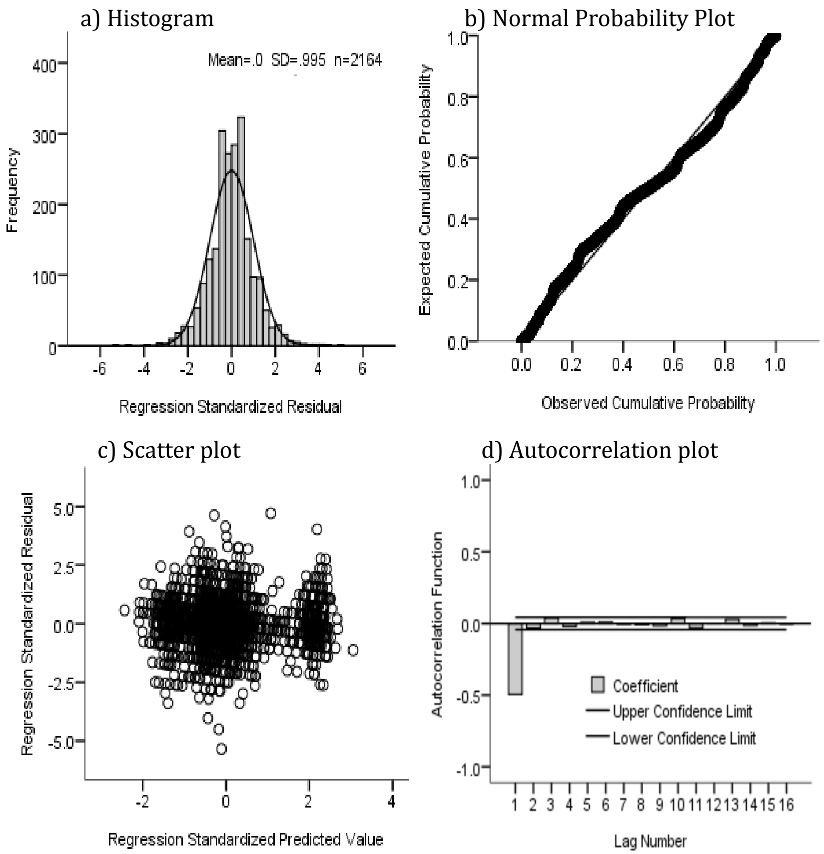


Figure F4. 24: England and Wales Acute Visits Excess first order difference linear regression with NO_2 maximum L0-7 a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

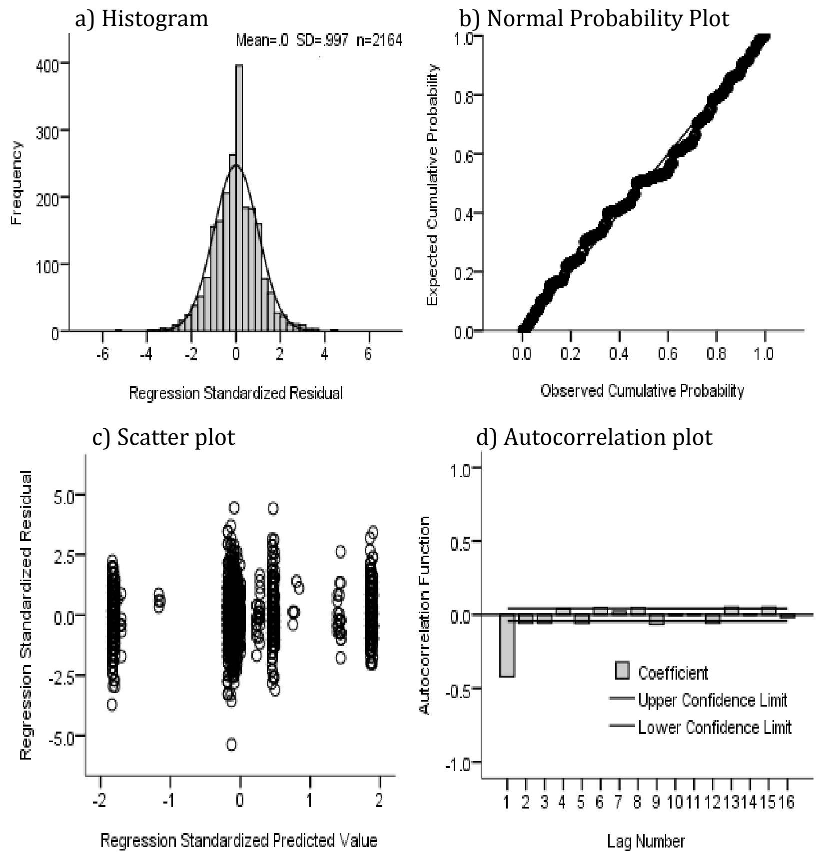


Figure F4. 25: England and Wales Casualty Counts Asthmatics first order difference linear regression base model a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot

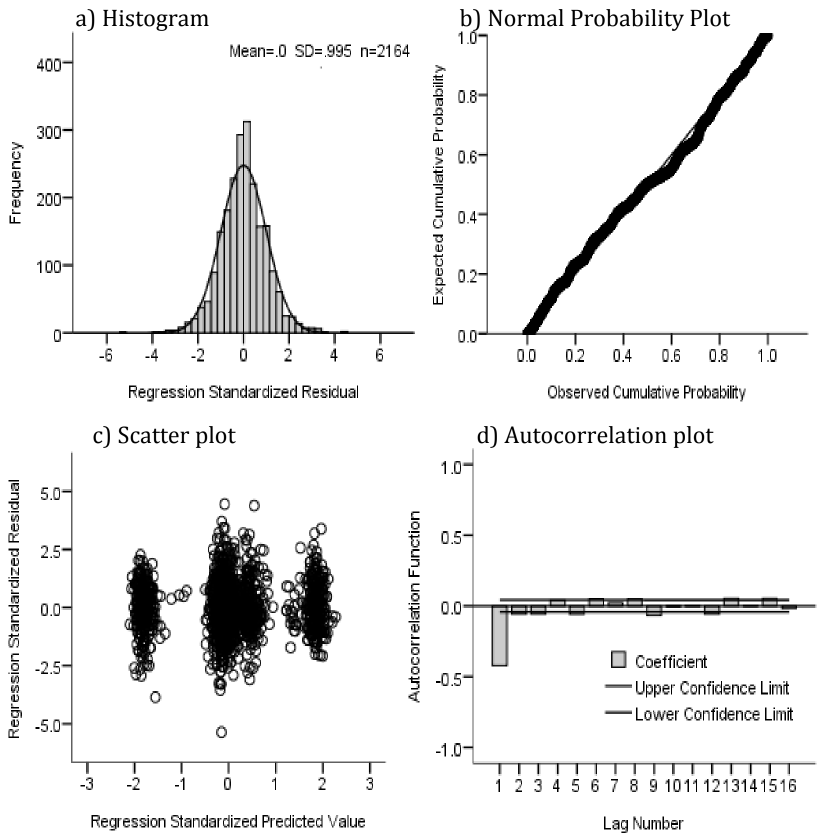


Figure F4. 26: Casualty Counts Asthmatics first order difference linear regression with NO mean L0-7 a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

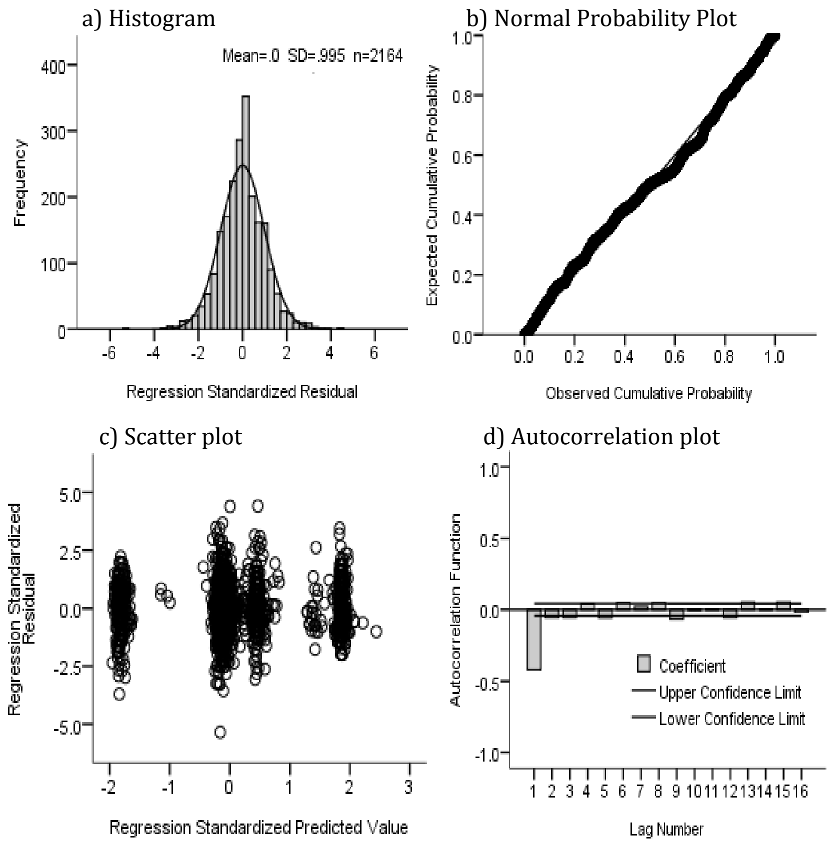


Figure F4. 27: Casualty Counts Asthmatics first order difference linear regression with NO maximum L0-7 a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

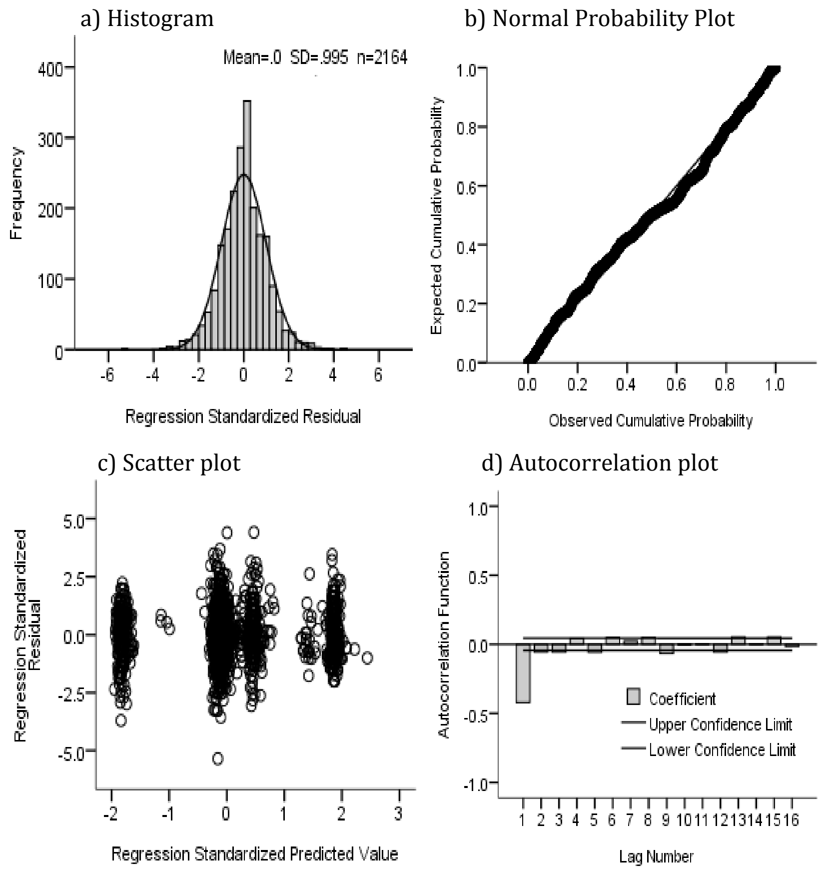


Figure F4. 28: England and Wales Casualty Counts Asthmatics first order difference linear regression with Sun L0-7 a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

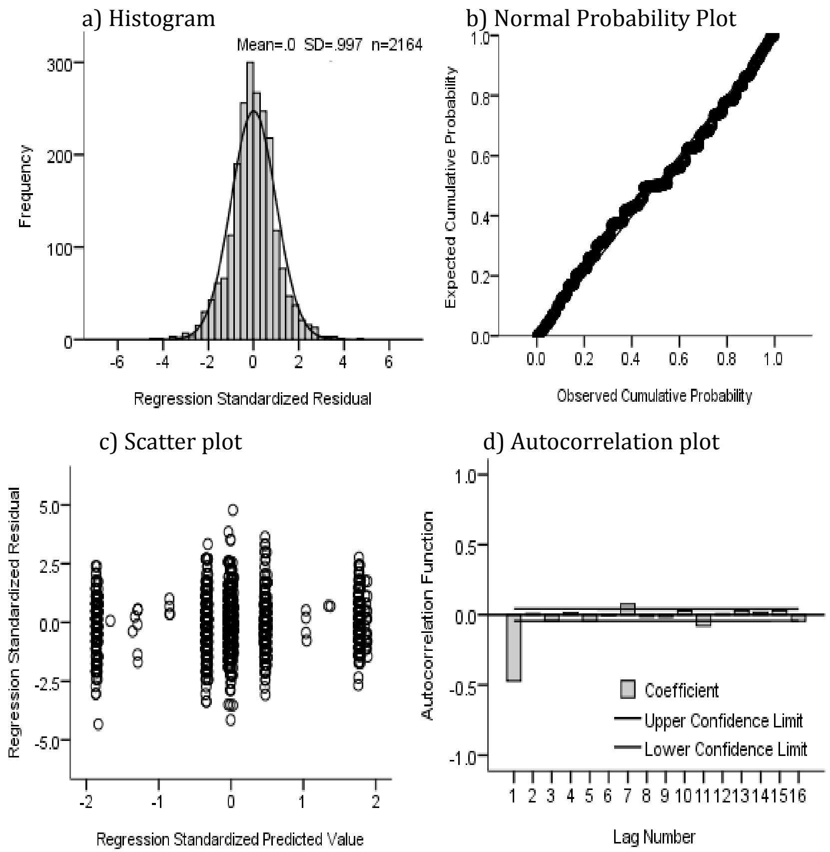


Figure F4. 29: England and Wales Casualty Counts Non-asthmatics first order difference linear regression base model a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot

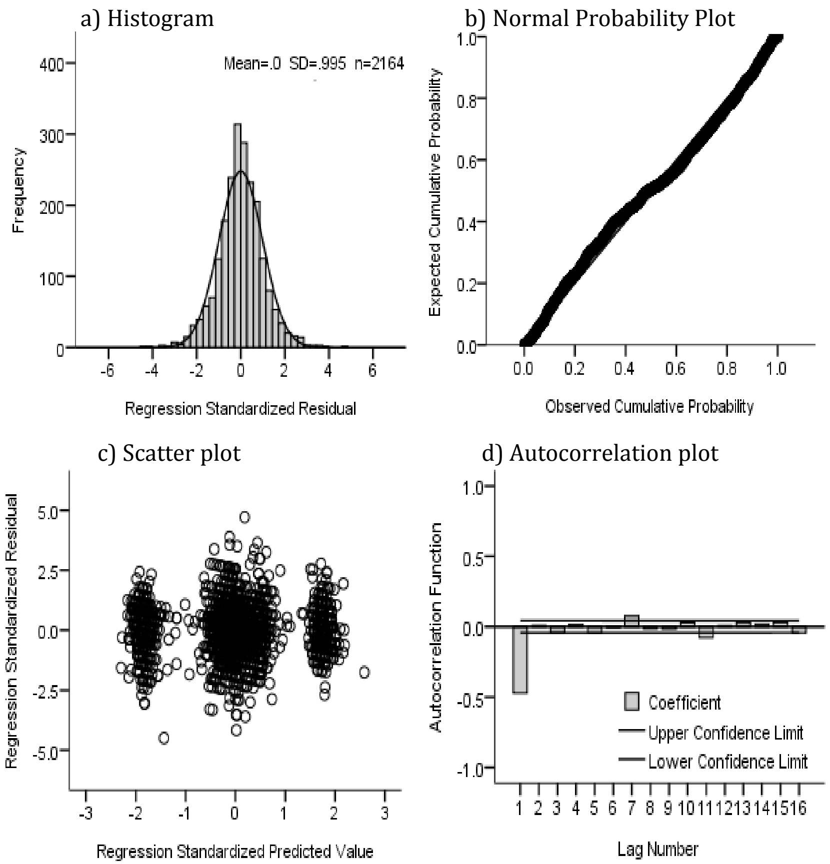


Figure F4. 30: England and Wales Casualty Counts Non-asthmatics first order difference linear regression with NO mean L0-7 a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

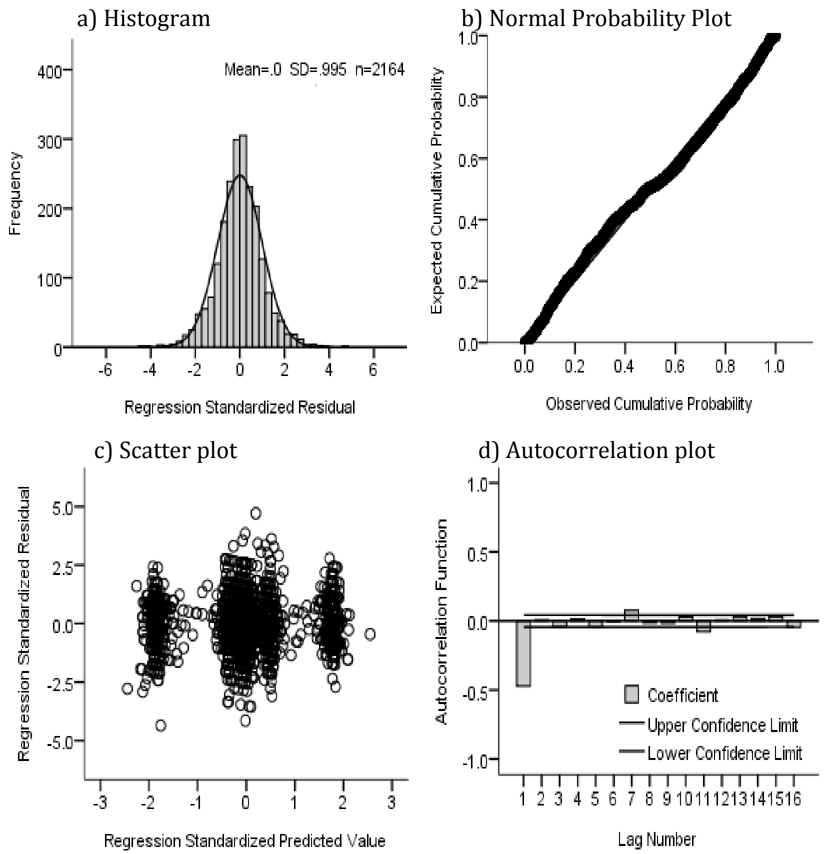


Figure F4. 31: England and Wales Casualty Counts Non-asthmatics first order difference linear regression with NO maximum L0-7 a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

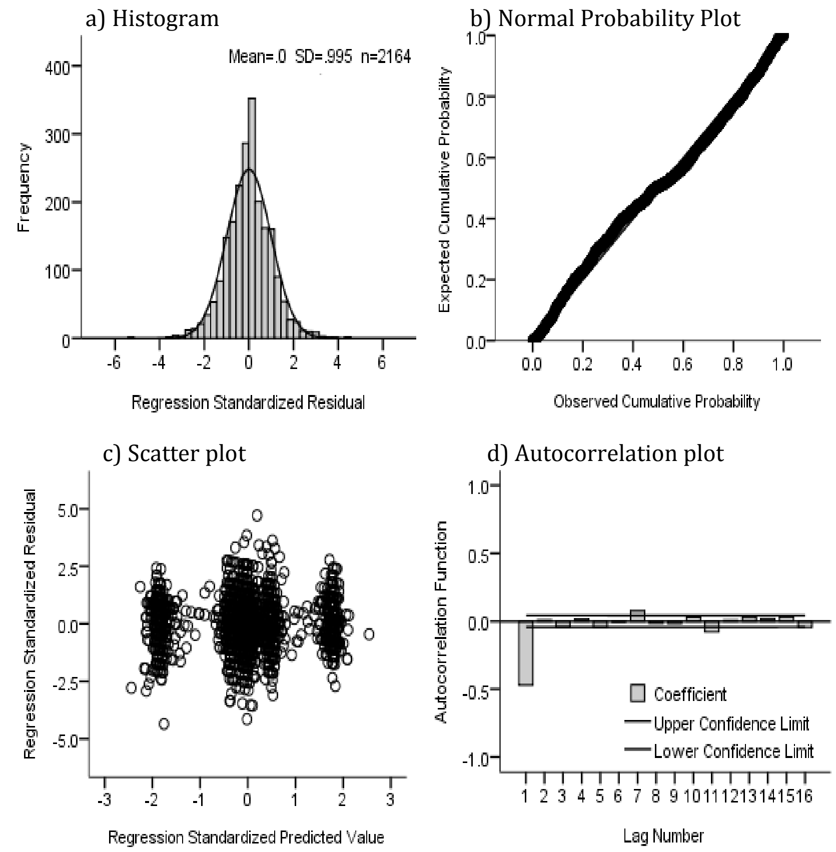


Figure F4. 32: England and Wales Casualty Counts Non-asthmatics first order difference linear regression with Sun L0-7 a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

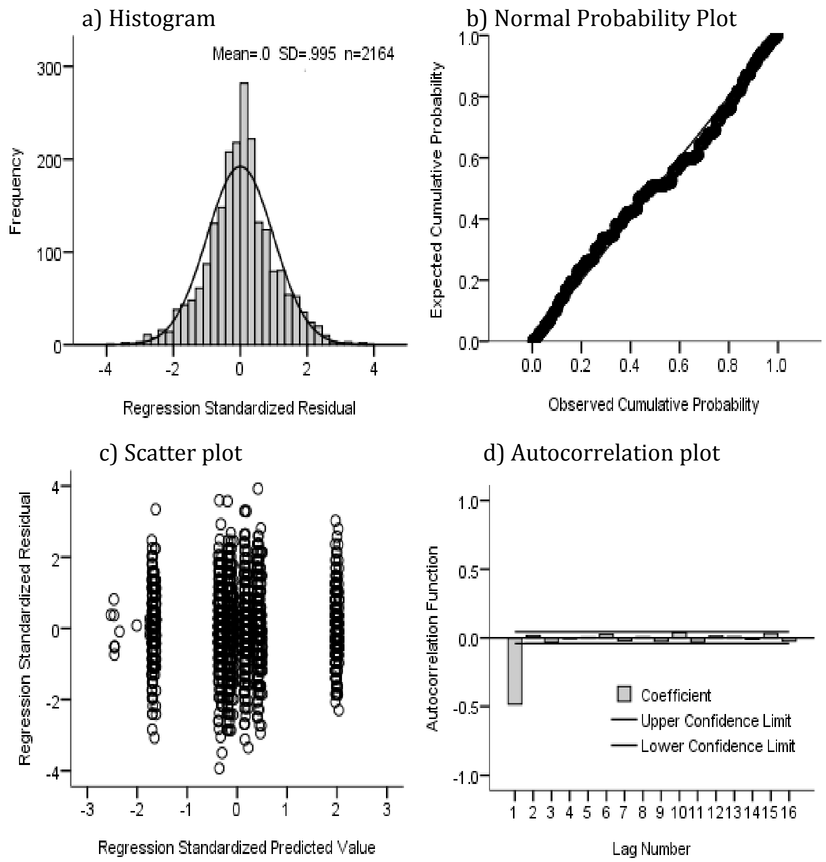


Figure F4. 33: England and Wales Casualty Counts Excess first order difference linear regression base Model a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

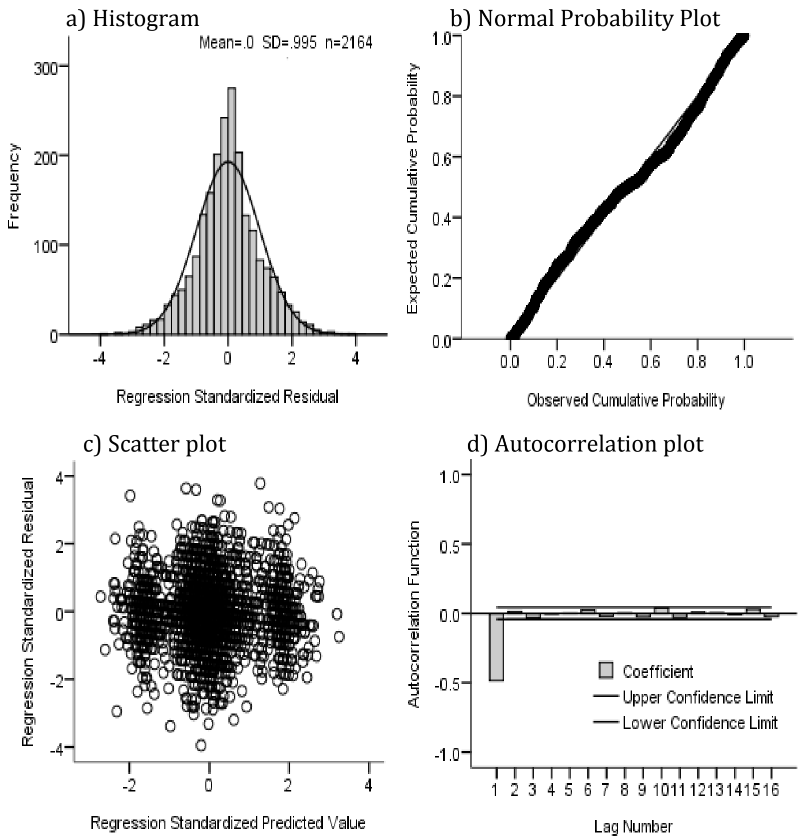


Figure F4. 34: England and Wales Casualty Counts Excess first order difference linear regression with NO mean L0-7 a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

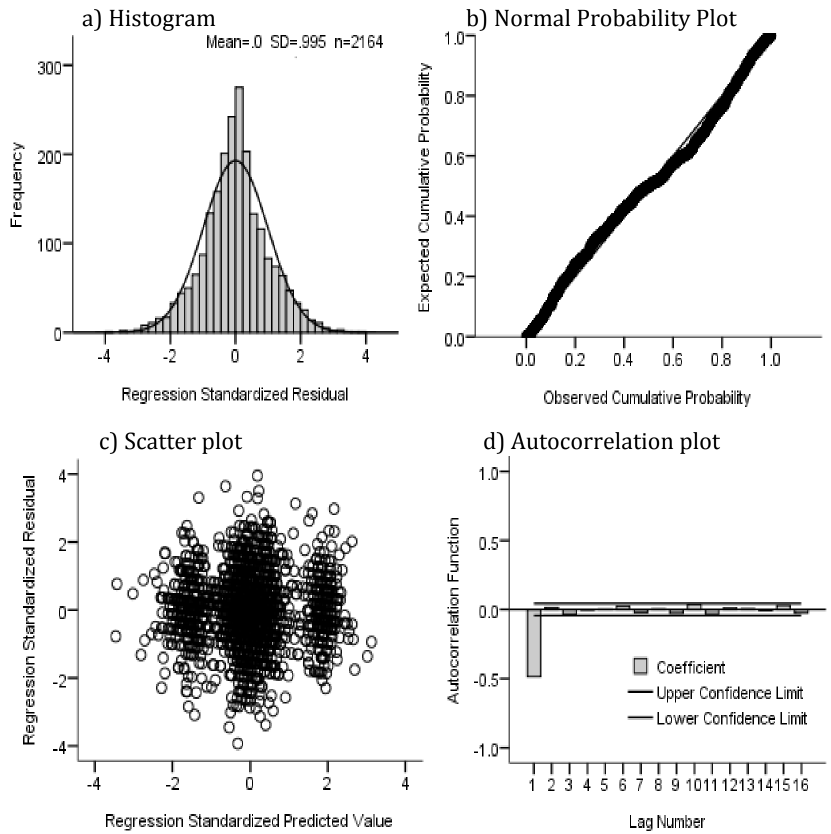


Figure F4. 35: England and Wales Casualty Counts excess first order difference linear regression with NO maximum L0-7 a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

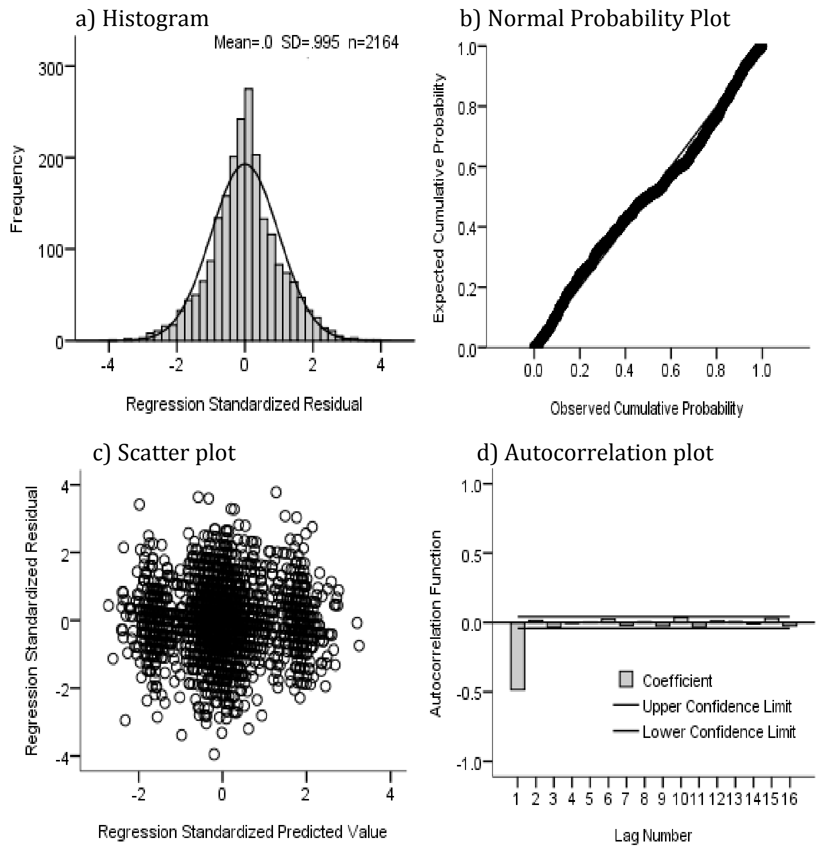


Figure F4. 36: England and Wales Casualty Counts excess first order difference linear regression with Sun L0-7 a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

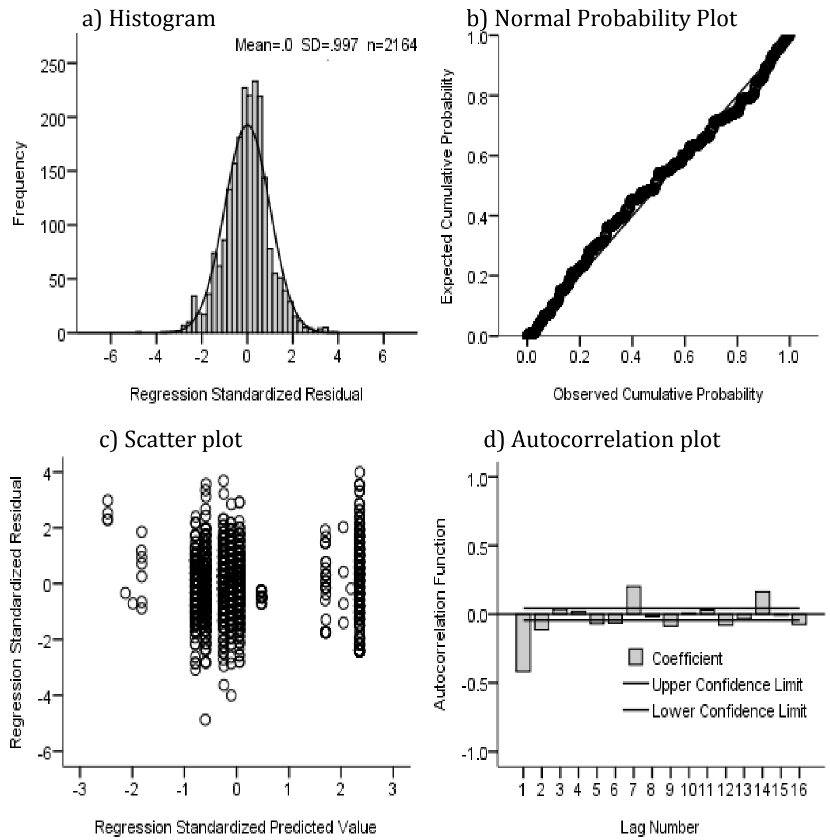


Figure F4. 37: England and Wales Emergency Consultations Asthmatics first order difference linear regression base model a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

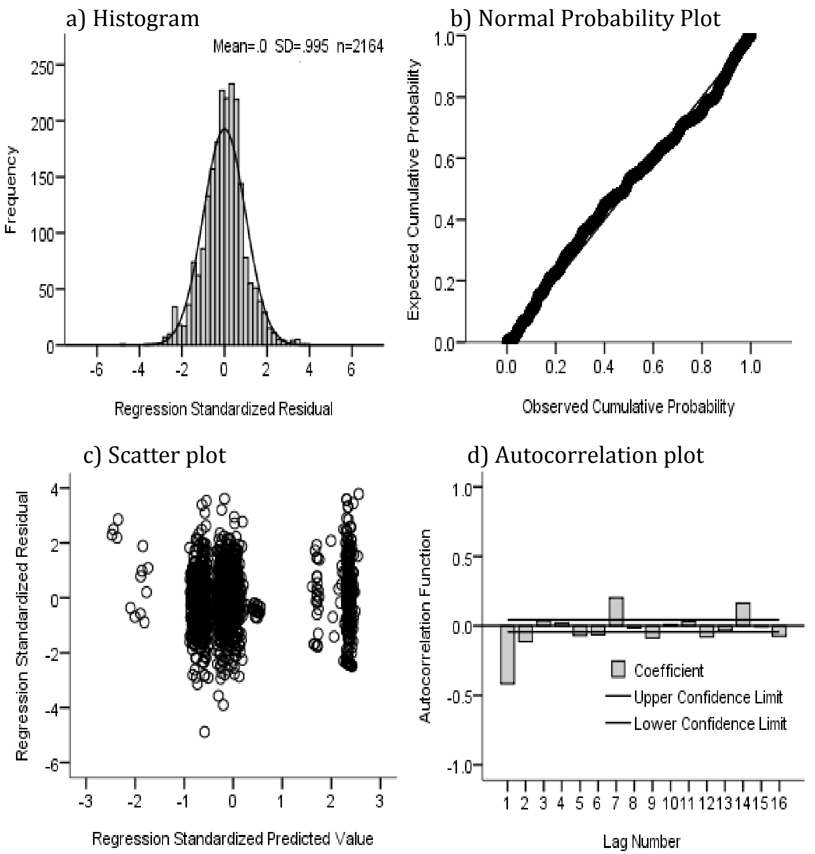


Figure F4. 38: England and Wales Emergency Consultations Asthmatics first order difference linear regression with O_3 Minimum L0-7 a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

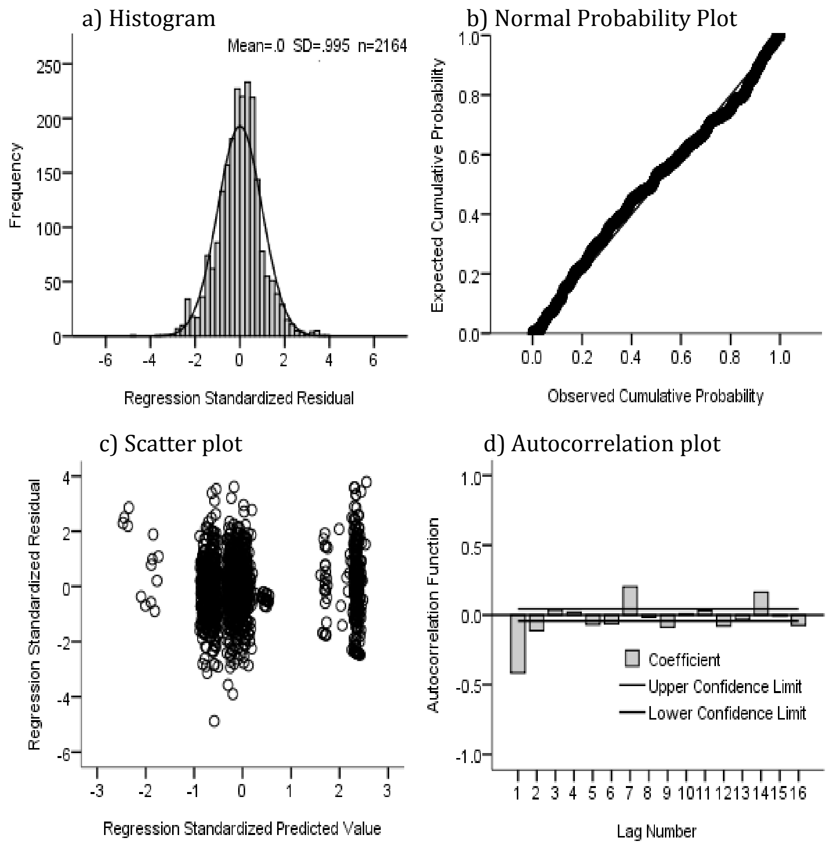


Figure F4. 39: England and Wales Emergency Consultations asthmatics first order difference linear regression with SO_2 mean L0-7 a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

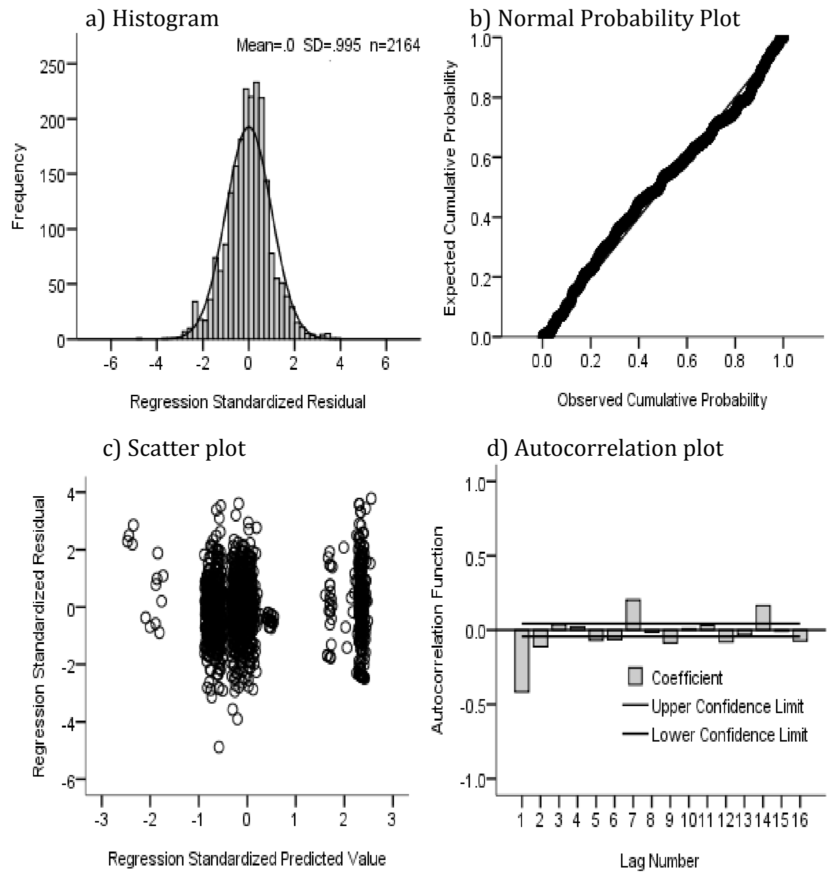


Figure F4. 40: England and Wales Emergency Consultations Asthmatics first order difference linear regression with CO maximum L0-7 a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

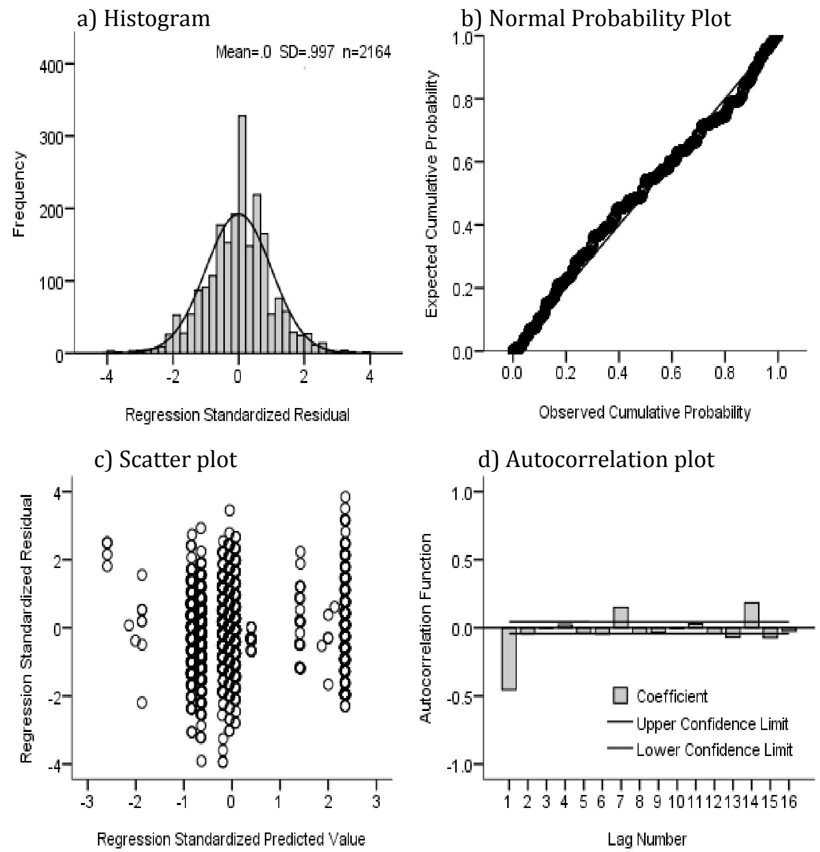


Figure F4. 41: England and Wales Emergency Consultations Non-asthmatics first order difference linear regression base model a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

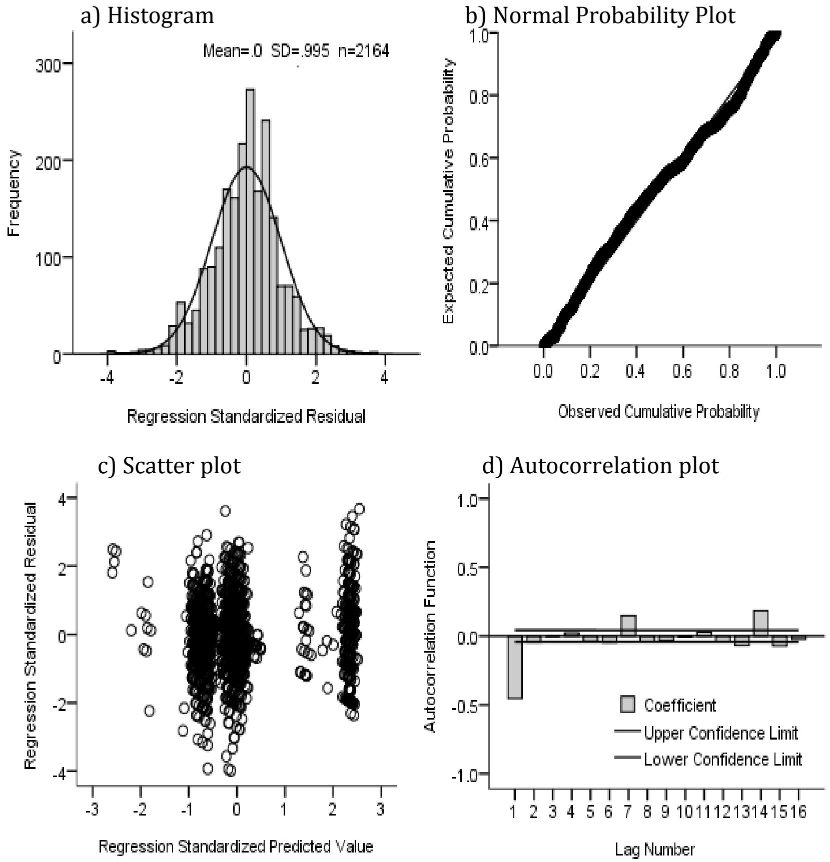


Figure F4. 42: England and Wales Emergency Consultations Non-asthmatics first order difference linear regression with O_3 Minimum L0-7 a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

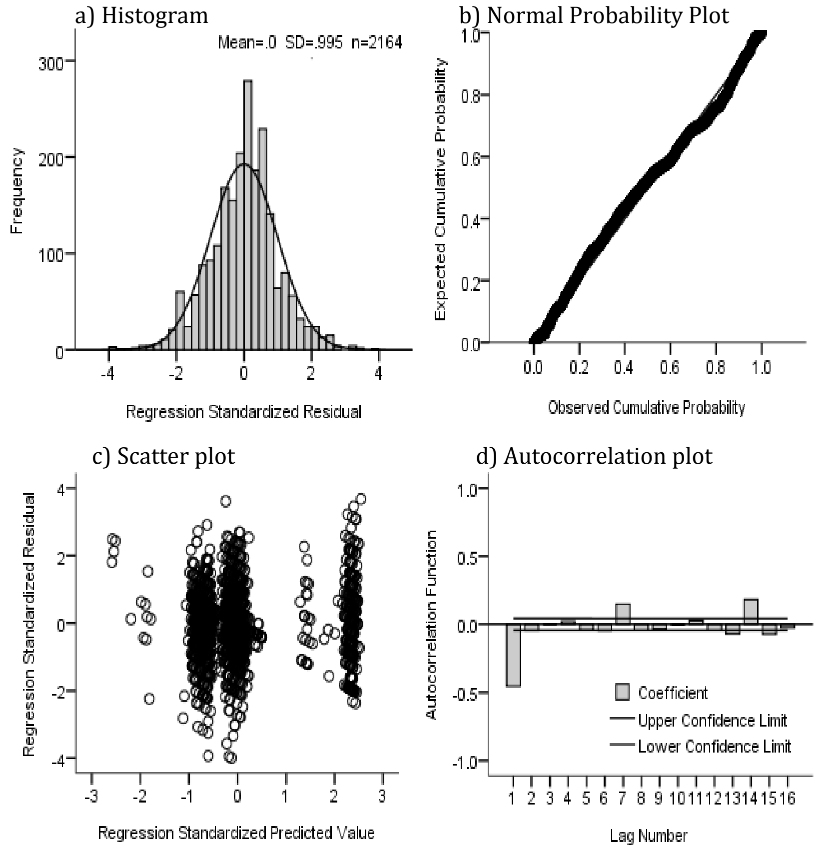


Figure F4. 43: England and Wales Emergency Consultations Non-asthmatics first order difference linear regression with SO_2 mean L0-7 a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

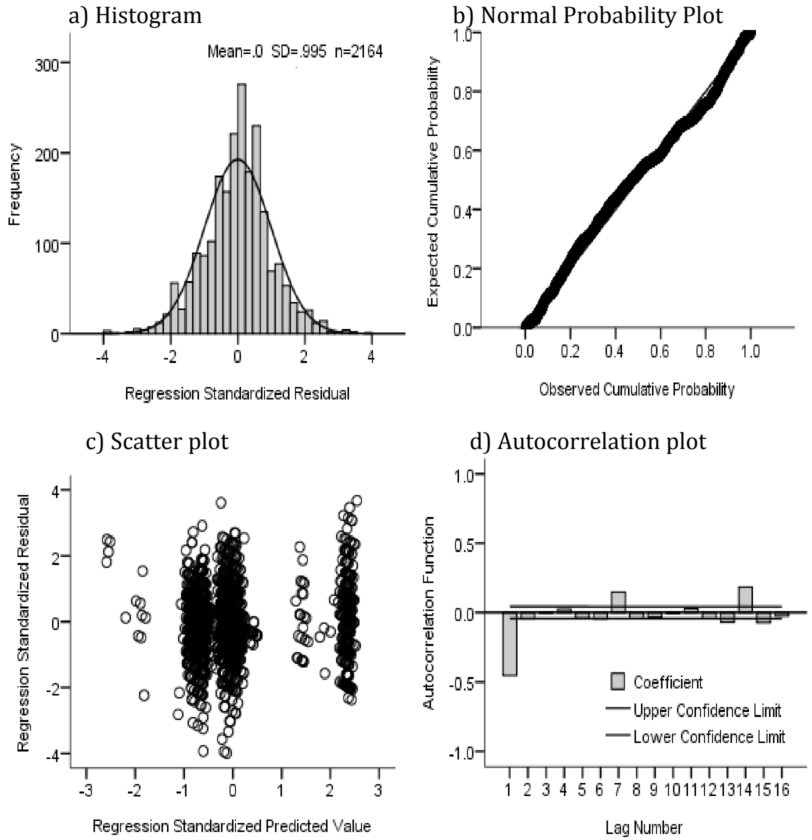


Figure F4. 44: England and Wales Emergency Consultations Non-asthmatics First Order Difference Linear Regression with CO Maximum L0-7 a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

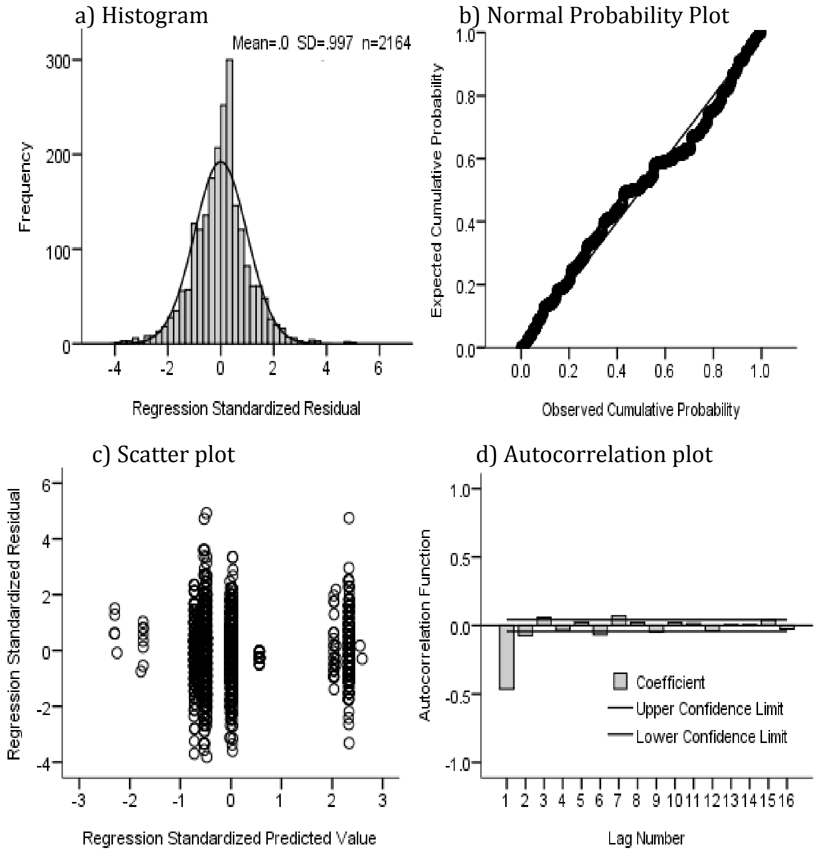


Figure F4. 45: England and Wales Emergency Consultations Excess First Order Difference Linear Regression Base Model a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

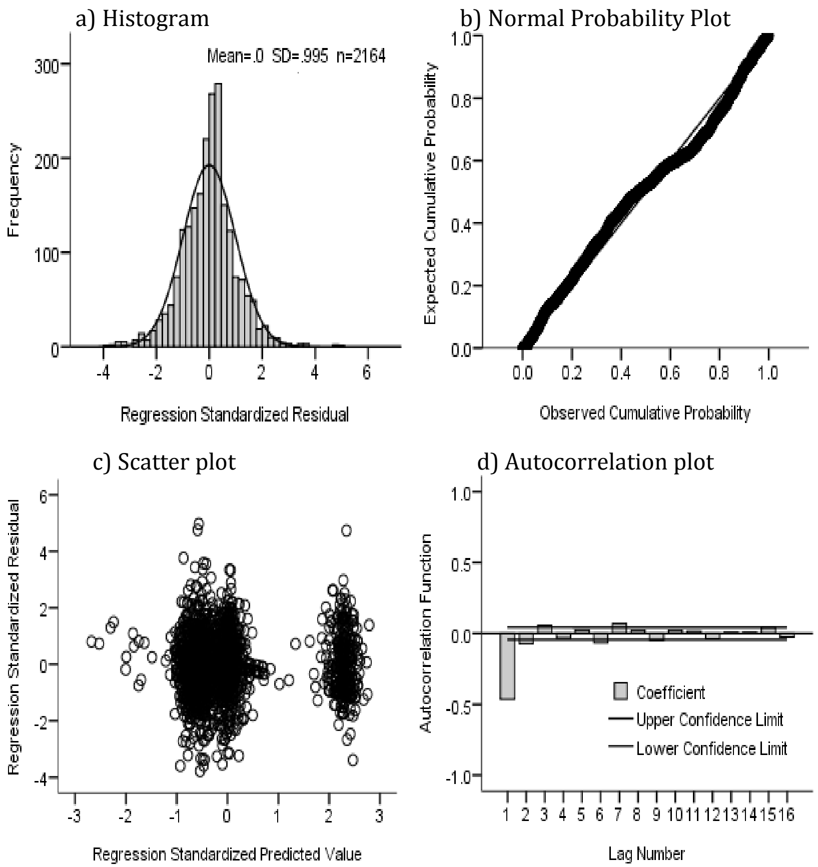


Figure F4. 46: England and Wales Emergency Consultations Excess first order difference linear regression with O_3 Minimum L0-7 a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

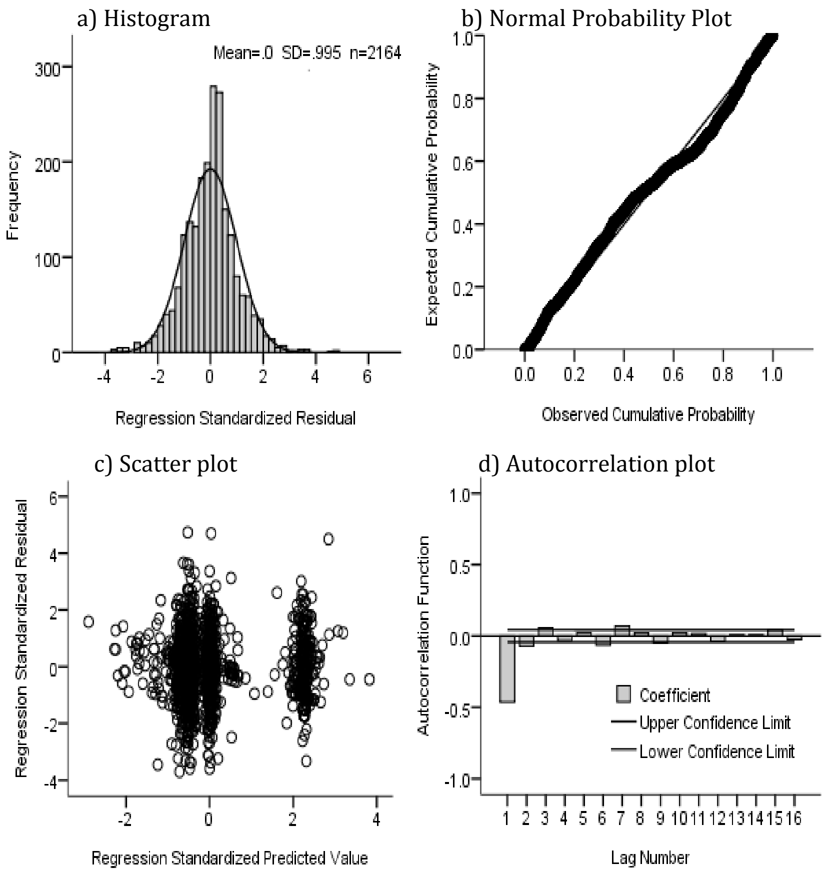


Figure F4. 47: England and Wales Emergency Consultations Excess first order difference linear regression with SO_2 mean L0-7 a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

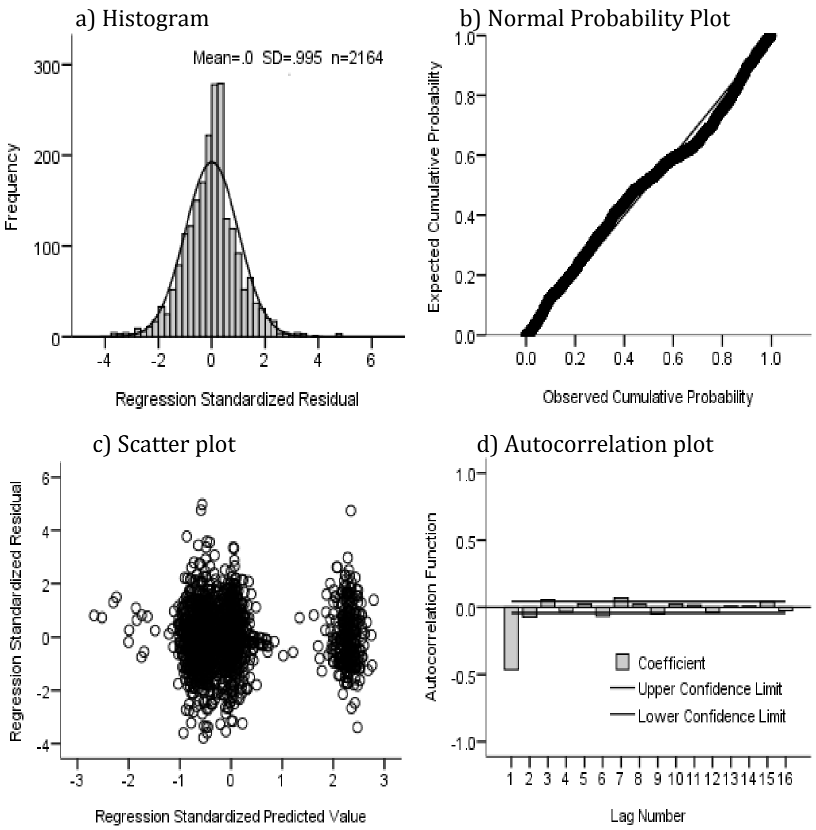


Figure F4. 48: England and Wales Emergency Consultations Excess first order difference linear regression with CO maximum L0-7 a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot

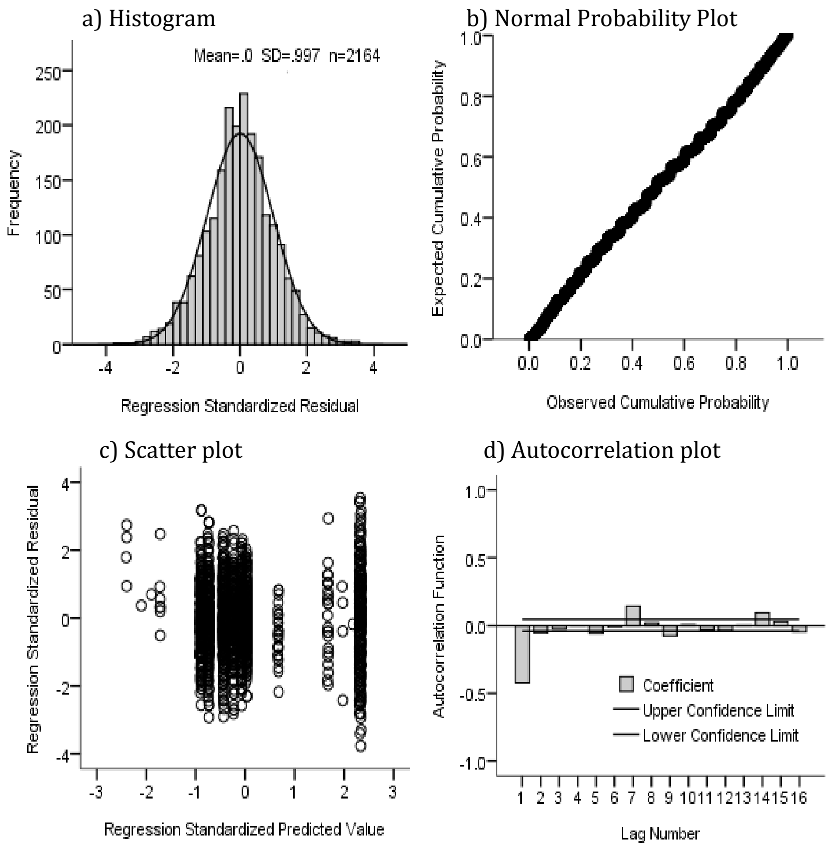


Figure F4. 49: England and Wales Emergency Counts Asthmatics first order difference linear regression base model a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

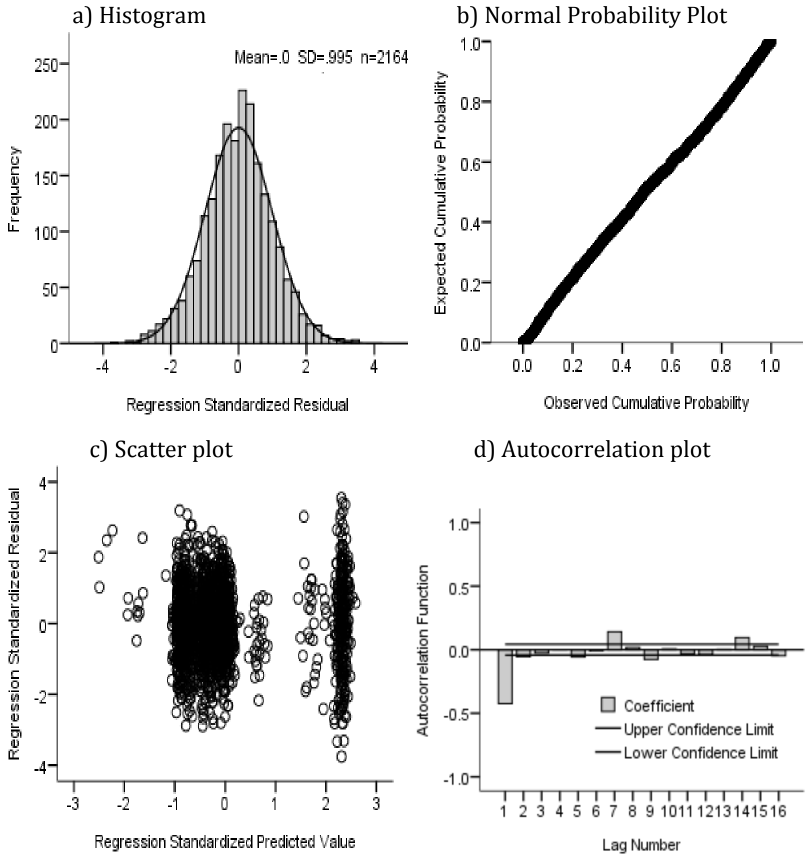


Figure F4. 50: Emergency Counts Asthmatics first order difference linear regression with CO Minimum L0-7 a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot

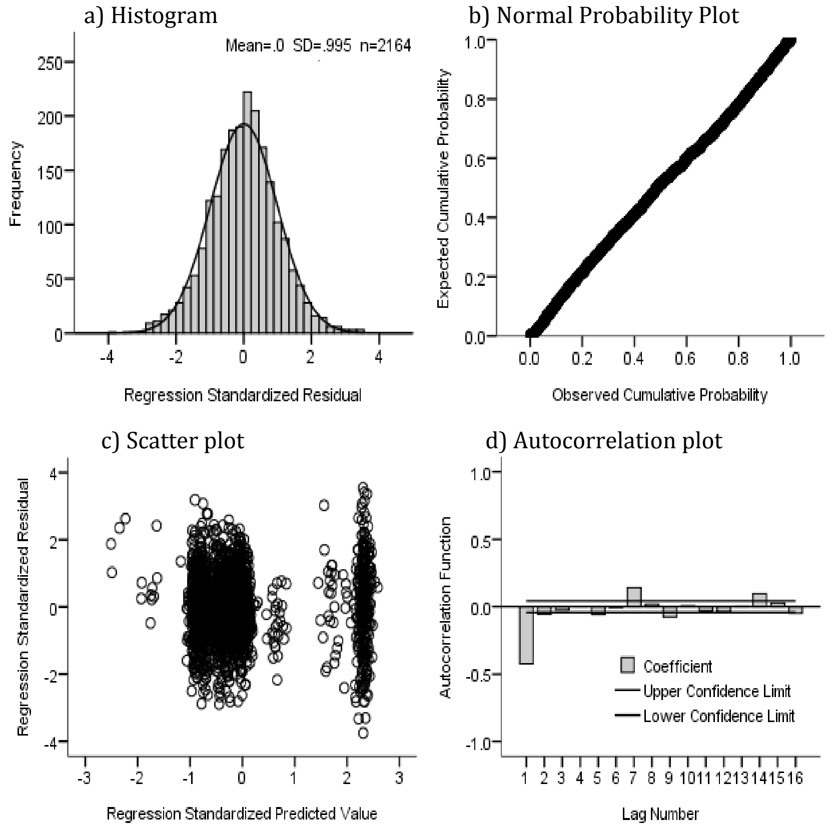


Figure F4. 51: Emergency Counts Asthmatics first order difference linear regression with CO mean L0-7 a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

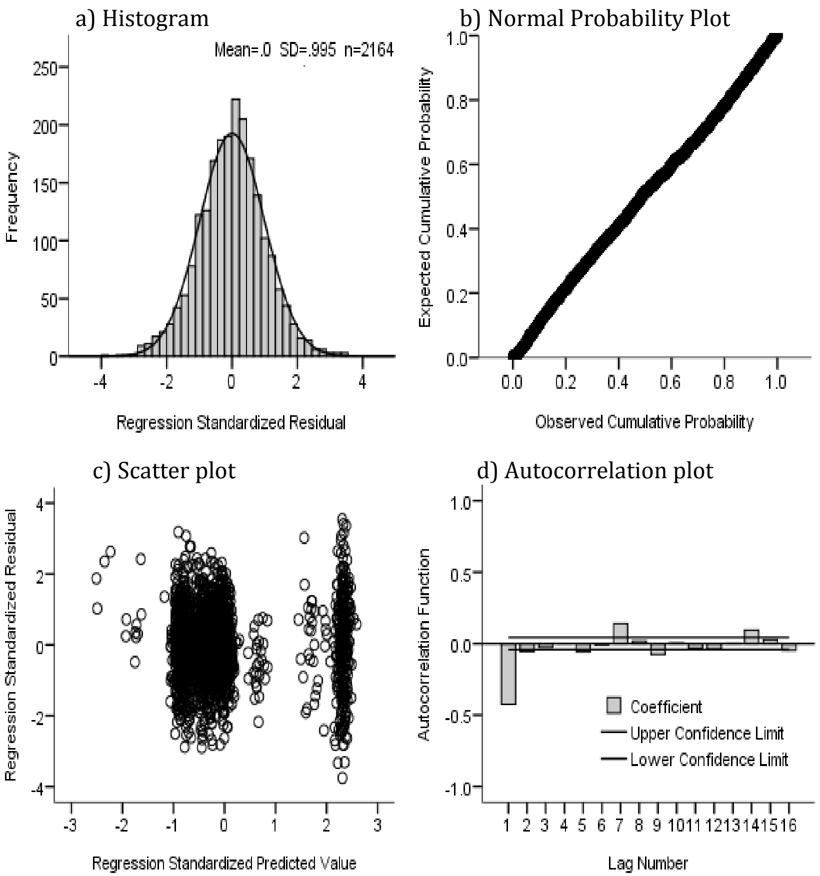


Figure F4. 52: England and Wales Emergency Counts Asthmatics first order difference linear regression with O_3 maximum L0-7 a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

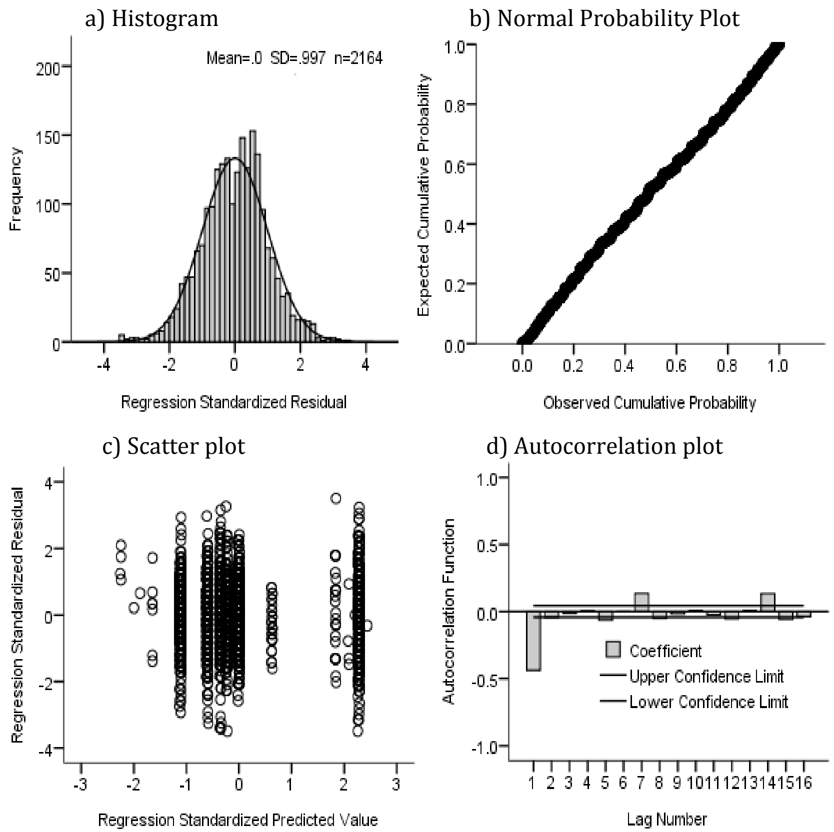


Figure F4. 53: England and Wales Emergency Counts Non-asthmatics first order difference linear regression base model a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

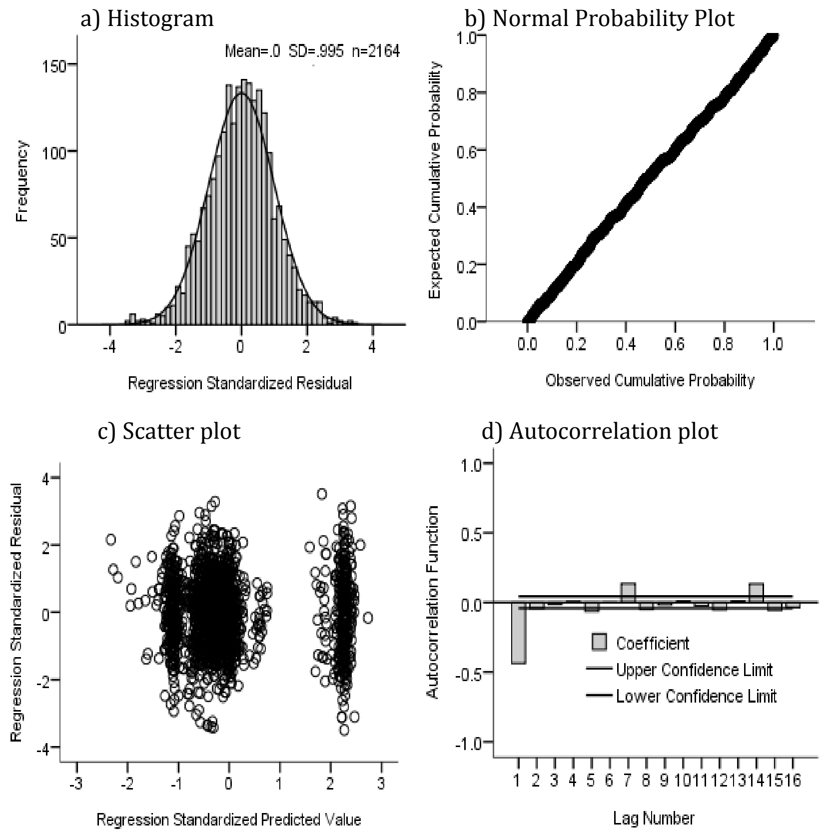


Figure F4. 54: England and Wales Emergency Counts Non-asthmatics first order difference linear regression with CO Minimum L0-7 a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

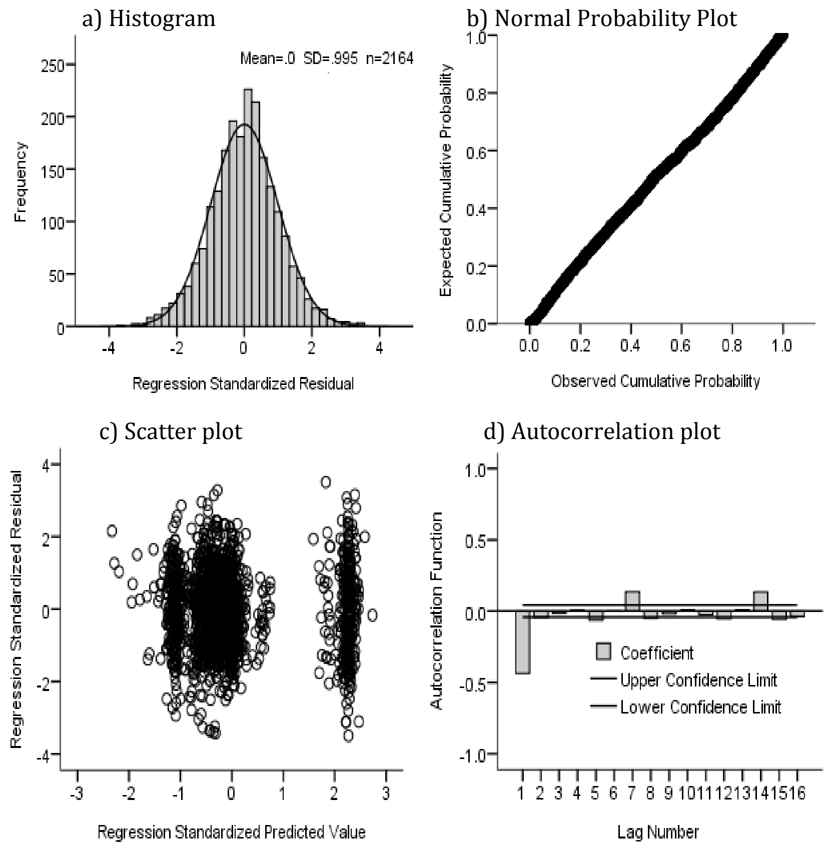


Figure F4. 55: England and Wales Emergency Counts Non-asthmatics first order difference linear regression with CO mean L0-7 a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

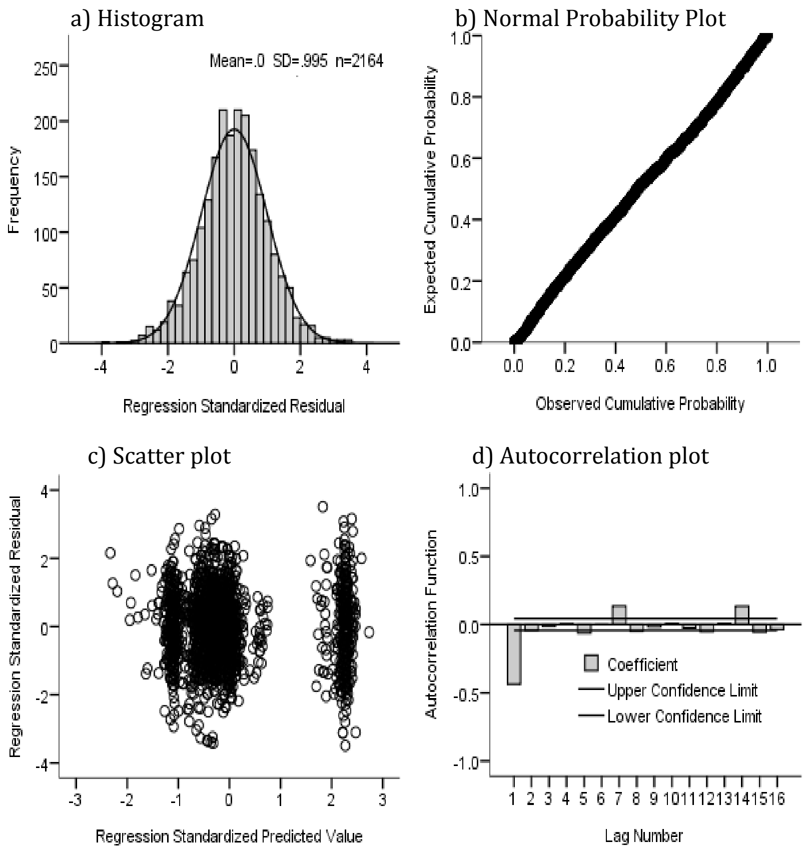


Figure F4. 56: England and Wales Emergency Counts Non-asthmatics first order difference linear regression with O_3 maximum L0-7 a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

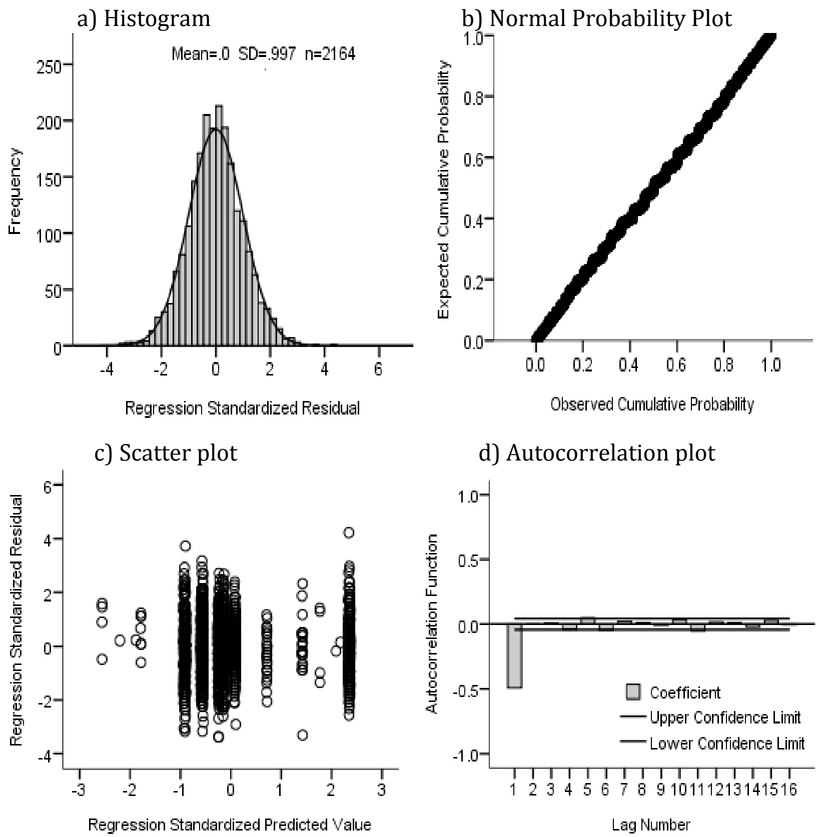


Figure F4. 57: England and Wales Emergency Counts Excess first order difference linear regression base model a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

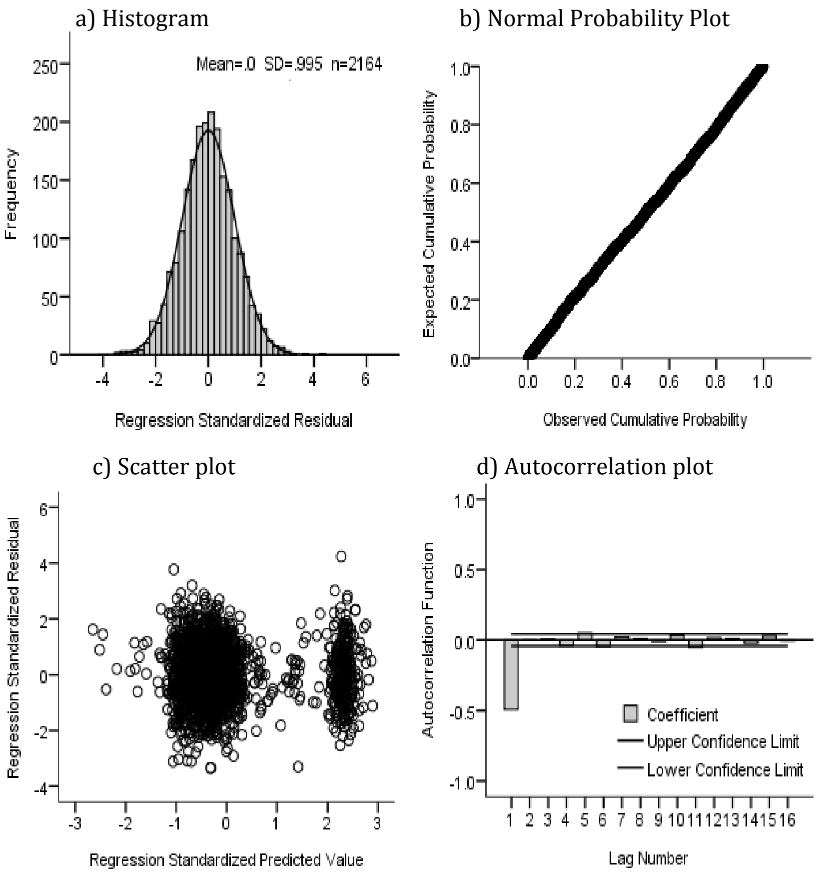


Figure F4. 58: England and Wales Emergency Counts Excess first order difference linear regression with CO Minimum L0-7 a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

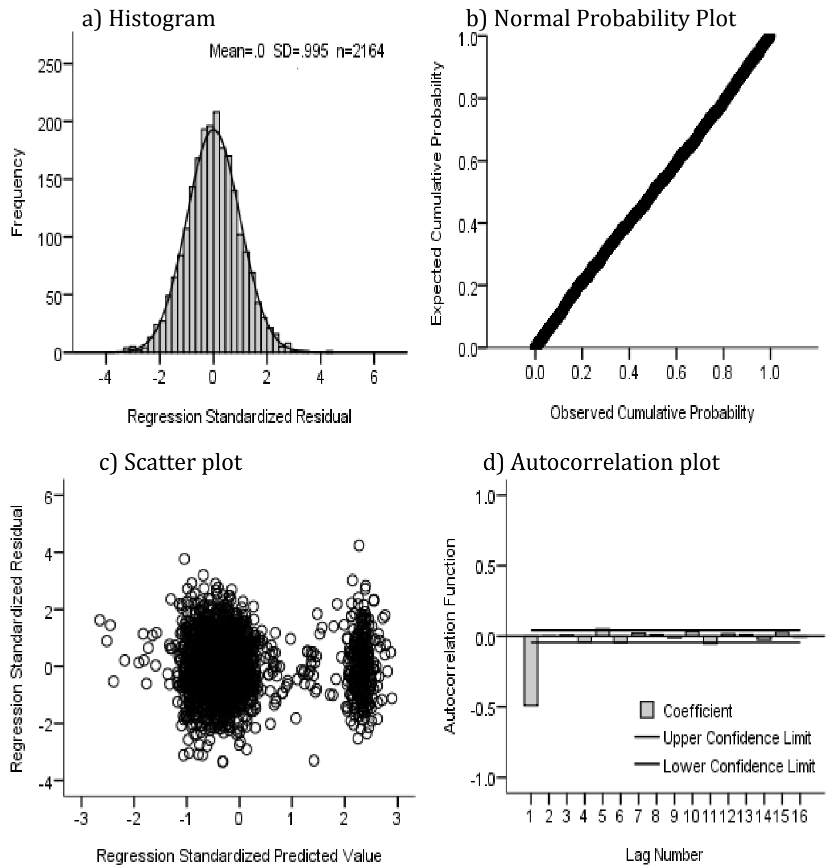


Figure F4. 59: England and Wales Emergency Counts Excess first order difference linear regression with CO mean L0-7 a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

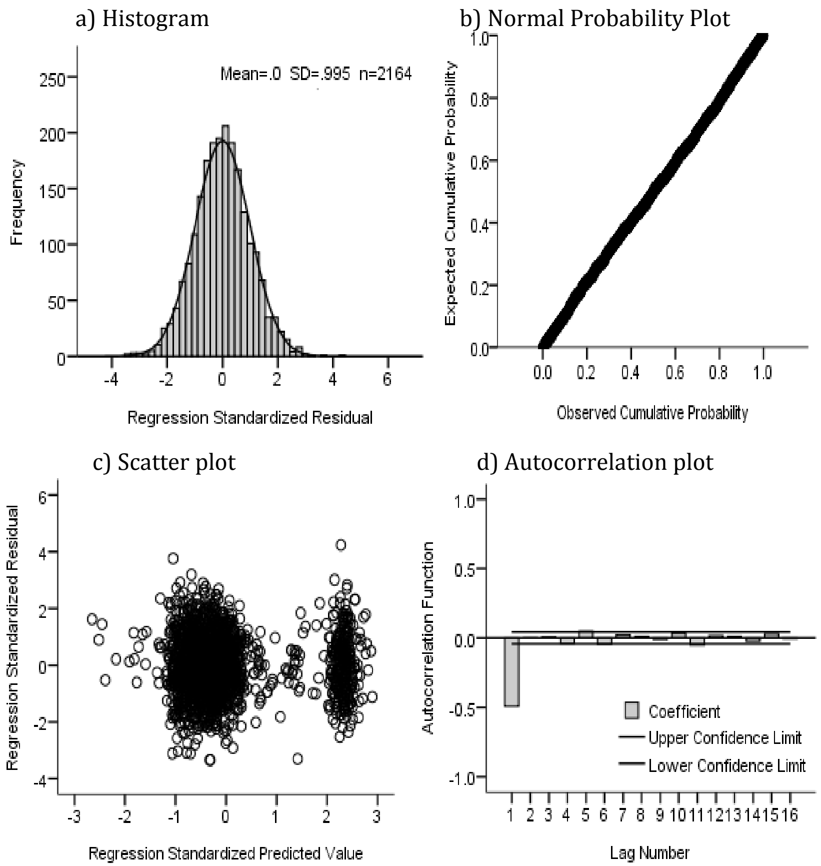


Figure F4. 60: England and Wales Emergency Counts Excess first order difference linear regression with O_3 maximum L0-7 a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

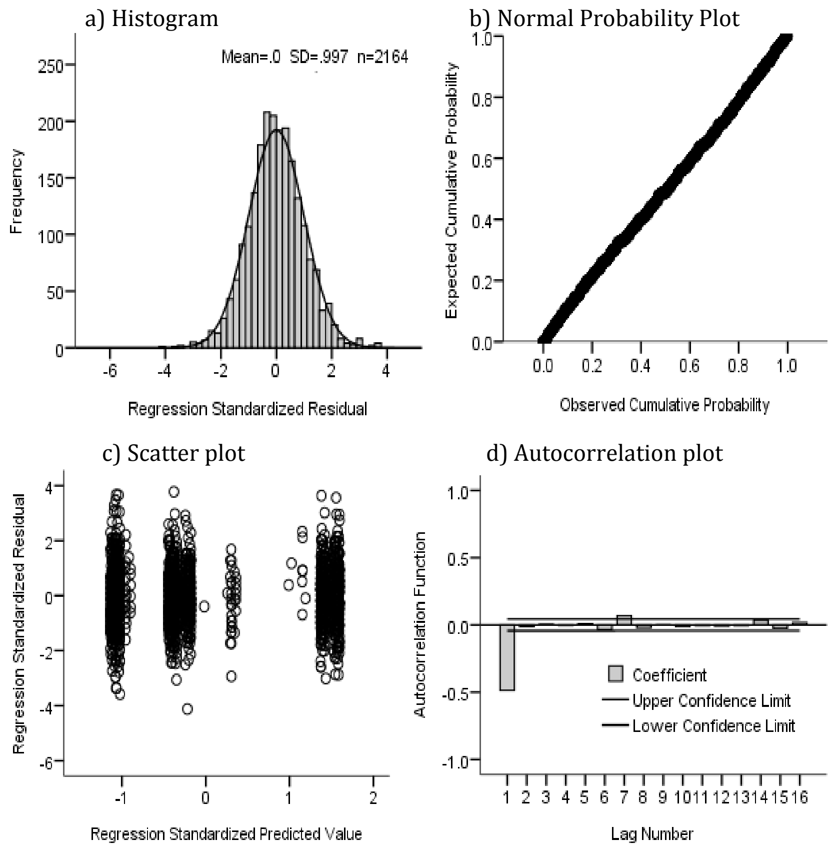


Figure F4. 61: England and Wales Out of Hours Counts Asthmatics first order difference linear regression base model a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

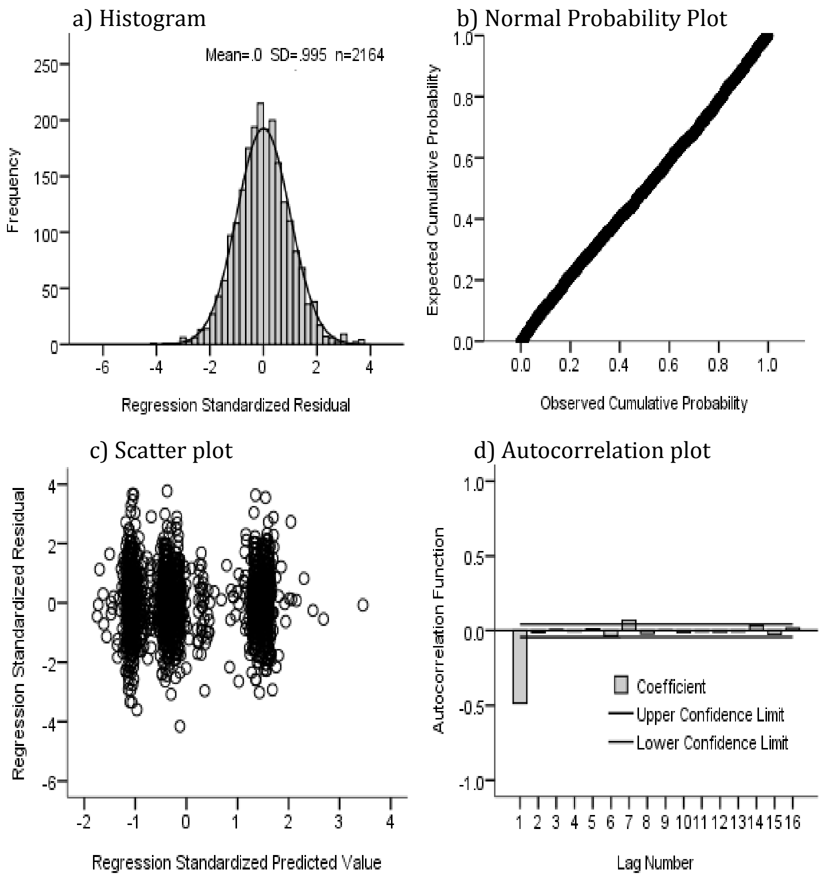


Figure F4. 62: England and Wales Out of Hours Counts Asthmatics first order difference linear regression with NO Minimum L0-7 a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

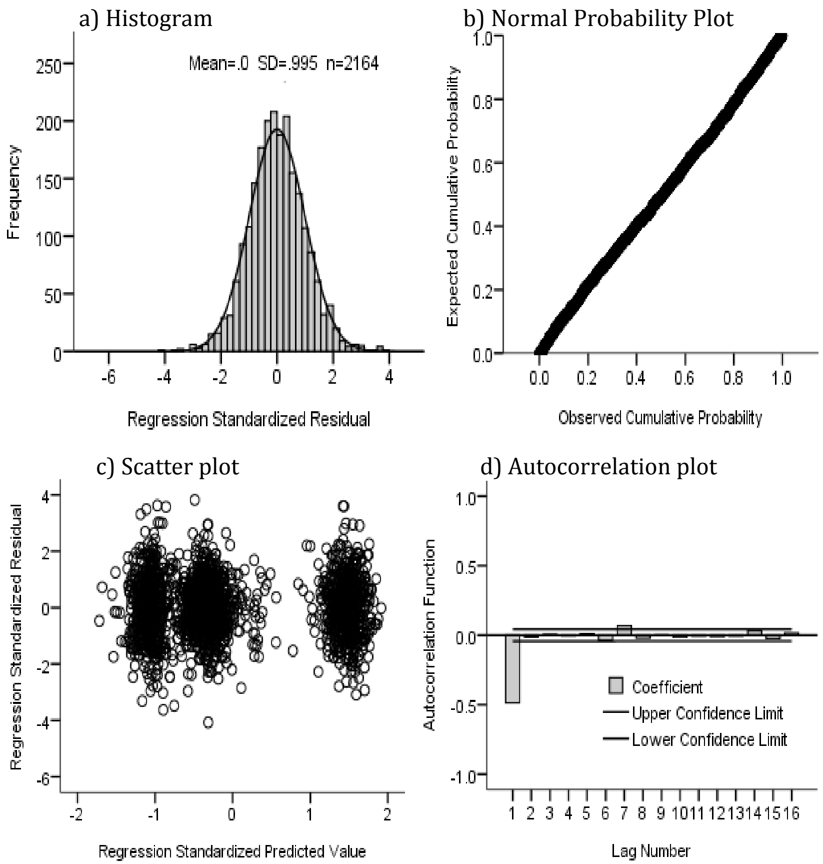


Figure F4. 63: England and Wales Out of Hours Counts Asthmatics first order difference linear regression with PM_{10} mean L0-7 a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

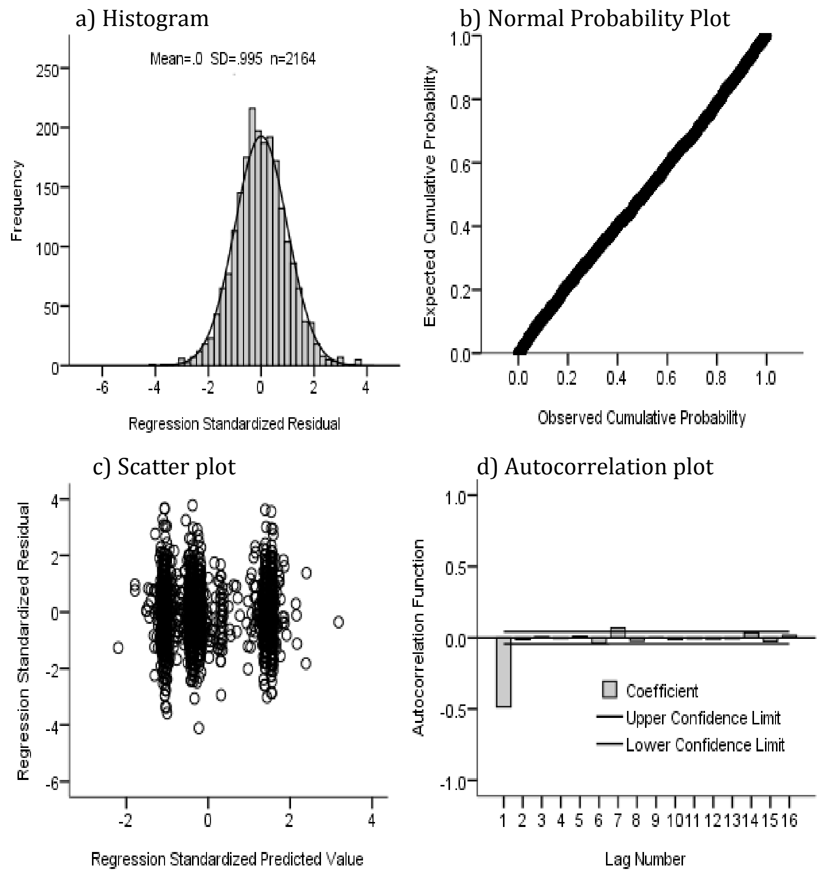


Figure F4. 64: England and Wales Out of Hours Counts Asthmatics first order difference linear regression with grass L0-7 a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

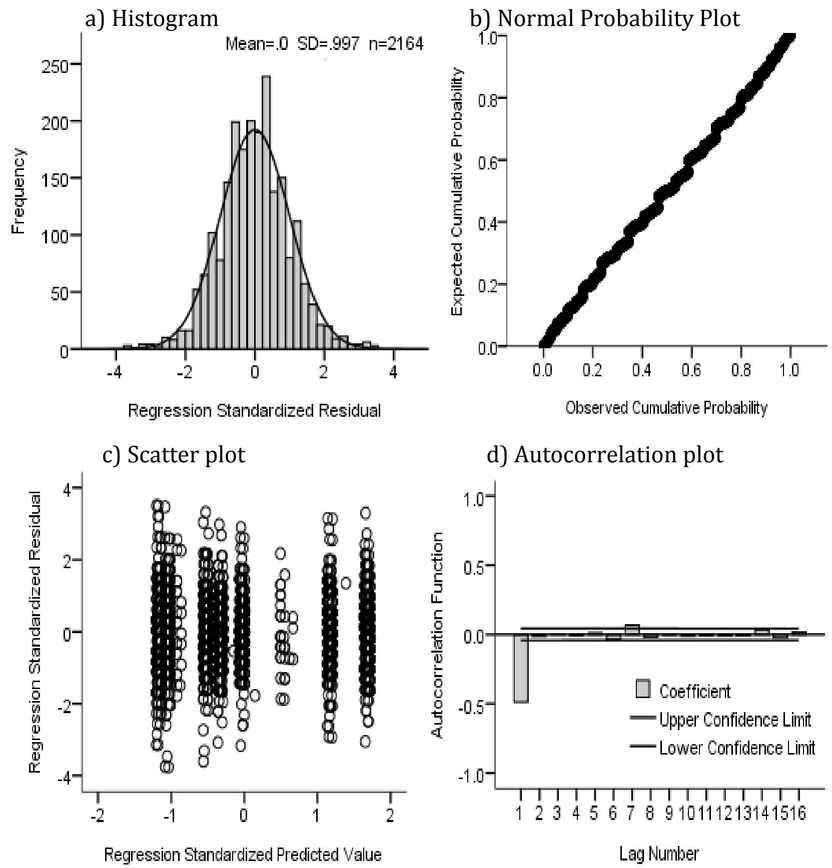


Figure F4. 65: England and Wales Out of Hours Counts Non-asthmatics first order difference linear regression base model a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

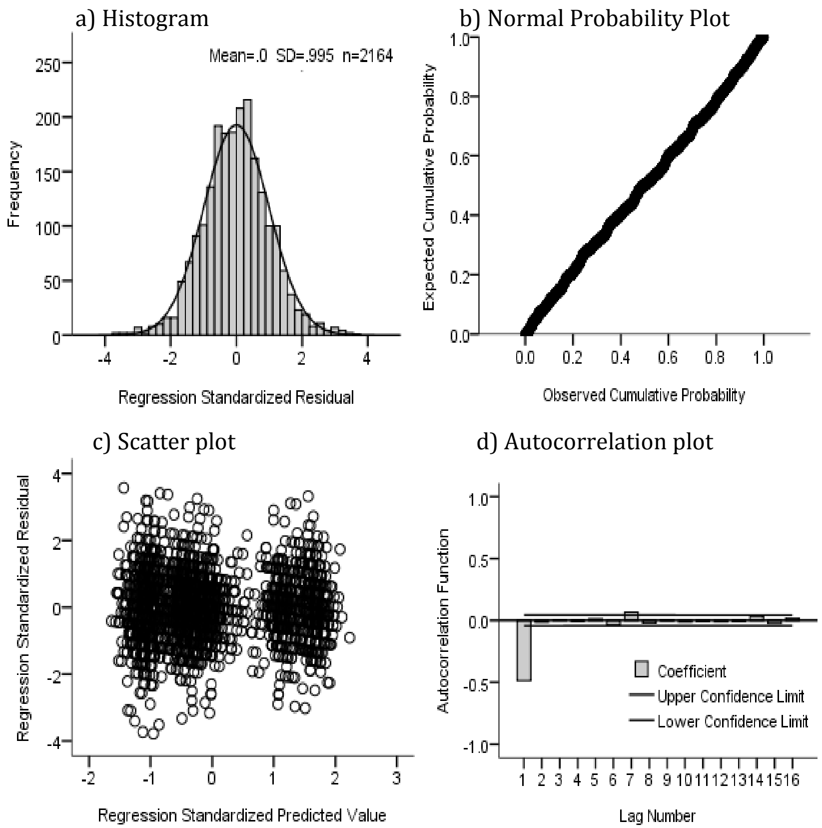


Figure F4. 66: Out of Hours Counts Non-asthmatics first order difference linear regression with NO Minimum L0-7 a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

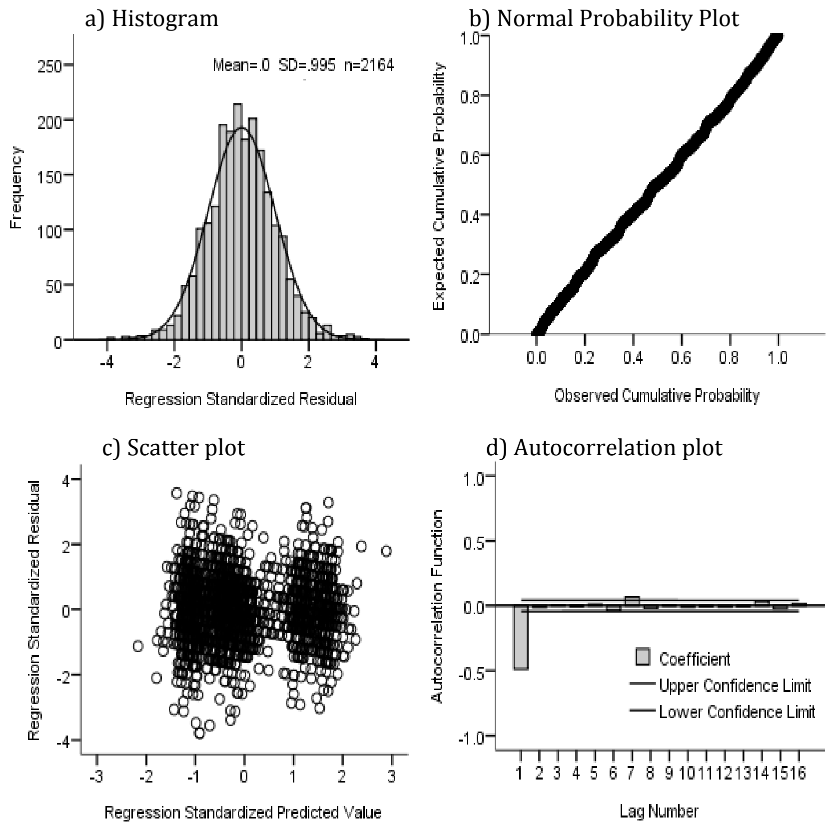


Figure F4. 67: Out of Hours Counts Non-asthmatics first order difference linear regression with PM_{10} mean L0-7 a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

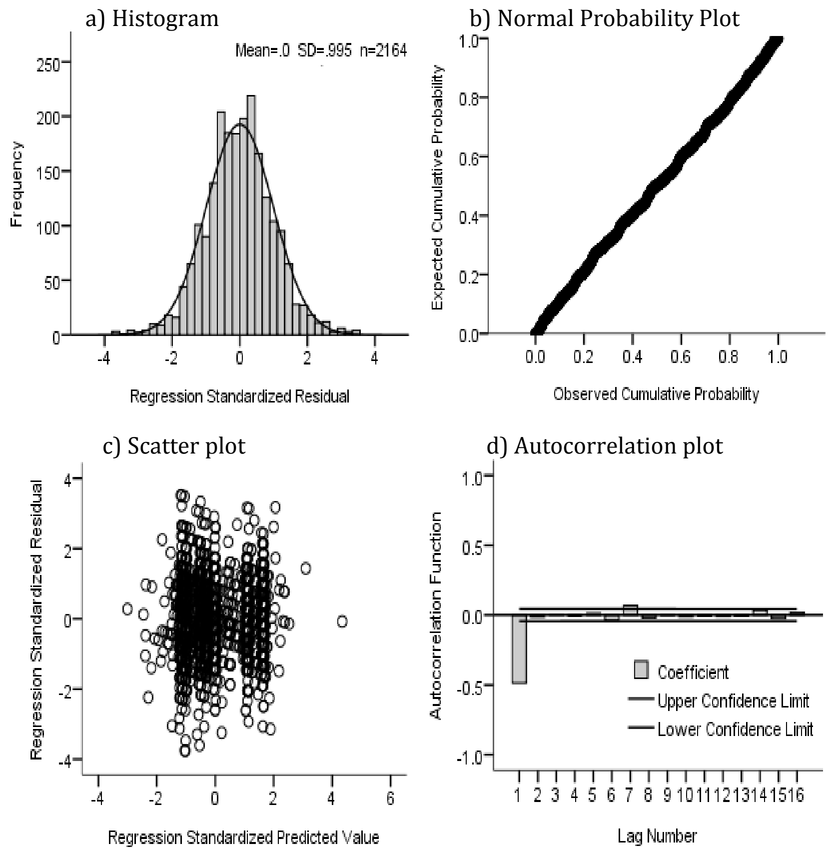


Figure F4. 68: England and Wales Out of Hours Counts Non-asthmatics first order difference linear regression with grass L0-7 a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

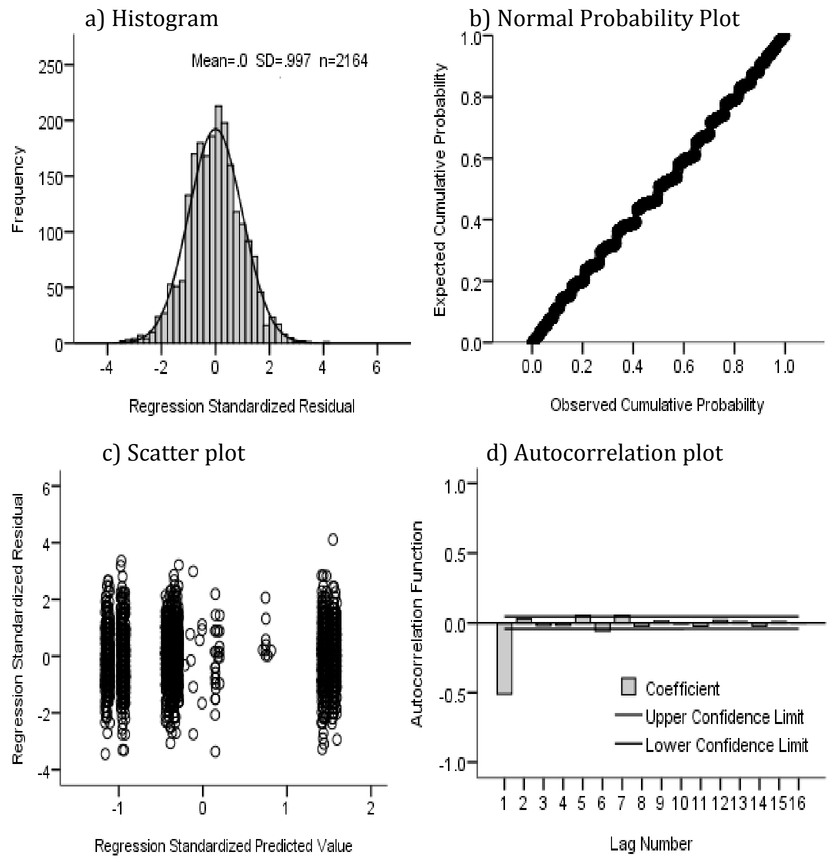


Figure F4. 69: England and Wales Out of Hours Counts Excess first order difference linear regression base model a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

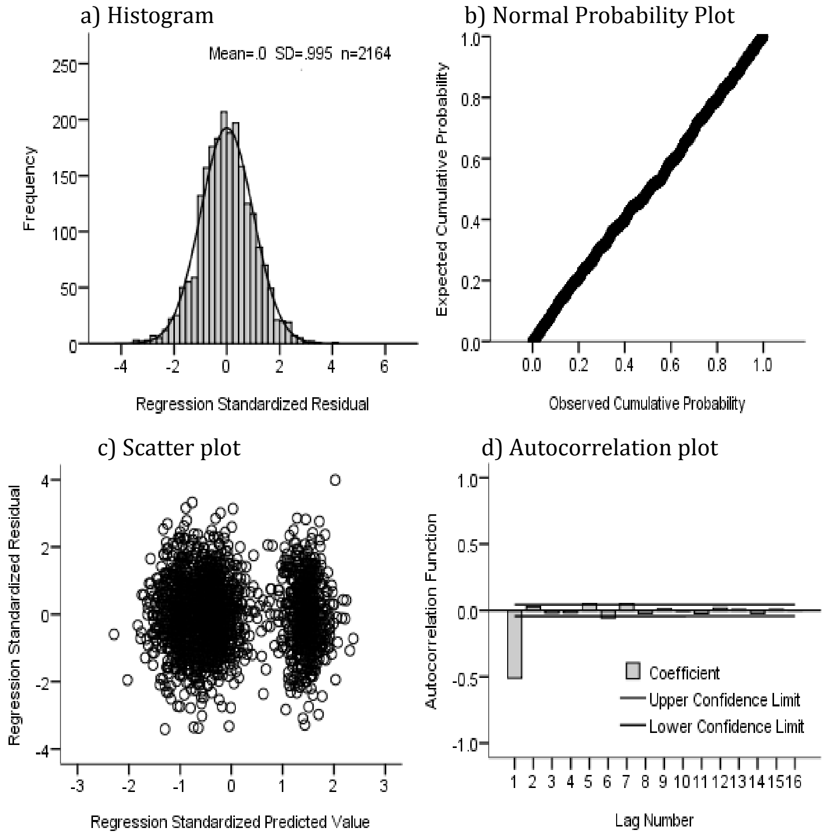


Figure F4. 70: England and Wales Out of Hours Counts Excess first order difference linear regression with NO Minimum L0-7 a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

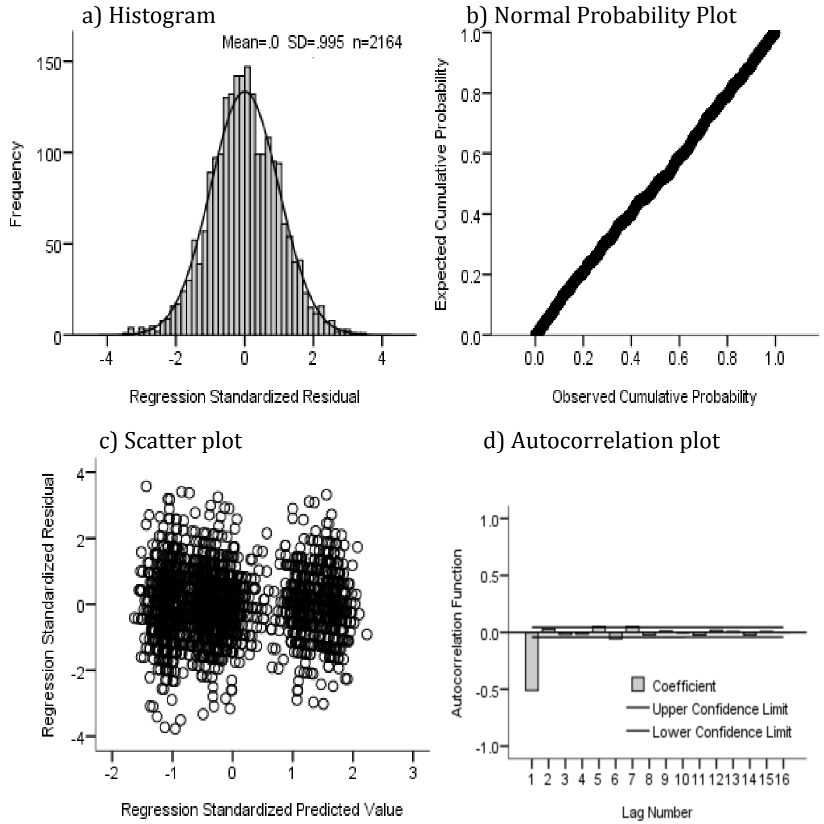


Figure F4. 71: England and Wales Out of Hours Counts Excess first order difference linear regression with PM_{10} mean L0-7 a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

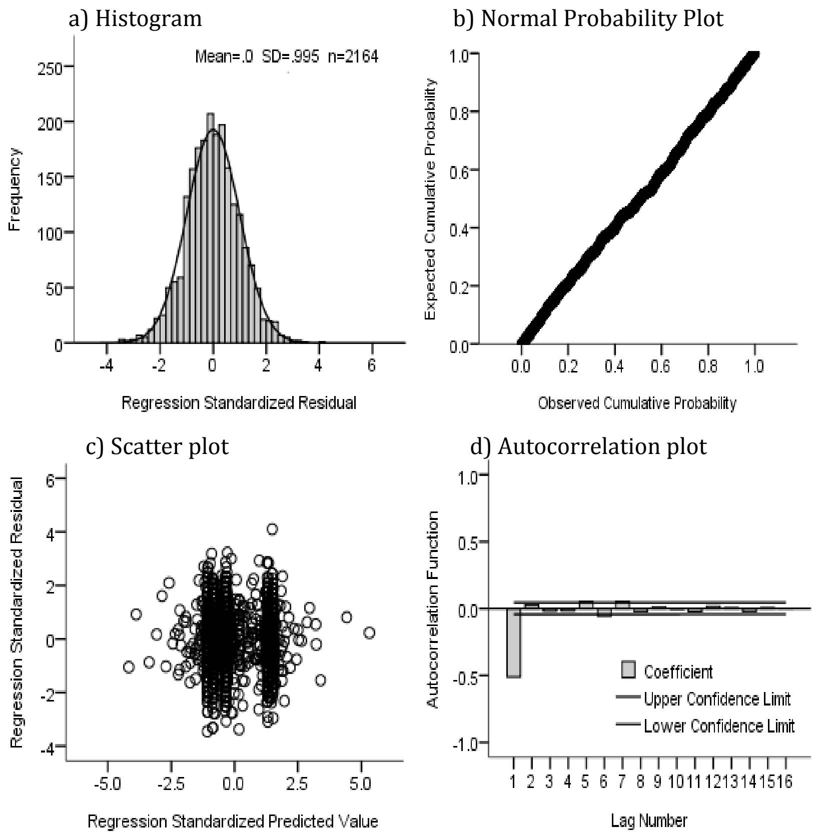


Figure F4. 72: England and Wales Out of Hours Counts Excess first order difference linear regression with grass L0-7 a) Histogram, b) Normal Probability Plot, c) Scatter plot and d) Autocorrelation plot.

F4.2. Trent Region Multiple Regression Diagnostics

Poisson regression analysis. Diagnostics include autocorrelation plot. For each medical contacts, diagnostics only illustrated for the null model and three alternative models because diagnostics for the remaining alternative models (total alternative models n=28) were similar to those illustrated.

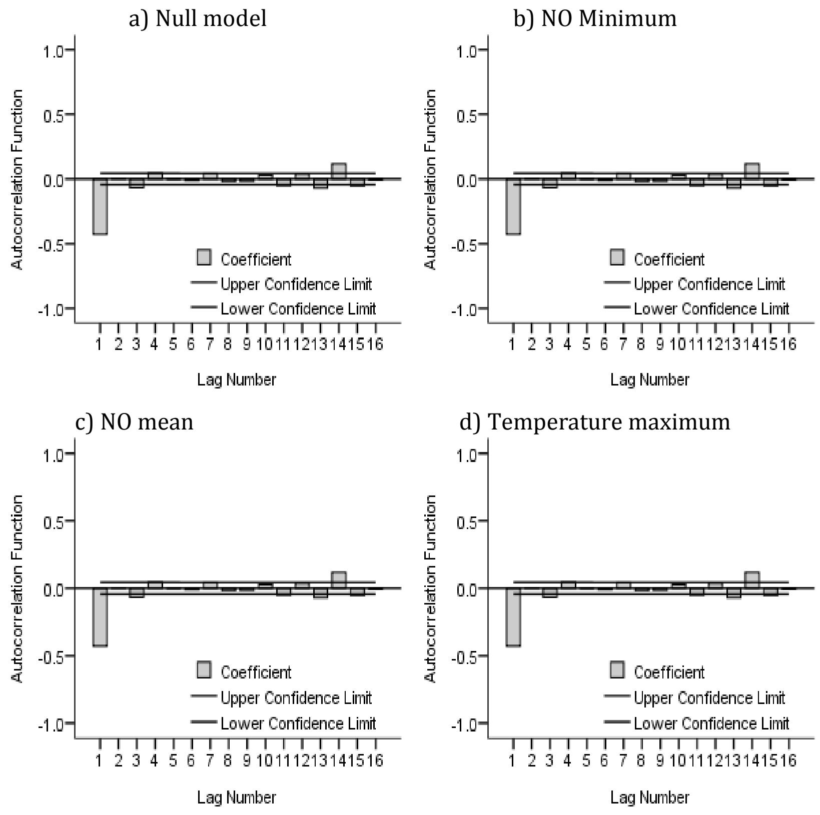


Figure F4. 73: Trent Region All Counts Asthmatics First Order Difference Poisson Regression a) Null model b) NO Minimum, c) NO mean and d) Temperature maximum.

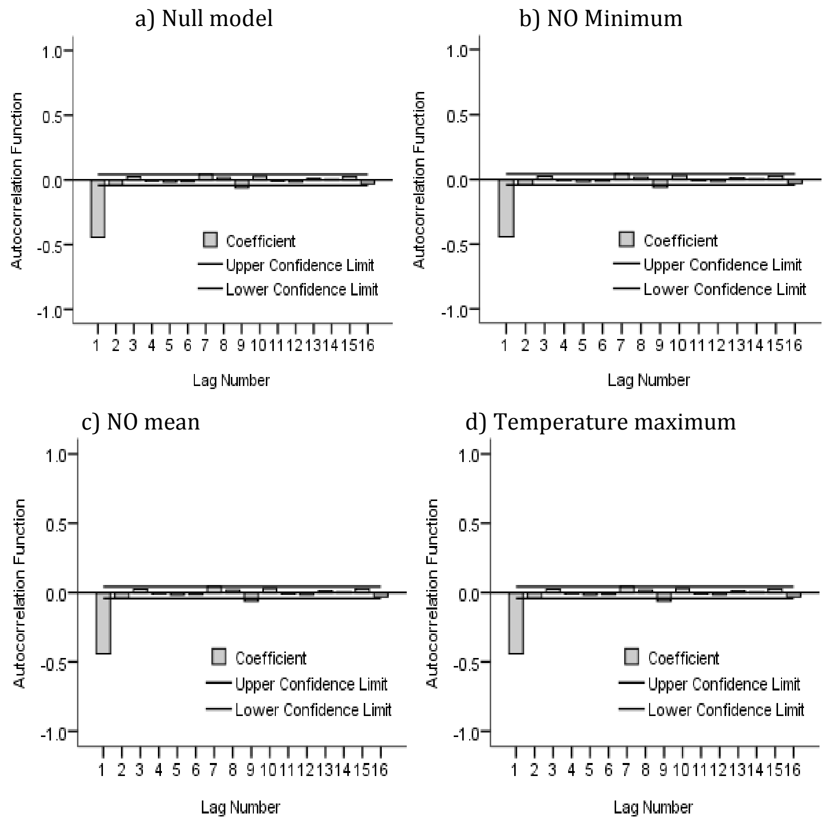


Figure F4. 74: Trent Region All Counts Non-asthmatics First Order Difference Poisson Regression a) Null model b) NO Minimum, c) NO mean and d) Temperature maximum.

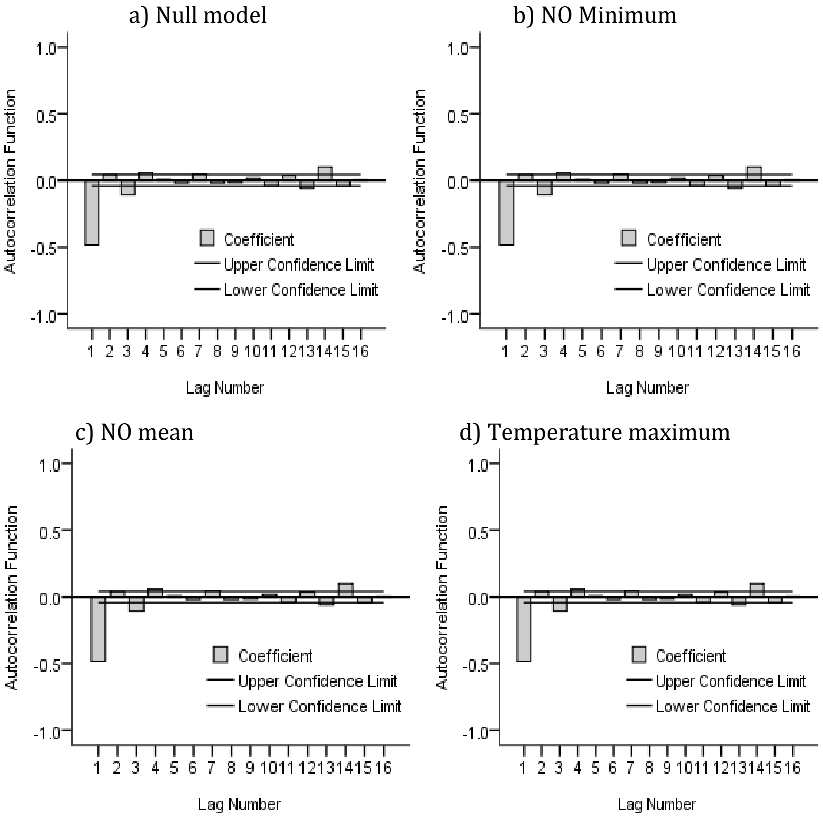


Figure F4. 75: Trent Region All Counts Excess first order difference Poisson regression a) Null model b) NO Minimum, c) NO mean and d) Temperature maximum.

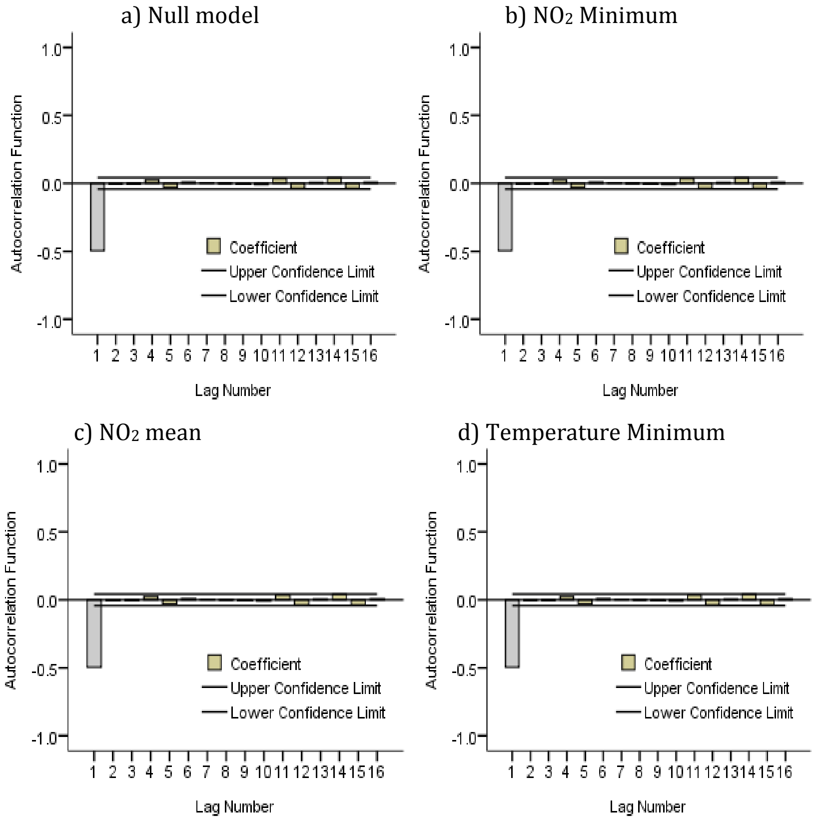


Figure F4. 76: Trent Region Acute Visits Asthmatics first order difference Poisson regression a) Null model b) NO_2 Minimum, c) NO_2 mean and d) Temperature Minimum.

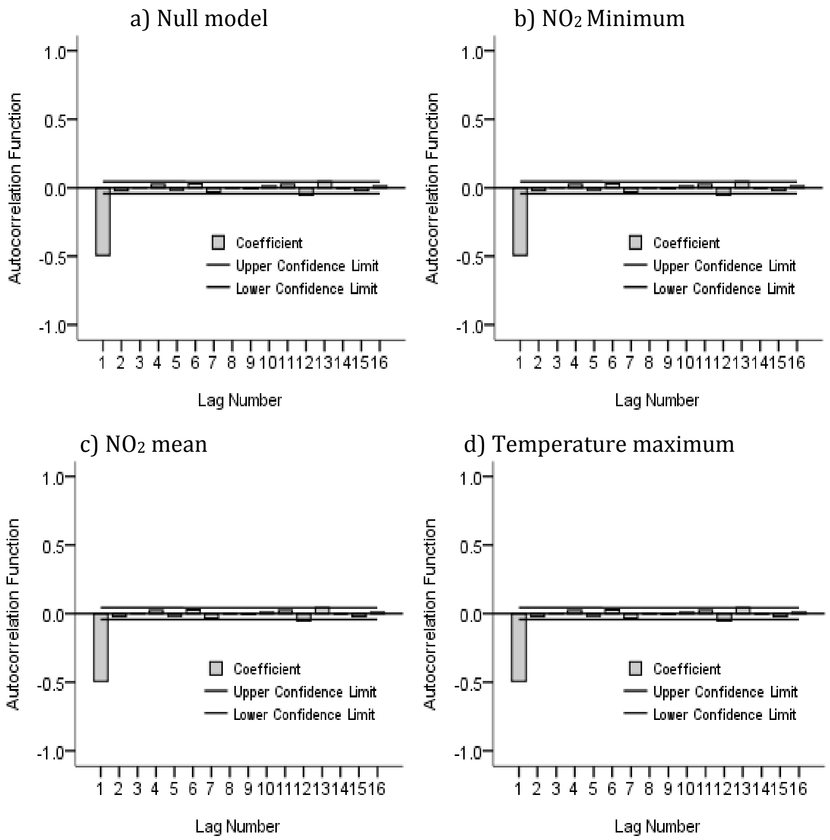


Figure F4. 77: Trent Region Acute Visits Non-asthmatics first order difference Poisson regression a) Null model b) NO_2 Minimum, c) NO_2 mean and d) Temperature maximum.

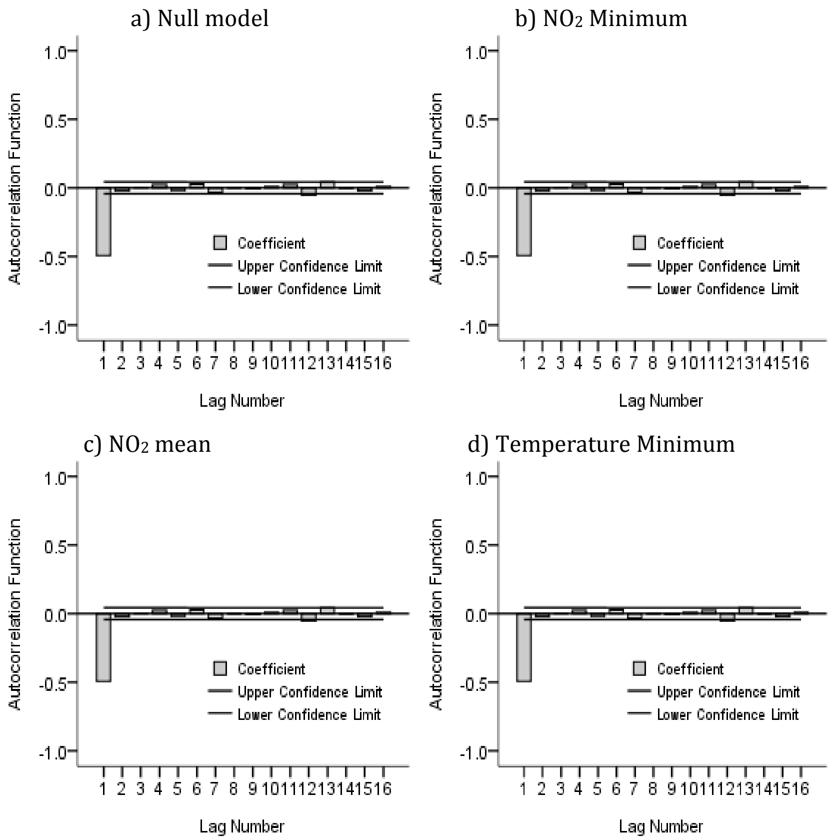


Figure F4. 78: Trent Region Acute Visits Excess first order difference Poisson regression a) Null model b) NO_2 Minimum, c) NO_2 mean and d) Temperature Minimum.

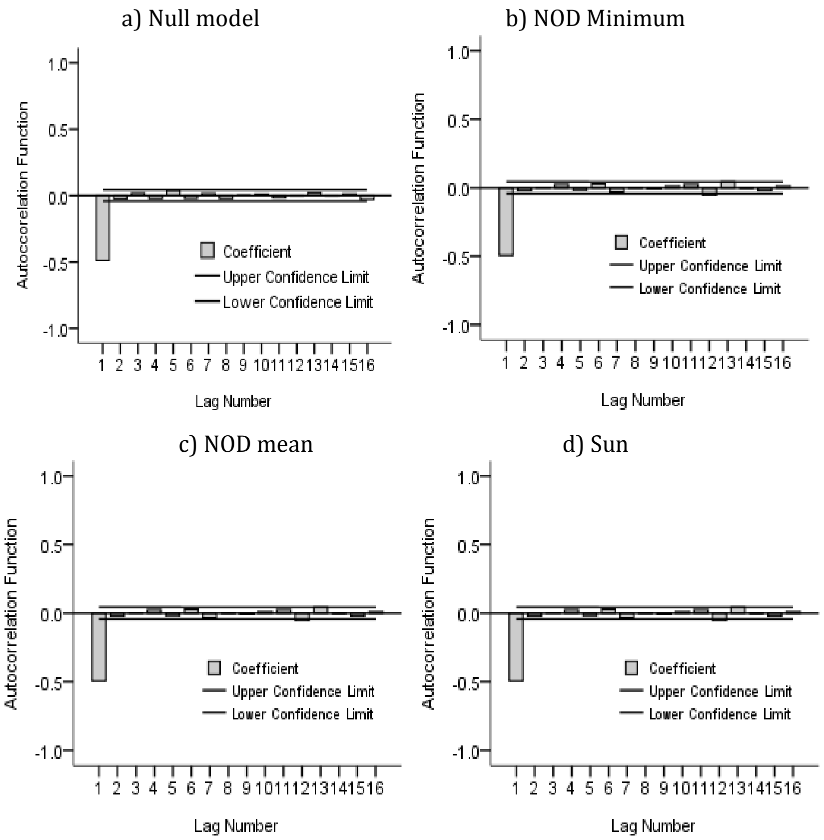


Figure F4. 79: Trent Region Casualty Counts Asthmatics first order difference Poisson regression a) Null model b) NOD Minimum, c) NOD mean and d) Sun.

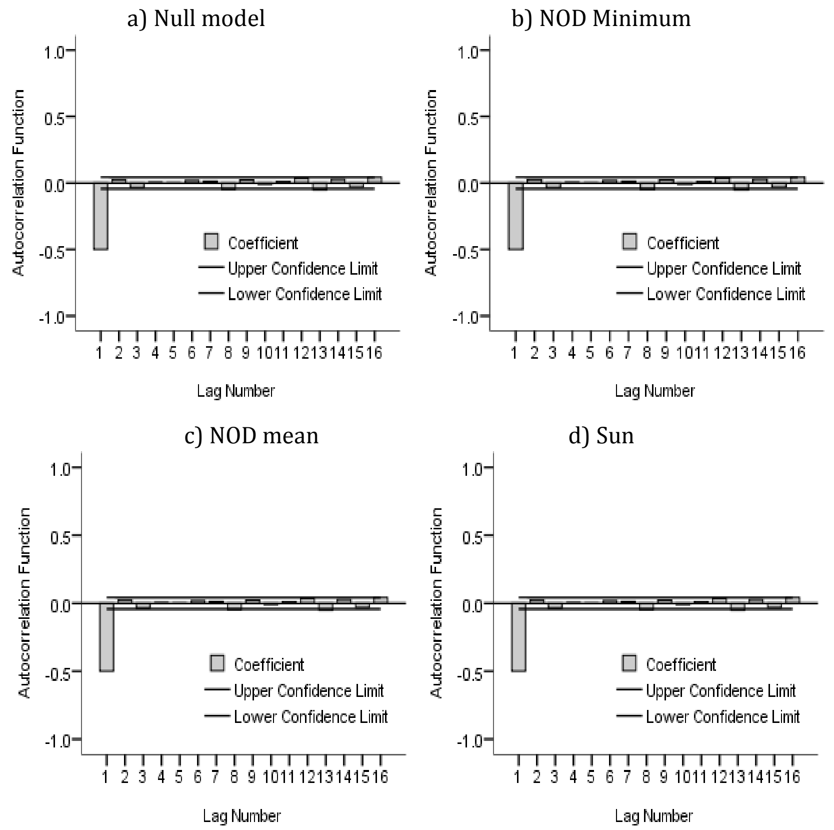


Figure F4. 80: Trent Region Casualty Counts Non-asthmatics first order difference Poisson regression a) Null model b) NO Minimum, c) NO mean and d) Temperature maximum.

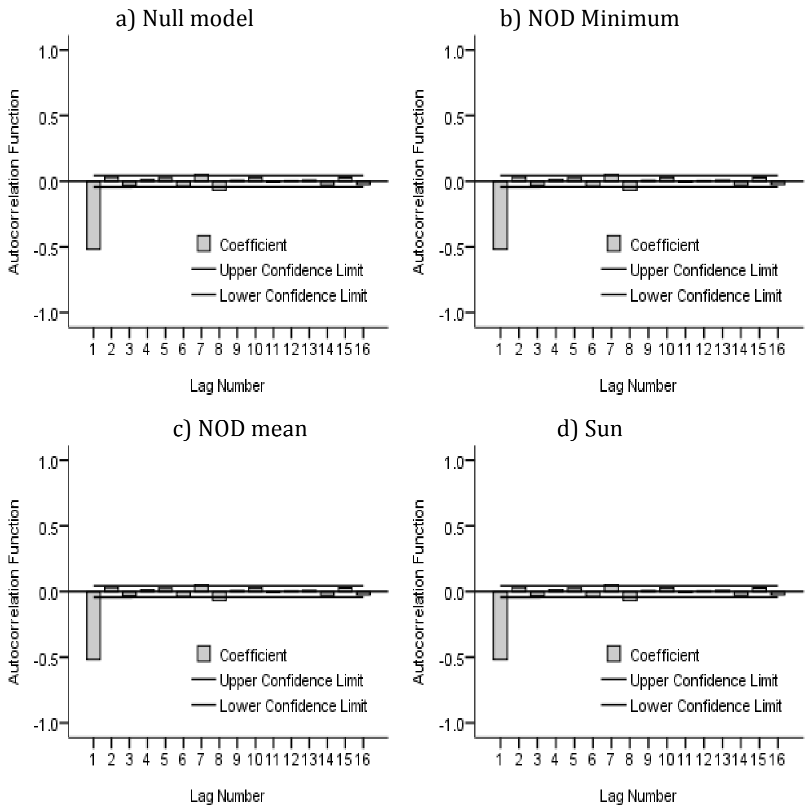


Figure F4. 81: Trent Region Casualty Counts Excess first order difference Poisson regression a) Null model b) NOD Minimum, c) NOD mean and d) Sun.

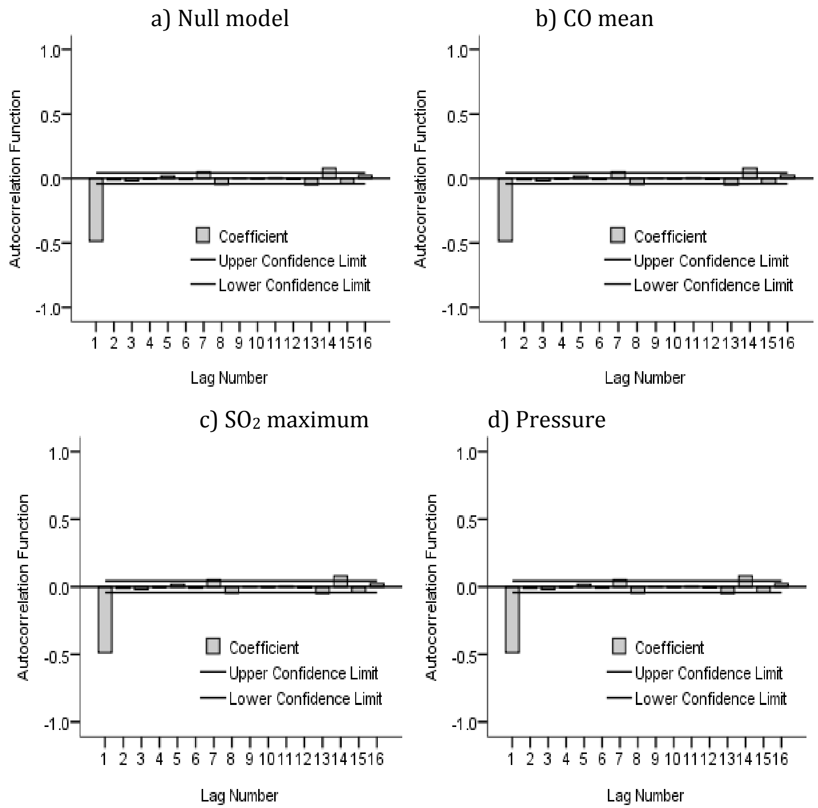


Figure F4. 82: Trent Region Emergency Consultations Asthmatics first order difference Poisson regression a Regression a) Null model b) CO mean, c) SO_2 maximum and d) Pressure.

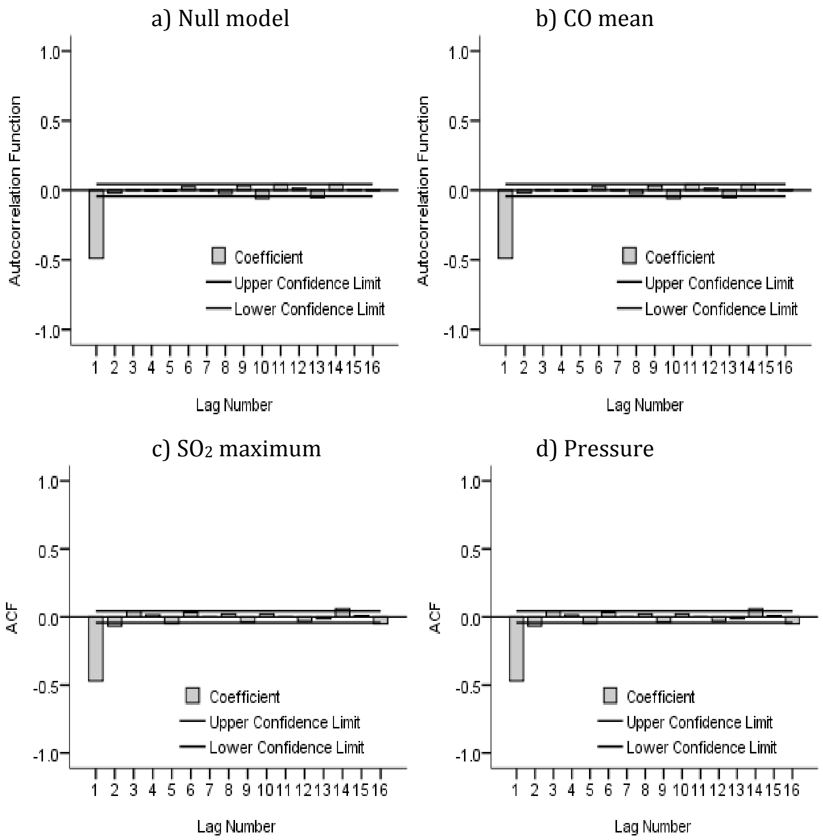


Figure F4. 83: Trent Region Emergency Consultations Non-asthmatics first order difference Poisson regression a) Null model b) CO mean, c) SO_2 maximum and d) Pressure.

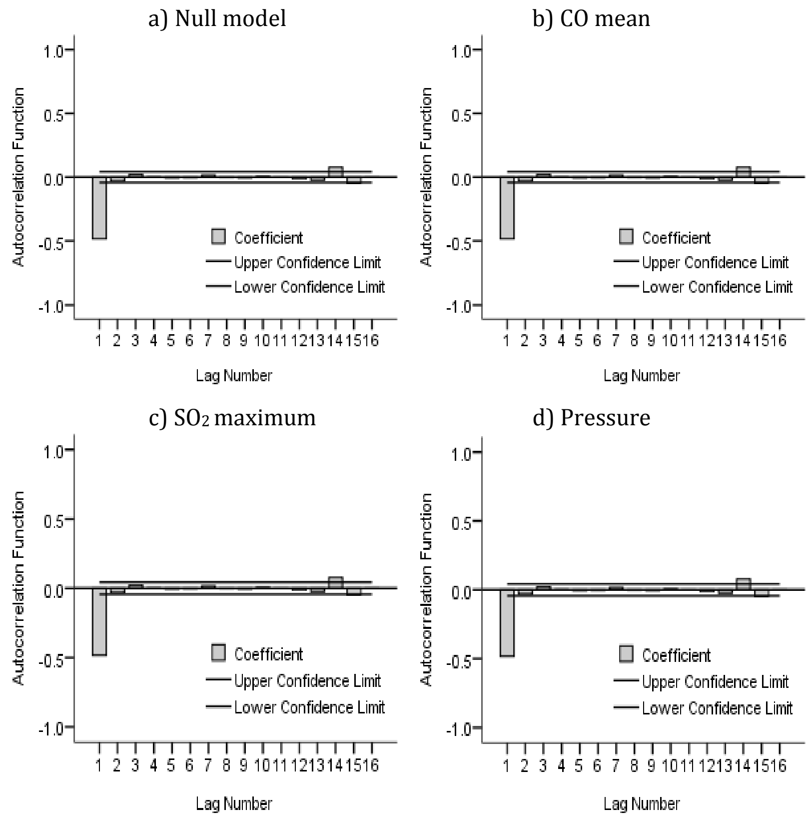


Figure F4. 84: Trent Region Emergency Consultations Excess first order difference Poisson regression a) Null model b) CO mean, c) SO_2 maximum and d) Pressure.

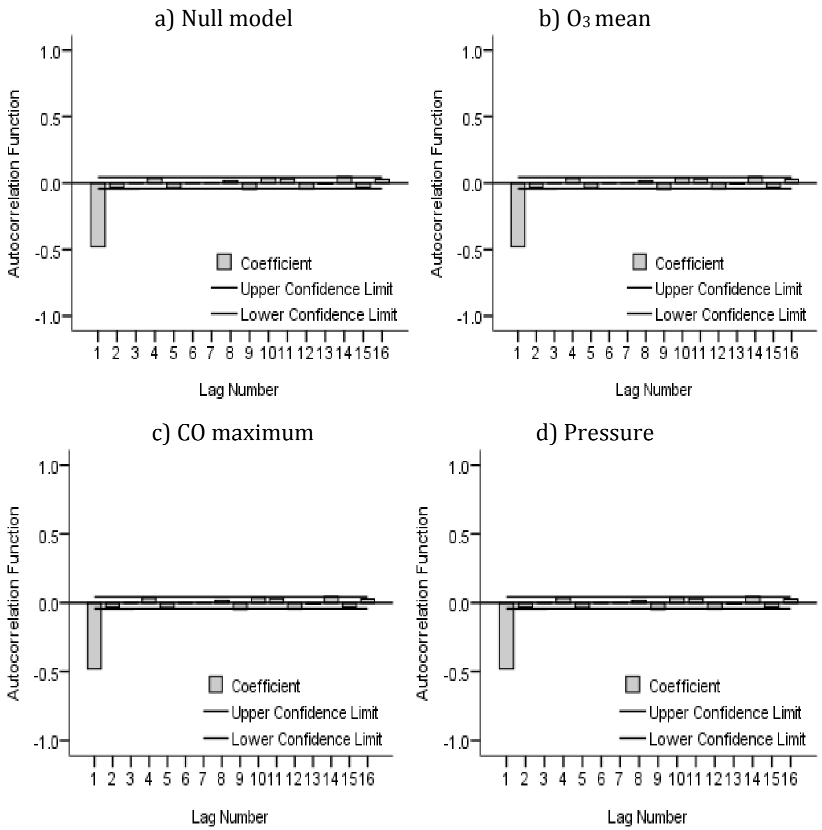


Figure F4. 85: Trent Region Emergency Counts Asthmatics first order difference Poisson regression a) Null model b) O_3 mean, c) CO maximum and d) Pressure.

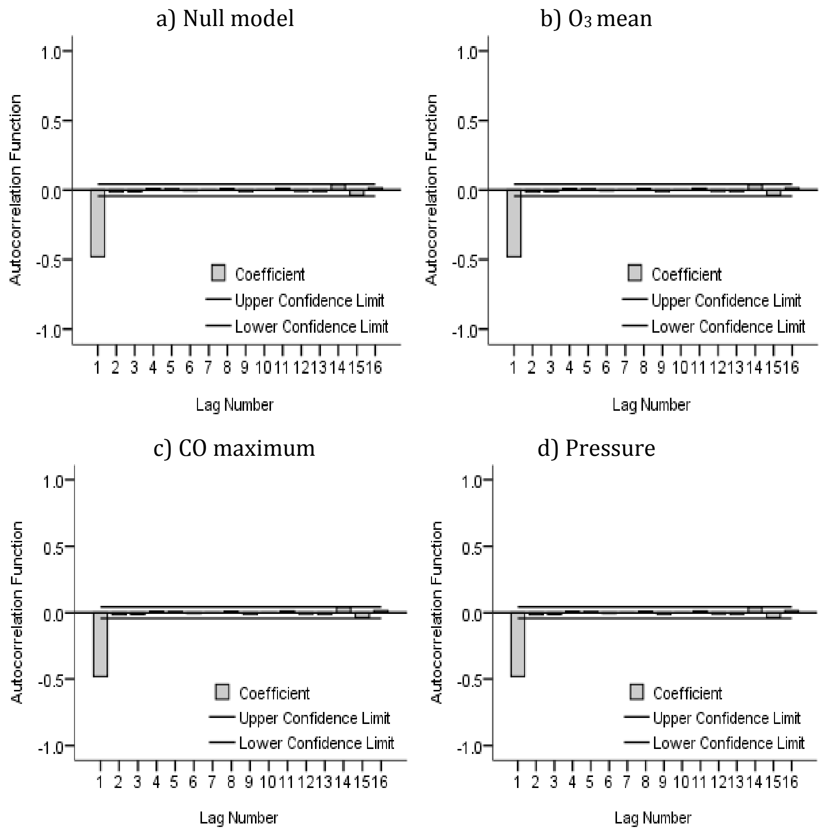


Figure F4. 86: Trent Region Emergency Counts Non-asthmatics first order difference Poisson regression a) Null model b) O_3 mean, c) CO maximum and d) Pressure.

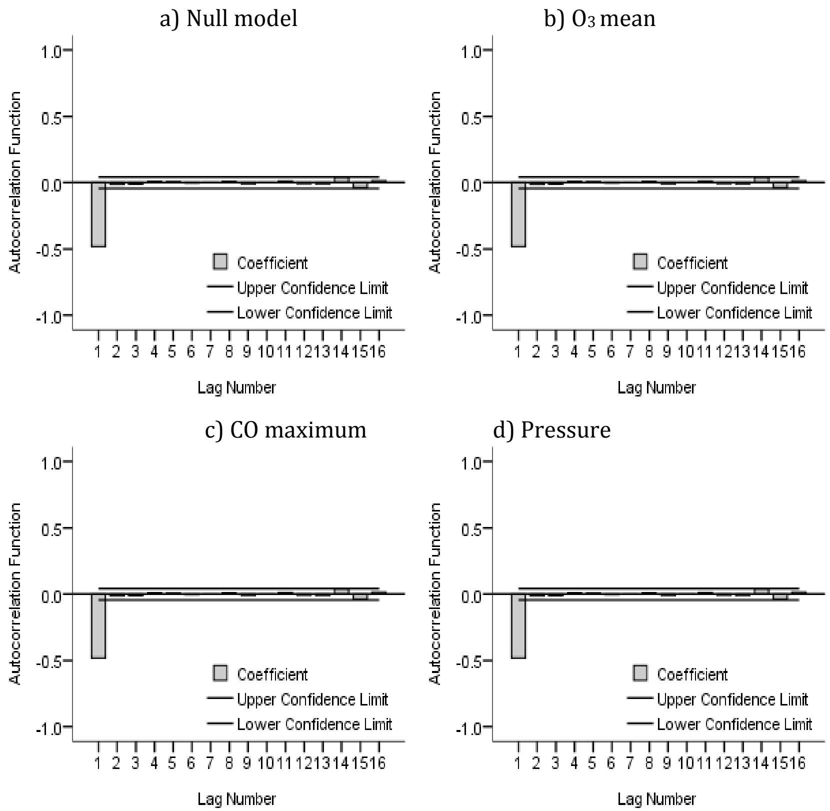


Figure F4. 87: Trent Region Emergency Counts Excess first order difference Poisson regression a) Null model b) O_3 mean, c) CO maximum and d) Pressure.

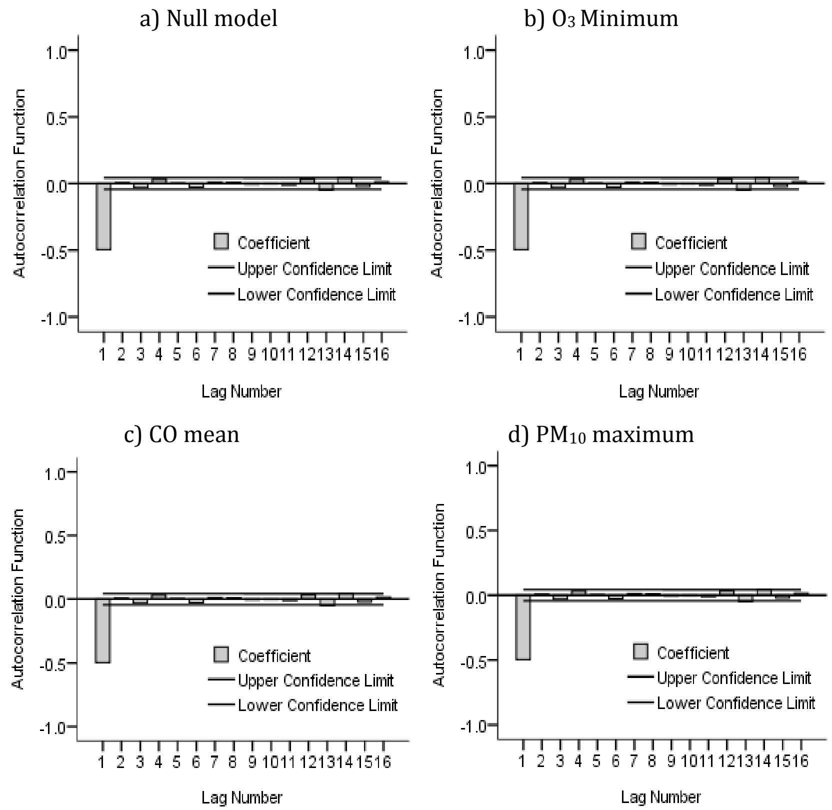


Figure F4. 88: Trent Region Out of Hours Counts Asthmatics first order difference Poisson regression a) Null model b) O_3 Minimum, c) CO mean and d) PM_{10} maximum.

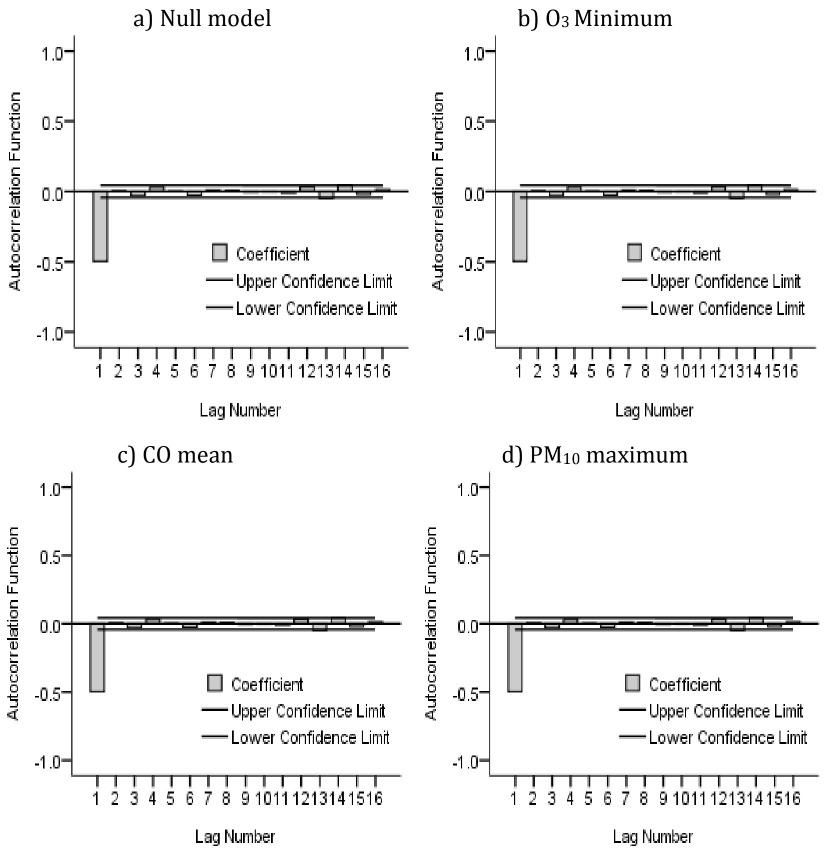


Figure F4. 89: Trent Region Out of Hours Counts Non-asthmatics first order difference Poisson regression a) Null model b) O_3 Minimum, c) CO mean and d) PM_{10} maximum.

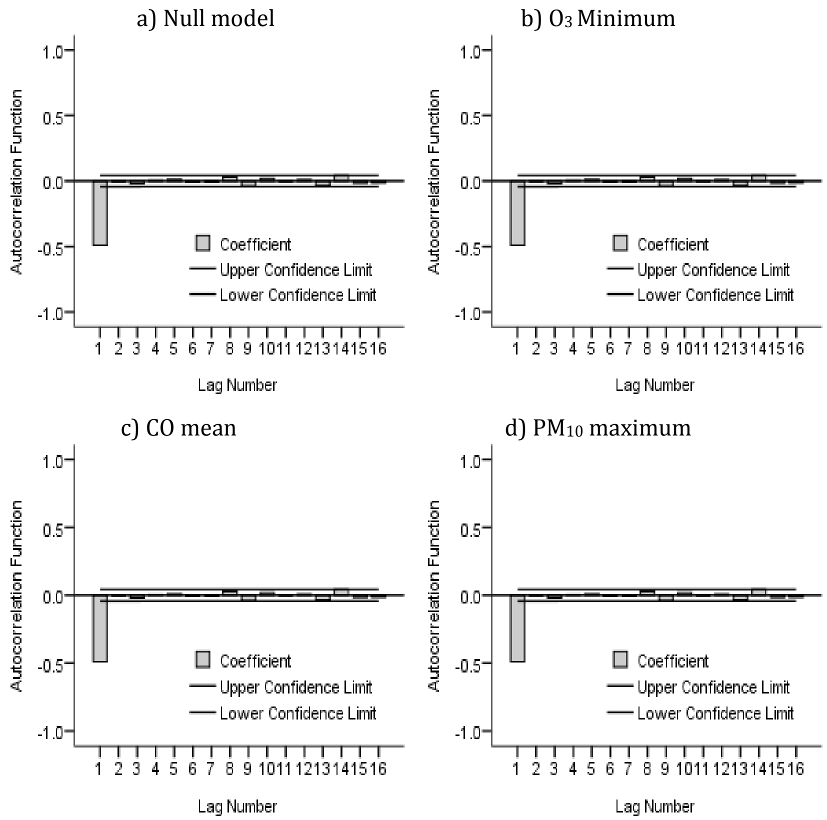


Figure F4. 90: Trent Region Out of Hours Counts Excess first order difference Poisson regression a) Null model b) O_3 Minimum, c) CO mean and d) PM_{10} maximum.

F4.3. Scotland Multiple Regression Diagnostics

Poisson multiple regressions. Diagnostics include autocorrelation plot. For each medical contacts, diagnostics only illustrated for the null model and three alternative models because diagnostics for the remaining alternative models (total alternative models n=31) were similar to those illustrated.

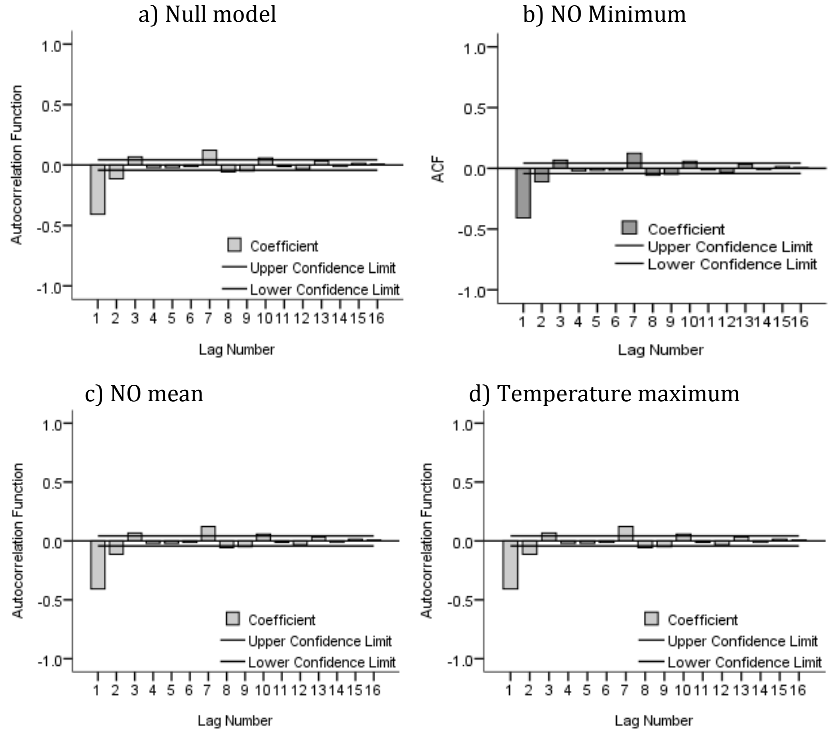


Figure F4. 91: Scotland All Counts Asthmatics first order difference Poisson regression a) Null model b) NO Minimum, c) NO mean and d) Temperature maximum.

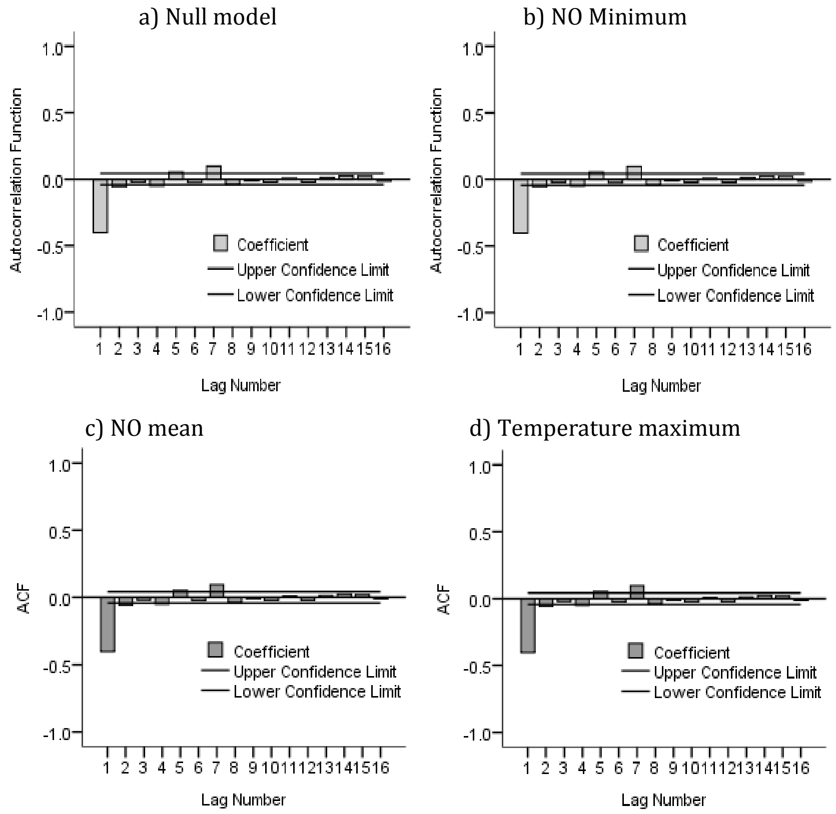


Figure F4. 92: Scotland All Counts Non-asthmatics first order difference Poisson regression a) Null model b) NO Minimum, c) NO mean and d) Temperature maximum.

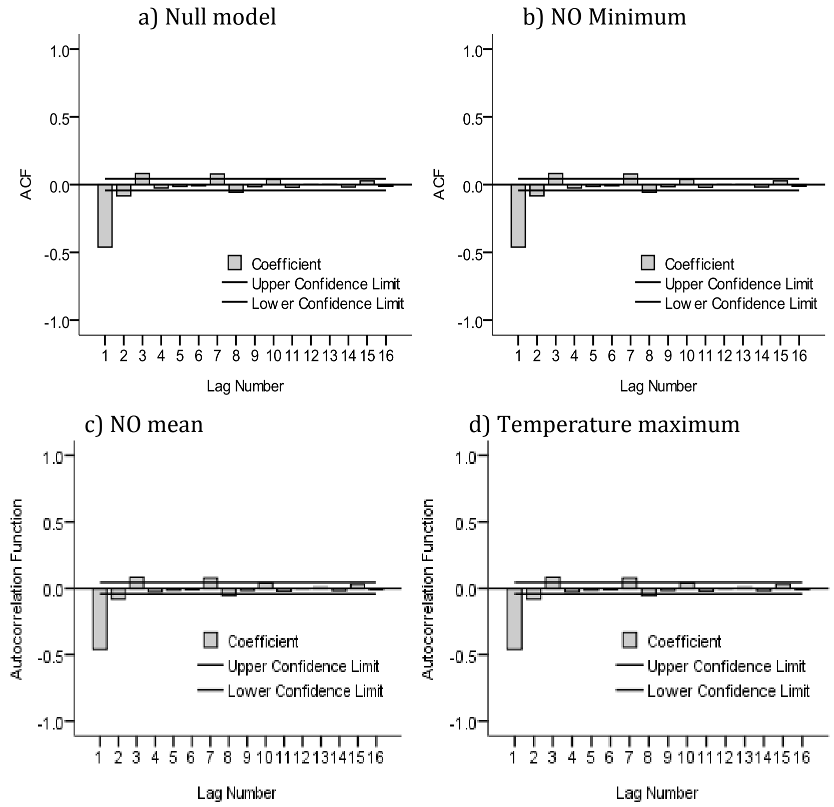


Figure F4. 93: Scotland All Counts Excess first order difference Poisson regression a) Null model b) NO Minimum, c) NO mean and d) Temperature maximum.

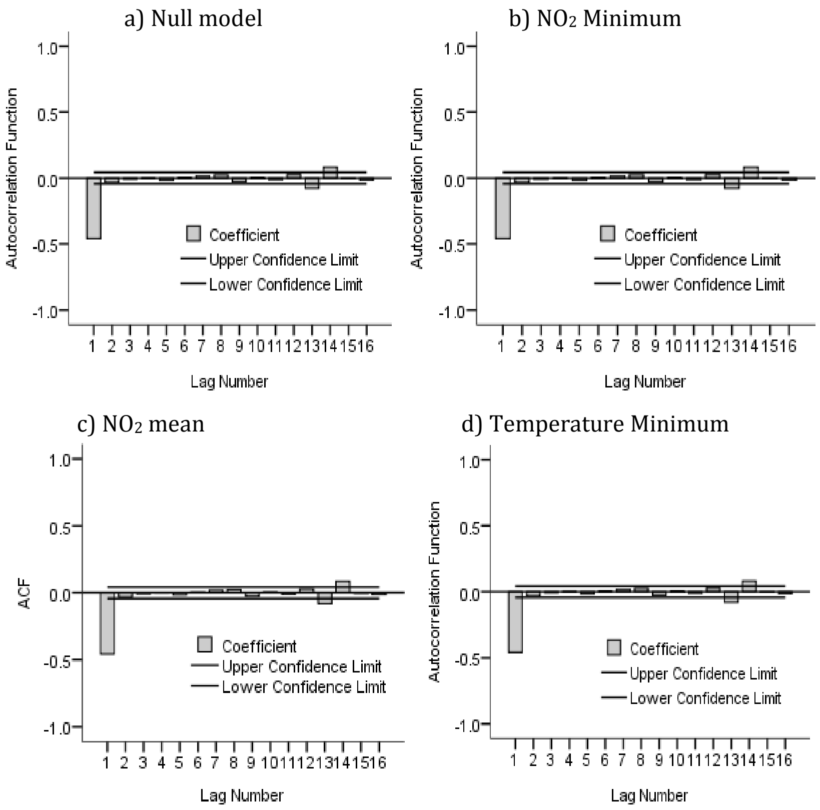


Figure F4. 94: Scotland Acute Visits Asthmatics first order difference Poisson regression a) Null model b) NO_2 Minimum, c) NO_2 mean and d) Temperature Minimum.

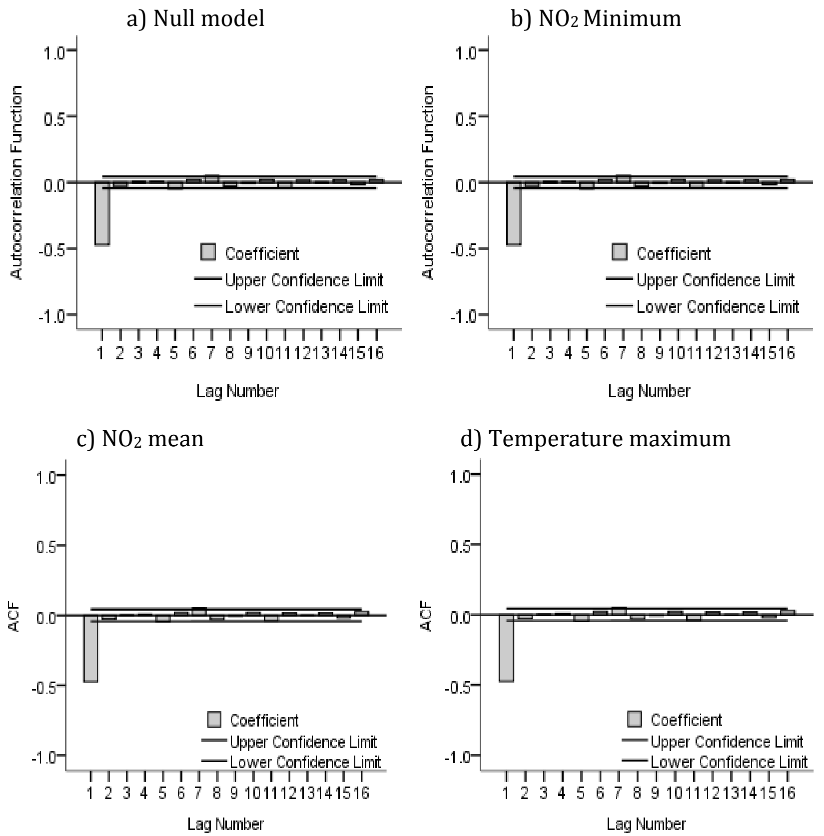


Figure F4. 95: Scotland Acute Visits Non-asthmatics first order difference Poisson regression a) Null model b) NO_2 Minimum, c) NO_2 mean and d) Temperature maximum.

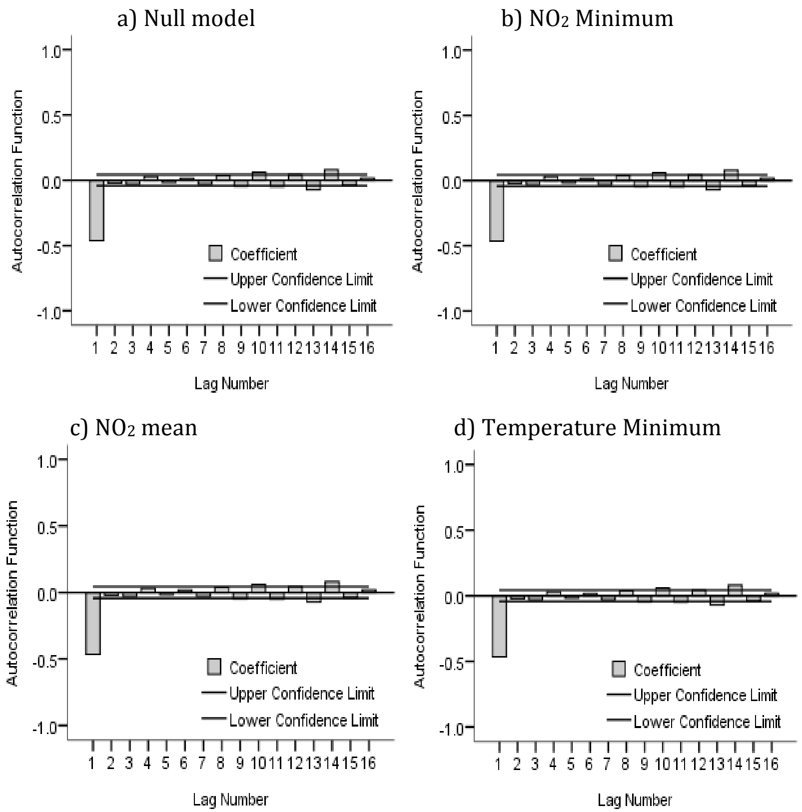


Figure F4. 96: Scotland Acute Visits Excess first order difference Poisson regression a) Null model b) NO_2 Minimum, c) NO_2 mean and d) Temperature Minimum.

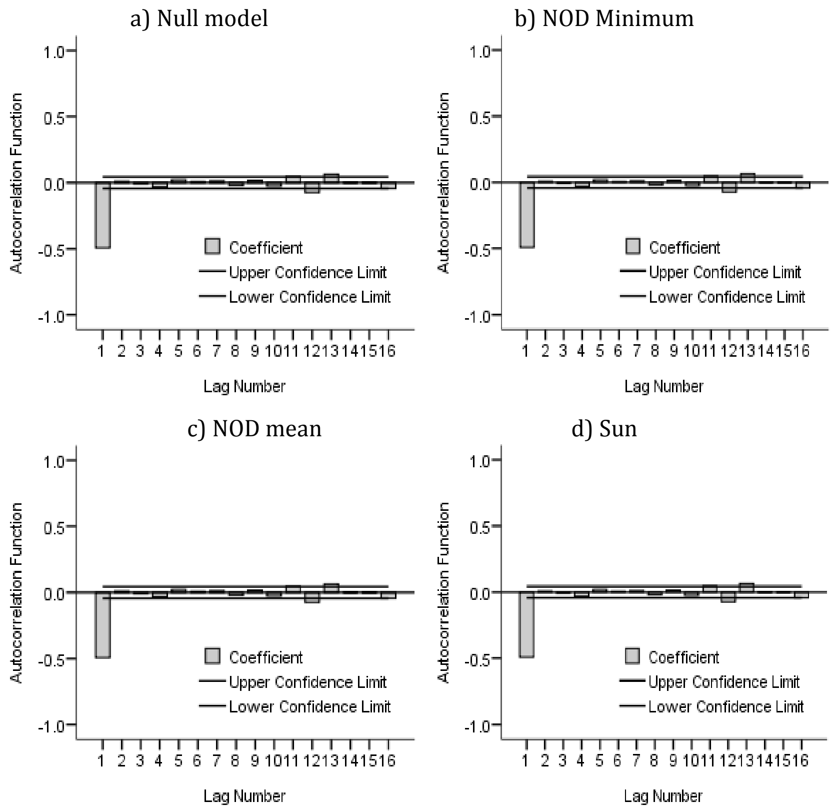


Figure F4. 97: Scotland Casualty Counts Asthmatics first order difference Poisson regression a) Null model b) NOD Minimum, c) NOD mean and d) Sun.

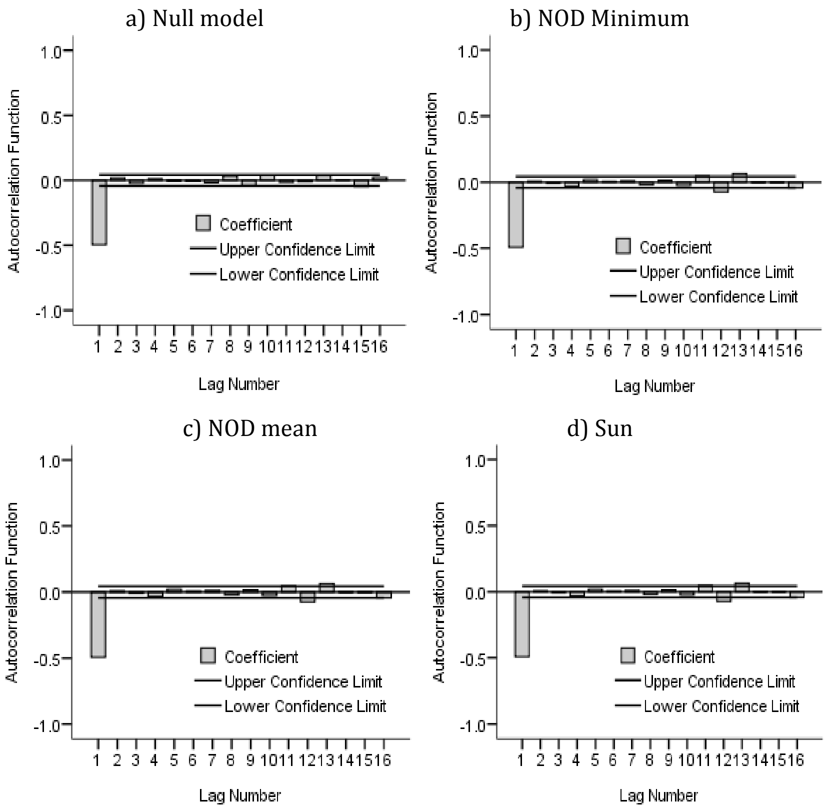


Figure F4. 98: Scotland Casualty Counts Non-asthmatics first order difference Poisson regression a) Null model b) NO Minimum, c) NO mean and d) Temperature maximum.

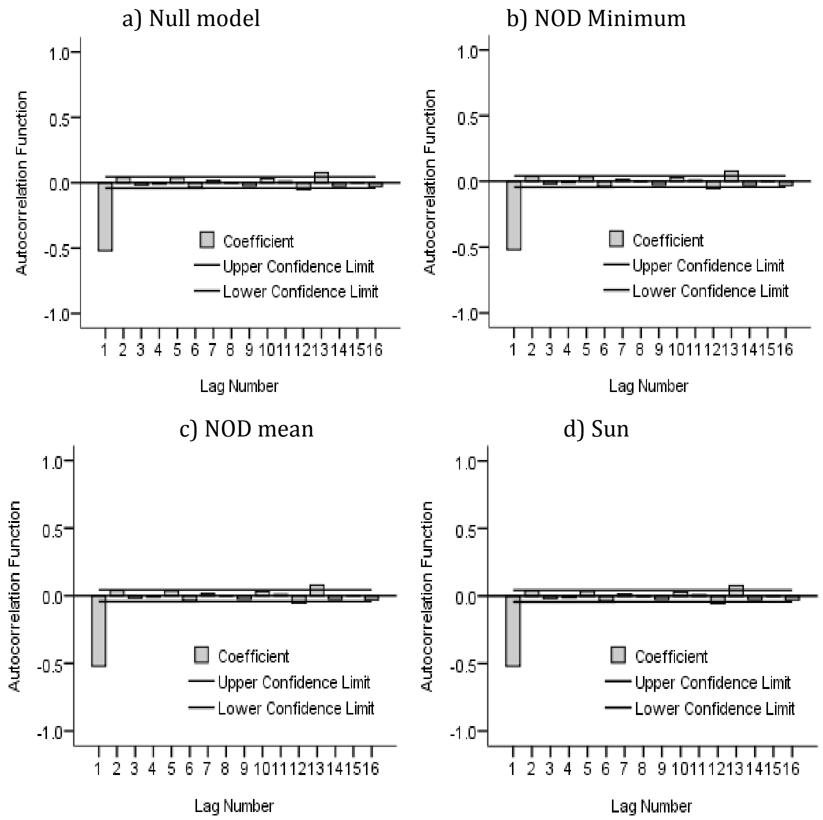


Figure F4. 99: Scotland Casualty Counts Excess first order difference Poisson regression a) Null model b) NOD Minimum, c) NOD mean and d) Sun.

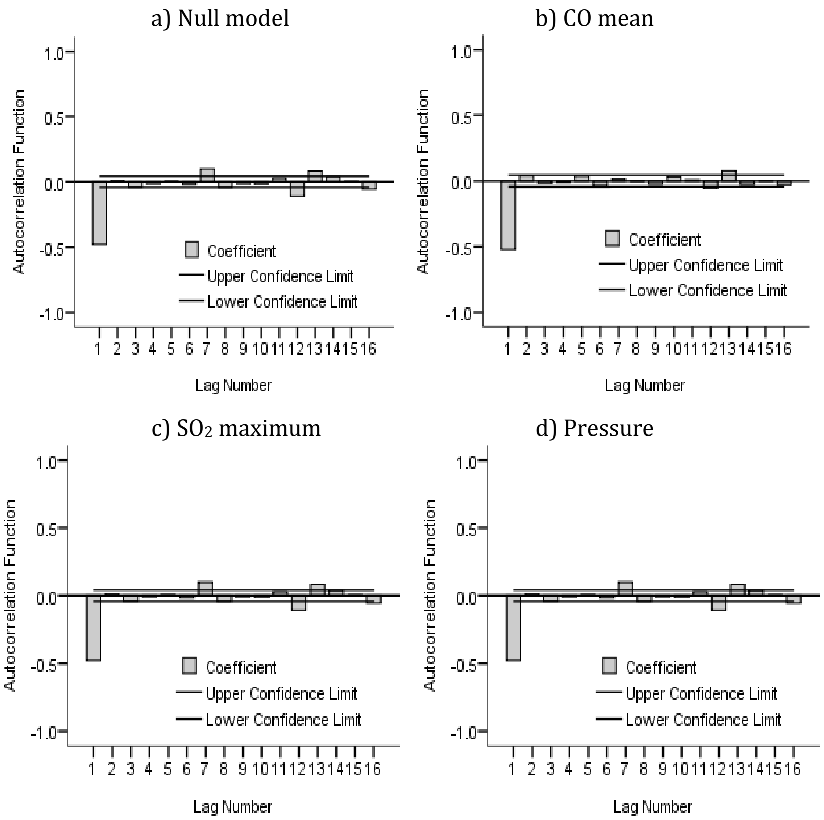


Figure F4. 100: Scotland Emergency Consultations Asthmatics first order difference Poisson regression a Regression a) Null model b) CO mean, c) SO_2 maximum and d) Pressure.

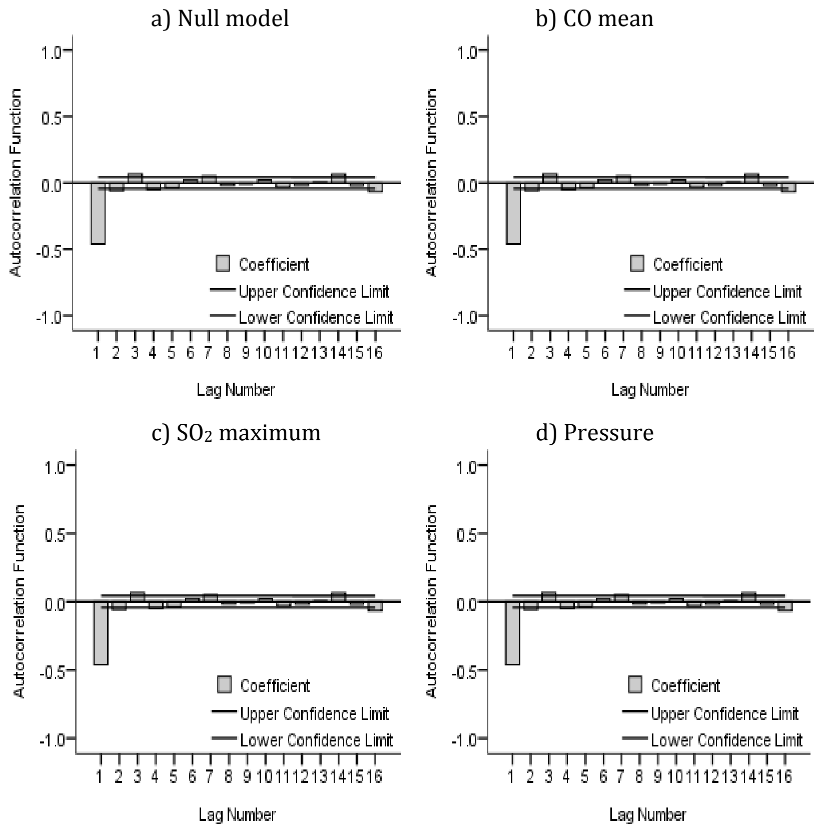


Figure F4. 101: Scotland Emergency Consultations Non-asthmatics first order difference Poisson regression a) Null model b) CO mean, c) SO_2 maximum and d) Pressure.

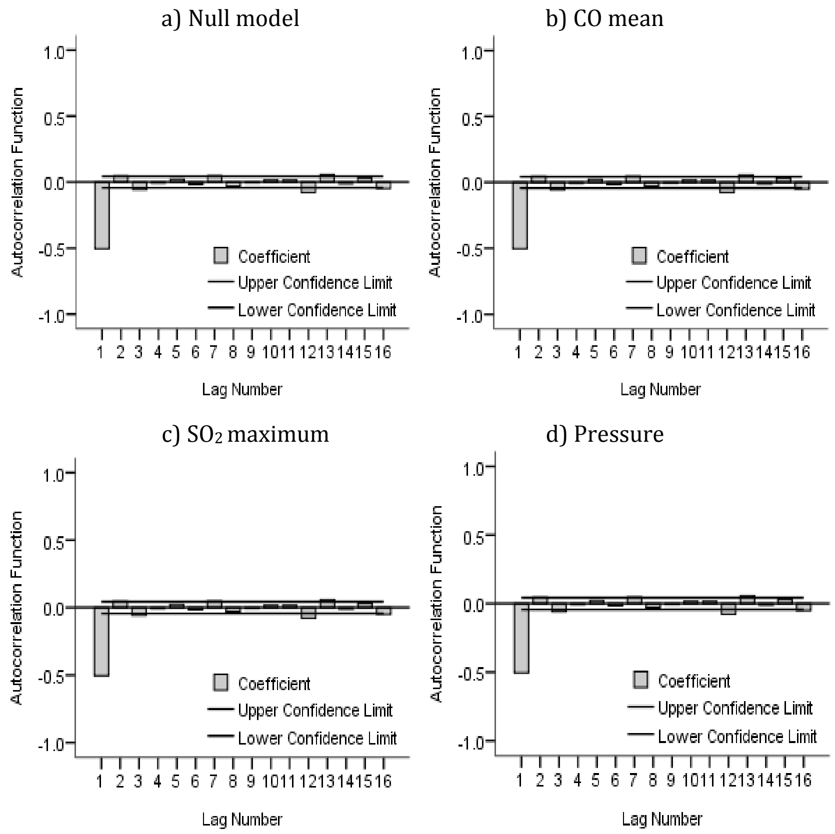


Figure F4. 102: Scotland Emergency Consultations Excess first order difference Poisson regression a) Null model b) CO mean, c) SO_2 maximum and d) Pressure.

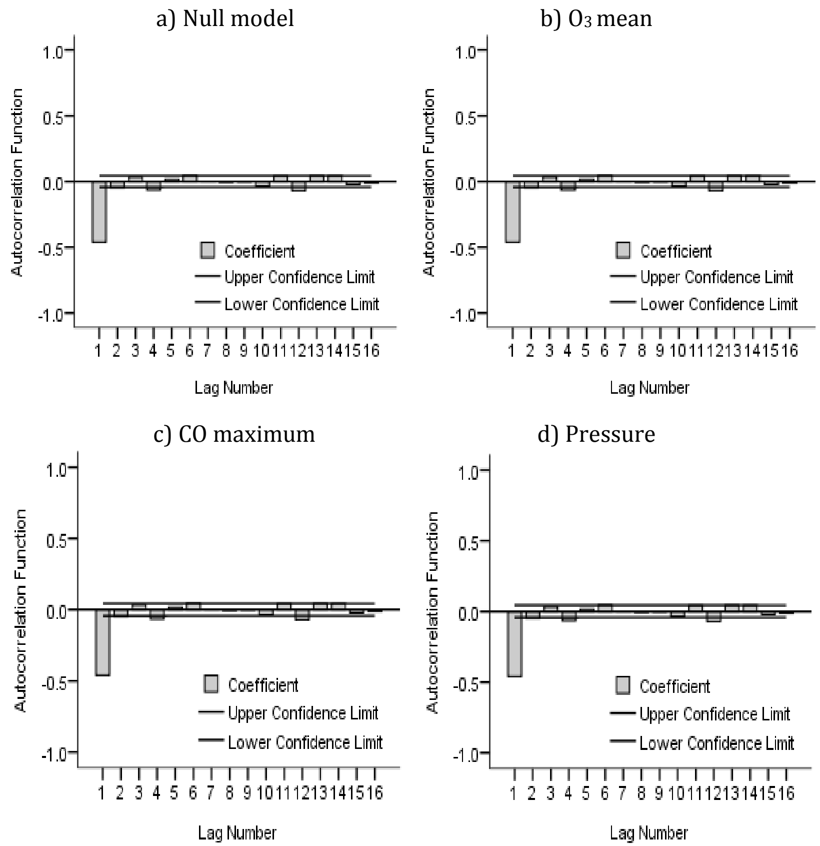


Figure F4. 103: Scotland Emergency Counts Asthmatics first order difference Poisson regression a) Null model b) O_3 mean, c) CO maximum and d) Pressure.

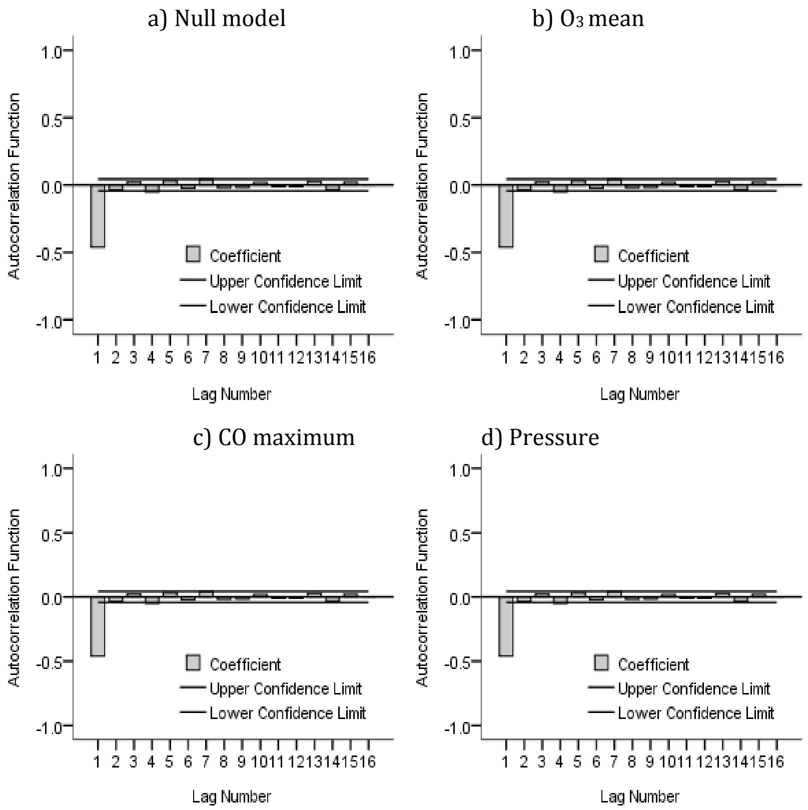


Figure F4. 104: Scotland Emergency Counts Non-asthmatics first order difference Poisson regression a) Null model b) O_3 mean, c) CO maximum and d) Pressure.

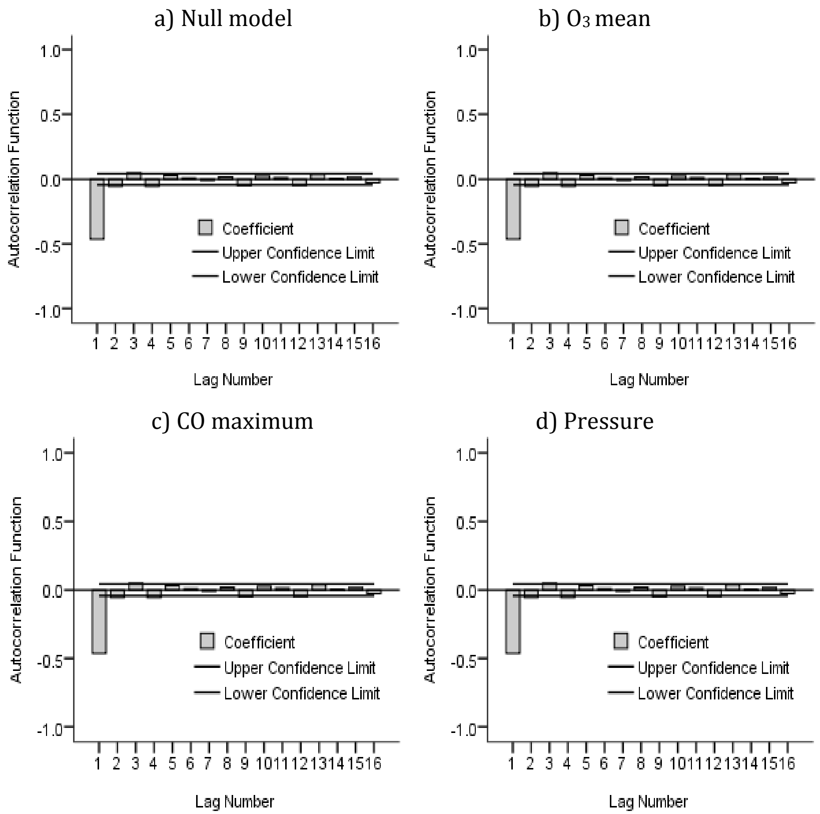


Figure F4. 105: Scotland Emergency Counts Excess first order difference Poisson regression a) Null model b) O_3 mean, c) CO maximum and d) Pressure.

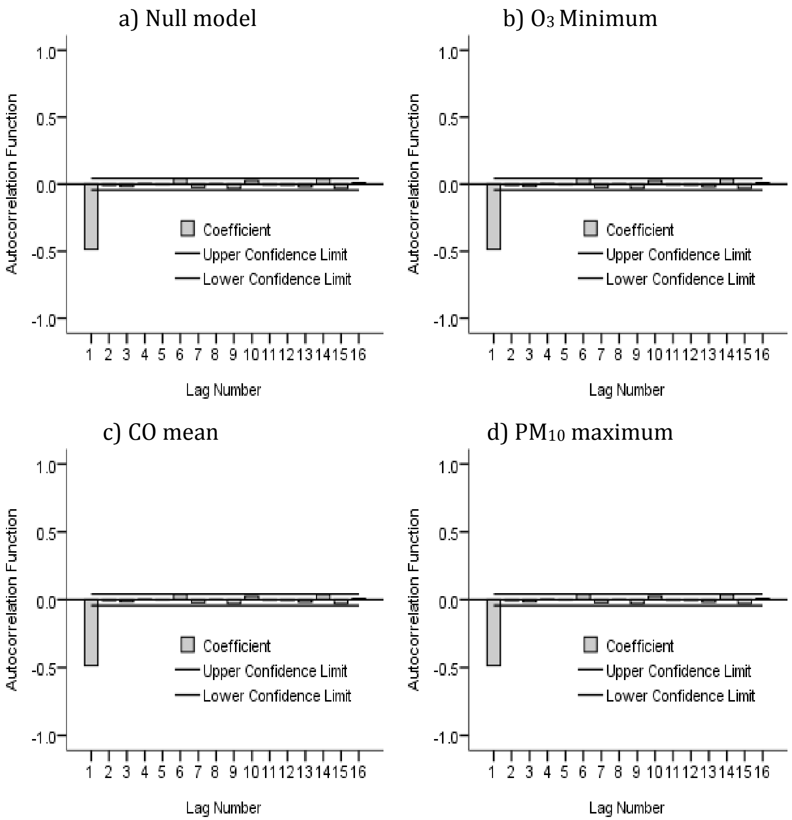


Figure F4. 106: Scotland Out of Hours Counts Asthmatics first order difference Poisson regression a) Null model b) O_3 Minimum, c) CO mean and d) PM_{10} maximum.

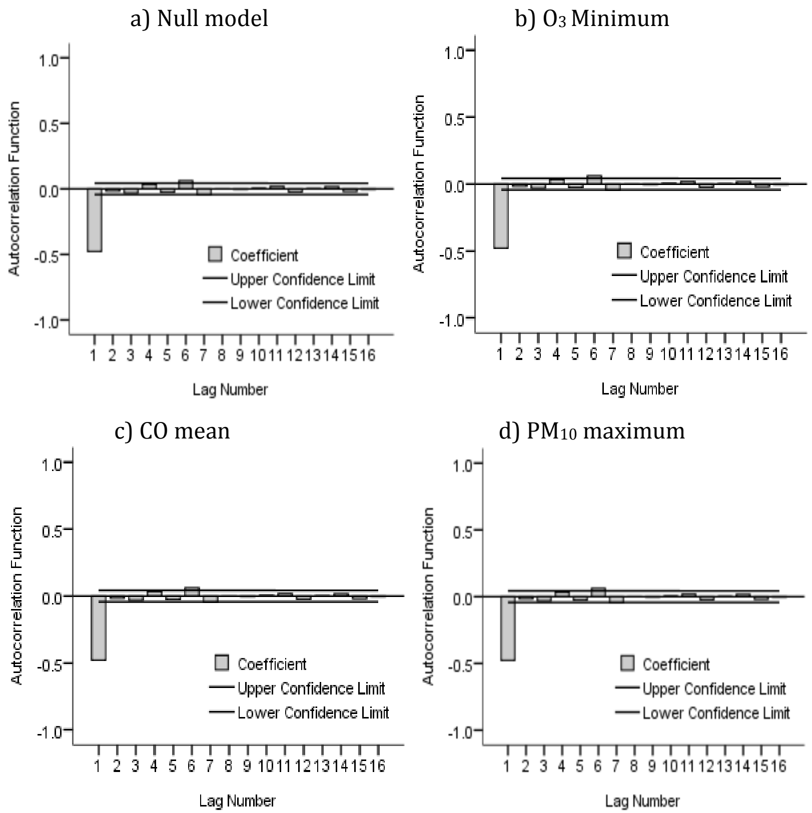


Figure F4. 107: Scotland Out of Hours Counts Non-asthmatics first order difference Poisson regression a) Null model b) O_3 Minimum, c) CO mean and d) PM_{10} maximum.

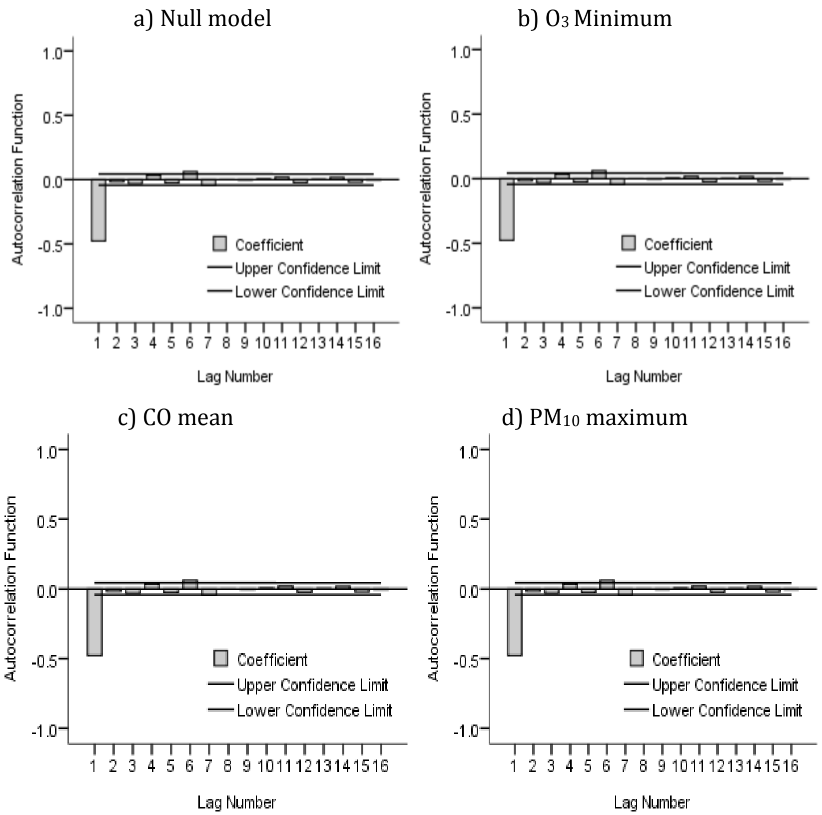


Figure F4. 108: Scotland Out of Hours Counts Excess first order difference Poisson regression a) Null model b) O_3 Minimum, c) CO mean and d) PM_{10} maximum.

Appendix G

Autoregressive Analyses

G1. Comparative Analysis for Autoregressive methods

England and Wales ARIMA vs. ARIMA with Robust SE

Asthmatics: for both types of analyses, ten models significantly improved the fit of the data.
Non-asthmatics: for both types of analyses, eleven models significantly improved the fit of the data. Excess, one model significantly improved the fit of the data using the first analysis (ARIMA). No models significantly improved the fit of the data using the second analysis (ARIMA with robust SE).

a) ARIMA b) ARIMA with Robust SE

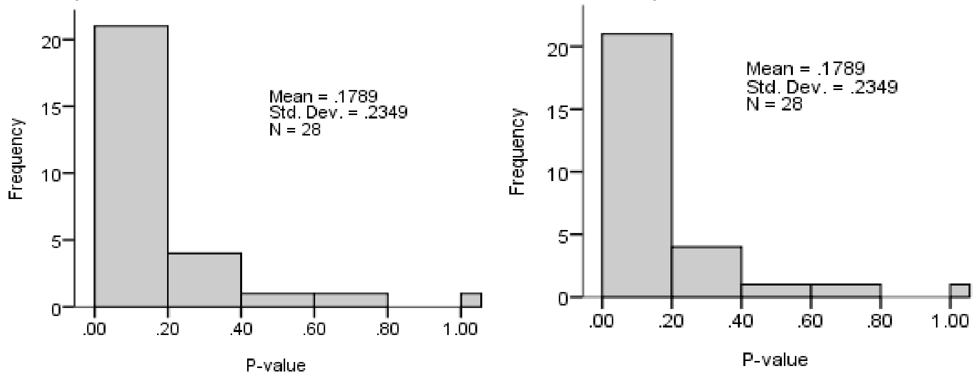


Figure G1. 1: England and Wales All Counts Asthmatics - distribution of the LLR P-values a) ARIMA and b) ARIMA with robust SE.

a) ARIMA b) ARIMA with Robust SE

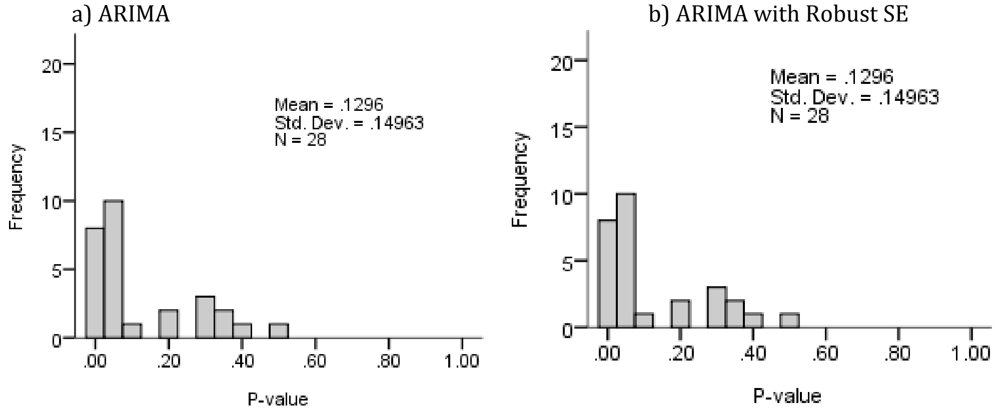


Figure G1. 2: England and Wales All Counts Non-asthmatics distribution of the LLR P-values a) ARIMA and b) ARIMA with robust SE.

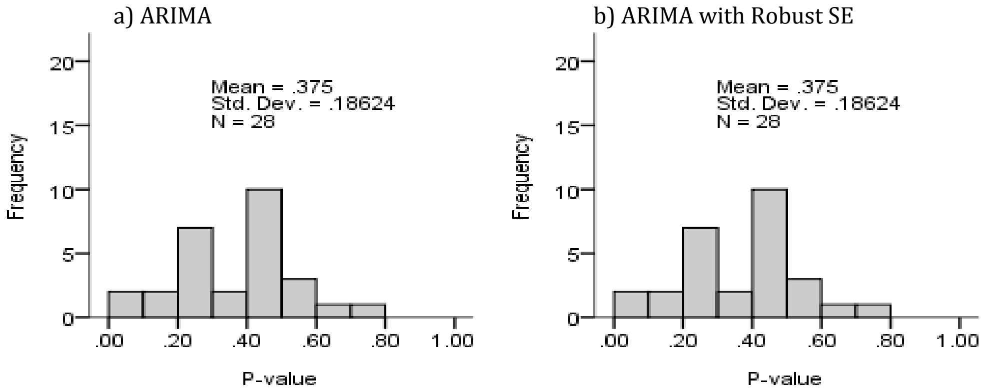


Figure G1. 3: England and Wales All Counts Excess - distribution of the LLR P-values a) ARIMA and b) ARIMA with robust SE.

There was little difference between the point-estimate P-value distributions.

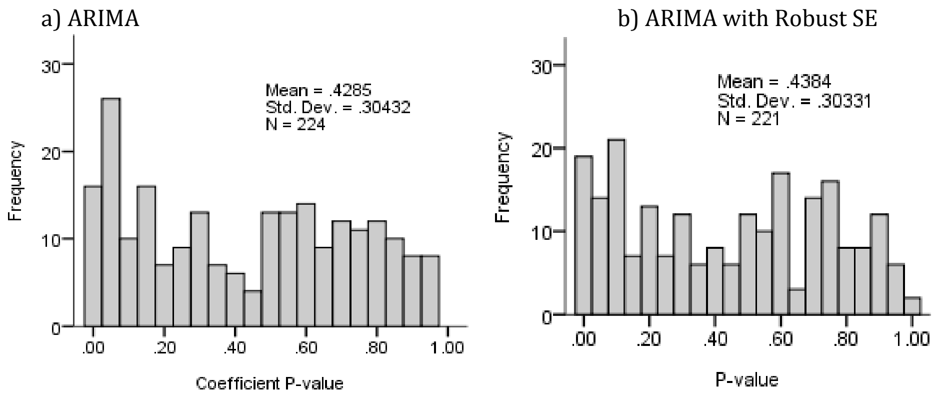


Figure G1. 4: England and Wales All Counts Asthmatics - distribution of the autoregressive point-estimate P-values a) ARIMA and b) ARIMA with robust SE.

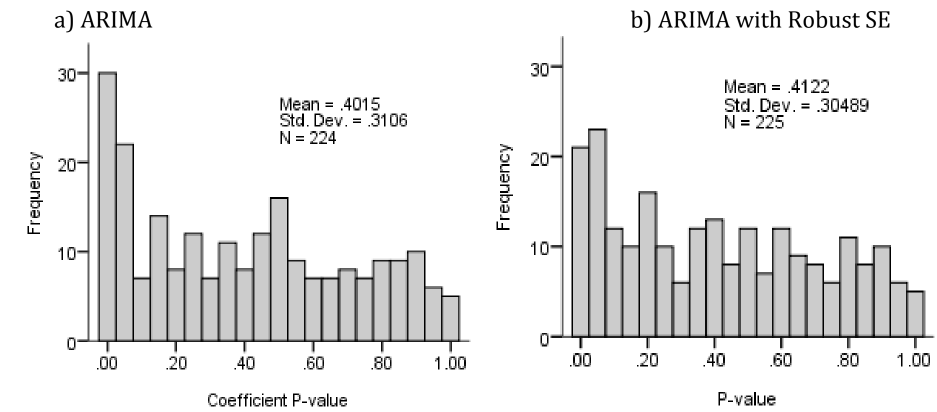


Figure G1. 5: England and Wales All Counts Non-asthmatics - distribution of the autoregressive point-estimate P-values a) ARIMA and b) ARIMA with robust SE.

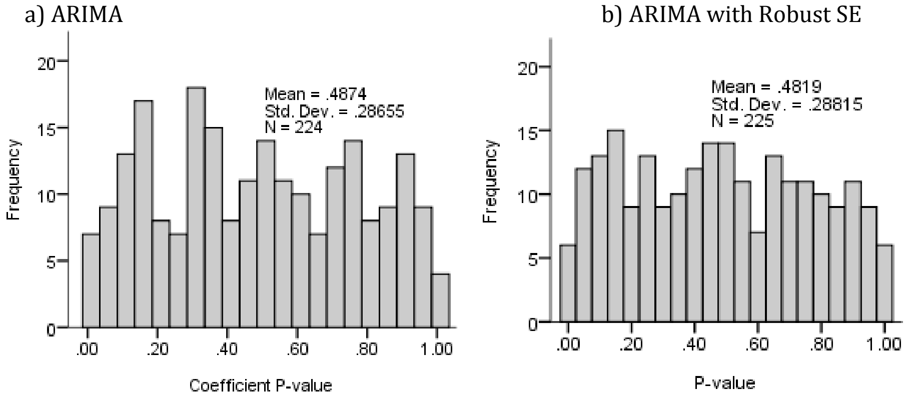


Figure G1. 6: England and Wales All Counts Excess - distribution of the autoregressive point-estimate P-values a) ARIMA and b) ARIMA with robust SE.

Scotland, Trent, Sheffield ARPOIS modelled on Excess (daily difference between the number of asthmatics and number of Non-asthmatics) versus ARPOIS modelled on asthmatics as dependent and Non-asthmatics as covariate.

Table G. 1: Scotland F-test P-values.

F-test	ARPOIS using Excess as endpoint	ARPOIS using asthmatics as the dependent variable and Non-asthmatics
NO Min'	0.80	0.96
NO_2 Min'	*<0.01	*0.01
NOD Min'	*0.03	0.05
SO_2 Min'	0.98	0.99
PM_{10} Min'	*0.05	0.11
O_3 Min'	0.60	0.59
CO Min'	0.06	0.11
NO Mean	0.31	0.75
NO_2 Mean	**<0.01	**<0.01
NOD Mean	*0.00	*0.02
SO_2 Mean	0.82	0.77
PM_{10} Mean	*<0.01	*<0.01
O_3 Mean	0.40	0.45
CO Mean	0.66	0.94
NO Max'	0.43	0.79
NO_2 Max'	*0.01	*0.04
NOD Max'	*0.02	0.07
SO_2 Max'	0.56	0.52
PM_{10} Max'	0.12	0.45
O_3 Max'	0.35	0.49
CO Max'	0.89	0.99
Temp Min'	0.20	0.39
Temp Max'	*0.00	*0.01
Sun	0.19	0.26
Rain	*0.01	0.11
Pressure	*0.03	*0.04
Wind speed	1.00	1.00
Grass	0.15	0.19
Birch	0.18	0.25
Oak	0.27	0.36
Nettle	0.50	0.45
Mean	0.31	0.39
Total No' of stat' sign' models	11	7

Scotland, a) ARPOIS using the excess as a dependent variable, eleven models significantly improved the fit of the data compared to the null model. b) ARPOIS using asthmatics as the dependent variable and Non-asthmatics as a covariate, seven models significantly improved the fit of the data. The same exposure contributed to the most significant model (NO_2 mean).

The exposures that contributed to a significant model using the asthmatics as an endpoint and non-asthmatics as a covariate were the same exposures that contributed to significant models using the excess as an endpoint. For the exposures that proved significant using the excess as an endpoint and not significant using asthmatics as an endpoint, the difference was not more than 0.1 of a P-value.

Two models that were not significant using asthmatics as an endpoint had P>0.1 and two had P<0.1.

a) ARPOIS Excess

b) ARPOIS asthmatics dependent, Non-asthmatics covariate

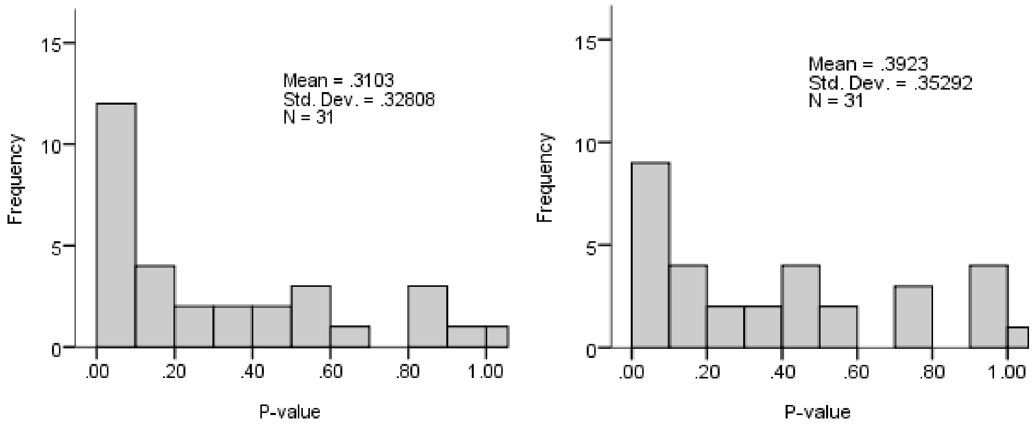


Figure G1. 7: Scotland All Counts Excess - distribution of the F-test P-values a) ARPOIS Excess and b) ARPOIS asthmatics as the dependent variable, Non-asthmatics as covariate.

a) ARPOIS Excess

b) ARPOIS asthmatics dependent, Non-asthmatics covariate

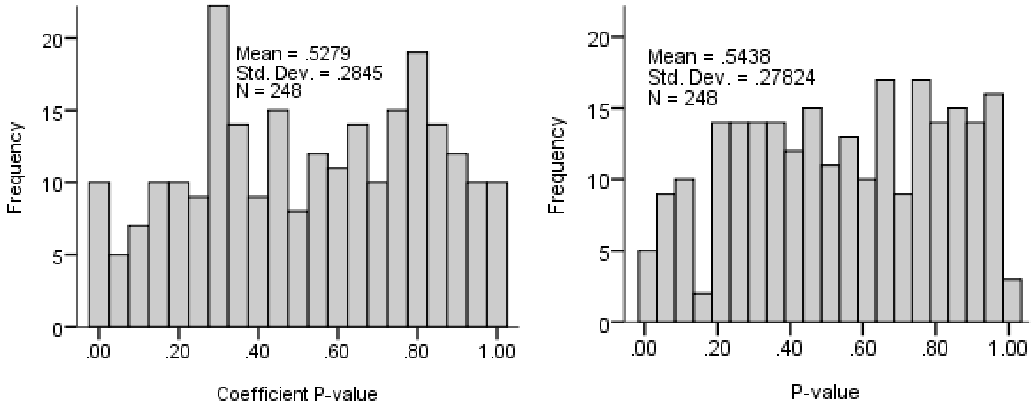


Figure G1. 8: Scotland All Counts Excess –distribution of the autoregressive point-estimate P-values a) ARPOIS Excess and b) ARPOIS asthmatics as the dependent variable, Non-asthmatics as covariate.

Table G. 2: Trent Region F-test P-values.

F-test	ARPOIS using Excess as endpoint	ARPOIS using asthmatics as the dependent variable and Non-asthmatics as a covariate
NO Min'	*<0.01	*<0.01
NO_2 Min'	0.25	0.23
NOD Min'	*0.02	*0.03
SO_2 Min'	0.88	0.92
PM_{10} Min'	0.12	0.35
O_3 Min'	0.98	0.93
CO Min'	0.39	0.19
NO Mean	0.13	0.24
NO_2 Mean	0.93	0.92
NOD Mean	0.36	0.49
SO_2 Mean	0.41	0.35
PM_{10} Mean	0.66	0.88
O_3 Mean	0.64	0.35
CO Mean	0.99	0.95
NO Max'	0.64	0.52
NO_2 Max'	1.00	0.99
NOD Max'	0.78	0.65
SO_2 Max'	0.22	0.15
PM_{10} Max'	0.38	0.64
O_3 Max'	0.06	0.06
CO Max'	0.92	0.95
Temp Min'	0.94	0.96
Temp Max'	0.52	0.40
Sun	0.14	0.14
Rain	0.45	0.33
Pressure	*0.04	0.09
Wind speed	0.99	0.95
Grass	**<0.01	**<0.01
Mean	0.50	0.49
Total No' of stat' sign' models	4	3

Trent Region, a) ARPOIS using the excess as the endpoint, four models significantly improved the fit of the data compared to the null model. b) ARPOIS using asthmatics as the endpoint and non-asthmatics as a covariate, three models significantly improved the fit of the data. The same exposure contributed to the most significant model (grass).

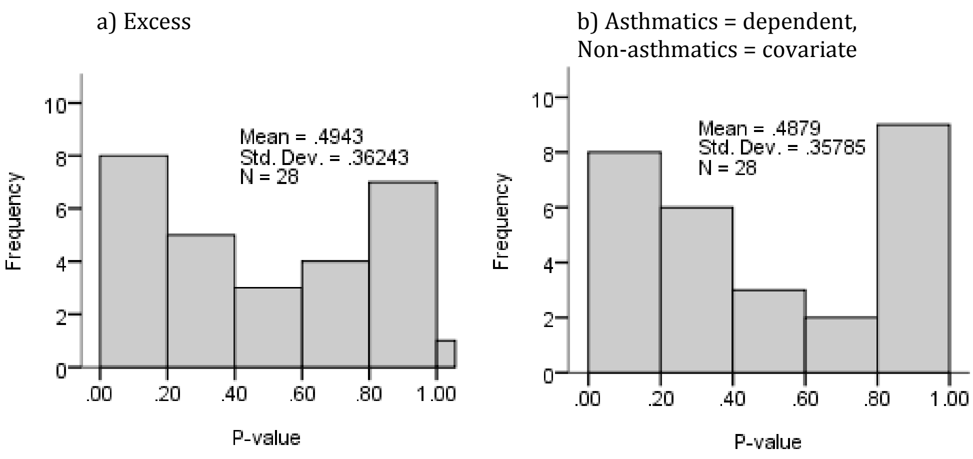


Figure G1. 9: Trent Region All Counts Excess - distribution of the F-test P-values a) ARPOIS Excess and b) ARPOIS asthmatics as the dependent variable, Non-asthmatics as covariate.

a) ARPOIS Excess b) ARPOIS asthmatics dependent, Non-asthmatics covariate

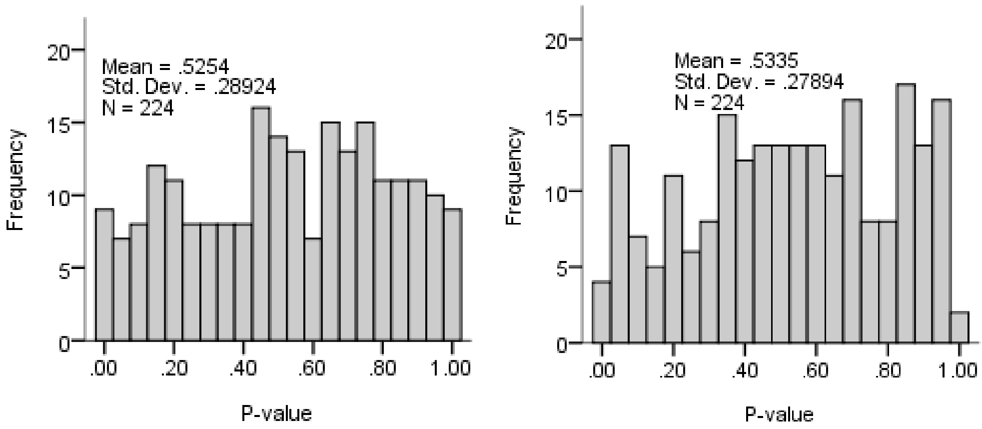


Figure G1. 10: Trent Region All Counts Excess - distribution of the autoregressive point-estimate P-values a) ARPOIS Excess and b) ARPOIS asthmatics as the dependent variable, Non-asthmatics as covariate.

Table G. 3: Sheffield F-test P-values.

F_test	ARPOIS using Excess as endpoint	ARPOIS using asthmatics as the dependent variable and Non-asthmatics as a covariate
NO Min'	0.79	1.00
NO_2 Min'	0.90	1.00
NOD Min'	0.94	1.00
SO_2 Min'	0.45	*<0.01
PM_{10} Min'	0.94	0.99
O_3 Min'	0.69	0.11
CO Min'	0.40	1.00
NO Mean	0.41	0.98
NO_2 Mean	0.97	0.99
NOD Mean	0.69	1.00
SO_2 Mean	1.00	1.00
PM_{10} Mean	0.75	0.79
O_3 Mean	0.91	0.86
CO Mean	0.10	0.99
NO Max'	0.45	0.77
NO_2 Max'	0.93	1.00
NOD Max'	0.45	0.75
SO_2 Max'	0.97	1.00
PM_{10} Max'	0.46	0.82
O_3 Max'	0.48	0.62
CO Max'	0.12	0.26
Temp Min'	0.51	0.68
Temp Max'	0.39	0.54
Sun	*0.04	*<0.01
Rain	0.92	0.47
Pressure	0.46	*0.01
Wind speed	0.17	0.63
Grass	0.07	**<0.01
Mean	0.58	0.69
Total No' of stat' sign' models	1	4

Sheffield, a) ARPOIS using the excess as a dependent variable, one model significantly improved the fit of the data compared to the null model. b) ARPOIS using asthmatics as the dependent variable and non-asthmatics as a covariate, four models significantly improved the fit of the data. Different exposures contribute to the most significant model. a) ARPOIS using the excess as a dependent variable, Sun b) ARPOIS using asthmatics as the dependent variable and non-asthmatics as a covariate, grass.

The exposures that contributed to a significant model using the asthmatics as an endpoint and non-asthmatics as a covariate were the same exposures that contributed to significant models using the excess as an endpoint. For the exposures that proved significant using the excess as an endpoint and not significant using asthmatics as an endpoint, the difference between the models was as high as 0.46 of a P-value.

For Sheffield, two models that were not significant using excess as an endpoint had P>0.1 and one had a P<0.1.

a) ARPOIS Excess

b) ARPOIS asthmatics dependent,
Non-asthmatics covariate

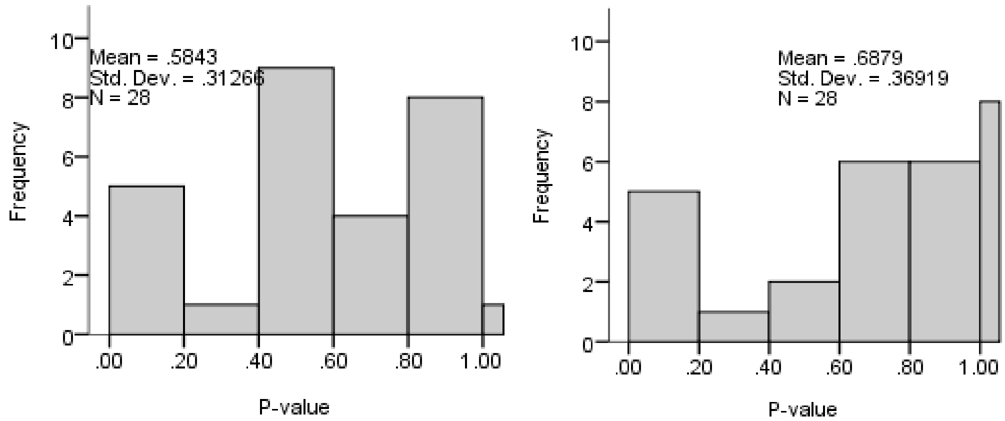


Figure G1. 11: Sheffield All Counts Excess - distribution of the F-test P-values a) ARPOIS Excess and b) ARPOIS asthmatics as the dependent variable, Non-asthmatics as covariate.

a) ARPOIS Excess

b) ARPOIS asthmatics dependent,
Non-asthmatics covariate

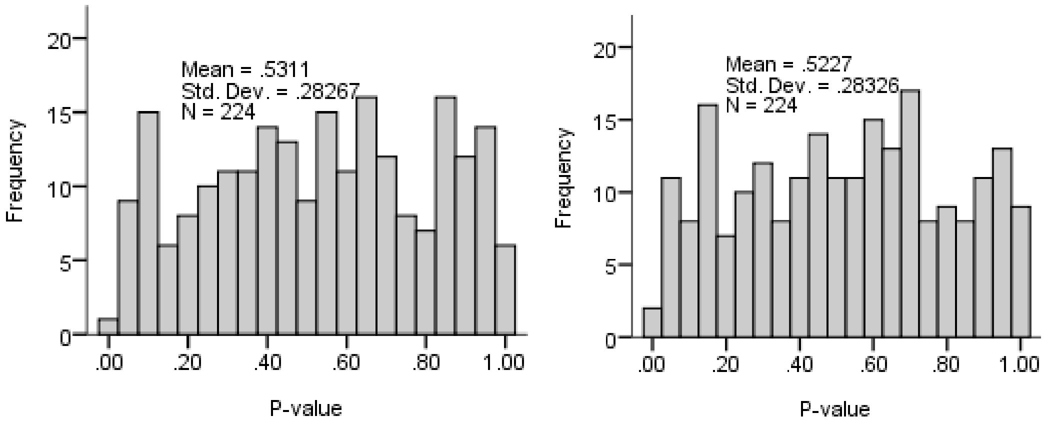


Figure G1. 12: Sheffield All Counts Excess - distribution of the autoregressive point-estimate P-values a) ARPOIS Excess and b) ARPOIS asthmatics dependent, Non-asthmatics covariate.

G2. Internal Check Autoregressive analysis

Table G. 4: England and Wales All Counts Asthmatics - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	27.21	15.81	0.09	-3.77	58.20	28.45	3.94	0.00	20.73	36.17
Monday	765.45	7.33	0.00	751.08	779.81	768.71	5.66	0.00	757.61	779.82
Tuesday	652.99	10.14	0.00	633.12	672.86	654.05	5.58	0.00	643.11	665.00
Wednesday	586.24	10.99	0.00	564.71	607.77	586.73	5.57	0.00	575.80	597.66
Thursday	570.96	11.78	0.00	547.87	594.04	571.77	5.57	0.00	560.84	582.71
Friday	565.65	11.59	0.00	542.93	588.37	566.73	5.57	0.00	555.81	577.66
Saturday	59.20	10.82	0.00	38.00	80.40	61.03	5.58	0.00	50.09	71.97
Bank holiday	-677.40	4.46	0.00	-686.15	-668.66	-716.10	11.39	0.00	-738.44	-693.77
seassin	11.21	11.44	0.33	-11.22	33.64	12.92	2.11	0.00	8.79	17.05
seascos	28.70	10.57	0.01	7.98	49.42	31.23	2.12	0.00	27.08	35.38
seassin1	-35.20	9.06	0.00	-52.95	-17.44	-34.18	2.11	0.00	-38.31	-30.05
seascos1	10.39	8.66	0.23	-6.59	27.37	11.83	2.11	0.00	7.68	15.98
Model including Minimum measures of NO										
constant	23.76	15.62	0.13	-6.85	54.36	27.48	4.26	0.00	19.13	35.83
Monday	765.80	7.21	0.00	751.66	779.94	768.32	5.71	0.00	757.12	779.52
Tuesday	652.75	10.07	0.00	633.01	672.49	653.74	5.64	0.00	642.68	664.80
Wednesday	584.63	10.89	0.00	563.28	605.98	585.33	5.62	0.00	574.31	596.35
Thursday	570.39	11.63	0.00	547.60	593.17	571.37	5.62	0.00	560.35	582.40
Friday	564.49	11.36	0.00	542.22	586.76	566.09	5.63	0.00	555.05	577.14
Saturday	58.22	10.58	0.00	37.48	78.96	60.84	5.63	0.00	49.80	71.89
Bank holiday	-678.66	4.55	0.00	-687.58	-669.73	-716.27	11.43	0.00	-738.69	-693.85
seassin	11.27	11.47	0.33	-11.21	33.75	12.91	2.11	0.00	8.78	17.05
seascos	26.18	10.63	0.01	5.36	47.01	30.30	2.35	0.00	25.70	34.91
seassin1	-35.32	9.09	0.00	-53.14	-17.50	-34.22	2.11	0.00	-38.35	-30.09
seascos1	10.14	8.67	0.24	-6.86	27.14	11.71	2.12	0.00	7.55	15.87
NO min lag0	0.48	0.23	0.04	0.03	0.93	0.26	0.27	0.34	-0.27	0.78
NO min lag1	-0.13	0.20	0.54	-0.53	0.27	-0.40	0.28	0.16	-0.95	0.15
NO min lag2	0.01	0.21	0.97	-0.41	0.42	0.05	0.28	0.85	-0.50	0.61
NO min lag3	-0.10	0.20	0.60	-0.49	0.28	-0.14	0.28	0.61	-0.70	0.41
NO min lag4	0.18	0.18	0.31	-0.17	0.53	0.13	0.28	0.64	-0.42	0.69
NO min lag5	0.32	0.13	0.01	0.07	0.57	0.44	0.28	0.12	-0.12	0.99
NO min lag6	-0.04	0.12	0.76	-0.27	0.19	-0.22	0.28	0.44	-0.77	0.33
NO min lag7	0.59	0.21	0.01	0.17	1.00	0.34	0.27	0.21	-0.19	0.86
Model including mean measures of NO										
constant	21.18	15.60	0.18	-9.40	51.76	16.83	4.80	0.00	7.41	26.25
Monday	761.85	7.29	0.00	747.55	776.14	764.63	5.88	0.00	753.10	776.17
Tuesday	649.03	10.09	0.00	629.25	668.82	650.22	5.91	0.00	638.63	661.82
Wednesday	582.28	10.99	0.00	560.73	603.82	582.97	5.86	0.00	571.47	594.47
Thursday	566.34	11.74	0.00	543.33	589.35	566.12	5.87	0.00	554.61	577.64
Friday	561.04	11.50	0.00	538.50	583.58	561.02	5.92	0.00	549.40	572.63
Saturday	55.95	10.65	0.00	35.07	76.83	56.75	5.77	0.00	45.44	68.06
Bank holiday	-677.11	4.54	0.00	-686.01	-668.22	-715.88	11.38	0.00	-738.20	-693.56
seassin	12.09	11.28	0.28	-10.02	34.20	14.28	2.11	0.00	10.14	18.42
seascos	24.06	10.40	0.02	3.69	44.43	23.40	2.56	0.00	18.38	28.42
seassin1	-34.28	8.93	0.00	-51.79	-16.77	-32.79	2.11	0.00	-36.93	-28.66
seascos1	9.93	8.62	0.25	-6.96	26.82	10.94	2.11	0.00	6.81	15.07
NO mean lag0	0.11	0.05	0.01	0.03	0.20	0.14	0.06	0.03	0.02	0.27
NO mean lag1	-0.02	0.05	0.67	-0.11	0.07	0.00	0.07	0.95	-0.14	0.13
NO mean lag2	0.02	0.05	0.62	-0.07	0.12	0.07	0.07	0.31	-0.07	0.21
NO mean lag3	0.04	0.04	0.32	-0.04	0.13	0.12	0.07	0.10	-0.02	0.25
NO mean lag4	-0.03	0.04	0.50	-0.11	0.05	-0.05	0.07	0.52	-0.19	0.09
NO mean lag5	0.04	0.04	0.26	-0.03	0.11	0.06	0.07	0.38	-0.08	0.20
NO mean lag6	0.00	0.03	0.96	-0.06	0.06	-0.01	0.07	0.87	-0.15	0.13
NO mean lag7	0.16	0.05	0.00	0.06	0.25	0.20	0.06	0.00	0.08	0.33

Table G. 5: England and Wales All Counts Non-asthmatics - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
					Null model					
constant	14.63	8.34	0.08	-1.73	30.98	15.36	2.16	0.00	11.13	19.59
Monday	383.87	3.95	0.00	376.13	391.60	385.58	3.10	0.00	379.50	391.66
Tuesday	330.91	5.28	0.00	320.55	341.26	331.40	3.06	0.00	325.41	337.39
Wednesday	299.48	5.65	0.00	288.40	310.55	299.79	3.05	0.00	293.80	305.77
Thursday	292.77	5.94	0.00	281.12	304.41	293.18	3.05	0.00	287.20	299.17
Friday	297.04	5.98	0.00	285.33	308.76	297.62	3.05	0.00	291.63	303.60
Saturday	29.63	5.62	0.00	18.61	40.65	30.49	3.05	0.00	24.50	36.48
Bank holiday	-344.21	3.04	0.00	-350.17	-338.25	-363.82	6.23	0.00	-376.05	-351.60
seassin	15.07	6.01	0.01	3.29	26.86	16.12	1.15	0.00	13.86	18.38
seascos	9.80	5.53	0.08	-1.04	20.63	11.26	1.16	0.00	8.99	13.53
seassin1	-9.39	4.64	0.04	-18.47	-0.30	-8.65	1.15	0.00	-10.91	-6.39
seascos1	9.00	4.59	0.05	0.01	17.99	9.87	1.16	0.00	7.60	12.14
					Model including Minimum measures of NO					
constant	13.43	8.21	0.10	-2.66	29.52	14.87	2.33	0.00	10.30	19.43
Monday	383.77	3.88	0.00	376.17	391.37	385.22	3.12	0.00	379.09	391.35
Tuesday	330.76	5.22	0.00	320.53	340.99	331.22	3.09	0.00	325.17	337.27
Wednesday	298.79	5.55	0.00	287.92	309.67	298.95	3.07	0.00	292.92	304.98
Thursday	292.79	5.82	0.00	281.39	304.19	292.95	3.08	0.00	286.92	298.98
Friday	296.60	5.85	0.00	285.12	308.07	297.11	3.08	0.00	291.06	303.15
Saturday	29.19	5.48	0.00	18.44	39.94	30.32	3.08	0.00	24.28	36.36
Bank holiday	-344.49	3.10	0.00	-350.56	-338.42	-363.68	6.25	0.00	-375.95	-351.42
seassin	15.12	5.99	0.01	3.38	26.87	16.13	1.15	0.00	13.87	18.39
seascos	8.89	5.54	0.11	-1.97	19.76	10.74	1.28	0.00	8.22	13.26
seassin1	-9.41	4.64	0.04	-18.50	-0.33	-8.66	1.15	0.00	-10.92	-6.40
seascos1	8.90	4.61	0.05	-0.14	17.94	9.80	1.16	0.00	7.52	12.07
NO min lag0	0.31	0.12	0.01	0.08	0.54	0.26	0.15	0.08	-0.03	0.54
NO min lag1	-0.21	0.12	0.08	-0.44	0.02	-0.29	0.15	0.06	-0.59	0.01
NO min lag2	0.08	0.11	0.47	-0.14	0.30	0.09	0.15	0.57	-0.22	0.39
NO min lag3	0.03	0.10	0.80	-0.18	0.23	-0.09	0.15	0.56	-0.39	0.21
NO min lag4	0.07	0.11	0.50	-0.14	0.28	0.03	0.15	0.83	-0.27	0.34
NO min lag5	0.15	0.07	0.03	0.01	0.29	0.28	0.15	0.07	-0.03	0.58
NO min lag6	-0.16	0.07	0.03	-0.31	-0.02	-0.16	0.15	0.29	-0.46	0.14
NO min lag7	0.20	0.10	0.05	0.00	0.40	0.15	0.15	0.32	-0.14	0.44
					Model including mean measures of NO					
constant	12.60	8.26	0.13	-3.59	28.79	9.06	2.63	0.00	3.90	14.22
Monday	382.13	3.95	0.00	374.38	389.88	383.52	3.22	0.00	377.21	389.84
Tuesday	329.23	5.33	0.00	318.78	339.68	329.39	3.24	0.00	323.04	335.74
Wednesday	298.03	5.70	0.00	286.86	309.20	297.72	3.21	0.00	291.42	304.02
Thursday	291.11	5.94	0.00	279.46	302.76	290.70	3.22	0.00	284.39	297.00
Friday	294.85	6.00	0.00	283.09	306.61	294.61	3.24	0.00	288.25	300.97
Saturday	27.57	5.59	0.00	16.61	38.53	27.94	3.16	0.00	21.74	34.13
Bank holiday	-343.52	3.06	0.00	-349.52	-337.52	-363.42	6.23	0.00	-375.64	-351.19
seassin	15.43	5.93	0.01	3.82	27.05	16.86	1.16	0.00	14.59	19.13
seascos	8.06	5.47	0.14	-2.65	18.78	7.07	1.40	0.00	4.32	9.82
seassin1	-9.02	4.59	0.05	-18.00	-0.03	-7.89	1.16	0.00	-10.16	-5.63
seascos1	8.84	4.58	0.05	-0.14	17.82	9.40	1.15	0.00	7.13	11.66
NO mean lag0	0.06	0.03	0.02	0.01	0.11	0.08	0.04	0.02	0.01	0.15
NO mean lag1	-0.02	0.03	0.50	-0.07	0.04	0.00	0.04	0.93	-0.08	0.07
NO mean lag2	0.01	0.03	0.65	-0.04	0.06	0.05	0.04	0.24	-0.03	0.12
NO mean lag3	0.03	0.03	0.23	-0.02	0.08	0.05	0.04	0.23	-0.03	0.12
NO mean lag4	0.00	0.02	0.95	-0.05	0.05	0.00	0.04	0.92	-0.07	0.08
NO mean lag5	0.01	0.02	0.51	-0.03	0.06	0.03	0.04	0.42	-0.04	0.11
NO mean lag6	-0.04	0.02	0.03	-0.08	0.00	-0.03	0.04	0.48	-0.10	0.05
NO mean lag7	0.07	0.02	0.00	0.02	0.12	0.11	0.04	0.00	0.04	0.18

Table G. 6: England and Wales All Counts Excess - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	L CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	12.81	7.69	0.10	-2.26	27.88	13.09	2.60	0.00	7.99	18.19
Monday	381.85	4.94	0.00	372.16	391.54	383.13	3.74	0.00	375.80	390.46
Tuesday	322.26	5.99	0.00	310.52	333.99	322.66	3.68	0.00	315.43	329.88
Wednesday	286.74	6.52	0.00	273.95	299.52	286.94	3.68	0.00	279.72	294.16
Thursday	278.31	6.96	0.00	264.66	291.95	278.59	3.68	0.00	271.37	285.81
Friday	268.81	6.60	0.00	255.88	281.75	269.12	3.68	0.00	261.91	276.33
Saturday	29.86	7.02	0.00	16.09	43.62	30.54	3.68	0.00	23.32	37.76
Bank holiday	-336.63	4.83	0.00	-346.09	-327.17	-352.28	7.52	0.00	-367.02	-337.54
seassin	-3.50	4.74	0.46	-12.79	5.80	-3.20	1.39	0.02	-5.93	-0.47
seascos	19.24	4.47	0.00	10.48	28.00	19.97	1.40	0.00	17.23	22.71
seassin1	-25.51	4.33	0.00	-34.00	-17.02	-25.54	1.39	0.00	-28.26	-22.81
seascos1	1.39	4.22	0.74	-6.89	9.66	1.96	1.40	0.16	-0.77	4.70
Model including Minimum measures of NO										
constant	10.98	7.80	0.16	-4.31	26.27	12.61	2.81	0.00	7.10	18.13
Monday	382.14	4.95	0.00	372.44	391.84	383.10	3.77	0.00	375.70	390.50
Tuesday	322.15	6.03	0.00	310.34	333.96	322.52	3.73	0.00	315.21	329.82
Wednesday	285.89	6.55	0.00	273.06	298.72	286.39	3.71	0.00	279.11	293.67
Thursday	277.80	6.99	0.00	264.10	291.49	278.42	3.71	0.00	271.14	285.71
Friday	268.24	6.60	0.00	255.30	281.17	268.98	3.72	0.00	261.68	276.28
Saturday	29.47	7.02	0.00	15.71	43.22	30.52	3.72	0.00	23.23	37.82
Bank holiday	-337.48	4.88	0.00	-347.04	-327.92	-352.59	7.55	0.00	-367.40	-337.77
seassin	-3.48	4.79	0.47	-12.86	5.90	-3.22	1.39	0.02	-5.95	-0.49
seascos	17.89	4.54	0.00	8.98	26.79	19.56	1.55	0.00	16.52	22.61
seassin1	-25.57	4.38	0.00	-34.15	-16.99	-25.56	1.39	0.00	-28.29	-22.83
seascos1	1.24	4.27	0.77	-7.12	9.60	1.91	1.40	0.17	-0.84	4.66
NO min lag0	0.12	0.13	0.36	-0.14	0.39	0.00	0.18	0.99	-0.35	0.35
NO min lag1	0.02	0.18	0.91	-0.33	0.37	-0.11	0.19	0.56	-0.47	0.26
NO min lag2	-0.05	0.15	0.74	-0.35	0.25	-0.03	0.19	0.85	-0.40	0.33
NO min lag3	-0.11	0.16	0.49	-0.42	0.20	-0.05	0.19	0.77	-0.42	0.31
NO min lag4	0.10	0.17	0.56	-0.24	0.44	0.10	0.19	0.59	-0.27	0.46
NO min lag5	0.19	0.16	0.22	-0.12	0.50	0.16	0.19	0.39	-0.21	0.52
NO min lag6	0.07	0.12	0.53	-0.16	0.30	-0.05	0.19	0.77	-0.42	0.31
NO min lag7	0.34	0.18	0.06	-0.02	0.69	0.19	0.18	0.29	-0.16	0.54
Model including mean measures of NO										
constant	8.87	7.89	0.26	-6.58	24.33	7.77	3.18	0.02	1.53	14.01
Monday	379.94	4.99	0.00	370.16	389.72	381.11	3.90	0.00	373.47	388.75
Tuesday	320.14	6.01	0.00	308.36	331.92	320.83	3.92	0.00	313.15	328.52
Wednesday	284.55	6.59	0.00	271.63	297.46	285.25	3.89	0.00	277.63	292.87
Thursday	275.30	7.02	0.00	261.53	289.06	275.43	3.89	0.00	267.80	283.06
Friday	266.43	6.64	0.00	253.41	279.45	266.41	3.92	0.00	258.71	274.10
Saturday	28.58	7.01	0.00	14.85	42.31	28.81	3.82	0.00	21.32	36.30
Bank holiday	-337.11	4.88	0.00	-346.68	-327.55	-352.46	7.54	0.00	-367.25	-337.67
seassin	-3.01	4.71	0.52	-12.23	6.21	-2.58	1.40	0.07	-5.32	0.16
seascos	16.35	4.52	0.00	7.49	25.21	16.33	1.70	0.00	13.01	19.66
seassin1	-24.98	4.31	0.00	-33.43	-16.53	-24.90	1.40	0.00	-27.64	-22.16
seascos1	1.08	4.21	0.80	-7.16	9.33	1.54	1.40	0.27	-1.20	4.28
NO mean lag0	0.05	0.04	0.15	-0.02	0.12	0.06	0.04	0.14	-0.02	0.15
NO mean lag1	0.00	0.04	0.92	-0.08	0.07	0.00	0.05	0.98	-0.09	0.09
NO mean lag2	0.01	0.04	0.76	-0.06	0.08	0.03	0.05	0.57	-0.07	0.12
NO mean lag3	0.03	0.04	0.43	-0.05	0.11	0.07	0.05	0.14	-0.02	0.16
NO mean lag4	-0.04	0.04	0.30	-0.11	0.04	-0.05	0.05	0.29	-0.14	0.04
NO mean lag5	0.03	0.04	0.40	-0.04	0.10	0.03	0.05	0.50	-0.06	0.12
NO mean lag6	0.03	0.03	0.30	-0.03	0.09	0.02	0.05	0.74	-0.08	0.11
NO mean lag7	0.09	0.04	0.03	0.01	0.16	0.09	0.04	0.03	0.01	0.18

Table G. 7: England and Wales Acute Visits Asthmatics - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	0.25	0.81	0.76	-1.34	1.85	0.27	0.10	0.01	0.08	0.46
Monday	2.53	0.18	0.00	2.17	2.88	2.51	0.14	0.00	2.24	2.79
Tuesday	2.02	0.19	0.00	1.64	2.40	2.01	0.14	0.00	1.75	2.28
Wednesday	1.61	0.19	0.00	1.25	1.98	1.61	0.14	0.00	1.34	1.88
Thursday	1.58	0.19	0.00	1.21	1.95	1.58	0.14	0.00	1.31	1.85
Friday	1.62	0.19	0.00	1.24	2.00	1.61	0.14	0.00	1.34	1.88
Saturday	0.22	0.23	0.34	-0.23	0.67	0.21	0.14	0.12	-0.06	0.48
Bank holiday	-1.97	0.39	0.00	-2.74	-1.20	-1.92	0.28	0.00	-2.47	-1.37
seassin	0.22	0.10	0.03	0.02	0.42	0.32	0.05	0.00	0.22	0.42
seascos	0.45	0.10	0.00	0.26	0.64	0.44	0.05	0.00	0.34	0.54
seassin1	-0.02	0.08	0.82	-0.17	0.14	0.03	0.05	0.58	-0.07	0.13
seascos1	0.17	0.07	0.02	0.03	0.31	0.16	0.05	0.00	0.06	0.26
Model including mean measures of NOD										
constant	0.21	0.82	0.80	-1.40	1.83	-0.01	0.13	0.95	-0.27	0.26
Monday	2.49	0.18	0.00	2.13	2.85	2.45	0.15	0.00	2.16	2.74
Tuesday	2.02	0.20	0.00	1.63	2.41	1.97	0.15	0.00	1.68	2.26
Wednesday	1.55	0.20	0.00	1.17	1.93	1.51	0.15	0.00	1.22	1.80
Thursday	1.52	0.20	0.00	1.14	1.91	1.48	0.15	0.00	1.19	1.77
Friday	1.58	0.20	0.00	1.18	1.98	1.52	0.15	0.00	1.23	1.81
Saturday	0.19	0.23	0.41	-0.26	0.65	0.16	0.14	0.27	-0.13	0.44
Bank holiday	-1.96	0.40	0.00	-2.74	-1.18	-1.91	0.28	0.00	-2.46	-1.35
seassin	0.23	0.10	0.03	0.03	0.42	0.33	0.05	0.00	0.23	0.43
seascos	0.43	0.10	0.00	0.23	0.63	0.32	0.06	0.00	0.20	0.44
seassin1	-0.01	0.08	0.88	-0.17	0.15	0.05	0.05	0.32	-0.05	0.15
seascos1	0.17	0.07	0.02	0.03	0.32	0.16	0.05	0.00	0.06	0.26
NOD mean	0.00	0.00	0.41	0.00	0.00	0.00	0.00	0.10	0.00	0.00
NOD mean	0.00	0.00	0.44	0.00	0.00	0.00	0.00	0.87	0.00	0.00
NOD mean	0.00	0.00	0.16	0.00	0.00	0.00	0.00	0.13	0.00	0.00
NOD mean	0.00	0.00	0.34	0.00	0.00	0.00	0.00	0.69	0.00	0.00
NOD mean	0.00	0.00	0.64	0.00	0.00	0.00	0.00	0.87	0.00	0.00
NOD mean	0.00	0.00	0.62	0.00	0.00	0.00	0.00	0.48	0.00	0.00
NOD mean	0.00	0.00	0.82	0.00	0.00	0.00	0.00	0.73	0.00	0.00
NOD mean	0.00	0.00	0.42	0.00	0.00	0.00	0.00	0.14	0.00	0.00
Model including maximum measures of NOD										
constant	0.21	0.83	0.80	-1.41	1.84	-0.09	0.14	0.51	-0.36	0.18
Monday	2.50	0.18	0.00	2.14	2.86	2.45	0.15	0.00	2.16	2.74
Tuesday	2.00	0.20	0.00	1.61	2.39	1.95	0.15	0.00	1.66	2.23
Wednesday	1.53	0.20	0.00	1.14	1.91	1.48	0.15	0.00	1.19	1.77
Thursday	1.51	0.19	0.00	1.12	1.89	1.45	0.15	0.00	1.17	1.74
Friday	1.58	0.20	0.00	1.19	1.97	1.52	0.15	0.00	1.23	1.81
Saturday	0.20	0.23	0.39	-0.25	0.65	0.17	0.14	0.24	-0.11	0.45
Bank holiday	-1.96	0.40	0.00	-2.74	-1.18	-1.89	0.28	0.00	-2.44	-1.34
seassin	0.23	0.10	0.02	0.03	0.43	0.34	0.05	0.00	0.24	0.44
seascos	0.42	0.10	0.00	0.22	0.63	0.28	0.06	0.00	0.15	0.40
seassin1	-0.01	0.08	0.88	-0.17	0.15	0.05	0.05	0.30	-0.05	0.16
seascos1	0.17	0.07	0.02	0.03	0.32	0.16	0.05	0.00	0.06	0.26
NOD max lag0	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.02	0.00	0.00
NOD max lag1	0.00	0.00	0.92	0.00	0.00	0.00	0.00	0.58	0.00	0.00
NOD max lag2	0.00	0.00	0.17	0.00	0.00	0.00	0.00	0.07	0.00	0.00
NOD max lag3	0.00	0.00	0.19	0.00	0.00	0.00	0.00	0.59	0.00	0.00
NOD max lag4	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.81	0.00	0.00
NOD max lag5	0.00	0.00	0.60	0.00	0.00	0.00	0.00	0.32	0.00	0.00
NOD max lag6	0.00	0.00	0.80	0.00	0.00	0.00	0.00	0.29	0.00	0.00
NOD max lag7	0.00	0.00	0.68	0.00	0.00	0.00	0.00	0.20	0.00	0.00

Table G. 8: England and Wales Acute Visits Non-asthmatics - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	1.31	0.12	0.00	1.07	1.54	1.30	0.09	0.00	1.12	1.47
Monday	1.11	0.13	0.00	0.85	1.36	1.10	0.09	0.00	0.93	1.27
Tuesday	0.93	0.13	0.00	0.67	1.18	0.92	0.09	0.00	0.75	1.10
Wednesday	0.91	0.14	0.00	0.64	1.17	0.91	0.09	0.00	0.74	1.08
Thursday	0.76	0.14	0.00	0.49	1.02	0.75	0.09	0.00	0.58	0.92
Friday	0.11	0.16	0.49	-0.20	0.42	0.11	0.09	0.22	-0.06	0.28
Saturday	-1.22	0.32	0.00	-1.85	-0.59	-1.18	0.18	0.00	-1.53	-0.83
Bank holiday	0.12	0.06	0.06	-0.01	0.24	0.16	0.03	0.00	0.09	0.22
seassin	0.23	0.06	0.00	0.10	0.35	0.23	0.03	0.00	0.16	0.29
seascos	-0.02	0.04	0.71	-0.10	0.07	0.00	0.03	0.91	-0.06	0.07
seassin1	0.08	0.04	0.05	0.00	0.17	0.08	0.03	0.02	0.02	0.15
seascos1	0.14	0.31	0.65	-0.46	0.74	0.17	0.06	0.01	0.05	0.29
Model including mean measures of NOD										
constant	0.06	0.31	0.84	-0.55	0.67	-0.06	0.09	0.51	-0.23	0.11
Monday	1.32	0.12	0.00	1.09	1.56	1.29	0.09	0.00	1.11	1.48
Tuesday	1.11	0.13	0.00	0.85	1.37	1.08	0.09	0.00	0.89	1.27
Wednesday	0.93	0.13	0.00	0.67	1.19	0.90	0.09	0.00	0.72	1.09
Thursday	0.95	0.14	0.00	0.68	1.22	0.92	0.09	0.00	0.73	1.10
Friday	0.77	0.14	0.00	0.50	1.04	0.73	0.10	0.00	0.54	0.92
Saturday	0.13	0.16	0.41	-0.18	0.44	0.10	0.09	0.26	-0.08	0.29
Bank holiday	-1.18	0.33	0.00	-1.82	-0.54	-1.14	0.18	0.00	-1.49	-0.79
seassin	0.12	0.06	0.05	0.00	0.25	0.17	0.03	0.00	0.11	0.24
seascos	0.21	0.06	0.00	0.08	0.33	0.14	0.04	0.00	0.06	0.22
seassin1	-0.01	0.04	0.80	-0.10	0.07	0.02	0.03	0.54	-0.04	0.09
seascos1	0.09	0.04	0.04	0.00	0.17	0.08	0.03	0.01	0.02	0.15
NOD mean	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.03	0.00	0.00
NOD mean	0.00	0.00	0.62	0.00	0.00	0.00	0.00	0.42	0.00	0.00
NOD mean	0.00	0.00	0.76	0.00	0.00	0.00	0.00	0.53	0.00	0.00
NOD mean	0.00	0.00	0.44	0.00	0.00	0.00	0.00	0.71	0.00	0.00
NOD mean	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.04	0.00	0.00
NOD mean	0.00	0.00	0.55	0.00	0.00	0.00	0.00	0.87	0.00	0.00
NOD mean	0.00	0.00	0.44	0.00	0.00	0.00	0.00	0.26	0.00	0.00
NOD mean	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.24	0.00	0.00
Model including maximum measures of NOD										
constant	0.10	0.30	0.75	-0.50	0.69	-0.07	0.09	0.42	-0.24	0.10
Monday	1.29	0.12	0.00	1.05	1.52	1.25	0.09	0.00	1.07	1.43
Tuesday	1.08	0.13	0.00	0.82	1.34	1.04	0.09	0.00	0.86	1.23
Wednesday	0.89	0.13	0.00	0.63	1.16	0.86	0.09	0.00	0.67	1.04
Thursday	0.89	0.14	0.00	0.62	1.16	0.86	0.09	0.00	0.68	1.04
Friday	0.71	0.14	0.00	0.44	0.98	0.67	0.09	0.00	0.49	0.86
Saturday	0.10	0.16	0.51	-0.20	0.41	0.08	0.09	0.37	-0.10	0.26
Bank holiday	-1.17	0.33	0.00	-1.81	-0.54	-1.13	0.18	0.00	-1.48	-0.78
seassin	0.13	0.06	0.05	0.00	0.25	0.18	0.03	0.00	0.11	0.24
seascos	0.20	0.07	0.00	0.07	0.33	0.12	0.04	0.01	0.04	0.20
seassin1	-0.01	0.04	0.79	-0.10	0.07	0.02	0.03	0.53	-0.04	0.09
seascos1	0.09	0.04	0.04	0.00	0.17	0.08	0.03	0.02	0.02	0.14
NOD max lag0	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOD max lag1	0.00	0.00	0.93	0.00	0.00	0.00	0.00	0.45	0.00	0.00
NOD max lag2	0.00	0.00	0.51	0.00	0.00	0.00	0.00	0.25	0.00	0.00
NOD max lag3	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.59	0.00	0.00
NOD max lag4	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.04	0.00	0.00
NOD max lag5	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.35	0.00	0.00
NOD max lag6	0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.08	0.00	0.00
NOD max lag7	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.84	0.00	0.00

Table G. 9: England and Wales Acute Visits Non-asthmatics - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	0.10	0.68	0.89	-1.23	1.42	0.10	0.10	0.30	-0.09	0.29
Monday	1.22	0.24	0.00	0.75	1.68	1.21	0.14	0.00	0.94	1.49
Tuesday	0.91	0.24	0.00	0.44	1.39	0.91	0.14	0.00	0.64	1.18
Wednesday	0.69	0.23	0.00	0.23	1.14	0.69	0.14	0.00	0.41	0.96
Thursday	0.67	0.24	0.00	0.21	1.14	0.67	0.14	0.00	0.40	0.94
Friday	0.86	0.24	0.00	0.39	1.33	0.85	0.14	0.00	0.58	1.13
Saturday	0.11	0.29	0.71	-0.46	0.68	0.11	0.14	0.45	-0.17	0.38
Bank holiday	-0.75	0.38	0.05	-1.50	0.00	-0.74	0.28	0.01	-1.29	-0.18
seassin	0.12	0.07	0.06	-0.01	0.25	0.16	0.05	0.00	0.06	0.26
seascos	0.22	0.06	0.00	0.10	0.35	0.22	0.05	0.00	0.11	0.32
seassin1	0.01	0.07	0.91	-0.12	0.14	0.02	0.05	0.64	-0.08	0.13
seascos1	0.09	0.06	0.15	-0.03	0.20	0.08	0.05	0.13	-0.02	0.18
Model including mean measures of NOD										
constant	0.13	0.68	0.85	-1.21	1.47	0.05	0.14	0.73	-0.22	0.32
Monday	1.17	0.24	0.00	0.70	1.64	1.16	0.15	0.00	0.86	1.45
Tuesday	0.91	0.25	0.00	0.42	1.40	0.89	0.15	0.00	0.59	1.19
Wednesday	0.62	0.24	0.01	0.15	1.09	0.61	0.15	0.00	0.31	0.90
Thursday	0.58	0.24	0.02	0.11	1.05	0.56	0.15	0.00	0.26	0.85
Friday	0.81	0.25	0.00	0.33	1.30	0.79	0.15	0.00	0.49	1.09
Saturday	0.06	0.29	0.83	-0.50	0.63	0.05	0.15	0.72	-0.23	0.34
Bank holiday	-0.78	0.40	0.05	-1.56	-0.01	-0.77	0.29	0.01	-1.33	-0.20
seassin	0.12	0.07	0.07	-0.01	0.25	0.16	0.05	0.00	0.06	0.27
seascos	0.22	0.07	0.00	0.08	0.36	0.18	0.06	0.01	0.05	0.30
seassin1	0.01	0.07	0.90	-0.12	0.14	0.03	0.05	0.55	-0.07	0.14
seascos1	0.08	0.06	0.16	-0.03	0.20	0.08	0.05	0.14	-0.03	0.18
NOD mean	0.00	0.00	0.95	0.00	0.00	0.00	0.00	0.80	0.00	0.00
NOD mean	0.00	0.00	0.27	0.00	0.00	0.00	0.00	0.51	0.00	0.00
NOD mean	0.00	0.00	0.26	0.00	0.00	0.00	0.00	0.28	0.00	0.00
NOD mean	0.00	0.00	0.75	0.00	0.00	0.00	0.00	0.88	0.00	0.00
NOD mean	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.14	0.00	0.00
NOD mean	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.42	0.00	0.00
NOD mean	0.00	0.00	0.50	0.00	0.00	0.00	0.00	0.71	0.00	0.00
NOD mean	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.03	0.00	0.00
Model including maximum measures of NOD										
constant	-0.01	0.26	0.98	-0.52	0.51	-0.02	0.14	0.89	-0.29	0.26
Monday	1.21	0.26	0.00	0.70	1.71	1.20	0.15	0.00	0.91	1.49
Tuesday	0.90	0.26	0.00	0.39	1.41	0.90	0.15	0.00	0.61	1.20
Wednesday	0.62	0.25	0.01	0.13	1.11	0.62	0.15	0.00	0.33	0.92
Thursday	0.60	0.25	0.02	0.11	1.09	0.60	0.15	0.00	0.30	0.89
Friday	0.85	0.25	0.00	0.36	1.35	0.85	0.15	0.00	0.55	1.14
Saturday	0.09	0.30	0.77	-0.50	0.67	0.09	0.15	0.55	-0.20	0.37
Bank holiday	-0.78	0.40	0.05	-1.56	-0.01	-0.76	0.29	0.01	-1.32	-0.20
seassin	0.17	0.07	0.02	0.02	0.31	0.17	0.05	0.00	0.06	0.27
seascos	0.17	0.08	0.04	0.01	0.32	0.16	0.07	0.02	0.03	0.29
seassin1	0.03	0.07	0.67	-0.11	0.18	0.03	0.05	0.54	-0.07	0.14
seascos1	0.08	0.07	0.23	-0.05	0.21	0.08	0.05	0.14	-0.03	0.18
NOD max lag0	0.00	0.00	0.95	0.00	0.00	0.00	0.00	0.92	0.00	0.00
NOD max lag1	0.00	0.00	0.92	0.00	0.00	0.00	0.00	0.95	0.00	0.00
NOD max lag2	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.30	0.00	0.00
NOD max lag3	0.00	0.00	0.78	0.00	0.00	0.00	0.00	0.85	0.00	0.00
NOD max lag4	0.00	0.00	0.13	0.00	0.00	0.00	0.00	0.13	0.00	0.00
NOD max lag5	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.12	0.00	0.00
NOD max lag6	0.00	0.00	0.83	0.00	0.00	0.00	0.00	0.96	0.00	0.00
NOD max lag7	0.00	0.00	0.16	0.00	0.00	0.00	0.00	0.17	0.00	0.00

Table G. 10: England and Wales Casualty Counts Asthmatics - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	1.86	3.43	0.59	-4.86	8.58	3.01	0.22	0.00	2.58	3.44
Monday	3.79	0.25	0.00	3.29	4.28	3.82	0.32	0.00	3.20	4.44
Tuesday	4.50	0.28	0.00	3.95	5.05	4.52	0.31	0.00	3.91	5.13
Wednesday	4.13	0.29	0.00	3.56	4.70	4.15	0.31	0.00	3.54	4.76
Thursday	3.98	0.28	0.00	3.43	4.53	4.00	0.31	0.00	3.39	4.61
Friday	3.74	0.28	0.00	3.19	4.28	3.77	0.31	0.00	3.15	4.38
Saturday	0.03	0.28	0.90	-0.52	0.58	0.05	0.31	0.86	-0.56	0.67
Bank holiday	-4.01	0.52	0.00	-5.03	-2.99	-4.19	0.64	0.00	-5.44	-2.95
seassin	0.05	0.24	0.84	-0.42	0.51	-0.24	0.12	0.04	-0.47	-0.01
seascos	-0.55	0.22	0.01	-0.98	-0.12	-0.48	0.12	0.00	-0.71	-0.25
seassin1	-0.41	0.14	0.00	-0.69	-0.13	-0.55	0.12	0.00	-0.78	-0.32
seascos1	-0.16	0.14	0.26	-0.44	0.12	-0.09	0.12	0.43	-0.33	0.14
Model including Minimum measures of O_3										
constant	1.54	3.49	0.66	-5.30	8.38	3.08	0.30	0.00	2.49	3.66
Monday	3.81	0.26	0.00	3.30	4.32	3.82	0.33	0.00	3.18	4.47
Tuesday	4.45	0.29	0.00	3.87	5.03	4.45	0.33	0.00	3.81	5.09
Wednesday	4.15	0.30	0.00	3.56	4.73	4.14	0.32	0.00	3.50	4.77
Thursday	3.97	0.29	0.00	3.39	4.54	3.96	0.32	0.00	3.32	4.59
Friday	3.68	0.30	0.00	3.10	4.26	3.69	0.33	0.00	3.05	4.33
Saturday	0.01	0.29	0.98	-0.55	0.57	0.00	0.32	0.99	-0.63	0.64
Bank holiday	-3.97	0.52	0.00	-4.99	-2.94	-4.16	0.64	0.00	-5.41	-2.91
seassin	-0.04	0.24	0.86	-0.52	0.43	-0.23	0.13	0.08	-0.49	0.03
seascos	-0.47	0.22	0.03	-0.91	-0.04	-0.49	0.13	0.00	-0.74	-0.24
seassin1	-0.41	0.14	0.00	-0.69	-0.13	-0.55	0.12	0.00	-0.78	-0.32
seascos1	-0.18	0.14	0.20	-0.46	0.10	-0.09	0.12	0.44	-0.33	0.14
min lag0	0.00	0.01	0.77	-0.01	0.01	0.00	0.01	0.71	-0.02	0.01
O_3 min lag1	0.00	0.00	0.47	-0.01	0.01	-0.01	0.01	0.38	-0.02	0.01
O_3 min lag2	0.01	0.01	0.10	0.00	0.02	0.01	0.01	0.43	-0.01	0.02
O_3 min lag3	0.00	0.01	0.97	-0.01	0.01	0.00	0.01	0.66	-0.02	0.01
O_3 min lag4	0.00	0.01	0.65	-0.01	0.01	0.00	0.01	0.92	-0.01	0.01
O_3 min lag5	0.01	0.01	0.12	0.00	0.02	0.00	0.01	0.54	-0.01	0.02
O_3 min lag6	0.00	0.01	0.58	-0.01	0.01	0.00	0.01	0.92	-0.01	0.01
O_3 min lag7	0.00	0.01	0.92	-0.01	0.01	0.00	0.01	0.79	-0.02	0.01
Model including Sun										
constant	1.72	3.46	0.62	-5.05	8.49	3.26	0.35	0.00	2.57	3.95
Monday	3.78	0.25	0.00	3.29	4.27	3.82	0.32	0.00	3.20	4.44
Tuesday	4.49	0.28	0.00	3.94	5.04	4.52	0.31	0.00	3.90	5.13
Wednesday	4.14	0.29	0.00	3.58	4.71	4.16	0.31	0.00	3.55	4.77
Thursday	3.99	0.28	0.00	3.44	4.55	4.02	0.31	0.00	3.40	4.63
Friday	3.74	0.28	0.00	3.19	4.29	3.77	0.31	0.00	3.16	4.38
Saturday	0.04	0.28	0.88	-0.50	0.59	0.06	0.31	0.84	-0.55	0.68
Bank holiday	-4.00	0.53	0.00	-5.04	-2.96	-4.17	0.64	0.00	-5.42	-2.92
seassin	0.05	0.24	0.85	-0.42	0.51	-0.23	0.12	0.06	-0.46	0.00
seascos	-0.50	0.24	0.04	-0.97	-0.03	-0.59	0.17	0.00	-0.93	-0.26
seassin1	-0.42	0.14	0.00	-0.70	-0.14	-0.54	0.12	0.00	-0.77	-0.31
seascos1	-0.15	0.14	0.28	-0.44	0.13	-0.11	0.12	0.36	-0.34	0.13
Sun lag0	0.01	0.02	0.45	-0.02	0.05	0.00	0.02	0.97	-0.05	0.05
Sun lag1	0.00	0.02	0.84	-0.04	0.03	-0.01	0.03	0.58	-0.06	0.04
Sun lag2	-0.02	0.02	0.41	-0.05	0.02	-0.02	0.03	0.41	-0.07	0.03
Sun lag3	0.00	0.02	0.85	-0.04	0.03	-0.01	0.03	0.62	-0.06	0.04
Sun lag4	0.01	0.02	0.74	-0.03	0.04	0.00	0.03	0.91	-0.05	0.05
Sun lag5	-0.01	0.02	0.46	-0.05	0.02	-0.02	0.03	0.42	-0.07	0.03
Sun lag6	0.03	0.02	0.09	0.00	0.07	0.02	0.03	0.44	-0.03	0.07
Sun lag7	0.01	0.02	0.73	-0.03	0.04	0.00	0.02	0.96	-0.05	0.05

Table G. 11: England and Wales Casualty Counts Non-asthmatics - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	1.21	2.53	0.63	-3.74	6.17	2.03	0.16	0.00	1.71	2.35
Monday	2.45	0.21	0.00	2.03	2.86	2.46	0.23	0.00	2.00	2.92
Tuesday	2.98	0.21	0.00	2.57	3.40	2.99	0.23	0.00	2.54	3.44
Wednesday	2.52	0.23	0.00	2.08	2.97	2.53	0.23	0.00	2.08	2.98
Thursday	2.48	0.23	0.00	2.03	2.93	2.49	0.23	0.00	2.04	2.94
Friday	2.49	0.22	0.00	2.06	2.92	2.51	0.23	0.00	2.06	2.96
Saturday	-0.03	0.23	0.89	-0.49	0.42	-0.02	0.23	0.93	-0.47	0.43
Bank holiday	-2.69	0.53	0.00	-3.72	-1.65	-2.75	0.47	0.00	-3.67	-1.83
seassin	0.19	0.15	0.20	-0.10	0.49	0.00	0.09	1.00	-0.17	0.17
seascos	-0.58	0.14	0.00	-0.86	-0.30	-0.53	0.09	0.00	-0.70	-0.36
seassin1	-0.22	0.09	0.02	-0.40	-0.03	-0.31	0.09	0.00	-0.48	-0.13
seascos1	-0.13	0.10	0.18	-0.32	0.06	-0.08	0.09	0.34	-0.25	0.09
Model including Minimum measures of O_3										
constant	1.26	2.52	0.62	-3.67	6.20	2.28	0.22	0.00	1.85	2.71
Monday	2.43	0.22	0.00	2.00	2.86	2.43	0.24	0.00	1.96	2.91
Tuesday	3.04	0.22	0.00	2.61	3.46	3.02	0.24	0.00	2.55	3.49
Wednesday	2.61	0.23	0.00	2.15	3.07	2.59	0.24	0.00	2.12	3.06
Thursday	2.46	0.24	0.00	2.00	2.93	2.45	0.24	0.00	1.98	2.92
Friday	2.50	0.23	0.00	2.05	2.95	2.49	0.24	0.00	2.02	2.96
Saturday	0.00	0.24	0.99	-0.46	0.46	0.00	0.24	0.99	-0.47	0.46
Bank holiday	-2.72	0.53	0.00	-3.75	-1.69	-2.80	0.47	0.00	-3.72	-1.87
seassin	0.21	0.16	0.19	-0.10	0.53	0.08	0.10	0.39	-0.11	0.28
seascos	-0.59	0.15	0.00	-0.88	-0.31	-0.60	0.09	0.00	-0.78	-0.41
seassin1	-0.22	0.10	0.03	-0.40	-0.03	-0.31	0.09	0.00	-0.48	-0.14
seascos1	-0.12	0.10	0.20	-0.31	0.06	-0.07	0.09	0.45	-0.24	0.10
O_3 min lag0	0.00	0.00	0.47	-0.01	0.01	0.00	0.01	0.90	-0.01	0.01
O_3 min lag1	0.00	0.00	0.39	0.00	0.01	0.00	0.01	0.74	-0.01	0.01
O_3 min lag2	0.00	0.00	0.41	-0.01	0.00	0.00	0.01	0.35	-0.02	0.01
O_3 min lag3	-0.01	0.00	0.02	-0.02	0.00	-0.01	0.01	0.04	-0.02	0.00
O_3 min lag4	0.00	0.00	0.24	0.00	0.01	0.00	0.01	0.53	-0.01	0.01
O_3 min lag5	0.00	0.00	0.58	-0.01	0.01	0.00	0.01	0.92	-0.01	0.01
O_3 min lag6	0.00	0.00	0.59	-0.01	0.01	0.00	0.01	0.44	-0.01	0.01
O_3 min lag7	0.00	0.00	0.58	-0.01	0.01	0.00	0.01	0.37	-0.01	0.01
Model including Sun										
constant	0.93	2.54	0.71	-4.04	5.91	2.02	0.26	0.00	1.51	2.53
Monday	2.43	0.21	0.00	2.01	2.84	2.44	0.23	0.00	1.99	2.90
Tuesday	2.97	0.21	0.00	2.56	3.39	2.99	0.23	0.00	2.53	3.44
Wednesday	2.53	0.22	0.00	2.10	2.97	2.54	0.23	0.00	2.09	2.99
Thursday	2.49	0.23	0.00	2.04	2.94	2.50	0.23	0.00	2.05	2.95
Friday	2.49	0.22	0.00	2.07	2.92	2.51	0.23	0.00	2.06	2.96
Saturday	-0.02	0.23	0.92	-0.47	0.43	-0.01	0.23	0.97	-0.46	0.44
Bank holiday	-2.69	0.53	0.00	-3.72	-1.65	-2.73	0.47	0.00	-3.66	-1.81
seassin	0.19	0.15	0.20	-0.10	0.49	0.01	0.09	0.93	-0.16	0.18
seascos	-0.47	0.17	0.01	-0.79	-0.14	-0.52	0.13	0.00	-0.77	-0.28
seassin1	-0.22	0.09	0.02	-0.41	-0.03	-0.30	0.09	0.00	-0.47	-0.13
seascos1	-0.11	0.10	0.24	-0.30	0.07	-0.08	0.09	0.36	-0.25	0.09
Sun lag0	0.01	0.01	0.41	-0.02	0.04	0.00	0.02	0.79	-0.03	0.04
Sun lag1	-0.02	0.02	0.18	-0.05	0.01	-0.03	0.02	0.15	-0.06	0.01
Sun lag2	-0.01	0.01	0.60	-0.04	0.02	-0.01	0.02	0.46	-0.05	0.02
Sun lag3	0.01	0.01	0.55	-0.02	0.04	0.00	0.02	0.89	-0.03	0.04
Sun lag4	0.00	0.02	0.88	-0.03	0.03	-0.01	0.02	0.74	-0.04	0.03
Sun lag5	-0.01	0.01	0.37	-0.04	0.02	-0.02	0.02	0.33	-0.06	0.02
Sun lag6	0.04	0.01	0.01	0.01	0.07	0.04	0.02	0.06	0.00	0.07
Sun lag7	0.03	0.01	0.04	0.00	0.06	0.02	0.02	0.18	-0.01	0.06

Table G. 12: England and Wales Casualty Counts Excess - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	L CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	0.57	1.65	0.73	-2.67	3.81	0.98	0.19	0.00	0.60	1.36
Monday	1.35	0.30	0.00	0.76	1.94	1.36	0.28	0.00	0.82	1.90
Tuesday	1.52	0.29	0.00	0.94	2.10	1.53	0.27	0.00	0.99	2.06
Wednesday	1.62	0.31	0.00	1.00	2.23	1.62	0.27	0.00	1.09	2.16
Thursday	1.51	0.31	0.00	0.89	2.12	1.51	0.27	0.00	0.98	2.05
Friday	1.25	0.30	0.00	0.65	1.85	1.26	0.27	0.00	0.72	1.79
Saturday	0.07	0.34	0.85	-0.61	0.74	0.07	0.27	0.79	-0.46	0.61
Bank holiday	-1.37	0.75	0.07	-2.84	0.09	-1.45	0.56	0.01	-2.54	-0.35
seassin	-0.14	0.13	0.26	-0.39	0.10	-0.24	0.10	0.02	-0.44	-0.04
seascos	0.03	0.12	0.84	-0.22	0.27	0.05	0.10	0.64	-0.15	0.25
seassin1	-0.20	0.11	0.08	-0.42	0.02	-0.24	0.10	0.02	-0.45	-0.04
seascos1	-0.03	0.11	0.76	-0.25	0.18	-0.01	0.10	0.91	-0.21	0.19
Model including Minimum measures of O_3										
constant	0.26	1.70	0.88	-3.08	3.59	0.80	0.26	0.00	0.29	1.31
Monday	1.38	0.31	0.00	0.77	1.99	1.39	0.29	0.00	0.83	1.95
Tuesday	1.43	0.31	0.00	0.83	2.03	1.42	0.28	0.00	0.87	1.98
Wednesday	1.55	0.32	0.00	0.92	2.19	1.55	0.28	0.00	0.99	2.10
Thursday	1.51	0.32	0.00	0.88	2.14	1.51	0.28	0.00	0.95	2.06
Friday	1.20	0.32	0.00	0.57	1.83	1.20	0.29	0.00	0.64	1.76
Saturday	0.01	0.35	0.98	-0.67	0.69	0.01	0.28	0.98	-0.54	0.56
Bank holiday	-1.29	0.75	0.08	-2.76	0.17	-1.36	0.56	0.02	-2.46	-0.27
seassin	-0.25	0.14	0.07	-0.52	0.02	-0.32	0.12	0.01	-0.54	-0.09
seascos	0.11	0.13	0.39	-0.14	0.37	0.11	0.11	0.32	-0.11	0.33
seassin1	-0.20	0.11	0.08	-0.42	0.02	-0.24	0.10	0.02	-0.45	-0.04
seascos1	-0.05	0.11	0.62	-0.27	0.16	-0.03	0.10	0.81	-0.23	0.18
O_3 min lag0	0.00	0.01	0.72	-0.01	0.01	0.00	0.01	0.59	-0.01	0.01
O_3 min lag1	-0.01	0.01	0.25	-0.02	0.00	-0.01	0.01	0.20	-0.02	0.00
O_3 min lag2	0.01	0.01	0.05	0.00	0.02	0.01	0.01	0.09	0.00	0.02
O_3 min lag3	0.01	0.01	0.15	0.00	0.02	0.01	0.01	0.22	0.00	0.02
O_3 min lag4	0.00	0.01	0.76	-0.01	0.01	0.00	0.01	0.67	-0.01	0.01
O_3 min lag5	0.00	0.01	0.44	-0.01	0.02	0.00	0.01	0.54	-0.01	0.02
O_3 min lag6	0.01	0.01	0.41	-0.01	0.02	0.00	0.01	0.44	-0.01	0.02
O_3 min lag7	0.00	0.01	0.53	-0.01	0.02	0.00	0.01	0.65	-0.01	0.01
Model including Sun										
constant	0.72	1.66	0.66	-2.53	3.97	1.24	0.31	0.00	0.63	1.84
Monday	1.36	0.30	0.00	0.76	1.95	1.37	0.28	0.00	0.83	1.92
Tuesday	1.53	0.30	0.00	0.95	2.10	1.53	0.27	0.00	0.99	2.07
Wednesday	1.62	0.32	0.00	1.00	2.23	1.62	0.27	0.00	1.08	2.16
Thursday	1.51	0.32	0.00	0.89	2.13	1.51	0.27	0.00	0.98	2.05
Friday	1.25	0.31	0.00	0.65	1.85	1.26	0.27	0.00	0.73	1.80
Saturday	0.06	0.34	0.85	-0.61	0.74	0.07	0.27	0.79	-0.47	0.61
Bank holiday	-1.36	0.75	0.07	-2.83	0.10	-1.44	0.56	0.01	-2.53	-0.34
seassin	-0.14	0.13	0.27	-0.39	0.11	-0.24	0.10	0.02	-0.44	-0.03
seascos	-0.04	0.17	0.80	-0.37	0.28	-0.07	0.15	0.64	-0.37	0.23
seassin1	-0.19	0.11	0.09	-0.42	0.03	-0.24	0.10	0.02	-0.44	-0.03
seascos1	-0.04	0.11	0.70	-0.26	0.17	-0.03	0.10	0.79	-0.23	0.18
Sun lag0	0.00	0.02	0.96	-0.04	0.04	0.00	0.02	0.85	-0.05	0.04
Sun lag1	0.02	0.02	0.46	-0.03	0.06	0.01	0.02	0.56	-0.03	0.06
Sun lag2	0.00	0.02	0.83	-0.05	0.04	-0.01	0.02	0.76	-0.05	0.04
Sun lag3	-0.01	0.02	0.56	-0.05	0.03	-0.02	0.02	0.49	-0.06	0.03
Sun lag4	0.01	0.02	0.74	-0.04	0.05	0.00	0.02	0.88	-0.04	0.05
Sun lag5	0.00	0.02	0.97	-0.04	0.04	0.00	0.02	0.92	-0.05	0.04
Sun lag6	-0.01	0.02	0.51	-0.06	0.03	-0.02	0.02	0.47	-0.06	0.03
Sun lag7	-0.02	0.02	0.34	-0.06	0.02	-0.02	0.02	0.29	-0.07	0.02

Table G. 13: England and Wales Emergency Consultations Asthmatics - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	10.53	0.37	0.00	9.80	11.26	10.64	0.35	0.00	9.96	11.32
Monday	7.91	0.46	0.00	7.01	8.81	7.93	0.34	0.00	7.26	8.60
Tuesday	6.80	0.47	0.00	5.88	7.72	6.79	0.34	0.00	6.12	7.46
Wednesday	6.32	0.48	0.00	5.37	7.26	6.33	0.34	0.00	5.67	7.00
Thursday	6.53	0.50	0.00	5.55	7.51	6.57	0.34	0.00	5.90	7.24
Friday	2.84	0.50	0.00	1.86	3.81	2.86	0.34	0.00	2.19	3.53
Saturday	-8.58	0.46	0.00	-9.49	-7.67	-9.47	0.70	0.00	-10.84	-8.10
Bank holiday	0.48	0.76	0.53	-1.01	1.97	0.37	0.13	0.00	0.12	0.62
seassin	0.93	0.70	0.19	-0.45	2.31	1.15	0.13	0.00	0.90	1.41
seascos	-0.34	0.47	0.46	-1.26	0.57	-0.44	0.13	0.00	-0.69	-0.19
seassin1	0.24	0.44	0.59	-0.63	1.11	0.36	0.13	0.01	0.11	0.62
seascos1	0.02	1.06	0.98	-2.05	2.09	0.23	0.24	0.35	-0.25	0.70
Model including mean measures of PM_{10}										
constant	-0.19	1.09	0.86	-2.32	1.94	-0.10	0.38	0.80	-0.85	0.65
Monday	10.43	0.38	0.00	9.69	11.17	10.56	0.35	0.00	9.86	11.26
Tuesday	7.79	0.47	0.00	6.87	8.70	7.83	0.36	0.00	7.13	8.53
Wednesday	6.73	0.48	0.00	5.79	7.68	6.76	0.36	0.00	6.06	7.46
Thursday	6.27	0.50	0.00	5.29	7.24	6.30	0.36	0.00	5.60	7.01
Friday	6.43	0.51	0.00	5.43	7.43	6.46	0.36	0.00	5.76	7.17
Saturday	2.84	0.50	0.00	1.86	3.81	2.85	0.35	0.00	2.17	3.54
Bank holiday	-8.57	0.47	0.00	-9.50	-7.65	-9.45	0.70	0.00	-10.82	-8.07
seassin	0.46	0.77	0.55	-1.04	1.96	0.34	0.13	0.01	0.09	0.60
seascos	0.92	0.71	0.19	-0.47	2.31	1.14	0.13	0.00	0.88	1.39
seassin1	-0.35	0.47	0.46	-1.27	0.57	-0.45	0.13	0.00	-0.70	-0.19
seascos1	0.26	0.45	0.56	-0.62	1.14	0.39	0.13	0.00	0.13	0.65
PM_{10} mean lag0	0.01	0.01	0.20	-0.01	0.02	0.01	0.01	0.36	-0.01	0.03
PM_{10} mean lag1	-0.01	0.01	0.42	-0.02	0.01	0.00	0.01	0.86	-0.02	0.02
PM_{10} mean lag2	-0.01	0.01	0.52	-0.02	0.01	0.00	0.01	0.68	-0.03	0.02
PM_{10} mean lag3	0.00	0.01	1.00	-0.01	0.01	0.00	0.01	0.85	-0.02	0.02
PM_{10} mean lag4	0.01	0.01	0.05	0.00	0.03	0.02	0.01	0.17	-0.01	0.04
PM_{10} mean lag5	-0.02	0.01	0.03	-0.03	0.00	-0.02	0.01	0.11	-0.04	0.00
PM_{10} mean lag6	0.02	0.01	0.06	0.00	0.03	0.01	0.01	0.21	-0.01	0.04
PM_{10} mean lag7	0.00	0.01	0.99	-0.01	0.01	0.00	0.01	0.90	-0.02	0.02
Model including grass										
constant	-0.08	1.05	0.94	-2.14	1.99	0.08	0.24	0.76	-0.40	0.55
Monday	10.51	0.37	0.00	9.78	11.24	10.60	0.35	0.00	9.92	11.28
Tuesday	7.88	0.46	0.00	6.97	8.78	7.90	0.34	0.00	7.23	8.57
Wednesday	6.77	0.47	0.00	5.85	7.70	6.78	0.34	0.00	6.11	7.45
Thursday	6.31	0.48	0.00	5.36	7.26	6.33	0.34	0.00	5.66	7.00
Friday	6.54	0.50	0.00	5.56	7.53	6.58	0.34	0.00	5.92	7.25
Saturday	2.86	0.50	0.00	1.88	3.83	2.88	0.34	0.00	2.21	3.55
Bank holiday	-8.54	0.46	0.00	-9.44	-7.65	-9.28	0.70	0.00	-10.65	-7.91
seassin	0.46	0.76	0.55	-1.03	1.95	0.34	0.13	0.01	0.09	0.59
seascos	1.13	0.72	0.11	-0.27	2.54	1.45	0.15	0.00	1.15	1.74
seassin1	-0.30	0.47	0.52	-1.22	0.62	-0.38	0.13	0.00	-0.63	-0.12
seascos1	0.06	0.45	0.89	-0.82	0.94	0.10	0.15	0.52	-0.19	0.38
Grass lag0	0.00	0.00	0.80	0.00	0.00	0.00	0.00	0.59	0.00	0.01
Grass lag1	0.00	0.00	0.04	0.00	0.01	0.00	0.00	0.17	0.00	0.01
Grass lag2	0.00	0.00	0.24	0.00	0.01	0.00	0.00	0.55	0.00	0.01
Grass lag3	0.00	0.00	0.45	0.00	0.01	0.00	0.00	0.67	0.00	0.01
Grass lag4	0.00	0.00	0.43	-0.01	0.00	0.00	0.00	0.93	-0.01	0.01
Grass lag5	0.00	0.00	0.34	-0.01	0.00	0.00	0.00	0.77	-0.01	0.01
Grass lag6	0.00	0.00	0.52	0.00	0.01	0.00	0.00	0.80	-0.01	0.01
Grass lag7	0.00	0.00	0.15	0.00	0.01	0.00	0.00	0.24	0.00	0.01

Table G. 14: England and Wales Emergency Consultations Non-asthmatics - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	-1.04	1.86	0.58	-4.68	2.59	0.15	0.15	0.30	-0.14	0.44
Monday	5.78	0.18	0.00	5.42	6.14	5.79	0.21	0.00	5.37	6.21
Tuesday	4.13	0.21	0.00	3.71	4.54	4.13	0.21	0.00	3.72	4.54
Wednesday	3.98	0.21	0.00	3.57	4.39	3.98	0.21	0.00	3.57	4.40
Thursday	3.51	0.22	0.00	3.08	3.94	3.52	0.21	0.00	3.10	3.93
Friday	3.69	0.22	0.00	3.26	4.12	3.70	0.21	0.00	3.29	4.11
Saturday	1.53	0.23	0.00	1.09	1.97	1.54	0.21	0.00	1.13	1.96
Bank holiday	-5.21	0.44	0.00	-6.08	-4.35	-5.28	0.43	0.00	-6.12	-4.43
seassin	0.58	0.15	0.00	0.29	0.88	0.41	0.08	0.00	0.26	0.57
seascos	0.43	0.15	0.00	0.15	0.72	0.49	0.08	0.00	0.33	0.64
seassin1	-0.21	0.10	0.03	-0.39	-0.02	-0.28	0.08	0.00	-0.44	-0.13
seascos1	0.17	0.09	0.06	-0.01	0.36	0.22	0.08	0.01	0.07	0.38
Model including mean measures of PM_{10}										
constant	-1.26	1.88	0.50	-4.94	2.42	0.09	0.24	0.71	-0.38	0.55
Monday	5.74	0.19	0.00	5.37	6.11	5.76	0.22	0.00	5.33	6.19
Tuesday	4.07	0.22	0.00	3.63	4.51	4.09	0.22	0.00	3.66	4.52
Wednesday	3.92	0.22	0.00	3.49	4.36	3.94	0.22	0.00	3.51	4.37
Thursday	3.45	0.23	0.00	3.00	3.90	3.48	0.22	0.00	3.04	3.91
Friday	3.61	0.23	0.00	3.17	4.06	3.64	0.22	0.00	3.21	4.07
Saturday	1.50	0.23	0.00	1.05	1.96	1.53	0.22	0.00	1.10	1.95
Bank holiday	-5.20	0.45	0.00	-6.07	-4.32	-5.26	0.43	0.00	-6.11	-4.42
seassin	0.56	0.15	0.00	0.27	0.86	0.40	0.08	0.00	0.25	0.56
seascos	0.43	0.15	0.00	0.14	0.71	0.48	0.08	0.00	0.33	0.64
seassin1	-0.21	0.10	0.03	-0.40	-0.02	-0.29	0.08	0.00	-0.44	-0.13
seascos1	0.20	0.10	0.04	0.01	0.38	0.23	0.08	0.00	0.07	0.39
PM_{10} mean lag0	0.01	0.00	0.27	0.00	0.02	0.00	0.01	0.55	-0.01	0.02
PM_{10} mean lag1	0.00	0.01	0.92	-0.01	0.01	0.00	0.01	0.87	-0.02	0.01
PM_{10} mean lag2	0.00	0.01	0.83	-0.01	0.01	0.00	0.01	0.92	-0.01	0.01
PM_{10} mean lag3	0.00	0.01	0.69	-0.01	0.01	0.00	0.01	0.67	-0.02	0.01
PM_{10} mean lag4	0.00	0.01	0.41	-0.01	0.02	0.00	0.01	0.55	-0.01	0.02
PM_{10} mean lag5	-0.01	0.01	0.35	-0.02	0.01	-0.01	0.01	0.38	-0.02	0.01
PM_{10} mean lag6	0.00	0.01	0.35	-0.01	0.02	0.00	0.01	0.53	-0.01	0.02
PM_{10} mean lag7	0.00	0.01	0.56	-0.01	0.01	0.00	0.01	0.82	-0.01	0.01
Model including grass										
constant	-1.14	1.91	0.55	-4.89	2.61	0.08	0.15	0.58	-0.21	0.38
Monday	5.76	0.18	0.00	5.40	6.11	5.76	0.21	0.00	5.34	6.18
Tuesday	4.12	0.21	0.00	3.70	4.53	4.12	0.21	0.00	3.71	4.53
Wednesday	3.97	0.21	0.00	3.56	4.38	3.97	0.21	0.00	3.56	4.38
Thursday	3.51	0.22	0.00	3.08	3.93	3.51	0.21	0.00	3.10	3.93
Friday	3.69	0.22	0.00	3.27	4.12	3.70	0.21	0.00	3.29	4.12
Saturday	1.53	0.23	0.00	1.08	1.97	1.54	0.21	0.00	1.13	1.95
Bank holiday	-5.16	0.44	0.00	-6.02	-4.30	-5.17	0.43	0.00	-6.02	-4.33
seassin	0.57	0.15	0.00	0.29	0.86	0.39	0.08	0.00	0.24	0.55
seascos	0.55	0.15	0.00	0.25	0.84	0.63	0.09	0.00	0.45	0.82
seassin1	-0.18	0.09	0.06	-0.36	0.01	-0.25	0.08	0.00	-0.41	-0.09
seascos1	0.07	0.10	0.48	-0.13	0.27	0.09	0.09	0.31	-0.08	0.27
Grass lag0	0.00	0.00	0.55	0.00	0.00	0.00	0.00	0.53	0.00	0.00
Grass lag1	0.00	0.00	0.07	0.00	0.01	0.00	0.00	0.12	0.00	0.01
Grass lag2	0.00	0.00	0.31	0.00	0.00	0.00	0.00	0.44	0.00	0.01
Grass lag3	0.00	0.00	0.05	-0.01	0.00	0.00	0.00	0.11	-0.01	0.00
Grass lag4	0.00	0.00	0.10	0.00	0.01	0.00	0.00	0.20	0.00	0.01
Grass lag5	0.00	0.00	0.54	0.00	0.00	0.00	0.00	0.55	0.00	0.01
Grass lag6	0.00	0.00	0.31	-0.01	0.00	0.00	0.00	0.36	-0.01	0.00
Grass lag7	0.00	0.00	0.42	0.00	0.00	0.00	0.00	0.39	0.00	0.00

Table G. 15: England and Wales Emergency Consultations Excess - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	L CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	0.01	0.78	0.99	-1.51	1.53	0.07	0.20	0.71	-0.31	0.46
Monday	4.81	0.49	0.00	3.85	5.77	4.85	0.28	0.00	4.30	5.40
Tuesday	3.81	0.54	0.00	2.76	4.86	3.80	0.28	0.00	3.26	4.35
Wednesday	2.82	0.51	0.00	1.81	3.82	2.81	0.28	0.00	2.27	3.35
Thursday	2.81	0.54	0.00	1.75	3.88	2.82	0.28	0.00	2.27	3.36
Friday	2.86	0.54	0.00	1.81	3.91	2.87	0.28	0.00	2.33	3.41
Saturday	1.31	0.59	0.03	0.16	2.46	1.32	0.28	0.00	0.78	1.86
Bank holiday	-3.89	1.06	0.00	-5.98	-1.81	-4.19	0.57	0.00	-5.30	-3.08
seassin	-0.03	0.38	0.95	-0.78	0.72	-0.04	0.10	0.70	-0.25	0.17
seascos	0.57	0.34	0.10	-0.10	1.25	0.66	0.11	0.00	0.46	0.87
seassin1	-0.13	0.27	0.62	-0.66	0.39	-0.15	0.10	0.14	-0.36	0.05
seascos1	0.09	0.25	0.73	-0.40	0.57	0.14	0.11	0.19	-0.07	0.35
Model including mean measures of PM_{10}										
constant	-0.10	0.80	0.90	-1.68	1.48	-0.19	0.31	0.55	-0.80	0.43
Monday	4.76	0.49	0.00	3.81	5.72	4.80	0.29	0.00	4.24	5.37
Tuesday	3.75	0.53	0.00	2.71	4.80	3.74	0.29	0.00	3.17	4.31
Wednesday	2.83	0.51	0.00	1.83	3.83	2.82	0.29	0.00	2.25	3.39
Thursday	2.83	0.54	0.00	1.77	3.89	2.83	0.29	0.00	2.26	3.40
Friday	2.82	0.53	0.00	1.77	3.86	2.82	0.29	0.00	2.25	3.39
Saturday	1.32	0.58	0.02	0.18	2.45	1.32	0.28	0.00	0.77	1.88
Bank holiday	-3.90	1.06	0.00	-5.99	-1.82	-4.18	0.57	0.00	-5.30	-3.07
seassin	-0.03	0.39	0.93	-0.79	0.73	-0.06	0.11	0.57	-0.27	0.15
seascos	0.57	0.35	0.10	-0.12	1.25	0.65	0.11	0.00	0.45	0.86
seassin1	-0.14	0.27	0.61	-0.66	0.38	-0.16	0.10	0.12	-0.37	0.04
seascos1	0.10	0.25	0.71	-0.40	0.59	0.16	0.11	0.13	-0.05	0.37
PM_{10} mean lag0	0.00	0.01	0.56	-0.01	0.02	0.01	0.01	0.50	-0.01	0.02
PM_{10} mean lag1	0.00	0.01	0.80	-0.02	0.02	0.00	0.01	0.93	-0.02	0.02
PM_{10} mean lag2	-0.01	0.01	0.48	-0.02	0.01	-0.01	0.01	0.56	-0.02	0.01
PM_{10} mean lag3	0.00	0.01	0.57	-0.01	0.02	0.01	0.01	0.58	-0.01	0.02
PM_{10} mean lag4	0.01	0.01	0.17	0.00	0.03	0.01	0.01	0.21	-0.01	0.03
PM_{10} mean lag5	-0.01	0.01	0.15	-0.03	0.00	-0.01	0.01	0.20	-0.03	0.01
PM_{10} mean lag6	0.01	0.01	0.28	-0.01	0.02	0.01	0.01	0.29	-0.01	0.03
PM_{10} mean lag7	0.00	0.01	0.71	-0.02	0.01	0.00	0.01	0.74	-0.02	0.01
Model including grass										
constant	-0.05	0.77	0.95	-1.55	1.46	-0.01	0.20	0.97	-0.40	0.38
Monday	4.81	0.48	0.00	3.87	5.76	4.84	0.28	0.00	4.29	5.40
Tuesday	3.79	0.53	0.00	2.76	4.83	3.78	0.28	0.00	3.24	4.33
Wednesday	2.81	0.51	0.00	1.82	3.80	2.81	0.28	0.00	2.26	3.35
Thursday	2.81	0.54	0.00	1.77	3.86	2.82	0.28	0.00	2.28	3.36
Friday	2.87	0.53	0.00	1.83	3.90	2.88	0.28	0.00	2.34	3.42
Saturday	1.33	0.58	0.02	0.19	2.47	1.34	0.28	0.00	0.79	1.88
Bank holiday	-3.87	1.06	0.00	-5.94	-1.80	-4.10	0.57	0.00	-5.22	-2.99
seassin	-0.03	0.38	0.93	-0.78	0.72	-0.05	0.10	0.60	-0.26	0.15
seascos	0.68	0.36	0.06	-0.03	1.39	0.81	0.12	0.00	0.57	1.05
seassin1	-0.12	0.27	0.66	-0.64	0.40	-0.13	0.11	0.23	-0.33	0.08
seascos1	-0.01	0.26	0.98	-0.51	0.50	0.00	0.12	0.98	-0.23	0.24
Grass lag0	0.00	0.00	0.96	0.00	0.00	0.00	0.00	0.86	0.00	0.00
Grass lag1	0.00	0.00	0.56	0.00	0.01	0.00	0.00	0.62	0.00	0.01
Grass lag2	0.00	0.00	0.93	0.00	0.00	0.00	0.00	0.88	0.00	0.01
Grass lag3	0.00	0.00	0.06	0.00	0.01	0.00	0.00	0.08	0.00	0.01
Grass lag4	0.00	0.00	0.16	-0.01	0.00	0.00	0.00	0.28	-0.01	0.00
Grass lag5	0.00	0.00	0.33	-0.01	0.00	0.00	0.00	0.42	-0.01	0.00
Grass lag6	0.00	0.00	0.29	0.00	0.01	0.00	0.00	0.31	0.00	0.01
Grass lag7	0.00	0.00	0.47	0.00	0.01	0.00	0.00	0.43	0.00	0.01

Table G. 16: England and Wales Emergency Counts Asthmatics - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	15.82	1.38	0.00	13.12	18.52	16.05	0.46	0.00	15.15	16.95
Monday	14.52	0.54	0.00	13.47	15.58	14.68	0.66	0.00	13.39	15.98
Tuesday	10.15	0.69	0.00	8.80	11.50	10.18	0.65	0.00	8.91	11.46
Wednesday	7.47	0.75	0.00	6.00	8.94	7.47	0.65	0.00	6.19	8.75
Thursday	6.01	0.75	0.00	4.53	7.49	6.06	0.65	0.00	4.78	7.33
Friday	5.57	0.74	0.00	4.12	7.02	5.62	0.65	0.00	4.35	6.90
Saturday	-0.19	0.66	0.77	-1.48	1.10	-0.15	0.65	0.82	-1.42	1.13
Bank holiday	-10.77	0.79	0.00	-12.31	-9.23	-12.37	1.33	0.00	-14.98	-9.77
seassin	1.29	1.34	0.34	-1.34	3.93	1.33	0.25	0.00	0.85	1.81
seascos	1.93	1.29	0.13	-0.59	4.45	2.25	0.25	0.00	1.76	2.73
seassin1	-1.14	0.92	0.22	-2.94	0.66	-1.14	0.25	0.00	-1.62	-0.66
seascos1	0.97	0.90	0.28	-0.79	2.73	1.13	0.25	0.00	0.65	1.62
Model including Minimum measures of NO_2										
constant	15.78	1.43	0.00	12.99	18.58	14.89	0.59	0.00	13.73	16.05
Monday	14.39	0.55	0.00	13.31	15.46	14.55	0.67	0.00	13.24	15.87
Tuesday	10.03	0.71	0.00	8.64	11.41	10.07	0.67	0.00	8.76	11.37
Wednesday	7.28	0.76	0.00	5.78	8.77	7.34	0.66	0.00	6.03	8.64
Thursday	5.71	0.77	0.00	4.20	7.22	5.79	0.67	0.00	4.49	7.09
Friday	5.36	0.76	0.00	3.87	6.85	5.40	0.67	0.00	4.09	6.71
Saturday	-0.40	0.67	0.55	-1.71	0.91	-0.40	0.66	0.55	-1.70	0.90
Bank holiday	-10.80	0.79	0.00	-12.35	-9.25	-12.61	1.33	0.00	-15.22	-10.00
seassin	1.29	1.35	0.34	-1.35	3.94	1.34	0.25	0.00	0.85	1.82
seascos	1.89	1.29	0.15	-0.65	4.42	1.98	0.26	0.00	1.47	2.48
seassin1	-1.13	0.92	0.22	-2.92	0.67	-1.09	0.25	0.00	-1.58	-0.61
seascos1	0.97	0.90	0.28	-0.79	2.73	1.20	0.25	0.00	0.71	1.68
NO_2 min lag0	0.03	0.02	0.08	0.00	0.06	0.04	0.02	0.08	0.00	0.08
NO_2 min lag1	-0.03	0.02	0.10	-0.06	0.00	-0.02	0.02	0.39	-0.06	0.02
NO_2 min lag2	0.01	0.02	0.53	-0.02	0.04	0.03	0.02	0.25	-0.02	0.07
NO_2 min lag3	-0.01	0.02	0.61	-0.04	0.02	0.01	0.02	0.57	-0.03	0.06
NO_2 min lag4	-0.03	0.01	0.07	-0.06	0.00	-0.02	0.02	0.43	-0.06	0.03
NO_2 min lag5	0.03	0.02	0.11	-0.01	0.06	0.03	0.02	0.20	-0.02	0.07
NO_2 min lag6	-0.01	0.02	0.38	-0.04	0.02	-0.01	0.02	0.65	-0.05	0.03
NO_2 min lag7	0.03	0.01	0.05	0.00	0.06	0.04	0.02	0.05	0.00	0.08
Model including mean measures of NO_2										
constant	15.41	1.51	0.00	12.44	18.37	15.49	0.85	0.00	13.82	17.15
Monday	14.11	0.59	0.00	12.95	15.28	14.39	0.73	0.00	12.95	15.82
Tuesday	9.71	0.75	0.00	8.24	11.18	9.91	0.74	0.00	8.47	11.35
Wednesday	7.05	0.80	0.00	5.48	8.61	7.22	0.73	0.00	5.80	8.64
Thursday	5.46	0.81	0.00	3.88	7.05	5.66	0.73	0.00	4.23	7.09
Friday	5.28	0.80	0.00	3.70	6.85	5.40	0.74	0.00	3.95	6.85
Saturday	-0.45	0.70	0.52	-1.81	0.92	-0.41	0.71	0.57	-1.81	0.99
Bank holiday	-10.79	0.80	0.00	-12.35	-9.23	-12.40	1.34	0.00	-15.03	-9.76
seassin	1.28	1.35	0.34	-1.37	3.93	1.32	0.25	0.00	0.83	1.80
seascos	1.81	1.30	0.16	-0.74	4.36	2.12	0.27	0.00	1.58	2.66
seassin1	-1.10	0.92	0.23	-2.90	0.70	-1.11	0.25	0.00	-1.59	-0.62
seascos1	1.01	0.90	0.26	-0.75	2.77	1.18	0.25	0.00	0.69	1.68
NO_2 mean lag0	0.01	0.01	0.24	-0.01	0.04	0.01	0.02	0.55	-0.02	0.04
NO_2 mean lag1	-0.01	0.01	0.50	-0.03	0.02	-0.01	0.02	0.77	-0.04	0.03
NO_2 mean lag2	-0.01	0.01	0.65	-0.03	0.02	0.00	0.02	0.95	-0.04	0.03
NO_2 mean lag3	0.00	0.01	0.76	-0.02	0.03	0.01	0.02	0.64	-0.03	0.04
NO_2 mean lag4	-0.01	0.01	0.22	-0.04	0.01	-0.01	0.02	0.49	-0.05	0.02
NO_2 mean lag5	0.01	0.01	0.27	-0.01	0.04	0.01	0.02	0.48	-0.02	0.05
NO_2 mean lag6	0.00	0.01	0.99	-0.02	0.02	-0.01	0.02	0.75	-0.04	0.03
NO_2 mean lag7	0.02	0.01	0.12	0.00	0.04	0.02	0.02	0.28	-0.01	0.05

Table G. 17: England and Wales Emergency Counts Non-asthmatics - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
					Null model					
constant	8.47	0.75	0.00	7.01	9.94	8.55	0.30	0.00	7.96	9.14
Monday	8.37	0.37	0.00	7.64	9.10	8.42	0.43	0.00	7.57	9.27
Tuesday	6.24	0.46	0.00	5.34	7.15	6.28	0.43	0.00	5.44	7.11
Wednesday	5.01	0.48	0.00	4.07	5.95	5.01	0.43	0.00	4.17	5.84
Thursday	4.15	0.50	0.00	3.17	5.13	4.17	0.43	0.00	3.34	5.01
Friday	4.20	0.49	0.00	3.24	5.15	4.21	0.43	0.00	3.37	5.05
Saturday	0.02	0.45	0.96	-0.87	0.91	0.04	0.43	0.92	-0.79	0.88
Bank holiday	-7.30	0.79	0.00	-8.86	-5.74	-7.93	0.87	0.00	-9.64	-6.22
seassin	1.07	0.76	0.16	-0.41	2.55	1.08	0.16	0.00	0.76	1.39
seascos	0.58	0.72	0.42	-0.84	1.99	0.72	0.16	0.00	0.40	1.03
seassin1	-0.65	0.58	0.27	-1.79	0.49	-0.66	0.16	0.00	-0.97	-0.34
seascos1	0.59	0.58	0.32	-0.56	1.73	0.68	0.16	0.00	0.37	1.00
					Model including Minimum measures of NO_2					
constant	8.37	0.79	0.00	6.83	9.91	7.80	0.39	0.00	7.04	8.56
Monday	8.43	0.38	0.00	7.69	9.17	8.49	0.44	0.00	7.63	9.35
Tuesday	6.31	0.47	0.00	5.38	7.24	6.31	0.44	0.00	5.46	7.17
Wednesday	5.04	0.49	0.00	4.09	6.00	5.00	0.44	0.00	4.15	5.86
Thursday	4.23	0.51	0.00	3.24	5.22	4.20	0.44	0.00	3.34	5.06
Friday	4.28	0.50	0.00	3.30	5.25	4.21	0.44	0.00	3.35	5.07
Saturday	0.03	0.46	0.94	-0.86	0.93	-0.02	0.43	0.97	-0.87	0.84
Bank holiday	-7.27	0.80	0.00	-8.84	-5.71	-8.05	0.87	0.00	-9.76	-6.33
seassin	1.07	0.76	0.16	-0.42	2.56	1.08	0.16	0.00	0.76	1.40
seascos	0.57	0.72	0.43	-0.84	1.98	0.57	0.17	0.00	0.23	0.90
seassin1	-0.65	0.58	0.27	-1.79	0.50	-0.63	0.16	0.00	-0.95	-0.32
seascos1	0.59	0.59	0.31	-0.56	1.74	0.72	0.16	0.00	0.40	1.04
NO_2 min lag0	-0.01	0.01	0.64	-0.03	0.02	0.00	0.01	0.90	-0.02	0.03
NO_2 min lag1	0.01	0.01	0.40	-0.01	0.03	0.01	0.01	0.33	-0.01	0.04
NO_2 min lag2	0.00	0.01	0.81	-0.02	0.03	0.01	0.01	0.54	-0.02	0.04
NO_2 min lag3	-0.01	0.01	0.61	-0.03	0.02	0.00	0.01	0.94	-0.03	0.03
NO_2 min lag4	0.01	0.01	0.47	-0.01	0.03	0.01	0.01	0.46	-0.02	0.04
NO_2 min lag5	0.00	0.01	0.79	-0.02	0.03	0.01	0.01	0.73	-0.02	0.03
NO_2 min lag6	-0.01	0.01	0.34	-0.03	0.01	-0.01	0.01	0.71	-0.03	0.02
NO_2 min lag7	0.00	0.01	0.86	-0.02	0.02	0.02	0.01	0.20	-0.01	0.04
					Model including mean measures of NO_2					
constant	8.33	0.89	0.00	6.58	10.08	8.23	0.56	0.00	7.14	9.33
Monday	8.76	0.41	0.00	7.96	9.57	8.79	0.48	0.00	7.85	9.73
Tuesday	6.53	0.50	0.00	5.55	7.51	6.52	0.48	0.00	5.58	7.47
Wednesday	5.37	0.51	0.00	4.36	6.37	5.28	0.48	0.00	4.35	6.21
Thursday	4.60	0.53	0.00	3.57	5.64	4.53	0.48	0.00	3.59	5.47
Friday	4.55	0.53	0.00	3.52	5.58	4.46	0.48	0.00	3.51	5.41
Saturday	0.17	0.48	0.72	-0.77	1.12	0.13	0.47	0.78	-0.78	1.05
Bank holiday	-7.42	0.81	0.00	-9.00	-5.84	-8.06	0.88	0.00	-9.78	-6.33
seassin	1.07	0.76	0.16	-0.42	2.57	1.08	0.16	0.00	0.76	1.39
seascos	0.60	0.73	0.41	-0.82	2.03	0.70	0.18	0.00	0.35	1.05
seassin1	-0.65	0.58	0.26	-1.80	0.49	-0.66	0.16	0.00	-0.97	-0.34
seascos1	0.58	0.59	0.32	-0.57	1.73	0.69	0.16	0.00	0.37	1.01
NO_2 mean lag0	-0.02	0.01	0.04	-0.03	0.00	-0.02	0.01	0.08	-0.04	0.00
NO_2 mean lag1	0.01	0.01	0.12	0.00	0.03	0.02	0.01	0.19	-0.01	0.04
NO_2 mean lag2	0.00	0.01	0.87	-0.02	0.02	0.00	0.01	0.97	-0.02	0.02
NO_2 mean lag3	0.00	0.01	0.81	-0.02	0.02	0.00	0.01	0.91	-0.02	0.02
NO_2 mean lag4	0.01	0.01	0.24	-0.01	0.03	0.01	0.01	0.40	-0.01	0.03
NO_2 mean lag5	0.00	0.01	0.92	-0.02	0.02	0.00	0.01	0.97	-0.02	0.02
NO_2 mean lag6	-0.01	0.01	0.54	-0.02	0.01	-0.01	0.01	0.67	-0.03	0.02
NO_2 mean lag7	-0.01	0.01	0.42	-0.02	0.01	0.00	0.01	0.96	-0.02	0.02

Table G. 18: England and Wales Emergency Counts Excess - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	L CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	6.29	1.99	0.00	2.39	10.18	7.50	0.38	0.00	6.76	8.24
Monday	6.23	0.50	0.00	5.25	7.21	6.26	0.54	0.00	5.19	7.33
Tuesday	3.92	0.50	0.00	2.94	4.90	3.90	0.54	0.00	2.85	4.96
Wednesday	2.47	0.54	0.00	1.40	3.53	2.46	0.54	0.00	1.41	3.51
Thursday	1.87	0.54	0.00	0.81	2.94	1.88	0.54	0.00	0.83	2.93
Friday	1.41	0.53	0.01	0.37	2.44	1.41	0.53	0.01	0.36	2.46
Saturday	-0.21	0.58	0.72	-1.35	0.92	-0.19	0.54	0.72	-1.24	0.86
Bank holiday	-4.25	1.26	0.00	-6.72	-1.78	-4.45	1.09	0.00	-6.59	-2.30
seassin	0.31	0.31	0.32	-0.30	0.92	0.25	0.20	0.21	-0.14	0.65
seascos	1.47	0.29	0.00	0.90	2.04	1.53	0.20	0.00	1.13	1.93
seassin1	-0.46	0.27	0.09	-0.99	0.08	-0.48	0.20	0.02	-0.88	-0.09
seascos1	0.40	0.24	0.09	-0.07	0.88	0.45	0.20	0.03	0.05	0.85
Model including Minimum measures of NO_2										
constant	6.30	2.01	0.00	2.37	10.24	7.09	0.49	0.00	6.14	8.05
Monday	6.03	0.51	0.00	5.03	7.03	6.07	0.55	0.00	4.99	7.15
Tuesday	3.79	0.51	0.00	2.78	4.79	3.75	0.55	0.00	2.68	4.83
Wednesday	2.36	0.55	0.00	1.27	3.44	2.33	0.55	0.00	1.26	3.40
Thursday	1.60	0.56	0.00	0.51	2.70	1.59	0.55	0.00	0.52	2.67
Friday	1.23	0.54	0.02	0.16	2.29	1.19	0.55	0.03	0.11	2.27
Saturday	-0.37	0.58	0.53	-1.51	0.78	-0.38	0.55	0.48	-1.45	0.69
Bank holiday	-4.29	1.24	0.00	-6.73	-1.86	-4.57	1.10	0.00	-6.71	-2.42
seassin	0.31	0.31	0.33	-0.31	0.92	0.26	0.20	0.21	-0.14	0.65
seascos	1.45	0.31	0.00	0.84	2.05	1.41	0.21	0.00	0.99	1.83
seassin1	-0.45	0.27	0.10	-0.99	0.08	-0.46	0.20	0.02	-0.86	-0.06
seascos1	0.41	0.24	0.09	-0.07	0.89	0.48	0.20	0.02	0.08	0.88
NO_2 min lag0	0.03	0.02	0.08	0.00	0.06	0.03	0.02	0.04	0.00	0.07
NO_2 min lag1	-0.04	0.02	0.03	-0.07	0.00	-0.03	0.02	0.07	-0.07	0.00
NO_2 min lag2	0.01	0.02	0.38	-0.02	0.05	0.02	0.02	0.36	-0.02	0.05
NO_2 min lag3	0.01	0.02	0.63	-0.03	0.04	0.01	0.02	0.52	-0.02	0.05
NO_2 min lag4	-0.03	0.02	0.06	-0.07	0.00	-0.03	0.02	0.12	-0.07	0.01
NO_2 min lag5	0.02	0.02	0.22	-0.01	0.06	0.02	0.02	0.20	-0.01	0.06
NO_2 min lag6	-0.01	0.02	0.63	-0.04	0.02	0.00	0.02	0.80	-0.04	0.03
NO_2 min lag7	0.02	0.02	0.28	-0.01	0.05	0.02	0.02	0.19	-0.01	0.05
Model including mean measures of NO_2										
constant	6.15	2.06	0.00	2.11	10.19	7.25	0.70	0.00	5.88	8.62
Monday	5.56	0.56	0.00	4.46	6.66	5.60	0.60	0.00	4.42	6.78
Tuesday	3.40	0.57	0.00	2.28	4.52	3.39	0.60	0.00	2.20	4.57
Wednesday	1.94	0.60	0.00	0.77	3.11	1.94	0.60	0.00	0.77	3.11
Thursday	1.12	0.60	0.07	-0.07	2.30	1.12	0.60	0.06	-0.05	2.30
Friday	0.93	0.60	0.12	-0.24	2.11	0.94	0.61	0.12	-0.25	2.13
Saturday	-0.58	0.61	0.35	-1.78	0.63	-0.54	0.59	0.35	-1.69	0.61
Bank holiday	-4.14	1.24	0.00	-6.57	-1.70	-4.34	1.10	0.00	-6.50	-2.18
seassin	0.30	0.31	0.34	-0.31	0.91	0.24	0.20	0.23	-0.16	0.64
seascos	1.38	0.32	0.00	0.74	2.01	1.42	0.23	0.00	0.97	1.86
seassin1	-0.43	0.27	0.12	-0.97	0.11	-0.45	0.20	0.03	-0.85	-0.05
seascos1	0.44	0.25	0.07	-0.04	0.92	0.49	0.21	0.02	0.09	0.90
NO_2 mean lag0	0.03	0.01	0.03	0.00	0.05	0.03	0.01	0.03	0.00	0.05
NO_2 mean lag1	-0.02	0.01	0.10	-0.05	0.00	-0.02	0.01	0.16	-0.05	0.01
NO_2 mean lag2	0.00	0.01	0.94	-0.03	0.03	0.00	0.01	0.92	-0.03	0.03
NO_2 mean lag3	0.01	0.01	0.63	-0.02	0.03	0.01	0.01	0.63	-0.02	0.04
NO_2 mean lag4	-0.02	0.01	0.11	-0.05	0.00	-0.02	0.01	0.13	-0.05	0.01
NO_2 mean lag5	0.01	0.01	0.35	-0.01	0.04	0.01	0.01	0.37	-0.02	0.04
NO_2 mean lag6	0.00	0.01	0.87	-0.03	0.02	0.00	0.01	0.96	-0.03	0.03
NO_2 mean lag7	0.02	0.01	0.12	0.00	0.04	0.02	0.01	0.17	-0.01	0.04

Table G. 19: England and Wales Out of Hours Counts Asthmatics - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	12.53	0.26	0.00	12.02	13.04	12.54	0.22	0.00	12.11	12.97
Monday	-2.29	0.27	0.00	-2.82	-1.76	-2.29	0.31	0.00	-2.90	-1.68
Tuesday	-4.27	0.29	0.00	-4.85	-3.69	-4.29	0.31	0.00	-4.89	-3.68
Wednesday	-5.07	0.30	0.00	-5.67	-4.47	-5.08	0.31	0.00	-5.69	-4.48
Thursday	-5.86	0.32	0.00	-6.48	-5.24	-5.86	0.31	0.00	-6.46	-5.26
Friday	-6.31	0.32	0.00	-6.95	-5.68	-6.32	0.31	0.00	-6.92	-5.72
Saturday	-3.28	0.28	0.00	-3.82	-2.74	-3.28	0.31	0.00	-3.88	-2.67
Bank holiday	3.33	0.46	0.00	2.44	4.23	3.21	0.63	0.00	1.97	4.44
seassin	0.88	0.28	0.00	0.33	1.43	0.88	0.12	0.00	0.66	1.11
seascos	1.13	0.27	0.00	0.60	1.67	1.13	0.12	0.00	0.91	1.36
seassin1	-0.18	0.28	0.50	-0.72	0.36	-0.18	0.12	0.12	-0.41	0.05
seascos1	0.70	0.26	0.01	0.20	1.21	0.70	0.12	0.00	0.47	0.93
Model including mean measures of O_3										
constant	13.41	0.52	0.00	12.40	14.42	13.87	0.43	0.00	13.03	14.72
Monday	-2.53	0.29	0.00	-3.10	-1.96	-2.55	0.33	0.00	-3.21	-1.90
Tuesday	-4.45	0.32	0.00	-5.08	-3.82	-4.50	0.33	0.00	-5.16	-3.85
Wednesday	-5.23	0.33	0.00	-5.87	-4.59	-5.27	0.33	0.00	-5.91	-4.62
Thursday	-6.04	0.34	0.00	-6.70	-5.38	-6.08	0.33	0.00	-6.73	-5.43
Friday	-6.46	0.35	0.00	-7.14	-5.78	-6.52	0.34	0.00	-7.18	-5.86
Saturday	-3.40	0.29	0.00	-3.97	-2.83	-3.44	0.33	0.00	-4.08	-2.80
Bank holiday	3.30	0.47	0.00	2.38	4.22	3.20	0.63	0.00	1.96	4.44
seassin	1.02	0.30	0.00	0.45	1.60	1.12	0.14	0.00	0.85	1.38
seascos	0.96	0.29	0.00	0.39	1.53	0.86	0.14	0.00	0.59	1.14
seassin1	-0.19	0.27	0.49	-0.72	0.35	-0.19	0.12	0.11	-0.41	0.04
seascos1	0.71	0.25	0.01	0.21	1.20	0.70	0.12	0.00	0.48	0.93
O_3 mean lag0	-0.01	0.01	0.25	-0.02	0.00	-0.01	0.01	0.12	-0.02	0.00
O_3 mean lag1	0.01	0.01	0.15	0.00	0.02	0.01	0.01	0.30	-0.01	0.02
O_3 mean lag2	0.00	0.01	0.84	-0.01	0.01	0.00	0.01	0.76	-0.02	0.01
O_3 mean lag3	0.00	0.01	0.59	-0.02	0.01	-0.01	0.01	0.42	-0.02	0.01
O_3 mean lag4	0.00	0.01	0.90	-0.01	0.01	0.00	0.01	0.99	-0.01	0.01
O_3 mean lag5	-0.01	0.01	0.25	-0.02	0.01	-0.01	0.01	0.23	-0.02	0.01
O_3 mean lag6	0.00	0.01	0.76	-0.01	0.01	0.00	0.01	0.90	-0.01	0.01
O_3 mean lag7	-0.01	0.01	0.04	-0.02	0.00	-0.01	0.01	0.03	-0.03	0.00
Model including maximum measures of O_3										
constant	12.91	0.61	0.00	11.72	14.09	13.90	0.50	0.00	12.92	14.88
Monday	-2.44	0.28	0.00	-2.99	-1.89	-2.46	0.32	0.00	-3.09	-1.83
Tuesday	-4.45	0.31	0.00	-5.06	-3.85	-4.50	0.32	0.00	-5.14	-3.87
Wednesday	-5.20	0.32	0.00	-5.82	-4.58	-5.24	0.32	0.00	-5.86	-4.61
Thursday	-6.00	0.33	0.00	-6.64	-5.36	-6.04	0.32	0.00	-6.67	-5.42
Friday	-6.44	0.34	0.00	-7.11	-5.78	-6.51	0.32	0.00	-7.15	-5.88
Saturday	-3.33	0.28	0.00	-3.88	-2.78	-3.36	0.32	0.00	-3.98	-2.74
Bank holiday	3.30	0.47	0.00	2.38	4.21	3.18	0.63	0.00	1.94	4.42
seassin	0.91	0.29	0.00	0.34	1.48	1.03	0.13	0.00	0.78	1.29
seascos	1.08	0.30	0.00	0.50	1.66	0.91	0.14	0.00	0.64	1.19
seassin1	-0.19	0.28	0.50	-0.73	0.35	-0.18	0.12	0.12	-0.41	0.05
seascos1	0.70	0.26	0.01	0.19	1.21	0.68	0.12	0.00	0.45	0.91
O_3 max lag0	-0.01	0.00	0.21	-0.02	0.00	-0.01	0.00	0.05	-0.02	0.00
O_3 max lag1	0.01	0.00	0.13	0.00	0.02	0.00	0.01	0.37	-0.01	0.01
O_3 max lag2	0.00	0.00	0.39	-0.01	0.01	0.00	0.01	0.61	-0.01	0.01
O_3 max lag3	0.00	0.00	0.84	-0.01	0.01	0.00	0.01	0.46	-0.01	0.01
O_3 max lag4	0.00	0.01	0.92	-0.01	0.01	0.00	0.01	0.88	-0.01	0.01
O_3 max lag5	0.00	0.01	0.76	-0.01	0.01	0.00	0.01	0.65	-0.01	0.01
O_3 max lag6	0.00	0.00	0.68	-0.01	0.01	0.00	0.01	0.49	-0.01	0.01
O_3 max lag7	-0.01	0.00	0.21	-0.01	0.00	-0.01	0.00	0.11	-0.02	0.00

Table G. 20: England and Wales Out of Hours Counts Non-asthmatics - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	6.19	0.16	0.00	5.87	6.51	6.19	0.15	0.00	5.91	6.48
Monday	-1.11	0.19	0.00	-1.49	-0.74	-1.12	0.21	0.00	-1.53	-0.71
Tuesday	-1.95	0.21	0.00	-2.36	-1.54	-1.95	0.21	0.00	-2.35	-1.54
Wednesday	-2.42	0.21	0.00	-2.83	-2.01	-2.43	0.21	0.00	-2.83	-2.02
Thursday	-2.74	0.22	0.00	-3.17	-2.30	-2.74	0.21	0.00	-3.15	-2.33
Friday	-2.74	0.22	0.00	-3.18	-2.30	-2.75	0.21	0.00	-3.15	-2.34
Saturday	-1.58	0.20	0.00	-1.98	-1.19	-1.59	0.21	0.00	-1.99	-1.18
Bank holiday	1.26	0.45	0.01	0.39	2.14	1.28	0.42	0.00	0.45	2.11
seassin	0.51	0.15	0.00	0.22	0.80	0.51	0.08	0.00	0.35	0.66
seascos	0.54	0.14	0.00	0.27	0.80	0.53	0.08	0.00	0.38	0.69
seassin1	-0.07	0.14	0.60	-0.35	0.20	-0.07	0.08	0.35	-0.23	0.08
seascos1	0.46	0.14	0.00	0.19	0.74	0.46	0.08	0.00	0.31	0.61
Model including mean measures of O_3										
constant	6.64	0.35	0.00	5.96	7.32	6.76	0.29	0.00	6.20	7.33
Monday	-1.15	0.21	0.00	-1.56	-0.75	-1.18	0.22	0.00	-1.62	-0.74
Tuesday	-1.94	0.23	0.00	-2.40	-1.49	-1.96	0.23	0.00	-2.40	-1.52
Wednesday	-2.40	0.23	0.00	-2.84	-1.96	-2.42	0.22	0.00	-2.86	-1.99
Thursday	-2.71	0.23	0.00	-3.17	-2.25	-2.74	0.22	0.00	-3.17	-2.30
Friday	-2.70	0.25	0.00	-3.18	-2.22	-2.74	0.23	0.00	-3.18	-2.29
Saturday	-1.62	0.22	0.00	-2.04	-1.20	-1.63	0.22	0.00	-2.06	-1.20
Bank holiday	1.23	0.46	0.01	0.32	2.14	1.24	0.42	0.00	0.41	2.07
seassin	0.60	0.16	0.00	0.28	0.91	0.62	0.09	0.00	0.44	0.80
seascos	0.43	0.15	0.00	0.14	0.72	0.40	0.09	0.00	0.22	0.59
seassin1	-0.08	0.14	0.59	-0.35	0.20	-0.08	0.08	0.33	-0.23	0.08
seascos1	0.47	0.14	0.00	0.20	0.74	0.46	0.08	0.00	0.31	0.61
O_3 mean lag0	0.00	0.00	0.98	-0.01	0.01	0.00	0.00	0.98	-0.01	0.01
O_3 mean lag1	0.00	0.00	0.55	-0.01	0.01	0.00	0.00	0.58	-0.01	0.01
O_3 mean lag2	0.00	0.00	0.54	-0.01	0.01	0.00	0.00	0.55	-0.01	0.01
O_3 mean lag3	0.00	0.00	0.42	-0.01	0.01	0.00	0.00	0.33	-0.01	0.00
O_3 mean lag4	0.00	0.00	0.73	-0.01	0.01	0.00	0.00	0.74	-0.01	0.01
O_3 mean lag5	-0.01	0.00	0.18	-0.02	0.00	-0.01	0.00	0.19	-0.02	0.00
O_3 mean lag6	0.00	0.00	0.40	-0.01	0.01	0.00	0.00	0.47	-0.01	0.01
O_3 mean lag7	0.00	0.00	0.29	-0.01	0.00	-0.01	0.00	0.15	-0.01	0.00
Model including maximum measures of O_3										
constant	6.31	0.40	0.00	5.51	7.10	6.50	0.34	0.00	5.84	7.16
Monday	-1.13	0.20	0.00	-1.52	-0.73	-1.15	0.22	0.00	-1.57	-0.73
Tuesday	-1.95	0.22	0.00	-2.38	-1.51	-1.96	0.22	0.00	-2.39	-1.54
Wednesday	-2.39	0.22	0.00	-2.82	-1.96	-2.42	0.22	0.00	-2.84	-1.99
Thursday	-2.71	0.23	0.00	-3.15	-2.26	-2.73	0.22	0.00	-3.15	-2.31
Friday	-2.72	0.24	0.00	-3.18	-2.26	-2.75	0.22	0.00	-3.18	-2.33
Saturday	-1.56	0.21	0.00	-1.96	-1.15	-1.57	0.21	0.00	-1.99	-1.15
Bank holiday	1.22	0.46	0.01	0.32	2.12	1.23	0.42	0.00	0.40	2.06
seassin	0.52	0.16	0.00	0.21	0.83	0.54	0.09	0.00	0.37	0.71
seascos	0.51	0.15	0.00	0.21	0.80	0.47	0.09	0.00	0.29	0.66
seassin1	-0.07	0.14	0.60	-0.35	0.20	-0.07	0.08	0.34	-0.23	0.08
seascos1	0.46	0.14	0.00	0.19	0.74	0.45	0.08	0.00	0.30	0.61
O_3 max lag0	0.00	0.00	0.41	0.00	0.01	0.00	0.00	0.47	0.00	0.01
O_3 max lag1	0.00	0.00	0.53	0.00	0.01	0.00	0.00	0.56	0.00	0.01
O_3 max lag2	0.00	0.00	0.89	-0.01	0.01	0.00	0.00	0.89	-0.01	0.01
O_3 max lag3	0.00	0.00	0.75	-0.01	0.01	0.00	0.00	0.62	-0.01	0.01
O_3 max lag4	0.00	0.00	0.46	-0.01	0.00	0.00	0.00	0.46	-0.01	0.00
O_3 max lag5	0.00	0.00	0.85	-0.01	0.01	0.00	0.00	0.78	-0.01	0.01
O_3 max lag6	0.00	0.00	0.67	-0.01	0.01	0.00	0.00	0.51	-0.01	0.00
O_3 max lag7	0.00	0.00	0.52	-0.01	0.00	0.00	0.00	0.31	-0.01	0.00

Table G. 21: England and Wales Out of Hours Counts Excess - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	L CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
					Null model					
constant	6.35	0.20	0.00	5.95	6.74	6.35	0.22	0.00	5.91	6.78
Monday	-1.18	0.30	0.00	-1.76	-0.60	-1.17	0.32	0.00	-1.80	-0.54
Tuesday	-2.33	0.29	0.00	-2.90	-1.75	-2.34	0.32	0.00	-2.96	-1.72
Wednesday	-2.65	0.31	0.00	-3.26	-2.05	-2.65	0.32	0.00	-3.27	-2.04
Thursday	-3.12	0.31	0.00	-3.73	-2.52	-3.12	0.32	0.00	-3.74	-2.50
Friday	-3.57	0.31	0.00	-4.18	-2.97	-3.57	0.32	0.00	-4.19	-2.95
Saturday	-1.70	0.28	0.00	-2.25	-1.14	-1.69	0.32	0.00	-2.31	-1.07
Bank holiday	2.02	0.56	0.00	0.92	3.12	1.93	0.64	0.00	0.66	3.19
seassin	0.38	0.18	0.03	0.03	0.72	0.38	0.12	0.00	0.14	0.61
seascos	0.60	0.18	0.00	0.26	0.94	0.60	0.12	0.00	0.37	0.84
seassin1	-0.11	0.18	0.55	-0.46	0.25	-0.11	0.12	0.37	-0.34	0.13
seascos1	0.24	0.17	0.15	-0.09	0.57	0.24	0.12	0.04	0.01	0.48
					Model including mean measures of O_3					
constant	6.96	0.51	0.00	5.96	7.96	7.11	0.44	0.00	6.24	7.97
Monday	-1.38	0.32	0.00	-2.02	-0.75	-1.37	0.34	0.00	-2.04	-0.71
Tuesday	-2.52	0.32	0.00	-3.15	-1.88	-2.54	0.34	0.00	-3.22	-1.87
Wednesday	-2.84	0.33	0.00	-3.48	-2.19	-2.85	0.34	0.00	-3.51	-2.18
Thursday	-3.33	0.33	0.00	-3.98	-2.68	-3.34	0.34	0.00	-4.01	-2.68
Friday	-3.77	0.34	0.00	-4.43	-3.10	-3.78	0.35	0.00	-4.46	-3.10
Saturday	-1.79	0.30	0.00	-2.38	-1.20	-1.80	0.33	0.00	-2.46	-1.15
Bank holiday	2.04	0.57	0.00	0.93	3.15	1.96	0.65	0.00	0.69	3.23
seassin	0.47	0.20	0.02	0.08	0.86	0.50	0.14	0.00	0.23	0.77
seascos	0.49	0.20	0.02	0.09	0.89	0.46	0.14	0.00	0.18	0.74
seassin1	-0.11	0.18	0.54	-0.46	0.24	-0.11	0.12	0.36	-0.34	0.12
seascos1	0.24	0.17	0.15	-0.09	0.57	0.24	0.12	0.04	0.01	0.48
O_3 mean lag0	-0.01	0.01	0.21	-0.02	0.00	-0.01	0.01	0.13	-0.02	0.00
O_3 mean lag1	0.01	0.01	0.43	-0.01	0.02	0.00	0.01	0.52	-0.01	0.02
O_3 mean lag2	0.00	0.01	0.93	-0.01	0.01	0.00	0.01	0.93	-0.01	0.01
O_3 mean lag3	0.00	0.01	1.00	-0.01	0.01	0.00	0.01	0.88	-0.02	0.01
O_3 mean lag4	0.00	0.01	0.85	-0.01	0.02	0.00	0.01	0.82	-0.01	0.02
O_3 mean lag5	0.00	0.01	0.84	-0.02	0.01	0.00	0.01	0.76	-0.02	0.01
O_3 mean lag6	0.00	0.01	0.70	-0.02	0.01	0.00	0.01	0.73	-0.02	0.01
O_3 mean lag7	-0.01	0.01	0.21	-0.02	0.00	-0.01	0.01	0.21	-0.02	0.00
					Model including maximum measures of O_3					
constant	7.03	0.60	0.00	5.84	8.21	7.40	0.51	0.00	6.40	8.40
Monday	-1.32	0.31	0.00	-1.92	-0.71	-1.31	0.33	0.00	-1.95	-0.66
Tuesday	-2.52	0.31	0.00	-3.12	-1.91	-2.54	0.33	0.00	-3.19	-1.89
Wednesday	-2.81	0.32	0.00	-3.44	-2.19	-2.82	0.33	0.00	-3.46	-2.18
Thursday	-3.30	0.32	0.00	-3.93	-2.67	-3.31	0.33	0.00	-3.96	-2.67
Friday	-3.74	0.32	0.00	-4.37	-3.11	-3.76	0.33	0.00	-4.41	-3.11
Saturday	-1.78	0.29	0.00	-2.35	-1.21	-1.79	0.32	0.00	-2.43	-1.16
Bank holiday	2.04	0.56	0.00	0.93	3.14	1.95	0.65	0.00	0.68	3.22
seassin	0.45	0.19	0.02	0.07	0.82	0.49	0.13	0.00	0.24	0.75
seascos	0.50	0.20	0.01	0.11	0.90	0.44	0.14	0.00	0.16	0.72
seassin1	-0.11	0.18	0.55	-0.46	0.24	-0.11	0.12	0.37	-0.34	0.13
seascos1	0.23	0.17	0.17	-0.10	0.56	0.22	0.12	0.06	-0.01	0.46
O_3 max lag0	-0.01	0.01	0.05	-0.02	0.00	-0.01	0.00	0.02	-0.02	0.00
O_3 max lag1	0.00	0.01	0.45	-0.01	0.01	0.00	0.01	0.62	-0.01	0.01
O_3 max lag2	0.00	0.01	0.52	-0.01	0.01	0.00	0.01	0.55	-0.01	0.01
O_3 max lag3	0.00	0.01	0.85	-0.01	0.01	0.00	0.01	0.69	-0.01	0.01
O_3 max lag4	0.00	0.01	0.67	-0.01	0.01	0.00	0.01	0.74	-0.01	0.01
O_3 max lag5	0.00	0.01	0.58	-0.01	0.01	0.00	0.01	0.53	-0.01	0.01
O_3 max lag6	0.00	0.00	0.86	-0.01	0.01	0.00	0.01	0.81	-0.01	0.01
O_3 max lag7	0.00	0.00	0.43	-0.01	0.01	0.00	0.00	0.37	-0.01	0.01

Table G. 22: Trent Region All Counts Asthmatics - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	0.34	0.06	0.00	0.22	0.46	0.35	0.05	0.00	0.25	0.44
Monday	3.47	0.06	0.00	3.35	3.59	3.47	0.05	0.00	3.37	3.56
Tuesday	3.37	0.06	0.00	3.25	3.49	3.37	0.05	0.00	3.27	3.46
Wednesday	3.18	0.06	0.00	3.06	3.30	3.18	0.05	0.00	3.09	3.28
Thursday	3.22	0.06	0.00	3.09	3.34	3.22	0.05	0.00	3.12	3.31
Friday	3.22	0.06	0.00	3.09	3.34	3.22	0.05	0.00	3.12	3.31
Saturday	1.33	0.07	0.00	1.20	1.47	1.33	0.05	0.00	1.23	1.44
Bank holiday	-3.10	0.15	0.00	-3.38	-2.81	-3.10	0.11	0.00	-3.32	-2.88
seassin	0.03	0.01	0.00	0.01	0.04	0.03	0.01	0.00	0.02	0.04
seascos	0.07	0.01	0.00	0.06	0.09	0.07	0.01	0.00	0.06	0.08
seassin1	-0.07	0.01	0.00	-0.08	-0.06	-0.07	0.01	0.00	-0.08	-0.06
seascos1	0.03	0.01	0.00	0.01	0.04	0.02	0.01	0.00	0.01	0.03
Model including Minimum measures of NO										
constant	0.33	0.06	0.00	0.20	0.45	0.33	0.05	0.00	0.23	0.42
Monday	3.47	0.06	0.00	3.35	3.60	3.47	0.05	0.00	3.37	3.57
Tuesday	3.38	0.06	0.00	3.25	3.50	3.37	0.05	0.00	3.28	3.47
Wednesday	3.19	0.06	0.00	3.06	3.31	3.19	0.05	0.00	3.09	3.28
Thursday	3.22	0.06	0.00	3.10	3.35	3.22	0.05	0.00	3.13	3.32
Friday	3.22	0.06	0.00	3.10	3.34	3.22	0.05	0.00	3.13	3.32
Saturday	1.34	0.07	0.00	1.20	1.47	1.34	0.05	0.00	1.23	1.44
Bank holiday	-3.10	0.15	0.00	-3.39	-2.82	-3.11	0.11	0.00	-3.33	-2.88
seassin	0.03	0.01	0.00	0.02	0.04	0.03	0.01	0.00	0.02	0.04
seascos	0.07	0.01	0.00	0.06	0.09	0.07	0.01	0.00	0.06	0.08
seassin1	-0.07	0.01	0.00	-0.08	-0.05	-0.07	0.01	0.00	-0.08	-0.06
seascos1	0.03	0.01	0.00	0.01	0.04	0.02	0.01	0.00	0.01	0.03
NO min lag0	0.00	0.00	0.26	0.00	0.00	0.00	0.00	0.19	0.00	0.00
NO min lag1	0.00	0.00	0.61	0.00	0.00	0.00	0.00	0.51	0.00	0.00
NO min lag2	0.00	0.00	0.16	0.00	0.00	0.00	0.00	0.09	0.00	0.00
NO min lag3	0.00	0.00	0.75	0.00	0.00	0.00	0.00	0.69	0.00	0.00
NO min lag4	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.02	0.00	0.00
NO min lag5	0.00	0.00	0.28	0.00	0.00	0.00	0.00	0.09	0.00	0.00
NO min lag6	0.00	0.00	0.64	0.00	0.00	0.00	0.00	0.42	0.00	0.00
NO min lag7	0.00	0.00	0.66	0.00	0.00	0.00	0.00	0.76	0.00	0.00
Model including mean measures of NO										
constant	0.33	0.07	0.00	0.21	0.46	0.32	0.05	0.00	0.22	0.42
Monday	3.48	0.06	0.00	3.36	3.60	3.48	0.05	0.00	3.38	3.57
Tuesday	3.38	0.06	0.00	3.25	3.50	3.37	0.05	0.00	3.28	3.47
Wednesday	3.19	0.06	0.00	3.07	3.32	3.19	0.05	0.00	3.09	3.29
Thursday	3.23	0.06	0.00	3.10	3.35	3.23	0.05	0.00	3.13	3.32
Friday	3.22	0.06	0.00	3.10	3.35	3.22	0.05	0.00	3.13	3.32
Saturday	1.34	0.07	0.00	1.20	1.47	1.33	0.05	0.00	1.23	1.44
Bank holiday	-3.10	0.15	0.00	-3.39	-2.82	-3.11	0.11	0.00	-3.33	-2.88
seassin	0.03	0.01	0.00	0.02	0.04	0.03	0.01	0.00	0.02	0.04
seascos	0.07	0.01	0.00	0.06	0.09	0.07	0.01	0.00	0.06	0.08
seassin1	-0.07	0.01	0.00	-0.08	-0.05	-0.07	0.01	0.00	-0.08	-0.06
seascos1	0.03	0.01	0.00	0.01	0.04	0.02	0.01	0.00	0.01	0.04
NO mean lag0	0.00	0.00	0.28	0.00	0.00	0.00	0.00	0.21	0.00	0.00
NO mean lag1	0.00	0.00	0.44	0.00	0.00	0.00	0.00	0.24	0.00	0.00
NO mean lag2	0.00	0.00	0.68	0.00	0.00	0.00	0.00	0.72	0.00	0.00
NO mean lag3	0.00	0.00	0.49	0.00	0.00	0.00	0.00	0.56	0.00	0.00
NO mean lag4	0.00	0.00	0.50	0.00	0.00	0.00	0.00	0.18	0.00	0.00
NO mean lag5	0.00	0.00	0.90	0.00	0.00	0.00	0.00	0.83	0.00	0.00
NO mean lag6	0.00	0.00	0.78	0.00	0.00	0.00	0.00	0.62	0.00	0.00
NO mean lag7	0.00	0.00	0.85	0.00	0.00	0.00	0.00	0.77	0.00	0.00

Table G. 23: Trent Region All Counts Non-asthmatics - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
					Null model					
constant	-0.15	0.08	0.05	-0.30	0.00	-0.15	0.06	0.02	-0.27	-0.03
Monday	3.27	0.08	0.00	3.12	3.43	3.27	0.06	0.00	3.15	3.39
Tuesday	3.11	0.08	0.00	2.96	3.27	3.11	0.06	0.00	2.99	3.23
Wednesday	2.96	0.08	0.00	2.81	3.12	2.96	0.06	0.00	2.84	3.08
Thursday	3.00	0.08	0.00	2.85	3.16	3.00	0.06	0.00	2.87	3.12
Friday	3.00	0.08	0.00	2.85	3.16	3.00	0.06	0.00	2.88	3.12
Saturday	1.14	0.09	0.00	0.97	1.31	1.14	0.07	0.00	1.00	1.27
Bank holiday	-3.10	0.20	0.00	-3.49	-2.71	-3.10	0.16	0.00	-3.41	-2.78
seassin	0.07	0.01	0.00	0.05	0.09	0.07	0.01	0.00	0.06	0.09
seascos	0.04	0.01	0.00	0.02	0.06	0.04	0.01	0.00	0.02	0.06
seassin1	-0.02	0.01	0.04	-0.04	0.00	-0.02	0.01	0.02	-0.04	0.00
seascos1	0.05	0.01	0.00	0.03	0.07	0.05	0.01	0.00	0.03	0.06
					Model including Minimum measures of NO					
constant	-0.15	0.08	0.06	-0.30	0.01	-0.14	0.06	0.03	-0.26	-0.01
Monday	3.28	0.08	0.00	3.12	3.43	3.27	0.06	0.00	3.15	3.39
Tuesday	3.13	0.08	0.00	2.97	3.28	3.12	0.06	0.00	3.00	3.24
Wednesday	2.97	0.08	0.00	2.82	3.13	2.97	0.06	0.00	2.85	3.09
Thursday	3.01	0.08	0.00	2.85	3.16	3.00	0.06	0.00	2.88	3.13
Friday	3.01	0.08	0.00	2.85	3.16	3.00	0.06	0.00	2.88	3.13
Saturday	1.14	0.09	0.00	0.97	1.32	1.14	0.07	0.00	1.00	1.28
Bank holiday	-3.10	0.20	0.00	-3.50	-2.71	-3.10	0.16	0.00	-3.42	-2.79
seassin	0.07	0.01	0.00	0.05	0.10	0.07	0.01	0.00	0.06	0.09
seascos	0.04	0.01	0.00	0.02	0.06	0.04	0.01	0.00	0.03	0.06
seassin1	-0.02	0.01	0.04	-0.04	0.00	-0.02	0.01	0.01	-0.04	0.00
seascos1	0.05	0.01	0.00	0.03	0.07	0.05	0.01	0.00	0.03	0.06
NO min lag0	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.01	0.00	0.00
NO min lag1	0.00	0.00	0.96	0.00	0.00	0.00	0.00	0.80	0.00	0.00
NO min lag2	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.11	0.00	0.00
NO min lag3	0.00	0.00	0.91	0.00	0.00	0.00	0.00	0.70	0.00	0.00
NO min lag4	0.00	0.00	0.35	0.00	0.00	0.00	0.00	0.25	0.00	0.00
NO min lag5	0.00	0.00	0.37	0.00	0.00	0.00	0.00	0.31	0.00	0.00
NO min lag6	0.00	0.00	0.66	0.00	0.00	0.00	0.00	0.50	0.00	0.00
NO min lag7	0.00	0.00	0.65	0.00	0.00	0.00	0.00	0.67	0.00	0.00
					Model including mean measures of NO					
constant	-0.17	0.08	0.04	-0.33	-0.01	-0.17	0.07	0.01	-0.30	-0.04
Monday	3.28	0.08	0.00	3.12	3.43	3.27	0.06	0.00	3.15	3.40
Tuesday	3.12	0.08	0.00	2.96	3.27	3.11	0.06	0.00	2.99	3.24
Wednesday	2.97	0.08	0.00	2.82	3.13	2.97	0.06	0.00	2.85	3.10
Thursday	3.00	0.08	0.00	2.85	3.16	3.00	0.06	0.00	2.88	3.12
Friday	3.00	0.08	0.00	2.85	3.16	3.00	0.06	0.00	2.88	3.13
Saturday	1.14	0.09	0.00	0.97	1.32	1.14	0.07	0.00	1.00	1.28
Bank holiday	-3.11	0.20	0.00	-3.50	-2.71	-3.11	0.16	0.00	-3.42	-2.79
seassin	0.07	0.01	0.00	0.05	0.09	0.07	0.01	0.00	0.06	0.09
seascos	0.04	0.01	0.00	0.01	0.06	0.04	0.01	0.00	0.02	0.06
seassin1	-0.02	0.01	0.05	-0.04	0.00	-0.02	0.01	0.02	-0.04	0.00
seascos1	0.05	0.01	0.00	0.03	0.07	0.05	0.01	0.00	0.03	0.07
NO mean lag0	0.00	0.00	0.45	0.00	0.00	0.00	0.00	0.30	0.00	0.00
NO mean lag1	0.00	0.00	0.61	0.00	0.00	0.00	0.00	0.70	0.00	0.00
NO mean lag2	0.00	0.00	0.79	0.00	0.00	0.00	0.00	0.65	0.00	0.00
NO mean lag3	0.00	0.00	0.31	0.00	0.00	0.00	0.00	0.18	0.00	0.00
NO mean lag4	0.00	0.00	0.73	0.00	0.00	0.00	0.00	0.94	0.00	0.00
NO mean lag5	0.00	0.00	0.73	0.00	0.00	0.00	0.00	0.62	0.00	0.00
NO mean lag6	0.00	0.00	0.79	0.00	0.00	0.00	0.00	0.59	0.00	0.00
NO mean lag7	0.00	0.00	0.77	0.00	0.00	0.00	0.00	0.67	0.00	0.00

Table G. 24: Trent Region All Counts Excess - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	L CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	2.02	0.03	0.00	1.96	2.08	2.02	0.02	0.00	1.98	2.06
Monday	1.37	0.03	0.00	1.30	1.43	1.37	0.02	0.00	1.32	1.41
Tuesday	1.34	0.03	0.00	1.27	1.40	1.34	0.02	0.00	1.29	1.38
Wednesday	1.17	0.03	0.00	1.11	1.24	1.17	0.02	0.00	1.13	1.22
Thursday	1.20	0.03	0.00	1.13	1.26	1.20	0.02	0.00	1.15	1.24
Friday	1.19	0.03	0.00	1.13	1.26	1.20	0.02	0.00	1.15	1.24
Saturday	0.25	0.04	0.00	0.17	0.32	0.25	0.03	0.00	0.19	0.30
Bank holiday	-1.27	0.08	0.00	-1.43	-1.11	-1.28	0.06	0.00	-1.39	-1.17
seassin	-0.01	0.01	0.37	-0.03	0.01	-0.01	0.01	0.18	-0.02	0.00
seascos	0.07	0.01	0.00	0.05	0.09	0.07	0.01	0.00	0.06	0.08
seassin1	-0.08	0.01	0.00	-0.10	-0.06	-0.08	0.01	0.00	-0.09	-0.07
seascos1	0.00	0.01	0.96	-0.02	0.02	0.00	0.01	0.93	-0.01	0.01
Model including Minimum measures of NO										
constant	1.99	0.03	0.00	1.92	2.05	1.99	0.02	0.00	1.94	2.03
Monday	1.37	0.03	0.00	1.30	1.43	1.37	0.02	0.00	1.32	1.42
Tuesday	1.33	0.03	0.00	1.27	1.40	1.34	0.02	0.00	1.29	1.38
Wednesday	1.17	0.03	0.00	1.10	1.24	1.17	0.02	0.00	1.13	1.22
Thursday	1.20	0.03	0.00	1.14	1.27	1.20	0.02	0.00	1.16	1.25
Friday	1.20	0.03	0.00	1.13	1.26	1.20	0.02	0.00	1.15	1.25
Saturday	0.25	0.04	0.00	0.17	0.33	0.25	0.03	0.00	0.20	0.30
Bank holiday	-1.27	0.08	0.00	-1.43	-1.11	-1.28	0.06	0.00	-1.39	-1.17
seassin	-0.01	0.01	0.36	-0.03	0.01	-0.01	0.01	0.18	-0.02	0.00
seascos	0.06	0.01	0.00	0.04	0.08	0.06	0.01	0.00	0.05	0.08
seassin1	-0.08	0.01	0.00	-0.10	-0.06	-0.08	0.01	0.00	-0.09	-0.07
seascos1	0.00	0.01	0.87	-0.02	0.02	0.00	0.01	0.93	-0.01	0.01
NO min lag0	0.00	0.00	0.70	0.00	0.00	0.00	0.00	0.55	0.00	0.00
NO min lag1	0.00	0.00	0.50	0.00	0.00	0.00	0.00	0.31	0.00	0.00
NO min lag2	0.00	0.00	0.78	0.00	0.00	0.00	0.00	0.52	0.00	0.00
NO min lag3	0.00	0.00	0.67	0.00	0.00	0.00	0.00	0.45	0.00	0.00
NO min lag4	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NO min lag5	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.28	0.00	0.00
NO min lag6	0.00	0.00	0.65	0.00	0.00	0.00	0.00	0.60	0.00	0.00
NO min lag7	0.00	0.00	0.55	0.00	0.00	0.00	0.00	0.41	0.00	0.00
Model including mean measures of NO										
constant	2.00	0.04	0.00	1.92	2.08	2.00	0.03	0.00	1.95	2.06
Monday	1.37	0.04	0.00	1.30	1.44	1.38	0.02	0.00	1.33	1.43
Tuesday	1.34	0.04	0.00	1.27	1.40	1.34	0.02	0.00	1.29	1.39
Wednesday	1.18	0.04	0.00	1.11	1.25	1.18	0.03	0.00	1.13	1.23
Thursday	1.21	0.04	0.00	1.14	1.28	1.21	0.03	0.00	1.16	1.26
Friday	1.20	0.04	0.00	1.13	1.27	1.20	0.03	0.00	1.15	1.25
Saturday	0.24	0.04	0.00	0.16	0.32	0.25	0.03	0.00	0.19	0.30
Bank holiday	-1.27	0.08	0.00	-1.43	-1.11	-1.28	0.06	0.00	-1.39	-1.17
seassin	-0.01	0.01	0.38	-0.03	0.01	-0.01	0.01	0.19	-0.02	0.00
seascos	0.07	0.01	0.00	0.05	0.09	0.07	0.01	0.00	0.05	0.08
seassin1	-0.08	0.01	0.00	-0.10	-0.06	-0.08	0.01	0.00	-0.09	-0.07
seascos1	0.00	0.01	0.93	-0.02	0.02	0.00	0.01	0.98	-0.01	0.01
NO mean lag0	0.00	0.00	0.66	0.00	0.00	0.00	0.00	0.47	0.00	0.00
NO mean lag1	0.00	0.00	0.45	0.00	0.00	0.00	0.00	0.27	0.00	0.00
NO mean lag2	0.00	0.00	0.71	0.00	0.00	0.00	0.00	0.94	0.00	0.00
NO mean lag3	0.00	0.00	0.96	0.00	0.00	0.00	0.00	0.73	0.00	0.00
NO mean lag4	0.00	0.00	0.23	0.00	0.00	0.00	0.00	0.11	0.00	0.00
NO mean lag5	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.86	0.00	0.00
NO mean lag6	0.00	0.00	0.57	0.00	0.00	0.00	0.00	0.33	0.00	0.00
NO mean lag7	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.91	0.00	0.00

Table G. 25: Trent Region Acute Visits Asthmatics - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
					Null model					
constant	-3.15	0.29	0.00	-3.71	-2.59	-3.15	0.27	0.00	-3.68	-2.63
Monday	1.00	0.34	0.00	0.34	1.66	1.00	0.32	0.00	0.38	1.62
Tuesday	0.81	0.34	0.02	0.14	1.48	0.81	0.32	0.01	0.18	1.44
Wednesday	0.89	0.34	0.01	0.23	1.56	0.89	0.32	0.01	0.27	1.51
Thursday	0.70	0.35	0.05	0.01	1.38	0.70	0.33	0.03	0.06	1.34
Friday	0.90	0.34	0.01	0.24	1.56	0.90	0.32	0.01	0.28	1.52
Saturday	-0.33	0.44	0.45	-1.19	0.53	-0.33	0.41	0.43	-1.14	0.48
Bank holiday	-0.65	0.63	0.30	-1.89	0.59	-0.64	0.59	0.28	-1.80	0.53
seassin	0.42	0.12	0.00	0.19	0.65	0.42	0.11	0.00	0.21	0.64
seascos	0.16	0.11	0.17	-0.07	0.38	0.14	0.11	0.19	-0.07	0.35
seassin1	-0.20	0.11	0.08	-0.42	0.02	-0.20	0.11	0.06	-0.41	0.01
seascos1	0.01	0.11	0.91	-0.21	0.24	0.01	0.11	0.95	-0.20	0.22
					Model including mean measures of NOD					
constant	-3.06	0.34	0.00	-3.73	-2.38	-3.04	0.32	0.00	-3.68	-2.41
Monday	0.93	0.35	0.01	0.24	1.62	0.91	0.33	0.01	0.26	1.56
Tuesday	0.72	0.36	0.05	0.01	1.43	0.71	0.34	0.04	0.04	1.38
Wednesday	0.78	0.36	0.03	0.08	1.48	0.77	0.34	0.02	0.11	1.42
Thursday	0.65	0.36	0.07	-0.06	1.37	0.66	0.34	0.06	-0.02	1.33
Friday	0.84	0.36	0.02	0.14	1.54	0.84	0.34	0.01	0.18	1.50
Saturday	-0.21	0.45	0.64	-1.09	0.67	-0.21	0.42	0.62	-1.04	0.62
Bank holiday	-0.73	0.63	0.25	-1.96	0.51	-0.67	0.60	0.26	-1.84	0.50
seassin	0.41	0.12	0.00	0.18	0.64	0.42	0.11	0.00	0.20	0.64
seascos	0.16	0.14	0.24	-0.11	0.42	0.15	0.13	0.25	-0.10	0.40
seassin1	-0.21	0.11	0.07	-0.43	0.02	-0.20	0.11	0.06	-0.41	0.01
seascos1	0.00	0.11	0.99	-0.22	0.22	0.00	0.11	1.00	-0.21	0.21
NOD mean	0.00	0.00	0.50	0.00	0.00	0.00	0.00	0.48	0.00	0.00
NOD mean	0.00	0.00	0.41	-0.01	0.00	0.00	0.00	0.33	-0.01	0.00
NOD mean	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.96	0.00	0.00
NOD mean	0.00	0.00	0.18	-0.01	0.00	0.00	0.00	0.12	-0.01	0.00
NOD mean	0.00	0.00	0.41	0.00	0.01	0.00	0.00	0.33	0.00	0.01
NOD mean	0.00	0.00	0.32	-0.01	0.00	0.00	0.00	0.27	-0.01	0.00
NOD mean	0.00	0.00	0.02	0.00	0.01	0.00	0.00	0.01	0.00	0.01
NOD mean	0.00	0.00	0.50	0.00	0.00	0.00	0.00	0.48	0.00	0.00
					Model including maximum measures of NOD					
constant	-3.19	0.35	0.00	-3.87	-2.51	-3.16	0.33	0.00	-3.80	-2.52
Monday	0.88	0.35	0.01	0.20	1.56	0.88	0.33	0.01	0.23	1.52
Tuesday	0.76	0.36	0.03	0.06	1.47	0.75	0.34	0.03	0.09	1.42
Wednesday	0.86	0.35	0.02	0.17	1.55	0.85	0.33	0.01	0.20	1.50
Thursday	0.65	0.36	0.07	-0.06	1.36	0.66	0.34	0.05	-0.01	1.33
Friday	0.93	0.35	0.01	0.24	1.62	0.94	0.33	0.01	0.29	1.59
Saturday	-0.18	0.44	0.69	-1.05	0.69	-0.18	0.42	0.68	-1.00	0.65
Bank holiday	-0.72	0.63	0.25	-1.95	0.52	-0.64	0.59	0.28	-1.80	0.53
seassin	0.42	0.12	0.00	0.19	0.65	0.43	0.11	0.00	0.21	0.64
seascos	0.13	0.14	0.37	-0.15	0.40	0.12	0.13	0.38	-0.14	0.38
seassin1	-0.19	0.11	0.09	-0.42	0.03	-0.19	0.11	0.07	-0.40	0.02
seascos1	0.00	0.11	0.97	-0.22	0.22	0.00	0.11	0.99	-0.21	0.21
NOD max lag0	0.00	0.00	0.17	0.00	0.00	0.00	0.00	0.16	0.00	0.00
NOD max lag1	0.00	0.00	0.21	0.00	0.00	0.00	0.00	0.16	0.00	0.00
NOD max lag2	0.00	0.00	0.94	0.00	0.00	0.00	0.00	0.91	0.00	0.00
NOD max lag3	0.00	0.00	0.68	0.00	0.00	0.00	0.00	0.59	0.00	0.00
NOD max lag4	0.00	0.00	0.96	0.00	0.00	0.00	0.00	0.99	0.00	0.00
NOD max lag5	0.00	0.00	0.76	0.00	0.00	0.00	0.00	0.75	0.00	0.00
NOD max lag6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOD max lag7	0.00	0.00	0.18	0.00	0.00	0.00	0.00	0.15	0.00	0.00

Table G. 26: Trent Region Acute Visits Non-asthmatics - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	-3.44	0.32	0.00	-4.07	-2.80	-3.43	0.30	0.00	-4.03	-2.84
Monday	1.17	0.37	0.00	0.45	1.90	1.16	0.35	0.00	0.48	1.84
Tuesday	0.46	0.41	0.26	-0.34	1.26	0.46	0.39	0.24	-0.30	1.21
Wednesday	0.56	0.40	0.16	-0.22	1.35	0.55	0.38	0.14	-0.19	1.30
Thursday	0.66	0.39	0.09	-0.11	1.44	0.65	0.37	0.08	-0.08	1.38
Friday	-0.19	0.48	0.69	-1.12	0.74	-0.19	0.45	0.68	-1.07	0.69
Saturday	-0.43	0.51	0.40	-1.44	0.57	-0.44	0.48	0.36	-1.39	0.50
Bank holiday	-1.29	1.07	0.23	-3.39	0.80	-1.24	1.01	0.22	-3.23	0.74
seassin	0.49	0.16	0.00	0.18	0.80	0.48	0.15	0.00	0.19	0.78
seascos	0.19	0.14	0.18	-0.08	0.46	0.18	0.13	0.17	-0.08	0.43
seassin1	0.25	0.14	0.08	-0.03	0.53	0.25	0.14	0.07	-0.02	0.52
seascos1	0.28	0.15	0.06	-0.01	0.56	0.27	0.14	0.05	0.00	0.54
Model including mean measures of NOD										
constant	-3.73	0.39	0.00	-4.49	-2.97	-3.74	0.37	0.00	-4.47	-3.02
Monday	0.95	0.39	0.01	0.20	1.71	0.95	0.37	0.01	0.23	1.67
Tuesday	0.30	0.43	0.48	-0.54	1.14	0.30	0.41	0.45	-0.49	1.10
Wednesday	0.44	0.42	0.29	-0.38	1.27	0.45	0.40	0.26	-0.34	1.24
Thursday	0.46	0.41	0.27	-0.35	1.27	0.46	0.39	0.25	-0.31	1.23
Friday	-0.41	0.49	0.40	-1.37	0.55	-0.42	0.47	0.37	-1.33	0.50
Saturday	-0.62	0.52	0.23	-1.64	0.40	-0.62	0.49	0.21	-1.59	0.35
Bank holiday	-1.21	1.07	0.26	-3.30	0.88	-1.18	1.02	0.25	-3.17	0.81
seassin	0.51	0.16	0.00	0.20	0.83	0.51	0.15	0.00	0.21	0.81
seascos	0.00	0.16	0.98	-0.32	0.33	0.00	0.16	0.99	-0.31	0.30
seassin1	0.29	0.15	0.05	0.00	0.58	0.29	0.14	0.04	0.02	0.56
seascos1	0.26	0.15	0.07	-0.02	0.55	0.26	0.14	0.06	-0.01	0.53
NOD mean lag0	0.00	0.00	0.08	0.00	0.01	0.00	0.00	0.08	0.00	0.01
NOD mean lag1	0.00	0.00	0.40	-0.01	0.00	0.00	0.00	0.46	-0.01	0.00
NOD mean lag2	0.00	0.00	0.79	0.00	0.01	0.00	0.00	0.88	0.00	0.00
NOD mean lag3	0.00	0.00	0.18	0.00	0.01	0.00	0.00	0.12	0.00	0.01
NOD mean lag4	0.00	0.00	0.63	-0.01	0.00	0.00	0.00	0.63	-0.01	0.00
NOD mean lag5	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.92	0.00	0.00
NOD mean lag6	0.00	0.00	0.85	0.00	0.00	0.00	0.00	0.89	0.00	0.00
NOD mean lag7	0.00	0.00	0.21	0.00	0.01	0.00	0.00	0.20	0.00	0.01
Model including maximum measures of NOD										
constant	-3.70	0.39	0.00	-4.47	-2.93	-3.72	0.37	0.00	-4.45	-2.99
Monday	0.92	0.38	0.02	0.18	1.67	0.92	0.36	0.01	0.20	1.63
Tuesday	0.25	0.42	0.56	-0.58	1.07	0.25	0.40	0.53	-0.54	1.04
Wednesday	0.31	0.42	0.45	-0.50	1.13	0.33	0.40	0.41	-0.45	1.11
Thursday	0.34	0.41	0.40	-0.46	1.14	0.34	0.39	0.38	-0.42	1.10
Friday	-0.50	0.48	0.31	-1.45	0.45	-0.49	0.46	0.29	-1.39	0.42
Saturday	-0.57	0.51	0.27	-1.57	0.43	-0.57	0.49	0.25	-1.52	0.39
Bank holiday	-1.18	1.06	0.27	-3.26	0.90	-1.16	1.02	0.25	-3.15	0.83
seassin	0.52	0.16	0.00	0.21	0.84	0.52	0.15	0.00	0.22	0.82
seascos	-0.02	0.17	0.90	-0.36	0.31	-0.03	0.16	0.83	-0.35	0.28
seassin1	0.29	0.14	0.05	0.00	0.57	0.29	0.14	0.04	0.02	0.56
seascos1	0.26	0.14	0.07	-0.02	0.55	0.25	0.14	0.07	-0.02	0.52
NOD max lag0	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.01	0.00	0.00
NOD max lag1	0.00	0.00	0.48	0.00	0.00	0.00	0.00	0.49	0.00	0.00
NOD max lag2	0.00	0.00	0.58	0.00	0.00	0.00	0.00	0.67	0.00	0.00
NOD max lag3	0.00	0.00	0.50	0.00	0.00	0.00	0.00	0.37	0.00	0.00
NOD max lag4	0.00	0.00	0.41	0.00	0.00	0.00	0.00	0.43	0.00	0.00
NOD max lag5	0.00	0.00	0.45	0.00	0.00	0.00	0.00	0.43	0.00	0.00
NOD max lag6	0.00	0.00	0.52	0.00	0.00	0.00	0.00	0.49	0.00	0.00
NOD max lag7	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.07	0.00	0.00

Table G. 27: Trent Region Acute Visits Non-asthmatics - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	1.10	0.01	0.00	1.09	1.12	1.10	0.03	0.00	1.04	1.17
Monday	0.00	0.01	0.97	-0.02	0.02	0.00	0.05	1.00	-0.09	0.09
Tuesday	0.01	0.01	0.27	-0.01	0.03	0.01	0.05	0.80	-0.08	0.10
Wednesday	0.01	0.01	0.24	-0.01	0.03	0.01	0.05	0.78	-0.08	0.10
Thursday	0.00	0.01	0.69	-0.02	0.03	0.00	0.05	0.93	-0.09	0.09
Friday	0.02	0.01	0.03	0.00	0.04	0.02	0.05	0.62	-0.07	0.11
Saturday	0.00	0.01	0.99	-0.02	0.02	0.00	0.05	1.00	-0.09	0.09
Bank holiday	0.00	0.02	0.89	-0.04	0.05	0.00	0.09	0.97	-0.18	0.19
seassin	0.00	0.00	0.39	0.00	0.01	0.00	0.02	0.84	-0.03	0.04
seascos	0.00	0.00	0.68	-0.01	0.01	0.00	0.02	0.92	-0.04	0.03
seassin1	-0.01	0.00	0.01	-0.02	0.00	-0.01	0.02	0.57	-0.04	0.02
seascos1	0.00	0.00	0.25	-0.01	0.00	0.00	0.02	0.79	-0.04	0.03
Model including mean measures of NOD										
constant	1.11	0.01	0.00	1.09	1.13	1.11	0.05	0.00	1.02	1.20
Monday	0.00	0.01	0.83	-0.02	0.03	0.00	0.05	0.96	-0.10	0.10
Tuesday	0.01	0.01	0.24	-0.01	0.04	0.01	0.05	0.79	-0.09	0.11
Wednesday	0.01	0.01	0.32	-0.01	0.03	0.01	0.05	0.82	-0.09	0.11
Thursday	0.01	0.01	0.48	-0.01	0.03	0.01	0.05	0.87	-0.09	0.11
Friday	0.03	0.01	0.02	0.00	0.05	0.03	0.05	0.59	-0.07	0.13
Saturday	0.01	0.01	0.49	-0.01	0.03	0.01	0.05	0.87	-0.09	0.10
Bank holiday	0.00	0.02	0.96	-0.04	0.04	0.00	0.09	0.99	-0.18	0.19
seassin	0.00	0.00	0.47	0.00	0.01	0.00	0.02	0.87	-0.03	0.04
seascos	0.00	0.00	0.68	-0.01	0.01	0.00	0.02	0.92	-0.04	0.04
seassin1	-0.01	0.00	0.01	-0.02	0.00	-0.01	0.02	0.54	-0.05	0.02
seascos1	0.00	0.00	0.25	-0.01	0.00	0.00	0.02	0.79	-0.04	0.03
NOD mean lag0	0.00	0.00	0.53	0.00	0.00	0.00	0.00	0.89	0.00	0.00
NOD mean lag1	0.00	0.00	0.90	0.00	0.00	0.00	0.00	0.96	0.00	0.00
NOD mean lag2	0.00	0.00	0.94	0.00	0.00	0.00	0.00	1.00	0.00	0.00
NOD mean lag3	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.62	0.00	0.00
NOD mean lag4	0.00	0.00	0.30	0.00	0.00	0.00	0.00	0.81	0.00	0.00
NOD mean lag5	0.00	0.00	0.42	0.00	0.00	0.00	0.00	0.86	0.00	0.00
NOD mean lag6	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.62	0.00	0.00
NOD mean lag7	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.72	0.00	0.00
Model including maximum measures of NOD										
constant	1.11	0.01	0.00	1.08	1.13	1.11	0.05	0.00	1.01	1.20
Monday	0.00	0.01	0.83	-0.02	0.02	0.00	0.05	0.96	-0.09	0.10
Tuesday	0.02	0.01	0.15	-0.01	0.04	0.02	0.05	0.75	-0.08	0.11
Wednesday	0.02	0.01	0.15	-0.01	0.04	0.02	0.05	0.74	-0.08	0.11
Thursday	0.01	0.01	0.33	-0.01	0.03	0.01	0.05	0.82	-0.09	0.11
Friday	0.03	0.01	0.01	0.01	0.05	0.03	0.05	0.52	-0.07	0.13
Saturday	0.01	0.01	0.46	-0.01	0.03	0.01	0.05	0.86	-0.09	0.10
Bank holiday	0.00	0.02	0.93	-0.04	0.04	0.00	0.09	0.98	-0.18	0.19
seassin	0.00	0.00	0.47	0.00	0.01	0.00	0.02	0.87	-0.03	0.04
seascos	0.00	0.01	0.77	-0.01	0.01	0.00	0.02	0.94	-0.04	0.04
seassin1	-0.01	0.00	0.01	-0.02	0.00	-0.01	0.02	0.55	-0.04	0.02
seascos1	0.00	0.00	0.25	-0.01	0.00	0.00	0.02	0.79	-0.04	0.03
NOD max lag0	0.00	0.00	0.59	0.00	0.00	0.00	0.00	0.91	0.00	0.00
NOD max lag1	0.00	0.00	0.54	0.00	0.00	0.00	0.00	0.88	0.00	0.00
NOD max lag2	0.00	0.00	0.89	0.00	0.00	0.00	0.00	0.96	0.00	0.00
NOD max lag3	0.00	0.00	0.35	0.00	0.00	0.00	0.00	0.82	0.00	0.00
NOD max lag4	0.00	0.00	0.62	0.00	0.00	0.00	0.00	0.91	0.00	0.00
NOD max lag5	0.00	0.00	0.75	0.00	0.00	0.00	0.00	0.94	0.00	0.00
NOD max lag6	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.66	0.00	0.00
NOD max lag7	1.11	0.01	0.00	1.08	1.13	1.11	0.05	0.00	1.01	1.20

Table G. 28: Trent Region Casualty Counts Asthmatics - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	-1.89	0.16	0.00	-2.21	-1.57	-1.89	0.15	0.00	-2.18	-1.61
Monday	1.01	0.19	0.00	0.63	1.38	1.01	0.17	0.00	0.67	1.35
Tuesday	1.15	0.19	0.00	0.78	1.51	1.15	0.17	0.00	0.82	1.48
Wednesday	1.05	0.19	0.00	0.69	1.42	1.05	0.17	0.00	0.72	1.38
Thursday	1.17	0.19	0.00	0.80	1.53	1.16	0.17	0.00	0.84	1.49
Friday	1.00	0.19	0.00	0.63	1.37	1.00	0.17	0.00	0.66	1.33
Saturday	0.03	0.23	0.91	-0.42	0.47	0.03	0.21	0.90	-0.38	0.43
Bank holiday	-1.00	0.46	0.03	-1.90	-0.10	-1.05	0.41	0.01	-1.86	-0.24
seassin	-0.02	0.06	0.73	-0.13	0.09	-0.03	0.05	0.56	-0.13	0.07
seascos	-0.13	0.06	0.02	-0.24	-0.02	-0.15	0.05	0.00	-0.25	-0.05
seassin1	-0.01	0.06	0.83	-0.12	0.10	-0.01	0.05	0.78	-0.11	0.09
seascos1	0.01	0.06	0.85	-0.10	0.12	0.00	0.05	0.98	-0.10	0.10
Model including Minimum measures of O_3										
constant	-1.91	0.19	0.00	-2.28	-1.53	-1.88	0.17	0.00	-2.21	-1.54
Monday	1.03	0.20	0.00	0.65	1.42	1.04	0.18	0.00	0.69	1.38
Tuesday	1.14	0.19	0.00	0.77	1.52	1.15	0.17	0.00	0.81	1.49
Wednesday	1.09	0.19	0.00	0.71	1.47	1.09	0.17	0.00	0.75	1.43
Thursday	1.21	0.19	0.00	0.83	1.58	1.21	0.17	0.00	0.87	1.55
Friday	1.01	0.20	0.00	0.62	1.39	1.00	0.18	0.00	0.66	1.35
Saturday	0.06	0.23	0.81	-0.40	0.51	0.05	0.21	0.80	-0.35	0.46
Bank holiday	-0.98	0.46	0.03	-1.88	-0.07	-1.03	0.42	0.01	-1.85	-0.22
seassin	-0.01	0.06	0.83	-0.14	0.11	-0.02	0.06	0.77	-0.13	0.10
seascos	-0.13	0.06	0.04	-0.25	-0.01	-0.16	0.06	0.00	-0.27	-0.05
seassin1	-0.01	0.06	0.81	-0.12	0.10	-0.02	0.05	0.76	-0.12	0.08
seascos1	0.01	0.06	0.84	-0.10	0.12	0.00	0.05	0.95	-0.10	0.10
O_3 min lag0	0.00	0.00	0.85	-0.01	0.01	0.00	0.00	0.71	-0.01	0.01
O_3 min lag1	0.00	0.00	0.62	-0.01	0.01	0.00	0.00	0.44	-0.01	0.00
O_3 min lag2	0.00	0.00	0.50	0.00	0.01	0.00	0.00	0.50	0.00	0.01
O_3 min lag3	0.00	0.00	0.66	-0.01	0.01	0.00	0.00	0.48	-0.01	0.00
O_3 min lag4	0.00	0.00	0.36	-0.01	0.00	0.00	0.00	0.25	-0.01	0.00
O_3 min lag5	0.00	0.00	0.42	0.00	0.01	0.00	0.00	0.40	0.00	0.01
O_3 min lag6	0.00	0.00	0.56	-0.01	0.00	0.00	0.00	0.48	-0.01	0.00
O_3 min lag7	0.00	0.00	0.25	0.00	0.01	0.00	0.00	0.16	0.00	0.01
Model including rain										
constant	-1.91	0.17	0.00	-2.25	-1.57	-1.85	0.16	0.00	-2.16	-1.55
Monday	1.03	0.19	0.00	0.65	1.40	1.01	0.17	0.00	0.67	1.35
Tuesday	1.18	0.19	0.00	0.81	1.54	1.17	0.17	0.00	0.83	1.50
Wednesday	1.08	0.19	0.00	0.71	1.45	1.06	0.17	0.00	0.72	1.39
Thursday	1.17	0.19	0.00	0.81	1.54	1.16	0.17	0.00	0.83	1.48
Friday	1.04	0.19	0.00	0.67	1.42	1.03	0.17	0.00	0.69	1.37
Saturday	0.03	0.23	0.88	-0.41	0.48	0.01	0.21	0.94	-0.39	0.42
Bank holiday	-0.99	0.46	0.03	-1.89	-0.09	-1.04	0.41	0.01	-1.85	-0.23
seassin	-0.02	0.06	0.75	-0.13	0.09	-0.03	0.05	0.54	-0.13	0.07
seascos	-0.14	0.06	0.02	-0.25	-0.02	-0.15	0.05	0.01	-0.25	-0.05
seassin1	-0.01	0.06	0.83	-0.12	0.10	-0.02	0.05	0.74	-0.12	0.08
seascos1	0.01	0.06	0.82	-0.10	0.12	0.00	0.05	0.98	-0.10	0.10
Rain lag0	0.00	0.01	0.62	-0.01	0.02	0.00	0.01	0.92	-0.01	0.01
Rain lag1	0.00	0.01	0.98	-0.02	0.01	0.00	0.01	0.75	-0.02	0.01
Rain lag2	0.00	0.01	0.86	-0.01	0.02	0.00	0.01	0.81	-0.02	0.01
Rain lag3	-0.01	0.01	0.59	-0.02	0.01	-0.01	0.01	0.31	-0.03	0.01
Rain lag4	0.02	0.01	0.01	0.00	0.03	0.02	0.01	0.00	0.01	0.03
Rain lag5	-0.02	0.01	0.09	-0.04	0.00	-0.02	0.01	0.04	-0.04	0.00
Rain lag6	0.00	0.01	0.55	-0.02	0.01	0.00	0.01	0.57	-0.02	0.01
Rain lag7	0.00	0.01	0.98	-0.02	0.01	0.00	0.01	0.98	-0.01	0.01

Table G. 29: Trent Region Casualty Counts Non-asthmatics - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	-2.50	0.21	0.00	-2.91	-2.09	-2.50	0.20	0.00	-2.89	-2.12
Monday	1.33	0.24	0.00	0.86	1.80	1.33	0.22	0.00	0.90	1.77
Tuesday	1.43	0.23	0.00	0.97	1.89	1.43	0.22	0.00	1.00	1.86
Wednesday	1.31	0.24	0.00	0.85	1.78	1.31	0.22	0.00	0.88	1.75
Thursday	1.38	0.24	0.00	0.92	1.84	1.38	0.22	0.00	0.95	1.81
Friday	1.19	0.24	0.00	0.71	1.66	1.19	0.22	0.00	0.75	1.63
Saturday	0.08	0.29	0.78	-0.49	0.65	0.08	0.27	0.77	-0.45	0.61
Bank holiday	-1.84	0.76	0.02	-3.33	-0.34	-1.83	0.71	0.01	-3.22	-0.43
seassin	-0.16	0.07	0.02	-0.30	-0.03	-0.16	0.06	0.01	-0.28	-0.03
seascos	-0.22	0.07	0.00	-0.35	-0.09	-0.22	0.06	0.00	-0.34	-0.10
seassin1	-0.11	0.07	0.10	-0.24	0.02	-0.11	0.06	0.07	-0.23	0.01
seascos1	0.09	0.07	0.16	-0.04	0.22	0.09	0.06	0.15	-0.03	0.21
Model including Minimum measures of O_3										
constant	-2.34	0.24	0.00	-2.81	-1.87	-2.32	0.22	0.00	-2.76	-1.88
Monday	1.31	0.24	0.00	0.83	1.79	1.31	0.23	0.00	0.87	1.76
Tuesday	1.39	0.24	0.00	0.92	1.86	1.39	0.22	0.00	0.95	1.83
Wednesday	1.30	0.24	0.00	0.83	1.78	1.30	0.23	0.00	0.86	1.74
Thursday	1.36	0.24	0.00	0.89	1.83	1.36	0.22	0.00	0.92	1.80
Friday	1.18	0.25	0.00	0.70	1.66	1.18	0.23	0.00	0.73	1.63
Saturday	0.06	0.30	0.84	-0.52	0.64	0.06	0.28	0.84	-0.48	0.60
Bank holiday	-1.81	0.76	0.02	-3.30	-0.31	-1.81	0.71	0.01	-3.21	-0.42
seassin	-0.12	0.08	0.12	-0.27	0.03	-0.10	0.07	0.16	-0.24	0.04
seascos	-0.26	0.07	0.00	-0.40	-0.12	-0.27	0.07	0.00	-0.41	-0.14
seassin1	-0.12	0.07	0.08	-0.25	0.01	-0.12	0.06	0.05	-0.24	0.00
seascos1	0.10	0.07	0.12	-0.03	0.23	0.10	0.06	0.10	-0.02	0.23
O_3 min lag0	-0.01	0.00	0.15	-0.01	0.00	-0.01	0.00	0.08	-0.02	0.00
O_3 min lag1	0.00	0.00	0.72	-0.01	0.01	0.00	0.00	0.61	-0.01	0.01
O_3 min lag2	0.00	0.00	0.69	-0.01	0.01	0.00	0.00	0.59	-0.01	0.01
O_3 min lag3	0.00	0.00	0.48	-0.01	0.01	0.00	0.00	0.37	-0.01	0.00
O_3 min lag4	0.00	0.00	0.99	-0.01	0.01	0.00	0.00	0.99	-0.01	0.01
O_3 min lag5	0.00	0.00	0.33	-0.01	0.00	0.00	0.00	0.28	-0.01	0.00
O_3 min lag6	0.00	0.00	0.96	-0.01	0.01	0.00	0.00	0.87	-0.01	0.01
O_3 min lag7	0.00	0.00	0.57	-0.01	0.01	0.00	0.00	0.50	0.00	0.01
Model including rain										
constant	-2.44	0.22	0.00	-2.87	-2.00	-2.43	0.21	0.00	-2.84	-2.02
Monday	1.33	0.24	0.00	0.86	1.80	1.34	0.22	0.00	0.90	1.78
Tuesday	1.45	0.24	0.00	0.98	1.91	1.45	0.22	0.00	1.02	1.88
Wednesday	1.32	0.24	0.00	0.86	1.79	1.32	0.22	0.00	0.89	1.76
Thursday	1.37	0.24	0.00	0.91	1.84	1.38	0.22	0.00	0.95	1.81
Friday	1.17	0.24	0.00	0.70	1.65	1.18	0.23	0.00	0.74	1.62
Saturday	0.09	0.29	0.75	-0.48	0.67	0.10	0.27	0.72	-0.44	0.63
Bank holiday	-1.83	0.76	0.02	-3.33	-0.33	-1.83	0.71	0.01	-3.22	-0.43
seassin	-0.17	0.07	0.02	-0.30	-0.03	-0.16	0.06	0.01	-0.29	-0.04
seascos	-0.22	0.07	0.00	-0.35	-0.09	-0.22	0.06	0.00	-0.34	-0.10
seassin1	-0.11	0.07	0.09	-0.24	0.02	-0.11	0.06	0.06	-0.24	0.01
seascos1	0.09	0.07	0.18	-0.04	0.22	0.09	0.06	0.16	-0.03	0.21
Rain lag0	-0.01	0.01	0.56	-0.02	0.01	-0.01	0.01	0.53	-0.02	0.01
Rain lag1	0.01	0.01	0.24	-0.01	0.02	0.01	0.01	0.17	0.00	0.02
Rain lag2	0.00	0.01	0.81	-0.02	0.02	0.00	0.01	0.93	-0.02	0.02
Rain lag3	0.00	0.01	0.91	-0.02	0.02	0.00	0.01	0.93	-0.02	0.02
Rain lag4	0.00	0.01	0.96	-0.02	0.02	0.00	0.01	0.99	-0.02	0.02
Rain lag5	0.00	0.01	0.73	-0.01	0.02	0.00	0.01	0.76	-0.01	0.02
Rain lag6	-0.02	0.01	0.05	-0.05	0.00	-0.02	0.01	0.02	-0.05	0.00
Rain lag7	-0.01	0.01	0.34	-0.03	0.01	-0.01	0.01	0.31	-0.03	0.01

Table G. 30: Trent Region Casualty Counts Excess - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	L CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
					Null model					
constant	1.12	0.02	0.00	1.09	1.15	1.12	0.03	0.00	1.06	1.18
Monday	0.01	0.02	0.67	-0.03	0.05	0.01	0.05	0.83	-0.08	0.10
Tuesday	0.02	0.02	0.36	-0.02	0.06	0.02	0.05	0.68	-0.07	0.11
Wednesday	0.02	0.02	0.41	-0.02	0.06	0.02	0.05	0.70	-0.07	0.11
Thursday	0.03	0.02	0.20	-0.01	0.07	0.03	0.05	0.55	-0.06	0.12
Friday	0.02	0.02	0.31	-0.02	0.06	0.02	0.05	0.63	-0.07	0.11
Saturday	0.00	0.02	0.96	-0.04	0.04	0.00	0.05	0.98	-0.09	0.09
Bank holiday	-0.01	0.04	0.88	-0.09	0.08	0.00	0.09	0.96	-0.19	0.18
seassin	0.01	0.01	0.34	-0.01	0.02	0.01	0.02	0.67	-0.03	0.04
seascos	0.00	0.01	0.95	-0.02	0.02	0.00	0.02	0.99	-0.03	0.03
seassin1	0.01	0.01	0.42	-0.01	0.02	0.01	0.02	0.72	-0.03	0.04
seascos1	-0.01	0.01	0.41	-0.02	0.01	-0.01	0.02	0.69	-0.04	0.03
					Model including Minimum measures of O_3					
constant	1.11	0.02	0.00	1.07	1.15	1.11	0.04	0.00	1.03	1.20
Monday	0.01	0.02	0.55	-0.03	0.06	0.01	0.05	0.78	-0.08	0.11
Tuesday	0.02	0.02	0.32	-0.02	0.07	0.02	0.05	0.65	-0.07	0.11
Wednesday	0.02	0.02	0.32	-0.02	0.06	0.02	0.05	0.64	-0.07	0.11
Thursday	0.03	0.02	0.13	-0.01	0.08	0.03	0.05	0.49	-0.06	0.13
Friday	0.02	0.02	0.32	-0.02	0.07	0.02	0.05	0.64	-0.07	0.12
Saturday	0.00	0.02	0.89	-0.04	0.05	0.00	0.05	0.95	-0.09	0.10
Bank holiday	-0.01	0.04	0.91	-0.09	0.08	0.00	0.09	0.97	-0.19	0.18
seassin	0.00	0.01	0.58	-0.01	0.02	0.01	0.02	0.79	-0.03	0.04
seascos	0.00	0.01	0.77	-0.01	0.02	0.00	0.02	0.91	-0.03	0.04
seassin1	0.01	0.01	0.42	-0.01	0.02	0.01	0.02	0.71	-0.03	0.04
seascos1	-0.01	0.01	0.38	-0.02	0.01	-0.01	0.02	0.68	-0.04	0.03
O_3 min lag0	0.00	0.00	0.49	0.00	0.00	0.00	0.00	0.77	0.00	0.00
O_3 min lag1	0.00	0.00	0.81	0.00	0.00	0.00	0.00	0.91	0.00	0.00
O_3 min lag2	0.00	0.00	0.84	0.00	0.00	0.00	0.00	0.92	0.00	0.00
O_3 min lag3	0.00	0.00	0.95	0.00	0.00	0.00	0.00	0.99	0.00	0.00
O_3 min lag4	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.69	0.00	0.00
O_3 min lag5	0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.58	0.00	0.00
O_3 min lag6	0.00	0.00	0.69	0.00	0.00	0.00	0.00	0.85	0.00	0.00
O_3 min lag7	0.00	0.00	0.60	0.00	0.00	0.00	0.00	0.81	0.00	0.00
					Model including rain					
constant	1.12	0.02	0.00	1.09	1.15	1.12	0.04	0.00	1.05	1.19
Monday	0.01	0.02	0.68	-0.03	0.05	0.01	0.05	0.84	-0.08	0.10
Tuesday	0.02	0.02	0.38	-0.02	0.06	0.02	0.05	0.69	-0.07	0.11
Wednesday	0.02	0.02	0.44	-0.03	0.06	0.02	0.05	0.72	-0.07	0.11
Thursday	0.03	0.02	0.23	-0.02	0.07	0.03	0.05	0.57	-0.06	0.12
Friday	0.02	0.02	0.24	-0.02	0.07	0.03	0.05	0.58	-0.06	0.12
Saturday	0.00	0.02	0.83	-0.05	0.04	0.00	0.05	0.93	-0.09	0.09
Bank holiday	-0.01	0.04	0.90	-0.09	0.08	0.00	0.09	0.96	-0.19	0.18
seassin	0.01	0.01	0.34	-0.01	0.02	0.01	0.02	0.66	-0.03	0.04
seascos	0.00	0.01	0.96	-0.02	0.02	0.00	0.02	0.99	-0.03	0.03
seassin1	0.01	0.01	0.42	-0.01	0.02	0.01	0.02	0.72	-0.03	0.04
seascos1	-0.01	0.01	0.40	-0.02	0.01	-0.01	0.02	0.69	-0.04	0.03
Rain lag0	0.00	0.00	0.59	0.00	0.00	0.00	0.00	0.81	0.00	0.01
Rain lag1	0.00	0.00	0.29	0.00	0.00	0.00	0.00	0.60	-0.01	0.00
Rain lag2	0.00	0.00	0.84	0.00	0.00	0.00	0.00	0.91	-0.01	0.00
Rain lag3	0.00	0.00	0.49	0.00	0.00	0.00	0.00	0.72	-0.01	0.00
Rain lag4	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.36	0.00	0.01
Rain lag5	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.41	-0.01	0.00
Rain lag6	0.00	0.00	0.27	0.00	0.00	0.00	0.00	0.61	0.00	0.01
Rain lag7	0.00	0.00	0.54	0.00	0.00	0.00	0.00	0.77	0.00	0.01

Table G. 31: Trent Region Emergency Consultations Asthmatics - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	-19.97	806.47	0.98	-1601.51	1561.58	-19.02	763.80	0.98	-1516.05	1478.01
Monday	18.56	806.47	0.98	-1562.98	1600.11	17.54	763.80	0.98	-1479.49	1514.57
Tuesday	17.56	806.47	0.98	-1563.99	1599.10	16.59	763.80	0.98	-1480.44	1513.62
Wednesday	17.36	806.47	0.98	-1564.18	1598.91	16.33	763.80	0.98	-1480.70	1513.36
Thursday	18.27	806.47	0.98	-1563.27	1599.82	17.25	763.80	0.98	-1479.78	1514.28
Friday	18.49	806.47	0.98	-1563.06	1600.04	17.51	763.80	0.98	-1479.52	1514.54
Saturday	17.21	806.47	0.98	-1564.33	1598.76	16.17	763.80	0.98	-1480.86	1513.20
Bank holiday	-2.13	1.06	0.04	-4.21	-0.05	-2.13	1.01	0.03	-4.11	-0.16
seassin	0.05	0.10	0.64	-0.14	0.23	0.05	0.09	0.59	-0.13	0.23
seascos	-0.07	0.09	0.48	-0.25	0.12	-0.06	0.09	0.51	-0.23	0.11
seassin1	0.00	0.09	0.98	-0.18	0.19	0.00	0.09	0.96	-0.18	0.17
seascos1	0.07	0.09	0.43	-0.11	0.26	0.09	0.09	0.33	-0.09	0.26
Model including mean measures of O_3										
constant	-20.44	807.46	0.98	-1603.93	1563.04	-19.47	763.38	0.98	-1515.67	1476.72
Monday	18.56	807.46	0.98	-1564.93	1602.04	17.53	763.38	0.98	-1478.67	1513.72
Tuesday	17.64	807.46	0.98	-1565.84	1601.12	16.67	763.38	0.98	-1479.53	1512.86
Wednesday	17.37	807.46	0.98	-1566.12	1600.85	16.35	763.38	0.98	-1479.84	1512.55
Thursday	18.23	807.46	0.98	-1565.25	1601.72	17.18	763.38	0.98	-1479.01	1513.38
Friday	18.48	807.46	0.98	-1565.01	1601.96	17.50	763.38	0.98	-1478.70	1513.69
Saturday	17.29	807.46	0.98	-1566.20	1600.77	16.27	763.38	0.98	-1479.92	1512.47
Bank holiday	-2.09	1.06	0.05	-4.17	0.00	-2.10	1.01	0.04	-4.07	-0.13
seassin	-0.04	0.11	0.69	-0.27	0.18	-0.04	0.11	0.71	-0.25	0.17
seascos	0.06	0.11	0.62	-0.16	0.27	0.04	0.10	0.66	-0.16	0.25
seassin1	0.03	0.09	0.77	-0.16	0.21	0.01	0.09	0.93	-0.17	0.18
seascos1	0.08	0.10	0.41	-0.11	0.27	0.09	0.09	0.31	-0.09	0.27
O_3 mean lag0	0.00	0.01	0.67	-0.01	0.01	0.00	0.01	0.56	-0.01	0.01
O_3 mean lag1	0.00	0.01	0.64	-0.01	0.01	0.00	0.01	0.51	-0.01	0.01
O_3 mean lag2	0.00	0.01	0.62	-0.01	0.01	0.00	0.01	0.67	-0.01	0.01
O_3 mean lag3	0.00	0.01	0.62	-0.01	0.01	0.00	0.01	0.86	-0.01	0.01
O_3 mean lag4	0.00	0.01	0.42	-0.01	0.02	0.01	0.01	0.20	0.00	0.02
O_3 mean lag5	0.01	0.01	0.31	-0.01	0.02	0.01	0.01	0.25	0.00	0.02
O_3 mean lag6	-0.01	0.01	0.39	-0.02	0.01	-0.01	0.01	0.17	-0.02	0.00
O_3 mean lag7	0.01	0.01	0.17	0.00	0.02	0.01	0.00	0.14	0.00	0.02
Model including maximum measures of O_3										
constant	-20.62	761.20	0.98	-1513.39	1472.15	-19.62	718.03	0.98	-1426.94	1387.70
Monday	18.48	761.20	0.98	-1474.29	1511.25	17.44	718.03	0.98	-1389.88	1424.76
Tuesday	17.46	761.20	0.98	-1475.31	1510.22	16.49	718.03	0.98	-1390.83	1423.81
Wednesday	17.16	761.20	0.98	-1475.60	1509.93	16.15	718.03	0.98	-1391.17	1423.47
Thursday	18.09	761.20	0.98	-1474.68	1510.86	17.07	718.03	0.98	-1390.25	1424.38
Friday	18.40	761.20	0.98	-1474.37	1511.16	17.40	718.03	0.98	-1389.92	1424.72
Saturday	17.11	761.20	0.98	-1475.66	1509.88	16.08	718.03	0.98	-1391.24	1423.40
Bank holiday	-2.12	1.07	0.05	-4.21	-0.03	-2.14	1.01	0.03	-4.12	-0.17
seassin	-0.04	0.11	0.69	-0.25	0.16	-0.04	0.10	0.73	-0.23	0.16
seascos	0.07	0.11	0.55	-0.15	0.28	0.06	0.10	0.53	-0.14	0.27
seassin1	0.00	0.09	0.99	-0.19	0.18	-0.01	0.09	0.94	-0.18	0.17
seascos1	0.08	0.10	0.41	-0.11	0.27	0.10	0.09	0.26	-0.08	0.28
O_3 max lag0	0.00	0.00	0.98	-0.01	0.01	0.00	0.00	0.69	-0.01	0.01
O_3 max lag1	0.00	0.00	0.61	-0.01	0.01	0.00	0.00	0.90	-0.01	0.01
O_3 max lag2	0.00	0.00	0.83	-0.01	0.01	0.00	0.00	0.86	-0.01	0.01
O_3 max lag3	0.01	0.00	0.13	0.00	0.01	0.00	0.00	0.18	0.00	0.01
O_3 max lag4	0.00	0.00	0.24	0.00	0.01	0.01	0.00	0.15	0.00	0.01
O_3 max lag5	0.00	0.00	0.87	-0.01	0.01	0.00	0.00	1.00	-0.01	0.01
O_3 max lag6	0.00	0.00	0.84	-0.01	0.01	0.00	0.00	0.58	-0.01	0.01
O_3 max lag7	0.00	0.00	0.21	0.00	0.01	0.00	0.00	0.18	0.00	0.01

Table G. 32: Trent Region Emergency Consultations Non-asthmatics - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	-19.43	566.70	0.97	-1130.78	1091.92	-18.48	572.88	0.97	-1141.31	1104.34
Monday	17.31	566.70	0.98	-1094.04	1128.66	16.31	572.88	0.98	-1106.51	1139.13
Tuesday	16.23	566.70	0.98	-1095.12	1127.58	15.28	572.88	0.98	-1107.54	1138.11
Wednesday	16.85	566.70	0.98	-1094.50	1128.20	15.89	572.88	0.98	-1106.94	1138.71
Thursday	17.04	566.70	0.98	-1094.31	1128.39	16.07	572.88	0.98	-1106.75	1138.90
Friday	17.19	566.70	0.98	-1094.16	1128.54	16.21	572.88	0.98	-1106.61	1139.04
Saturday	15.49	566.70	0.98	-1095.86	1126.84	14.50	572.88	0.98	-1108.32	1137.32
Bank holiday	-1.51	1.00	0.13	-3.47	0.45	-1.56	1.01	0.12	-3.55	0.42
seassin	0.34	0.13	0.01	0.09	0.60	0.34	0.13	0.01	0.08	0.60
seascos	-0.16	0.12	0.17	-0.39	0.07	-0.15	0.12	0.19	-0.38	0.07
seassin1	0.01	0.12	0.93	-0.23	0.25	0.00	0.12	0.99	-0.24	0.24
seascos1	0.24	0.12	0.05	0.00	0.48	0.25	0.12	0.05	0.00	0.49
Model including mean measures of O_3										
constant	-19.52	581.02	0.97	-1158.94	1119.90	-18.65	574.48	0.97	-1144.61	1107.31
Monday	17.24	581.02	0.98	-1122.18	1156.66	16.25	574.48	0.98	-1109.71	1142.21
Tuesday	16.16	581.02	0.98	-1123.26	1155.58	15.22	574.48	0.98	-1110.74	1141.18
Wednesday	16.69	581.02	0.98	-1122.74	1156.11	15.71	574.48	0.98	-1110.25	1141.67
Thursday	16.91	581.02	0.98	-1122.52	1156.33	15.93	574.48	0.98	-1110.03	1141.89
Friday	16.91	581.02	0.98	-1122.51	1156.33	15.97	574.48	0.98	-1109.99	1141.93
Saturday	15.38	581.02	0.98	-1124.04	1154.80	14.41	574.48	0.98	-1111.55	1140.37
Bank holiday	-1.34	1.02	0.19	-3.35	0.67	-1.41	1.01	0.17	-3.39	0.58
seassin	0.30	0.15	0.05	0.00	0.61	0.28	0.15	0.06	-0.02	0.58
seascos	-0.10	0.14	0.47	-0.38	0.17	-0.10	0.14	0.49	-0.37	0.18
seassin1	0.00	0.12	0.98	-0.24	0.24	0.00	0.12	0.97	-0.24	0.23
seascos1	0.24	0.13	0.06	-0.01	0.48	0.25	0.12	0.05	0.00	0.49
O_3 mean lag0	-0.01	0.01	0.06	-0.03	0.00	-0.01	0.01	0.12	-0.02	0.00
O_3 mean lag1	0.00	0.01	0.91	-0.02	0.01	0.00	0.01	0.96	-0.01	0.01
O_3 mean lag2	0.00	0.01	0.67	-0.02	0.01	0.00	0.01	0.68	-0.02	0.01
O_3 mean lag3	0.01	0.01	0.20	0.00	0.02	0.01	0.01	0.16	0.00	0.02
O_3 mean lag4	0.00	0.01	0.91	-0.01	0.01	0.00	0.01	0.93	-0.01	0.01
O_3 mean lag5	0.01	0.01	0.09	0.00	0.03	0.01	0.01	0.13	0.00	0.03
O_3 mean lag6	0.00	0.01	0.83	-0.02	0.01	0.00	0.01	0.80	-0.02	0.01
O_3 mean lag7	0.00	0.01	0.69	-0.01	0.02	0.00	0.01	0.71	-0.01	0.02
Model including maximum measures of O_3										
constant	-20.10	577.00	0.97	-1151.65	1111.45	-19.21	575.27	0.97	-1146.72	1108.31
Monday	17.28	577.00	0.98	-1114.27	1148.83	16.27	575.27	0.98	-1111.24	1143.78
Tuesday	16.03	577.00	0.98	-1115.52	1147.59	15.07	575.27	0.98	-1112.45	1142.58
Wednesday	16.70	577.00	0.98	-1114.85	1148.25	15.70	575.27	0.98	-1111.81	1143.22
Thursday	17.00	577.00	0.98	-1114.55	1148.55	16.01	575.27	0.98	-1111.50	1143.53
Friday	17.07	577.00	0.98	-1114.48	1148.62	16.08	575.27	0.98	-1111.43	1143.60
Saturday	15.31	577.00	0.98	-1116.24	1146.86	14.33	575.27	0.98	-1113.18	1141.85
Bank holiday	-1.40	1.02	0.17	-3.40	0.59	-1.45	1.01	0.15	-3.44	0.54
seassin	0.28	0.14	0.05	0.00	0.56	0.25	0.14	0.08	-0.03	0.53
seascos	-0.01	0.14	0.95	-0.28	0.26	-0.01	0.14	0.94	-0.28	0.26
seassin1	-0.02	0.12	0.87	-0.26	0.22	-0.03	0.12	0.82	-0.27	0.21
seascos1	0.26	0.13	0.04	0.01	0.50	0.26	0.12	0.04	0.02	0.51
O_3 max lag0	-0.01	0.01	0.08	-0.02	0.00	-0.01	0.01	0.12	-0.02	0.00
O_3 max lag1	0.00	0.01	0.60	-0.01	0.01	0.00	0.01	0.68	-0.01	0.01
O_3 max lag2	0.01	0.00	0.03	0.00	0.02	0.01	0.00	0.04	0.00	0.02
O_3 max lag3	0.01	0.01	0.21	0.00	0.02	0.01	0.01	0.22	0.00	0.02
O_3 max lag4	0.00	0.01	0.53	-0.01	0.01	0.00	0.01	0.61	-0.01	0.01
O_3 max lag5	0.00	0.01	0.98	-0.01	0.01	0.00	0.01	0.93	-0.01	0.01
O_3 max lag6	0.01	0.01	0.04	0.00	0.02	0.01	0.01	0.06	0.00	0.02
O_3 max lag7	0.00	0.01	0.82	-0.01	0.01	0.00	0.01	0.92	-0.01	0.01

Table G. 33: Trent Region Emergency Consultations Excess - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	L CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	1.39	0.01	0.00	1.37	1.40	1.39	0.03	0.00	1.33	1.44
Monday	0.03	0.01	0.00	0.01	0.04	0.03	0.04	0.51	-0.05	0.11
Tuesday	0.01	0.01	0.20	-0.01	0.03	0.01	0.04	0.77	-0.07	0.09
Wednesday	0.00	0.01	0.79	-0.02	0.02	0.00	0.04	0.95	-0.08	0.08
Thursday	0.02	0.01	0.03	0.00	0.04	0.02	0.04	0.63	-0.06	0.10
Friday	0.03	0.01	0.00	0.01	0.05	0.03	0.04	0.48	-0.05	0.11
Saturday	0.01	0.01	0.28	-0.01	0.03	0.01	0.04	0.81	-0.07	0.09
Bank holiday	-0.02	0.02	0.20	-0.06	0.01	-0.02	0.08	0.78	-0.18	0.14
seassin	0.00	0.00	0.33	-0.01	0.00	0.00	0.02	0.83	-0.03	0.03
seascos	0.00	0.00	0.75	-0.01	0.01	0.00	0.02	0.95	-0.03	0.03
seassin1	0.00	0.00	0.95	-0.01	0.01	0.00	0.02	0.99	-0.03	0.03
seascos1	0.00	0.00	0.80	-0.01	0.01	0.00	0.02	0.95	-0.03	0.03
Model including mean measures of O_3										
constant	1.38	0.01	0.00	1.35	1.40	1.38	0.06	0.00	1.27	1.49
Monday	0.03	0.01	0.01	0.01	0.05	0.03	0.04	0.52	-0.06	0.11
Tuesday	0.02	0.01	0.13	0.00	0.03	0.01	0.04	0.73	-0.07	0.10
Wednesday	0.00	0.01	0.89	-0.02	0.02	0.00	0.04	0.98	-0.08	0.09
Thursday	0.02	0.01	0.04	0.00	0.04	0.02	0.04	0.65	-0.06	0.10
Friday	0.03	0.01	0.00	0.01	0.05	0.03	0.04	0.47	-0.05	0.12
Saturday	0.01	0.01	0.14	0.00	0.03	0.01	0.04	0.74	-0.07	0.10
Bank holiday	-0.03	0.02	0.17	-0.06	0.01	-0.03	0.08	0.76	-0.19	0.14
seassin	-0.01	0.00	0.20	-0.01	0.00	0.00	0.02	0.78	-0.04	0.03
seascos	0.00	0.00	0.46	-0.01	0.01	0.00	0.02	0.88	-0.03	0.04
seassin1	0.00	0.00	0.94	-0.01	0.01	0.00	0.02	0.99	-0.03	0.03
seascos1	0.00	0.00	0.80	-0.01	0.01	0.00	0.02	0.95	-0.03	0.03
O_3 mean lag0	0.00	0.00	0.56	0.00	0.00	0.00	0.00	0.91	0.00	0.00
O_3 mean lag1	0.00	0.00	0.61	0.00	0.00	0.00	0.00	0.91	0.00	0.00
O_3 mean lag2	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.99	0.00	0.00
O_3 mean lag3	0.00	0.00	0.47	0.00	0.00	0.00	0.00	0.87	0.00	0.00
O_3 mean lag4	0.00	0.00	0.30	0.00	0.00	0.00	0.00	0.81	0.00	0.00
O_3 mean lag5	0.00	0.00	0.95	0.00	0.00	0.00	0.00	1.00	0.00	0.00
O_3 mean lag6	0.00	0.00	0.37	0.00	0.00	0.00	0.00	0.84	0.00	0.00
O_3 mean lag7	0.00	0.00	0.38	0.00	0.00	0.00	0.00	0.84	0.00	0.00
Model including maximum measures of O_3										
constant	1.37	0.01	0.00	1.35	1.40	1.38	0.06	0.00	1.25	1.50
Monday	0.03	0.01	0.00	0.01	0.05	0.03	0.04	0.50	-0.05	0.11
Tuesday	0.02	0.01	0.11	0.00	0.03	0.02	0.04	0.71	-0.07	0.10
Wednesday	0.00	0.01	0.91	-0.02	0.02	0.00	0.04	0.98	-0.08	0.08
Thursday	0.02	0.01	0.05	0.00	0.04	0.02	0.04	0.66	-0.06	0.10
Friday	0.03	0.01	0.00	0.01	0.05	0.03	0.04	0.47	-0.05	0.11
Saturday	0.01	0.01	0.16	-0.01	0.03	0.01	0.04	0.75	-0.07	0.09
Bank holiday	-0.03	0.02	0.17	-0.06	0.01	-0.03	0.08	0.76	-0.19	0.14
seassin	0.00	0.00	0.23	-0.01	0.00	0.00	0.02	0.79	-0.04	0.03
seascos	0.00	0.00	0.49	-0.01	0.01	0.00	0.02	0.89	-0.03	0.04
seassin1	0.00	0.00	0.95	-0.01	0.01	0.00	0.02	0.99	-0.03	0.03
seascos1	0.00	0.00	0.85	-0.01	0.01	0.00	0.02	0.96	-0.03	0.03
O_3 max lag0	0.00	0.00	0.53	0.00	0.00	0.00	0.00	0.90	0.00	0.00
O_3 max lag1	0.00	0.00	0.91	0.00	0.00	0.00	0.00	0.97	0.00	0.00
O_3 max lag2	0.00	0.00	0.38	0.00	0.00	0.00	0.00	0.83	0.00	0.00
O_3 max lag3	0.00	0.00	0.77	0.00	0.00	0.00	0.00	0.96	0.00	0.00
O_3 max lag4	0.00	0.00	0.18	0.00	0.00	0.00	0.00	0.76	0.00	0.00
O_3 max lag5	0.00	0.00	0.89	0.00	0.00	0.00	0.00	0.98	0.00	0.00
O_3 max lag6	0.00	0.00	0.14	0.00	0.00	0.00	0.00	0.73	0.00	0.00
O_3 max lag7	0.00	0.00	0.28	0.00	0.00	0.00	0.00	0.81	0.00	0.00

Table G. 34: Trent Region Emergency Counts Asthmatics - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	-0.08	0.07	0.20	-0.21	0.05	-0.08	0.06	0.16	-0.20	0.03
Monday	0.44	0.09	0.00	0.27	0.61	0.45	0.08	0.00	0.30	0.60
Tuesday	0.21	0.09	0.02	0.03	0.38	0.21	0.08	0.01	0.05	0.36
Wednesday	0.20	0.09	0.03	0.02	0.37	0.19	0.08	0.02	0.04	0.35
Thursday	0.22	0.09	0.02	0.04	0.39	0.21	0.08	0.01	0.06	0.37
Friday	0.25	0.09	0.00	0.08	0.43	0.25	0.08	0.00	0.09	0.40
Saturday	-0.13	0.10	0.20	-0.32	0.06	-0.13	0.09	0.14	-0.30	0.04
Bank holiday	-0.33	0.19	0.08	-0.69	0.03	-0.37	0.16	0.03	-0.69	-0.05
seassin	0.12	0.03	0.00	0.05	0.18	0.12	0.03	0.00	0.06	0.17
seascos	0.01	0.03	0.82	-0.06	0.07	0.01	0.03	0.85	-0.05	0.06
seassin1	-0.04	0.03	0.22	-0.10	0.02	-0.04	0.03	0.17	-0.10	0.02
seascos1	0.09	0.03	0.01	0.02	0.15	0.09	0.03	0.00	0.03	0.15
Model including Minimum measures of NO										
constant	-0.11	0.07	0.12	-0.25	0.03	-0.12	0.06	0.05	-0.25	0.00
Monday	0.44	0.09	0.00	0.26	0.61	0.44	0.08	0.00	0.29	0.59
Tuesday	0.19	0.09	0.04	0.01	0.37	0.19	0.08	0.02	0.03	0.35
Wednesday	0.18	0.09	0.04	0.01	0.36	0.18	0.08	0.03	0.02	0.34
Thursday	0.20	0.09	0.02	0.03	0.38	0.20	0.08	0.01	0.04	0.36
Friday	0.25	0.09	0.01	0.07	0.43	0.24	0.08	0.00	0.09	0.40
Saturday	-0.14	0.10	0.16	-0.33	0.06	-0.14	0.09	0.11	-0.31	0.03
Bank holiday	-0.33	0.19	0.08	-0.69	0.03	-0.37	0.17	0.03	-0.69	-0.04
seassin	0.12	0.03	0.00	0.05	0.18	0.12	0.03	0.00	0.06	0.17
seascos	-0.02	0.04	0.64	-0.09	0.05	-0.03	0.03	0.38	-0.09	0.03
seassin1	-0.04	0.03	0.22	-0.10	0.02	-0.04	0.03	0.16	-0.10	0.02
seascos1	0.08	0.03	0.01	0.02	0.15	0.09	0.03	0.00	0.03	0.14
NO min lag0	0.00	0.00	0.48	0.00	0.01	0.00	0.00	0.14	0.00	0.01
NO min lag1	0.00	0.00	0.79	-0.01	0.01	0.00	0.00	0.61	-0.01	0.01
NO min lag2	0.00	0.00	0.26	-0.01	0.00	0.00	0.00	0.34	-0.01	0.00
NO min lag3	0.01	0.00	0.19	0.00	0.01	0.01	0.00	0.11	0.00	0.01
NO min lag4	0.00	0.00	0.92	-0.01	0.01	0.00	0.00	0.87	-0.01	0.01
NO min lag5	0.00	0.00	0.20	0.00	0.01	0.00	0.00	0.16	0.00	0.01
NO min lag6	0.00	0.00	0.65	-0.01	0.01	0.00	0.00	0.54	0.00	0.01
NO min lag7	0.00	0.00	0.86	-0.01	0.01	0.00	0.00	0.83	-0.01	0.01
Model including mean measures of NO										
constant	-0.06	0.08	0.48	-0.21	0.10	-0.07	0.07	0.35	-0.20	0.07
Monday	0.47	0.09	0.00	0.29	0.65	0.47	0.08	0.00	0.31	0.62
Tuesday	0.23	0.09	0.02	0.04	0.41	0.23	0.08	0.01	0.06	0.39
Wednesday	0.25	0.09	0.01	0.06	0.43	0.24	0.08	0.00	0.07	0.40
Thursday	0.27	0.09	0.00	0.09	0.46	0.26	0.08	0.00	0.10	0.43
Friday	0.32	0.09	0.00	0.13	0.50	0.31	0.08	0.00	0.14	0.47
Saturday	-0.08	0.10	0.41	-0.28	0.11	-0.09	0.09	0.33	-0.26	0.09
Bank holiday	-0.32	0.19	0.09	-0.68	0.04	-0.36	0.17	0.03	-0.69	-0.04
seassin	0.11	0.03	0.00	0.05	0.18	0.11	0.03	0.00	0.05	0.17
seascos	0.04	0.04	0.32	-0.04	0.12	0.03	0.03	0.39	-0.04	0.10
seassin1	-0.04	0.03	0.17	-0.11	0.02	-0.04	0.03	0.13	-0.10	0.01
seascos1	0.09	0.03	0.01	0.03	0.16	0.09	0.03	0.00	0.04	0.15
NO mean lag0	0.00	0.00	0.62	0.00	0.00	0.00	0.00	0.70	0.00	0.00
NO mean lag1	0.00	0.00	0.88	0.00	0.00	0.00	0.00	0.89	0.00	0.00
NO mean lag2	0.00	0.00	0.21	0.00	0.00	0.00	0.00	0.22	0.00	0.00
NO mean lag3	0.00	0.00	0.58	0.00	0.00	0.00	0.00	0.51	0.00	0.00
NO mean lag4	0.00	0.00	0.58	0.00	0.00	0.00	0.00	0.54	0.00	0.00
NO mean lag5	0.00	0.00	0.73	0.00	0.00	0.00	0.00	0.68	0.00	0.00
NO mean lag6	0.00	0.00	0.71	0.00	0.00	0.00	0.00	0.65	0.00	0.00
NO mean lag7	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.00

Table G. 35: Trent Region Emergency Counts Non-asthmatics - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	-0.62	0.09	0.00	-0.79	-0.45	-0.63	0.08	0.00	-0.78	-0.47
Monday	0.52	0.11	0.00	0.30	0.73	0.53	0.10	0.00	0.33	0.72
Tuesday	0.19	0.12	0.10	-0.03	0.42	0.21	0.10	0.05	0.00	0.41
Wednesday	0.29	0.11	0.01	0.06	0.51	0.29	0.10	0.01	0.09	0.49
Thursday	0.21	0.11	0.07	-0.01	0.44	0.22	0.10	0.04	0.01	0.42
Friday	0.15	0.12	0.19	-0.08	0.38	0.15	0.11	0.15	-0.05	0.36
Saturday	-0.30	0.13	0.02	-0.56	-0.04	-0.30	0.12	0.01	-0.53	-0.07
Bank holiday	-0.62	0.27	0.02	-1.15	-0.10	-0.65	0.24	0.01	-1.12	-0.18
seassin	0.10	0.04	0.03	0.01	0.18	0.10	0.04	0.02	0.02	0.17
seascos	-0.01	0.04	0.76	-0.09	0.07	-0.01	0.04	0.77	-0.08	0.06
seassin1	-0.07	0.04	0.08	-0.16	0.01	-0.07	0.04	0.05	-0.15	0.00
seascos1	0.12	0.04	0.01	0.04	0.20	0.12	0.04	0.00	0.05	0.20
Model including Minimum measures of NO										
constant	-0.68	0.09	0.00	-0.86	-0.50	-0.69	0.08	0.00	-0.85	-0.53
Monday	0.54	0.11	0.00	0.32	0.76	0.54	0.10	0.00	0.35	0.74
Tuesday	0.20	0.12	0.08	-0.02	0.43	0.22	0.11	0.04	0.02	0.43
Wednesday	0.28	0.11	0.01	0.06	0.50	0.28	0.10	0.01	0.08	0.49
Thursday	0.22	0.12	0.06	-0.01	0.44	0.22	0.10	0.04	0.02	0.43
Friday	0.16	0.12	0.18	-0.07	0.39	0.16	0.11	0.14	-0.05	0.37
Saturday	-0.31	0.13	0.02	-0.57	-0.05	-0.31	0.12	0.01	-0.54	-0.07
Bank holiday	-0.65	0.27	0.02	-1.18	-0.13	-0.67	0.24	0.01	-1.15	-0.20
seassin	0.10	0.04	0.03	0.01	0.18	0.10	0.04	0.02	0.02	0.17
seascos	-0.05	0.05	0.29	-0.14	0.04	-0.05	0.04	0.22	-0.13	0.03
seassin1	-0.08	0.04	0.07	-0.16	0.01	-0.08	0.04	0.04	-0.15	0.00
seascos1	0.11	0.04	0.01	0.03	0.19	0.11	0.04	0.00	0.04	0.19
NO min lag0	0.00	0.01	0.91	-0.01	0.01	0.00	0.00	0.89	-0.01	0.01
NO min lag1	0.01	0.00	0.20	0.00	0.02	0.01	0.00	0.12	0.00	0.02
NO min lag2	0.00	0.01	0.59	-0.01	0.01	0.00	0.01	0.65	-0.01	0.01
NO min lag3	0.00	0.01	0.80	-0.01	0.01	0.00	0.01	0.75	-0.01	0.01
NO min lag4	0.00	0.01	0.53	-0.01	0.01	0.00	0.00	0.46	-0.01	0.01
NO min lag5	0.00	0.00	0.79	-0.01	0.01	0.00	0.00	0.76	-0.01	0.01
NO min lag6	0.00	0.01	0.64	-0.01	0.01	0.00	0.00	0.61	-0.01	0.01
NO min lag7	0.01	0.00	0.03	0.00	0.02	0.01	0.00	0.02	0.00	0.02
Model including mean measures of NO										
constant	-0.79	0.15	0.00	-1.09	-0.50	-0.63	0.09	0.00	-0.81	-0.45
Monday	0.51	0.12	0.00	0.27	0.75	0.51	0.10	0.00	0.31	0.72
Tuesday	0.17	0.13	0.19	-0.08	0.42	0.18	0.11	0.11	-0.04	0.39
Wednesday	0.30	0.13	0.02	0.06	0.55	0.28	0.11	0.01	0.07	0.49
Thursday	0.19	0.13	0.15	-0.07	0.44	0.19	0.11	0.09	-0.03	0.40
Friday	0.10	0.13	0.42	-0.15	0.36	0.13	0.11	0.24	-0.09	0.35
Saturday	-0.29	0.14	0.04	-0.56	-0.01	-0.33	0.12	0.01	-0.57	-0.10
Bank holiday	-0.59	0.27	0.03	-1.12	-0.07	-0.64	0.24	0.01	-1.12	-0.17
seassin	0.10	0.04	0.03	0.01	0.18	0.10	0.04	0.01	0.02	0.18
seascos	-0.04	0.05	0.36	-0.13	0.05	-0.03	0.05	0.56	-0.12	0.06
seassin1	-0.07	0.04	0.11	-0.15	0.01	-0.07	0.04	0.06	-0.15	0.00
seascos1	0.13	0.04	0.00	0.05	0.22	0.12	0.04	0.00	0.04	0.19
NO mean lag0	0.00	0.00	0.26	0.00	0.01	0.00	0.00	0.72	0.00	0.00
NO mean lag1	0.00	0.00	0.54	0.00	0.01	0.00	0.00	0.49	0.00	0.00
NO mean lag2	0.00	0.00	0.73	-0.01	0.00	0.00	0.00	0.31	0.00	0.00
NO mean lag3	0.00	0.00	0.32	0.00	0.01	0.00	0.00	0.25	0.00	0.00
NO mean lag4	0.00	0.00	0.95	-0.01	0.01	0.00	0.00	0.39	0.00	0.00
NO mean lag5	0.00	0.00	0.30	-0.01	0.00	0.00	0.00	0.47	0.00	0.00
NO mean lag6	0.00	0.00	0.22	0.00	0.01	0.00	0.00	0.37	0.00	0.00
NO mean lag7	0.00	0.00	0.33	-0.01	0.00	0.00	0.00	0.42	0.00	0.00

Table G. 36: Trent Region Emergency Counts Excess - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	L CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	1.68	0.01	0.00	1.65	1.71	1.68	0.02	0.00	1.64	1.73
Monday	0.03	0.02	0.20	-0.01	0.07	0.03	0.03	0.44	-0.04	0.10
Tuesday	0.02	0.02	0.41	-0.02	0.06	0.02	0.03	0.64	-0.05	0.08
Wednesday	0.00	0.02	0.85	-0.04	0.05	0.00	0.03	0.94	-0.07	0.07
Thursday	0.02	0.02	0.42	-0.02	0.06	0.02	0.03	0.64	-0.05	0.08
Friday	0.03	0.02	0.13	-0.01	0.07	0.03	0.03	0.37	-0.04	0.10
Saturday	0.01	0.02	0.80	-0.04	0.05	0.01	0.03	0.88	-0.06	0.07
Bank holiday	0.00	0.04	0.95	-0.09	0.08	0.00	0.07	0.95	-0.14	0.13
seassin	0.01	0.01	0.14	0.00	0.03	0.01	0.01	0.37	-0.01	0.04
seascos	0.00	0.01	0.72	-0.01	0.02	0.00	0.01	0.85	-0.02	0.03
seassin1	0.00	0.01	0.88	-0.01	0.02	0.00	0.01	0.95	-0.02	0.03
seascos1	0.00	0.01	0.60	-0.01	0.02	0.00	0.01	0.77	-0.02	0.03
Model including Minimum measures of NO										
constant	1.68	0.02	0.00	1.65	1.71	1.68	0.03	0.00	1.63	1.74
Monday	0.02	0.02	0.28	-0.02	0.06	0.02	0.04	0.51	-0.05	0.09
Tuesday	0.01	0.02	0.54	-0.03	0.05	0.01	0.03	0.74	-0.06	0.08
Wednesday	0.00	0.02	0.94	-0.04	0.04	0.00	0.03	0.99	-0.07	0.07
Thursday	0.01	0.02	0.51	-0.03	0.06	0.01	0.03	0.71	-0.06	0.08
Friday	0.03	0.02	0.15	-0.01	0.07	0.03	0.03	0.40	-0.04	0.10
Saturday	0.00	0.02	0.84	-0.04	0.05	0.00	0.03	0.91	-0.06	0.07
Bank holiday	0.00	0.04	0.97	-0.08	0.08	0.00	0.07	1.00	-0.14	0.14
seassin	0.01	0.01	0.13	0.00	0.03	0.01	0.01	0.37	-0.01	0.04
seascos	0.00	0.01	0.89	-0.02	0.02	0.00	0.01	0.98	-0.03	0.03
seassin1	0.00	0.01	0.88	-0.01	0.02	0.00	0.01	0.95	-0.02	0.03
seascos1	0.00	0.01	0.63	-0.01	0.02	0.00	0.01	0.79	-0.02	0.03
NO min lag0	0.00	0.00	0.34	0.00	0.00	0.00	0.00	0.53	0.00	0.00
NO min lag1	0.00	0.00	0.59	0.00	0.00	0.00	0.00	0.75	0.00	0.00
NO min lag2	0.00	0.00	0.67	0.00	0.00	0.00	0.00	0.79	0.00	0.00
NO min lag3	0.00	0.00	0.34	0.00	0.00	0.00	0.00	0.55	0.00	0.00
NO min lag4	0.00	0.00	0.75	0.00	0.00	0.00	0.00	0.85	0.00	0.00
NO min lag5	0.00	0.00	0.34	0.00	0.00	0.00	0.00	0.56	0.00	0.00
NO min lag6	0.00	0.00	0.47	0.00	0.00	0.00	0.00	0.65	0.00	0.00
NO min lag7	0.00	0.00	0.14	0.00	0.00	0.00	0.00	0.37	0.00	0.00
Model including mean measures of NO										
constant	1.69	0.02	0.00	1.65	1.72	1.69	0.03	0.00	1.63	1.75
Monday	0.03	0.02	0.14	-0.01	0.08	0.03	0.04	0.37	-0.04	0.10
Tuesday	0.03	0.02	0.25	-0.02	0.07	0.02	0.04	0.51	-0.05	0.10
Wednesday	0.02	0.02	0.49	-0.03	0.06	0.01	0.04	0.70	-0.06	0.09
Thursday	0.03	0.02	0.15	-0.01	0.08	0.03	0.04	0.40	-0.04	0.10
Friday	0.05	0.02	0.04	0.00	0.09	0.05	0.04	0.21	-0.03	0.12
Saturday	0.02	0.02	0.41	-0.02	0.06	0.02	0.04	0.62	-0.05	0.09
Bank holiday	0.00	0.04	0.99	-0.08	0.08	0.00	0.07	0.97	-0.14	0.14
seassin	0.01	0.01	0.18	0.00	0.03	0.01	0.01	0.42	-0.02	0.04
seascos	0.01	0.01	0.29	-0.01	0.03	0.01	0.02	0.56	-0.02	0.04
seassin1	0.00	0.01	0.99	-0.02	0.02	0.00	0.01	0.98	-0.03	0.03
seascos1	0.01	0.01	0.53	-0.01	0.02	0.00	0.01	0.73	-0.02	0.03
NO mean lag0	0.00	0.00	0.61	0.00	0.00	0.00	0.00	0.75	0.00	0.00
NO mean lag1	0.00	0.00	0.75	0.00	0.00	0.00	0.00	0.87	0.00	0.00
NO mean lag2	0.00	0.00	0.74	0.00	0.00	0.00	0.00	0.85	0.00	0.00
NO mean lag3	0.00	0.00	0.87	0.00	0.00	0.00	0.00	0.91	0.00	0.00
NO mean lag4	0.00	0.00	0.34	0.00	0.00	0.00	0.00	0.56	0.00	0.00
NO mean lag5	0.00	0.00	0.90	0.00	0.00	0.00	0.00	0.96	0.00	0.00
NO mean lag6	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.61	0.00	0.00
NO mean lag7	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.14	0.00	0.00

Table G. 37: Trent Region Out of Hours Counts Asthmatics - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	-0.33	0.07	0.00	-0.47	-0.19	-0.33	0.07	0.00	-0.46	-0.20
Monday	-0.08	0.10	0.46	-0.28	0.13	-0.07	0.10	0.46	-0.26	0.12
Tuesday	-0.45	0.11	0.00	-0.67	-0.22	-0.44	0.11	0.00	-0.65	-0.23
Wednesday	-0.35	0.11	0.00	-0.57	-0.13	-0.36	0.10	0.00	-0.56	-0.16
Thursday	-0.62	0.12	0.00	-0.85	-0.38	-0.61	0.11	0.00	-0.83	-0.39
Friday	-0.49	0.12	0.00	-0.72	-0.27	-0.50	0.11	0.00	-0.71	-0.29
Saturday	-0.25	0.11	0.02	-0.46	-0.04	-0.25	0.10	0.01	-0.44	-0.05
Bank holiday	0.16	0.21	0.45	-0.25	0.57	0.14	0.19	0.48	-0.24	0.52
seassin	0.19	0.05	0.00	0.09	0.28	0.19	0.04	0.00	0.10	0.27
seascos	0.10	0.04	0.03	0.01	0.18	0.10	0.04	0.01	0.02	0.18
seassin1	-0.05	0.04	0.24	-0.14	0.03	-0.05	0.04	0.21	-0.13	0.03
seascos1	0.16	0.04	0.00	0.07	0.25	0.16	0.04	0.00	0.08	0.25
Model including mean measures of PM_{10}										
constant	-0.36	0.12	0.00	-0.60	-0.12	-0.36	0.12	0.00	-0.59	-0.13
Monday	-0.10	0.11	0.35	-0.31	0.11	-0.09	0.10	0.36	-0.29	0.10
Tuesday	-0.47	0.12	0.00	-0.70	-0.23	-0.46	0.11	0.00	-0.67	-0.24
Wednesday	-0.31	0.12	0.01	-0.54	-0.08	-0.32	0.11	0.00	-0.53	-0.11
Thursday	-0.60	0.13	0.00	-0.85	-0.35	-0.59	0.12	0.00	-0.82	-0.36
Friday	-0.50	0.12	0.00	-0.74	-0.26	-0.51	0.11	0.00	-0.73	-0.28
Saturday	-0.25	0.11	0.03	-0.46	-0.03	-0.25	0.10	0.02	-0.45	-0.04
Bank holiday	0.15	0.21	0.48	-0.26	0.56	0.13	0.20	0.51	-0.26	0.51
seassin	0.18	0.05	0.00	0.09	0.28	0.19	0.04	0.00	0.10	0.27
seascos	0.09	0.04	0.03	0.01	0.18	0.10	0.04	0.01	0.02	0.18
seassin1	-0.05	0.04	0.22	-0.14	0.03	-0.05	0.04	0.19	-0.14	0.03
seascos1	0.16	0.05	0.00	0.07	0.25	0.17	0.04	0.00	0.08	0.25
PM_{10} mean lag0	0.00	0.00	0.58	0.00	0.01	0.00	0.00	0.59	0.00	0.01
PM_{10} mean lag1	0.00	0.00	0.89	-0.01	0.01	0.00	0.00	0.93	-0.01	0.01
PM_{10} mean lag2	-0.01	0.00	0.11	-0.01	0.00	-0.01	0.00	0.09	-0.01	0.00
PM_{10} mean lag3	0.01	0.00	0.02	0.00	0.02	0.01	0.00	0.01	0.00	0.02
PM_{10} mean lag4	0.00	0.00	0.76	-0.01	0.01	0.00	0.00	0.75	-0.01	0.01
PM_{10} mean lag5	0.00	0.00	0.30	-0.01	0.00	0.00	0.00	0.29	-0.01	0.00
PM_{10} mean lag6	0.00	0.00	0.66	-0.01	0.01	0.00	0.00	0.66	-0.01	0.01
PM_{10} mean lag7	0.00	0.00	0.59	-0.01	0.00	0.00	0.00	0.57	-0.01	0.00
Model including maximum measures of PM_{10}										
constant	-0.48	0.13	0.00	-0.73	-0.23	-0.48	0.12	0.00	-0.71	-0.25
Monday	-0.08	0.11	0.46	-0.29	0.13	-0.07	0.10	0.46	-0.27	0.12
Tuesday	-0.42	0.12	0.00	-0.65	-0.19	-0.41	0.11	0.00	-0.63	-0.20
Wednesday	-0.32	0.11	0.01	-0.55	-0.10	-0.33	0.11	0.00	-0.54	-0.12
Thursday	-0.60	0.12	0.00	-0.84	-0.35	-0.60	0.12	0.00	-0.82	-0.37
Friday	-0.50	0.12	0.00	-0.73	-0.27	-0.51	0.11	0.00	-0.72	-0.29
Saturday	-0.25	0.11	0.02	-0.47	-0.04	-0.25	0.10	0.01	-0.45	-0.05
Bank holiday	0.14	0.21	0.50	-0.27	0.55	0.12	0.20	0.53	-0.26	0.51
seassin	0.18	0.05	0.00	0.09	0.27	0.18	0.04	0.00	0.10	0.27
seascos	0.09	0.04	0.05	0.00	0.17	0.09	0.04	0.03	0.01	0.17
seassin1	-0.06	0.04	0.22	-0.14	0.03	-0.05	0.04	0.19	-0.14	0.03
seascos1	0.18	0.05	0.00	0.09	0.27	0.18	0.04	0.00	0.10	0.26
PM_{10} max lag0	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.90	0.00	0.00
PM_{10} max lag1	0.00	0.00	0.51	0.00	0.00	0.00	0.00	0.40	0.00	0.00
PM_{10} max lag2	0.00	0.00	0.18	0.00	0.00	0.00	0.00	0.12	0.00	0.00
PM_{10} max lag3	0.00	0.00	0.33	0.00	0.00	0.00	0.00	0.38	0.00	0.00
PM_{10} max lag4	0.00	0.00	0.19	0.00	0.00	0.00	0.00	0.15	0.00	0.00
PM_{10} max lag5	0.00	0.00	0.17	-0.01	0.00	0.00	0.00	0.15	0.00	0.00
PM_{10} max lag6	0.00	0.00	0.74	0.00	0.00	0.00	0.00	0.72	0.00	0.00
PM_{10} max lag7	0.00	0.00	0.75	0.00	0.00	0.00	0.00	0.75	0.00	0.00

Table G. 38: Trent Region Out of Hours Counts Non-asthmatics - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	-0.89	0.10	0.00	-1.08	-0.70	-0.89	0.09	0.00	-1.07	-0.72
Monday	-0.17	0.14	0.24	-0.45	0.11	-0.16	0.13	0.23	-0.42	0.10
Tuesday	-0.71	0.16	0.00	-1.03	-0.39	-0.67	0.15	0.00	-0.97	-0.37
Wednesday	-0.45	0.15	0.00	-0.75	-0.15	-0.44	0.14	0.00	-0.72	-0.17
Thursday	-0.91	0.18	0.00	-1.26	-0.57	-0.89	0.16	0.00	-1.21	-0.57
Friday	-0.67	0.16	0.00	-0.99	-0.34	-0.67	0.15	0.00	-0.96	-0.37
Saturday	-0.45	0.15	0.00	-0.75	-0.15	-0.45	0.14	0.00	-0.73	-0.18
Bank holiday	0.07	0.30	0.82	-0.53	0.67	0.04	0.28	0.88	-0.51	0.59
seassin	0.20	0.07	0.00	0.07	0.32	0.20	0.06	0.00	0.08	0.32
seascos	0.16	0.06	0.01	0.03	0.28	0.17	0.06	0.00	0.05	0.28
seassin1	-0.16	0.06	0.01	-0.29	-0.04	-0.16	0.06	0.01	-0.27	-0.04
seascos1	0.09	0.06	0.17	-0.04	0.21	0.10	0.06	0.10	-0.02	0.21
Model including mean measures of PM_{10}										
constant	-1.02	0.17	0.00	-1.36	-0.68	-1.00	0.16	0.00	-1.31	-0.69
Monday	-0.18	0.15	0.22	-0.47	0.11	-0.17	0.14	0.20	-0.44	0.09
Tuesday	-0.74	0.17	0.00	-1.08	-0.40	-0.70	0.16	0.00	-1.01	-0.39
Wednesday	-0.51	0.16	0.00	-0.82	-0.19	-0.50	0.15	0.00	-0.79	-0.21
Thursday	-0.94	0.19	0.00	-1.30	-0.57	-0.92	0.17	0.00	-1.25	-0.58
Friday	-0.67	0.17	0.00	-1.01	-0.33	-0.67	0.16	0.00	-0.98	-0.36
Saturday	-0.47	0.16	0.00	-0.78	-0.16	-0.48	0.14	0.00	-0.76	-0.19
Bank holiday	0.11	0.31	0.71	-0.49	0.71	0.08	0.28	0.76	-0.47	0.64
seassin	0.19	0.07	0.01	0.05	0.32	0.19	0.06	0.00	0.07	0.31
seascos	0.15	0.06	0.02	0.03	0.27	0.16	0.06	0.01	0.05	0.27
seassin1	-0.16	0.06	0.01	-0.29	-0.04	-0.16	0.06	0.01	-0.27	-0.04
seascos1	0.10	0.07	0.13	-0.03	0.23	0.11	0.06	0.07	-0.01	0.23
PM_{10} mean lag0	0.00	0.00	0.46	-0.01	0.01	0.00	0.00	0.45	-0.01	0.01
PM_{10} mean lag1	0.00	0.01	0.85	-0.01	0.01	0.00	0.01	0.84	-0.01	0.01
PM_{10} mean lag2	0.00	0.01	0.79	-0.01	0.01	0.00	0.01	0.83	-0.01	0.01
PM_{10} mean lag3	0.00	0.01	0.52	-0.01	0.01	0.00	0.01	0.49	-0.01	0.01
PM_{10} mean lag4	0.00	0.01	0.93	-0.01	0.01	0.00	0.00	0.85	-0.01	0.01
PM_{10} mean lag5	0.01	0.01	0.12	0.00	0.02	0.01	0.00	0.09	0.00	0.02
PM_{10} mean lag6	-0.01	0.01	0.25	-0.02	0.00	-0.01	0.01	0.21	-0.02	0.00
PM_{10} mean lag7	0.00	0.00	0.40	-0.01	0.01	0.00	0.00	0.36	0.00	0.01
Model including maximum measures of PM_{10}										
constant	-1.17	0.17	0.00	-1.51	-0.83	-1.17	0.16	0.00	-1.48	-0.86
Monday	-0.15	0.15	0.29	-0.44	0.13	-0.15	0.13	0.26	-0.41	0.11
Tuesday	-0.70	0.17	0.00	-1.03	-0.37	-0.67	0.15	0.00	-0.97	-0.36
Wednesday	-0.47	0.16	0.00	-0.78	-0.16	-0.47	0.15	0.00	-0.75	-0.18
Thursday	-0.95	0.18	0.00	-1.30	-0.59	-0.94	0.17	0.00	-1.27	-0.61
Friday	-0.68	0.17	0.00	-1.01	-0.35	-0.69	0.15	0.00	-0.99	-0.39
Saturday	-0.46	0.15	0.00	-0.76	-0.15	-0.47	0.14	0.00	-0.75	-0.19
Bank holiday	0.06	0.31	0.84	-0.54	0.66	0.04	0.28	0.89	-0.51	0.59
seassin	0.19	0.07	0.01	0.06	0.32	0.19	0.06	0.00	0.07	0.31
seascos	0.13	0.06	0.04	0.01	0.26	0.14	0.06	0.02	0.03	0.26
seassin1	-0.16	0.06	0.01	-0.29	-0.04	-0.16	0.06	0.01	-0.27	-0.04
seascos1	0.11	0.07	0.08	-0.01	0.24	0.13	0.06	0.04	0.01	0.24
PM_{10} max lag0	0.00	0.00	0.83	0.00	0.00	0.00	0.00	0.45	0.00	0.00
PM_{10} max lag1	0.00	0.00	0.68	0.00	0.00	0.00	0.00	0.79	0.00	0.00
PM_{10} max lag2	0.00	0.00	0.10	0.00	0.01	0.00	0.00	0.06	0.00	0.01
PM_{10} max lag3	0.00	0.00	0.87	0.00	0.00	0.00	0.00	0.96	0.00	0.00
PM_{10} max lag4	0.00	0.00	0.27	-0.01	0.00	0.00	0.00	0.19	-0.01	0.00
PM_{10} max lag5	0.00	0.00	0.30	0.00	0.01	0.00	0.00	0.28	0.00	0.01
PM_{10} max lag6	0.00	0.00	0.86	0.00	0.00	0.00	0.00	0.86	0.00	0.00
PM_{10} max lag7	0.00	0.00	0.54	0.00	0.00	0.00	0.00	0.52	0.00	0.00

Table G. 39: Trent Region Out of Hours Counts Excess - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	L CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
					Null model					
constant	1.67	0.01	0.00	1.65	1.69	1.67	0.02	0.00	1.62	1.72
Monday	0.00	0.01	0.89	-0.03	0.03	0.00	0.04	0.95	-0.07	0.07
Tuesday	-0.01	0.01	0.54	-0.04	0.02	-0.01	0.04	0.77	-0.08	0.06
Wednesday	-0.01	0.01	0.41	-0.04	0.02	-0.01	0.04	0.70	-0.08	0.06
Thursday	-0.02	0.01	0.28	-0.04	0.01	-0.02	0.04	0.64	-0.09	0.05
Friday	-0.02	0.01	0.30	-0.04	0.01	-0.02	0.04	0.65	-0.08	0.05
Saturday	0.00	0.01	0.93	-0.03	0.03	0.00	0.03	0.97	-0.07	0.07
Bank holiday	0.01	0.03	0.61	-0.04	0.07	0.01	0.07	0.84	-0.12	0.15
seassin	0.01	0.01	0.13	0.00	0.02	0.01	0.01	0.53	-0.02	0.03
seascos	0.00	0.01	0.62	-0.01	0.01	0.00	0.01	0.85	-0.02	0.03
seassin1	0.00	0.01	0.59	-0.01	0.01	0.00	0.01	0.83	-0.02	0.03
seascos1	0.01	0.01	0.04	0.00	0.02	0.01	0.01	0.39	-0.01	0.04
					Model including mean measures of PM_{10}					
constant	1.67	0.02	0.00	1.64	1.71	1.67	0.04	0.00	1.60	1.75
Monday	0.00	0.02	0.97	-0.03	0.03	0.00	0.04	0.99	-0.07	0.07
Tuesday	-0.01	0.02	0.55	-0.04	0.02	-0.01	0.04	0.78	-0.08	0.06
Wednesday	0.00	0.02	0.75	-0.03	0.02	-0.01	0.04	0.87	-0.08	0.07
Thursday	-0.01	0.02	0.42	-0.04	0.02	-0.01	0.04	0.73	-0.09	0.06
Friday	-0.02	0.02	0.30	-0.05	0.01	-0.02	0.04	0.65	-0.09	0.06
Saturday	0.00	0.01	0.99	-0.03	0.03	0.00	0.04	1.00	-0.07	0.07
Bank holiday	0.01	0.03	0.69	-0.05	0.07	0.01	0.07	0.87	-0.13	0.15
seassin	0.01	0.01	0.12	0.00	0.02	0.01	0.01	0.52	-0.02	0.04
seascos	0.00	0.01	0.61	-0.01	0.01	0.00	0.01	0.85	-0.02	0.03
seassin1	0.00	0.01	0.59	-0.01	0.01	0.00	0.01	0.83	-0.02	0.03
seascos1	0.01	0.01	0.05	0.00	0.02	0.01	0.01	0.42	-0.02	0.04
PM_{10} mean lag0	0.00	0.00	0.97	0.00	0.00	0.00	0.00	1.00	0.00	0.00
PM_{10} mean lag1	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.99	0.00	0.00
PM_{10} mean lag2	0.00	0.00	0.14	0.00	0.00	0.00	0.00	0.54	0.00	0.00
PM_{10} mean lag3	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.33	0.00	0.00
PM_{10} mean lag4	0.00	0.00	0.74	0.00	0.00	0.00	0.00	0.88	0.00	0.00
PM_{10} mean lag5	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.45	0.00	0.00
PM_{10} mean lag6	0.00	0.00	0.28	0.00	0.00	0.00	0.00	0.66	0.00	0.00
PM_{10} mean lag7	0.00	0.00	0.32	0.00	0.00	0.00	0.00	0.69	0.00	0.00
					Model including maximum measures of PM_{10}					
constant	1.67	0.02	0.00	1.64	1.70	1.67	0.04	0.00	1.59	1.75
Monday	0.00	0.01	0.90	-0.03	0.03	0.00	0.04	0.96	-0.07	0.07
Tuesday	-0.01	0.01	0.65	-0.04	0.02	-0.01	0.04	0.83	-0.08	0.06
Wednesday	-0.01	0.01	0.61	-0.04	0.02	-0.01	0.04	0.81	-0.08	0.06
Thursday	-0.01	0.02	0.44	-0.04	0.02	-0.01	0.04	0.75	-0.08	0.06
Friday	-0.01	0.01	0.33	-0.04	0.01	-0.01	0.04	0.68	-0.08	0.06
Saturday	0.00	0.01	0.94	-0.03	0.03	0.00	0.04	0.98	-0.07	0.07
Bank holiday	0.01	0.03	0.64	-0.04	0.07	0.01	0.07	0.85	-0.13	0.15
seassin	0.01	0.01	0.13	0.00	0.02	0.01	0.01	0.53	-0.02	0.03
seascos	0.00	0.01	0.62	-0.01	0.01	0.00	0.01	0.85	-0.02	0.03
seassin1	0.00	0.01	0.59	-0.01	0.01	0.00	0.01	0.83	-0.02	0.03
seascos1	0.01	0.01	0.04	0.00	0.02	0.01	0.01	0.41	-0.02	0.04
PM_{10} max lag0	0.00	0.00	0.84	0.00	0.00	0.00	0.00	0.89	0.00	0.00
PM_{10} max lag1	0.00	0.00	0.45	0.00	0.00	0.00	0.00	0.74	0.00	0.00
PM_{10} max lag2	0.00	0.00	0.95	0.00	0.00	0.00	0.00	0.96	0.00	0.00
PM_{10} max lag3	0.00	0.00	0.49	0.00	0.00	0.00	0.00	0.78	0.00	0.00
PM_{10} max lag4	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.44	0.00	0.00
PM_{10} max lag5	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.47	0.00	0.00
PM_{10} max lag6	0.00	0.00	0.86	0.00	0.00	0.00	0.00	0.94	0.00	0.00
PM_{10} max lag7	0.00	0.00	0.86	0.00	0.00	0.00	0.00	0.95	0.00	0.00

Table G. 40: Sheffield All Counts Asthmatics - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	-0.01	0.06	0.85	-0.13	0.11	-0.01	0.06	0.86	-0.12	0.10
Monday	-0.07	0.09	0.44	-0.24	0.10	-0.06	0.08	0.45	-0.22	0.10
Tuesday	-0.25	0.09	0.00	-0.43	-0.08	-0.25	0.09	0.00	-0.42	-0.08
Wednesday	-0.30	0.09	0.00	-0.48	-0.12	-0.30	0.09	0.00	-0.47	-0.13
Thursday	-0.44	0.09	0.00	-0.63	-0.26	-0.44	0.09	0.00	-0.62	-0.27
Friday	-0.44	0.09	0.00	-0.62	-0.25	-0.43	0.09	0.00	-0.61	-0.26
Saturday	-0.23	0.09	0.01	-0.41	-0.06	-0.23	0.08	0.01	-0.40	-0.07
Bank holiday	0.21	0.18	0.24	-0.14	0.57	0.13	0.17	0.45	-0.21	0.47
seassin	-0.33	0.04	0.00	-0.40	-0.26	-0.33	0.03	0.00	-0.40	-0.26
seascos	0.02	0.04	0.55	-0.05	0.09	0.02	0.04	0.62	-0.05	0.09
seassin1	-0.10	0.04	0.00	-0.18	-0.03	-0.11	0.03	0.00	-0.17	-0.04
seascos1	-0.03	0.04	0.37	-0.10	0.04	-0.03	0.03	0.40	-0.10	0.04
Model including Minimum measures of NO_2										
constant	-0.07	0.08	0.38	-0.23	0.09	-0.07	0.08	0.37	-0.22	0.08
Monday	-0.09	0.09	0.32	-0.26	0.08	-0.08	0.08	0.32	-0.25	0.08
Tuesday	-0.28	0.09	0.00	-0.46	-0.10	-0.27	0.09	0.00	-0.45	-0.10
Wednesday	-0.31	0.09	0.00	-0.49	-0.13	-0.31	0.09	0.00	-0.48	-0.14
Thursday	-0.46	0.10	0.00	-0.65	-0.27	-0.47	0.09	0.00	-0.65	-0.29
Friday	-0.46	0.10	0.00	-0.65	-0.27	-0.46	0.09	0.00	-0.64	-0.28
Saturday	-0.24	0.09	0.01	-0.42	-0.06	-0.24	0.09	0.01	-0.41	-0.07
Bank holiday	0.18	0.18	0.31	-0.17	0.54	0.10	0.17	0.57	-0.24	0.44
seassin	-0.33	0.04	0.00	-0.40	-0.26	-0.33	0.03	0.00	-0.40	-0.26
seascos	0.00	0.04	0.92	-0.07	0.08	0.00	0.04	0.99	-0.07	0.07
seassin1	-0.10	0.04	0.00	-0.17	-0.03	-0.11	0.03	0.00	-0.17	-0.04
seascos1	-0.03	0.04	0.38	-0.10	0.04	-0.03	0.03	0.43	-0.09	0.04
NO_2 min lag0	0.00	0.00	0.82	-0.01	0.01	0.00	0.00	0.88	-0.01	0.01
NO_2 min lag1	0.00	0.00	0.41	-0.01	0.00	0.00	0.00	0.37	-0.01	0.00
NO_2 min lag2	0.00	0.00	0.92	-0.01	0.01	0.00	0.00	0.91	-0.01	0.01
NO_2 min lag3	0.00	0.00	0.32	0.00	0.01	0.00	0.00	0.31	0.00	0.01
NO_2 min lag4	0.00	0.00	0.69	-0.01	0.01	0.00	0.00	0.63	-0.01	0.00
NO_2 min lag5	0.00	0.00	0.91	-0.01	0.01	0.00	0.00	0.95	-0.01	0.01
NO_2 min lag6	0.00	0.00	0.30	0.00	0.01	0.00	0.00	0.24	0.00	0.01
NO_2 min lag7	0.00	0.00	0.45	0.00	0.01	0.00	0.00	0.38	0.00	0.01
Model including mean measures of NO_2										
constant	0.03	0.12	0.83	-0.21	0.27	0.05	0.12	0.65	-0.18	0.28
Monday	-0.06	0.10	0.57	-0.25	0.13	-0.05	0.09	0.58	-0.23	0.13
Tuesday	-0.20	0.10	0.05	-0.40	0.00	-0.20	0.10	0.04	-0.39	-0.01
Wednesday	-0.26	0.10	0.01	-0.46	-0.07	-0.26	0.10	0.01	-0.45	-0.07
Thursday	-0.40	0.11	0.00	-0.61	-0.20	-0.40	0.10	0.00	-0.60	-0.20
Friday	-0.42	0.11	0.00	-0.63	-0.21	-0.40	0.10	0.00	-0.60	-0.20
Saturday	-0.22	0.10	0.03	-0.41	-0.02	-0.21	0.09	0.03	-0.39	-0.03
Bank holiday	0.20	0.18	0.27	-0.16	0.56	0.11	0.18	0.52	-0.23	0.46
seassin	-0.33	0.04	0.00	-0.40	-0.26	-0.33	0.03	0.00	-0.40	-0.26
seascos	0.03	0.04	0.44	-0.05	0.11	0.03	0.04	0.41	-0.04	0.11
seassin1	-0.11	0.04	0.00	-0.18	-0.04	-0.11	0.03	0.00	-0.18	-0.04
seascos1	-0.04	0.04	0.33	-0.11	0.04	-0.03	0.03	0.34	-0.10	0.03
NO_2 mean lag0	0.00	0.00	0.57	-0.01	0.00	0.00	0.00	0.38	-0.01	0.00
NO_2 mean lag1	0.00	0.00	0.53	-0.01	0.00	0.00	0.00	0.45	-0.01	0.00
NO_2 mean lag2	0.00	0.00	0.40	0.00	0.01	0.00	0.00	0.45	0.00	0.01
NO_2 mean lag3	0.00	0.00	0.94	-0.01	0.00	0.00	0.00	0.97	0.00	0.00
NO_2 mean lag4	0.00	0.00	0.68	0.00	0.01	0.00	0.00	0.72	0.00	0.01
NO_2 mean lag5	0.00	0.00	0.68	-0.01	0.00	0.00	0.00	0.70	-0.01	0.00
NO_2 mean lag6	0.00	0.00	0.87	-0.01	0.00	0.00	0.00	0.89	-0.01	0.00
NO_2 mean lag7	0.00	0.00	0.87	0.00	0.00	0.00	0.00	0.94	0.00	0.00

Table G. 41: Sheffield All Counts Non-asthmatics - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	-0.25	0.07	0.00	-0.38	-0.12	-0.25	0.06	0.00	-0.37	-0.12
Monday	0.12	0.09	0.21	-0.07	0.30	0.12	0.09	0.18	-0.05	0.30
Tuesday	0.13	0.09	0.16	-0.05	0.31	0.13	0.09	0.14	-0.04	0.30
Wednesday	0.03	0.09	0.76	-0.16	0.21	0.03	0.09	0.76	-0.15	0.20
Thursday	0.02	0.09	0.84	-0.17	0.20	0.02	0.09	0.83	-0.16	0.20
Friday	0.09	0.09	0.34	-0.09	0.27	0.09	0.09	0.32	-0.09	0.26
Saturday	-0.06	0.10	0.56	-0.25	0.13	-0.06	0.09	0.53	-0.24	0.12
Bank holiday	-0.19	0.20	0.34	-0.59	0.21	-0.26	0.20	0.19	-0.64	0.13
seassin	0.02	0.03	0.65	-0.05	0.08	0.02	0.03	0.62	-0.05	0.08
seascos	-0.04	0.04	0.33	-0.11	0.04	-0.04	0.03	0.29	-0.10	0.03
seassin1	-0.05	0.04	0.19	-0.12	0.02	-0.05	0.03	0.16	-0.11	0.02
seascos1	-0.07	0.04	0.04	-0.14	-0.01	-0.07	0.03	0.03	-0.14	-0.01
Model including Minimum measures of NO_2										
constant	-0.24	0.09	0.01	-0.41	-0.07	-0.23	0.08	0.01	-0.39	-0.07
Monday	0.11	0.10	0.26	-0.08	0.29	0.11	0.09	0.23	-0.07	0.29
Tuesday	0.14	0.09	0.14	-0.05	0.33	0.14	0.09	0.13	-0.04	0.32
Wednesday	0.03	0.10	0.79	-0.16	0.21	0.02	0.09	0.82	-0.16	0.20
Thursday	0.00	0.10	0.99	-0.19	0.19	0.00	0.09	1.00	-0.18	0.18
Friday	0.07	0.10	0.44	-0.11	0.26	0.07	0.09	0.43	-0.11	0.25
Saturday	-0.07	0.10	0.46	-0.27	0.12	-0.08	0.09	0.42	-0.26	0.11
Bank holiday	-0.21	0.20	0.30	-0.61	0.19	-0.27	0.20	0.17	-0.65	0.11
seassin	0.01	0.03	0.67	-0.05	0.08	0.02	0.03	0.64	-0.05	0.08
seascos	-0.04	0.04	0.35	-0.11	0.04	-0.03	0.04	0.34	-0.11	0.04
seassin1	-0.05	0.04	0.19	-0.11	0.02	-0.05	0.03	0.17	-0.11	0.02
seascos1	-0.07	0.04	0.04	-0.14	-0.01	-0.08	0.03	0.03	-0.14	-0.01
NO_2 min lag0	0.00	0.00	0.94	-0.01	0.01	0.00	0.00	0.91	-0.01	0.01
NO_2 min lag1	0.00	0.00	0.26	-0.01	0.00	0.00	0.00	0.22	-0.01	0.00
NO_2 min lag2	0.00	0.00	0.13	0.00	0.01	0.00	0.00	0.14	0.00	0.01
NO_2 min lag3	0.00	0.00	0.55	-0.01	0.00	0.00	0.00	0.48	-0.01	0.00
NO_2 min lag4	0.00	0.00	0.37	-0.01	0.00	0.00	0.00	0.37	-0.01	0.00
NO_2 min lag5	0.00	0.00	0.73	-0.01	0.01	0.00	0.00	0.86	-0.01	0.01
NO_2 min lag6	0.00	0.00	0.54	-0.01	0.00	0.00	0.00	0.54	-0.01	0.00
NO_2 min lag7	0.00	0.00	0.09	0.00	0.01	0.01	0.00	0.06	0.00	0.01
Model including mean measures of NO_2										
constant	-0.14	0.12	0.26	-0.38	0.10	-0.09	0.12	0.43	-0.32	0.14
Monday	0.10	0.10	0.34	-0.10	0.30	0.10	0.10	0.30	-0.09	0.30
Tuesday	0.18	0.10	0.09	-0.03	0.38	0.17	0.10	0.08	-0.02	0.37
Wednesday	0.01	0.10	0.94	-0.20	0.21	0.00	0.10	0.97	-0.19	0.20
Thursday	-0.03	0.11	0.76	-0.24	0.17	-0.03	0.10	0.75	-0.23	0.17
Friday	0.04	0.11	0.70	-0.17	0.25	0.04	0.10	0.72	-0.16	0.24
Saturday	-0.07	0.11	0.52	-0.27	0.14	-0.07	0.10	0.48	-0.27	0.13
Bank holiday	-0.21	0.20	0.30	-0.61	0.19	-0.27	0.20	0.17	-0.66	0.11
seassin	0.02	0.03	0.64	-0.05	0.08	0.02	0.03	0.61	-0.05	0.08
seascos	-0.02	0.04	0.63	-0.10	0.06	-0.01	0.04	0.71	-0.09	0.06
seassin1	-0.05	0.04	0.16	-0.12	0.02	-0.05	0.03	0.13	-0.12	0.01
seascos1	-0.08	0.04	0.02	-0.15	-0.01	-0.08	0.03	0.01	-0.15	-0.02
NO_2 mean lag0	0.00	0.00	0.70	-0.01	0.00	0.00	0.00	0.58	-0.01	0.00
NO_2 mean lag1	0.00	0.00	0.27	-0.01	0.00	0.00	0.00	0.25	-0.01	0.00
NO_2 mean lag2	0.00	0.00	0.06	0.00	0.01	0.00	0.00	0.07	0.00	0.01
NO_2 mean lag3	0.00	0.00	0.54	-0.01	0.00	0.00	0.00	0.44	-0.01	0.00
NO_2 mean lag4	0.00	0.00	0.27	-0.01	0.00	0.00	0.00	0.25	-0.01	0.00
NO_2 mean lag5	0.00	0.00	0.39	-0.01	0.00	0.00	0.00	0.29	-0.01	0.00
NO_2 mean lag6	0.00	0.00	0.97	-0.01	0.00	0.00	0.00	0.98	0.00	0.00
NO_2 mean lag7	0.00	0.00	0.21	0.00	0.01	0.00	0.00	0.16	0.00	0.01

Table G. 42: Sheffield All Counts Excess - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	1.66	0.01	0.00	1.63	1.68	1.66	0.02	0.00	1.61	1.70
Monday	-0.03	0.02	0.14	-0.07	0.01	-0.03	0.04	0.39	-0.10	0.04
Tuesday	-0.07	0.02	0.00	-0.11	-0.02	-0.07	0.04	0.07	-0.14	0.00
Wednesday	-0.06	0.02	0.01	-0.10	-0.02	-0.06	0.04	0.11	-0.13	0.01
Thursday	-0.07	0.02	0.00	-0.12	-0.03	-0.08	0.04	0.04	-0.15	-0.01
Friday	-0.09	0.02	0.00	-0.13	-0.05	-0.09	0.04	0.02	-0.16	-0.02
Saturday	-0.03	0.02	0.12	-0.07	0.01	-0.03	0.04	0.36	-0.10	0.04
Bank holiday	0.06	0.04	0.18	-0.03	0.14	0.06	0.07	0.42	-0.08	0.20
seassin	-0.06	0.01	0.00	-0.07	-0.04	-0.06	0.01	0.00	-0.08	-0.03
seascos	0.01	0.01	0.17	0.00	0.03	0.01	0.01	0.42	-0.02	0.04
seassin1	-0.01	0.01	0.23	-0.03	0.01	-0.01	0.01	0.48	-0.04	0.02
seascos1	0.00	0.01	0.63	-0.01	0.02	0.00	0.01	0.77	-0.02	0.03
Model including Minimum measures of NO_2										
constant	1.64	0.02	0.00	1.61	1.68	1.64	0.03	0.00	1.58	1.71
Monday	-0.03	0.02	0.13	-0.07	0.01	-0.03	0.04	0.37	-0.10	0.04
Tuesday	-0.07	0.02	0.00	-0.11	-0.03	-0.07	0.04	0.05	-0.14	0.00
Wednesday	-0.06	0.02	0.01	-0.10	-0.01	-0.06	0.04	0.12	-0.13	0.01
Thursday	-0.08	0.02	0.00	-0.12	-0.03	-0.08	0.04	0.04	-0.15	0.00
Friday	-0.09	0.02	0.00	-0.13	-0.05	-0.09	0.04	0.02	-0.16	-0.01
Saturday	-0.03	0.02	0.15	-0.07	0.01	-0.03	0.04	0.39	-0.10	0.04
Bank holiday	0.06	0.04	0.19	-0.03	0.14	0.06	0.07	0.43	-0.09	0.20
seassin	-0.06	0.01	0.00	-0.07	-0.04	-0.06	0.01	0.00	-0.08	-0.03
seascos	0.01	0.01	0.30	-0.01	0.03	0.01	0.01	0.56	-0.02	0.04
seassin1	-0.01	0.01	0.25	-0.02	0.01	-0.01	0.01	0.50	-0.04	0.02
seascos1	0.00	0.01	0.59	-0.01	0.02	0.00	0.01	0.74	-0.02	0.03
NO_2 min lag0	0.00	0.00	0.87	0.00	0.00	0.00	0.00	0.90	0.00	0.00
NO_2 min lag1	0.00	0.00	0.85	0.00	0.00	0.00	0.00	0.91	0.00	0.00
NO_2 min lag2	0.00	0.00	0.30	0.00	0.00	0.00	0.00	0.57	0.00	0.00
NO_2 min lag3	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.51	0.00	0.00
NO_2 min lag4	0.00	0.00	0.79	0.00	0.00	0.00	0.00	0.88	0.00	0.00
NO_2 min lag5	0.00	0.00	0.82	0.00	0.00	0.00	0.00	0.94	0.00	0.00
NO_2 min lag6	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.47	0.00	0.00
NO_2 min lag7	0.00	0.00	0.47	0.00	0.00	0.00	0.00	0.67	0.00	0.00
Model including mean measures of NO_2										
constant	1.64	0.03	0.00	1.59	1.70	1.64	0.05	0.00	1.55	1.73
Monday	-0.02	0.02	0.29	-0.07	0.02	-0.03	0.04	0.52	-0.10	0.05
Tuesday	-0.06	0.02	0.01	-0.11	-0.02	-0.06	0.04	0.11	-0.14	0.01
Wednesday	-0.05	0.02	0.05	-0.09	0.00	-0.05	0.04	0.25	-0.12	0.03
Thursday	-0.06	0.02	0.01	-0.11	-0.01	-0.06	0.04	0.14	-0.14	0.02
Friday	-0.07	0.02	0.00	-0.12	-0.03	-0.07	0.04	0.07	-0.15	0.01
Saturday	-0.03	0.02	0.25	-0.07	0.02	-0.03	0.04	0.49	-0.10	0.05
Bank holiday	0.06	0.04	0.18	-0.03	0.14	0.06	0.07	0.42	-0.08	0.20
seassin	-0.06	0.01	0.00	-0.07	-0.04	-0.06	0.01	0.00	-0.08	-0.03
seascos	0.01	0.01	0.25	-0.01	0.03	0.01	0.02	0.52	-0.02	0.04
seassin1	-0.01	0.01	0.24	-0.03	0.01	-0.01	0.01	0.49	-0.04	0.02
seascos1	0.00	0.01	0.60	-0.01	0.02	0.00	0.01	0.75	-0.02	0.03
NO_2 mean lag0	0.00	0.00	0.77	0.00	0.00	0.00	0.00	0.90	0.00	0.00
NO_2 mean lag1	0.00	0.00	0.71	0.00	0.00	0.00	0.00	0.86	0.00	0.00
NO_2 mean lag2	0.00	0.00	0.41	0.00	0.00	0.00	0.00	0.66	0.00	0.00
NO_2 mean lag3	0.00	0.00	0.66	0.00	0.00	0.00	0.00	0.78	0.00	0.00
NO_2 mean lag4	0.00	0.00	0.29	0.00	0.00	0.00	0.00	0.55	0.00	0.00
NO_2 mean lag5	0.00	0.00	0.69	0.00	0.00	0.00	0.00	0.78	0.00	0.00
NO_2 mean lag6	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.97	0.00	0.00
NO_2 mean lag7	0.00	0.00	0.30	0.00	0.00	0.00	0.00	0.54	0.00	0.00

Table G. 43: Sheffield Admissions Asthmatics - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	-1.08	0.10	0.00	-1.27	-0.88	-1.07	0.10	0.00	-1.26	-0.89
Monday	0.12	0.14	0.38	-0.15	0.38	0.12	0.13	0.36	-0.14	0.38
Tuesday	-0.04	0.14	0.80	-0.31	0.24	-0.04	0.14	0.79	-0.30	0.23
Wednesday	-0.32	0.15	0.04	-0.61	-0.02	-0.31	0.15	0.03	-0.60	-0.03
Thursday	-0.24	0.15	0.11	-0.52	0.05	-0.24	0.14	0.09	-0.52	0.04
Friday	-0.37	0.15	0.02	-0.66	-0.07	-0.37	0.15	0.01	-0.66	-0.07
Saturday	-0.43	0.15	0.01	-0.73	-0.12	-0.43	0.15	0.01	-0.73	-0.13
Bank holiday	-0.28	0.35	0.42	-0.96	0.40	-0.35	0.34	0.31	-1.02	0.32
seassin	-0.38	0.06	0.00	-0.49	-0.27	-0.38	0.06	0.00	-0.50	-0.27
seascos	-0.01	0.06	0.90	-0.12	0.11	-0.01	0.06	0.89	-0.12	0.11
seassin1	-0.06	0.06	0.26	-0.18	0.05	-0.07	0.06	0.23	-0.18	0.04
seascos1	-0.07	0.06	0.24	-0.18	0.05	-0.06	0.06	0.27	-0.17	0.05
Model including mean measures of O_3										
constant	-0.97	0.21	0.00	-1.38	-0.56	-1.01	0.21	0.00	-1.42	-0.61
Monday	0.05	0.15	0.73	-0.23	0.34	0.05	0.14	0.71	-0.23	0.33
Tuesday	-0.10	0.15	0.53	-0.40	0.20	-0.10	0.15	0.51	-0.39	0.19
Wednesday	-0.36	0.16	0.03	-0.67	-0.04	-0.35	0.16	0.02	-0.66	-0.05
Thursday	-0.27	0.16	0.08	-0.58	0.04	-0.27	0.15	0.08	-0.58	0.03
Friday	-0.44	0.17	0.01	-0.77	-0.12	-0.44	0.16	0.01	-0.76	-0.12
Saturday	-0.46	0.16	0.01	-0.78	-0.14	-0.46	0.16	0.00	-0.77	-0.14
Bank holiday	-0.23	0.35	0.52	-0.91	0.46	-0.30	0.34	0.38	-0.98	0.37
seassin	-0.37	0.07	0.00	-0.50	-0.23	-0.38	0.07	0.00	-0.51	-0.25
seascos	-0.02	0.07	0.78	-0.16	0.12	-0.01	0.07	0.87	-0.15	0.13
seassin1	-0.06	0.06	0.27	-0.18	0.05	-0.07	0.06	0.23	-0.18	0.04
seascos1	-0.07	0.06	0.25	-0.18	0.05	-0.06	0.06	0.27	-0.17	0.05
O_3 mean lag0	0.00	0.00	0.13	-0.01	0.00	0.00	0.00	0.19	-0.01	0.00
O_3 mean lag1	0.00	0.00	0.48	0.00	0.01	0.00	0.00	0.42	0.00	0.01
O_3 mean lag2	0.00	0.00	0.95	-0.01	0.01	0.00	0.00	0.84	-0.01	0.01
O_3 mean lag3	0.00	0.00	0.88	-0.01	0.01	0.00	0.00	0.90	-0.01	0.01
O_3 mean lag4	0.00	0.00	0.59	-0.01	0.01	0.00	0.00	0.58	-0.01	0.00
O_3 mean lag5	0.00	0.00	0.51	0.00	0.01	0.00	0.00	0.48	0.00	0.01
O_3 mean lag6	0.00	0.00	0.84	-0.01	0.01	0.00	0.00	0.84	-0.01	0.01
O_3 mean lag7	0.00	0.00	0.94	-0.01	0.01	0.00	0.00	0.95	-0.01	0.01
Model including rain										
constant	-1.06	0.11	0.00	-1.28	-0.84	-1.04	0.11	0.00	-1.26	-0.83
Monday	0.11	0.14	0.42	-0.16	0.38	0.11	0.13	0.40	-0.15	0.38
Tuesday	-0.03	0.14	0.82	-0.31	0.24	-0.04	0.14	0.79	-0.31	0.23
Wednesday	-0.31	0.15	0.04	-0.60	-0.01	-0.31	0.15	0.04	-0.60	-0.02
Thursday	-0.22	0.15	0.14	-0.51	0.07	-0.23	0.14	0.12	-0.51	0.06
Friday	-0.37	0.15	0.02	-0.67	-0.07	-0.37	0.15	0.01	-0.67	-0.08
Saturday	-0.42	0.16	0.01	-0.73	-0.11	-0.42	0.15	0.01	-0.72	-0.12
Bank holiday	-0.26	0.35	0.46	-0.94	0.43	-0.33	0.34	0.34	-1.00	0.34
seassin	-0.38	0.06	0.00	-0.49	-0.26	-0.38	0.06	0.00	-0.50	-0.27
seascos	0.00	0.06	0.98	-0.12	0.12	0.00	0.06	0.97	-0.12	0.11
seassin1	-0.07	0.06	0.26	-0.18	0.05	-0.07	0.06	0.20	-0.18	0.04
seascos1	-0.07	0.06	0.25	-0.18	0.05	-0.06	0.06	0.28	-0.17	0.05
Rain lag0	0.01	0.01	0.48	-0.01	0.02	0.00	0.01	0.49	-0.01	0.02
Rain lag1	0.00	0.01	0.72	-0.02	0.01	0.00	0.01	0.62	-0.02	0.01
Rain lag2	-0.01	0.01	0.51	-0.02	0.01	-0.01	0.01	0.49	-0.02	0.01
Rain lag3	0.00	0.01	0.82	-0.01	0.02	0.00	0.01	0.95	-0.01	0.02
Rain lag4	0.00	0.01	0.57	-0.02	0.01	-0.01	0.01	0.49	-0.02	0.01
Rain lag5	0.01	0.01	0.25	-0.01	0.02	0.01	0.01	0.24	-0.01	0.02
Rain lag6	0.01	0.01	0.36	-0.01	0.02	0.01	0.01	0.37	-0.01	0.02
Rain lag7	-0.02	0.01	0.09	-0.03	0.00	-0.01	0.01	0.09	-0.03	0.00

Table G. 44: Sheffield Admissions Non-asthmatics - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	-1.35	0.11	0.00	-1.57	-1.12	-1.35	0.11	0.00	-1.56	-1.13
Monday	0.27	0.15	0.08	-0.04	0.57	0.27	0.15	0.08	-0.03	0.56
Tuesday	0.40	0.15	0.01	0.11	0.69	0.40	0.14	0.01	0.12	0.68
Wednesday	0.16	0.15	0.29	-0.14	0.47	0.16	0.15	0.28	-0.13	0.46
Thursday	0.09	0.16	0.59	-0.22	0.39	0.09	0.15	0.58	-0.22	0.39
Friday	0.16	0.16	0.31	-0.15	0.46	0.15	0.15	0.31	-0.14	0.45
Saturday	-0.09	0.16	0.60	-0.41	0.24	-0.09	0.16	0.59	-0.40	0.23
Bank holiday	-0.44	0.35	0.21	-1.13	0.25	-0.44	0.34	0.20	-1.11	0.24
seassin	0.03	0.05	0.59	-0.08	0.14	0.03	0.05	0.58	-0.07	0.13
seascos	-0.04	0.06	0.51	-0.16	0.08	-0.04	0.06	0.50	-0.15	0.07
seassin1	0.01	0.06	0.86	-0.10	0.12	0.01	0.06	0.83	-0.10	0.12
seascos1	-0.16	0.06	0.00	-0.27	-0.05	-0.16	0.06	0.00	-0.27	-0.05
Model including mean measures of O_3										
constant	-1.47	0.22	0.00	-1.89	-1.04	-1.48	0.21	0.00	-1.89	-1.06
Monday	0.26	0.16	0.11	-0.06	0.58	0.26	0.16	0.10	-0.05	0.58
Tuesday	0.49	0.16	0.00	0.18	0.81	0.50	0.16	0.00	0.19	0.81
Wednesday	0.13	0.17	0.44	-0.20	0.45	0.13	0.16	0.42	-0.19	0.45
Thursday	0.04	0.17	0.80	-0.29	0.37	0.05	0.16	0.78	-0.28	0.37
Friday	0.13	0.17	0.45	-0.20	0.46	0.13	0.17	0.43	-0.19	0.46
Saturday	-0.10	0.17	0.57	-0.44	0.24	-0.10	0.17	0.56	-0.43	0.23
Bank holiday	-0.44	0.35	0.21	-1.13	0.25	-0.43	0.34	0.21	-1.11	0.24
seassin	0.01	0.06	0.94	-0.12	0.13	0.01	0.06	0.93	-0.12	0.13
seascos	-0.01	0.07	0.83	-0.15	0.12	-0.01	0.07	0.85	-0.15	0.12
seassin1	0.01	0.06	0.83	-0.10	0.12	0.01	0.06	0.82	-0.10	0.12
seascos1	-0.17	0.06	0.00	-0.28	-0.05	-0.16	0.06	0.00	-0.27	-0.05
O_3 mean lag0	0.00	0.00	0.76	-0.01	0.01	0.00	0.00	0.79	-0.01	0.01
O_3 mean lag1	0.00	0.00	0.26	0.00	0.01	0.00	0.00	0.23	0.00	0.01
O_3 mean lag2	-0.01	0.00	0.01	-0.02	0.00	-0.01	0.00	0.01	-0.02	0.00
O_3 mean lag3	0.00	0.00	0.17	0.00	0.01	0.00	0.00	0.15	0.00	0.01
O_3 mean lag4	0.00	0.00	0.38	0.00	0.01	0.00	0.00	0.35	0.00	0.01
O_3 mean lag5	0.00	0.00	0.70	-0.01	0.01	0.00	0.00	0.73	-0.01	0.01
O_3 mean lag6	0.00	0.00	0.64	-0.01	0.01	0.00	0.00	0.60	0.00	0.01
O_3 mean lag7	0.00	0.00	0.63	-0.01	0.00	0.00	0.00	0.60	-0.01	0.00
Model including rain										
constant	-1.28	0.13	0.00	-1.53	-1.03	-1.28	0.13	0.00	-1.53	-1.03
Monday	0.27	0.15	0.08	-0.03	0.58	0.27	0.15	0.07	-0.03	0.57
Tuesday	0.40	0.15	0.01	0.11	0.69	0.40	0.14	0.01	0.12	0.68
Wednesday	0.17	0.16	0.27	-0.13	0.47	0.17	0.15	0.27	-0.13	0.47
Thursday	0.09	0.16	0.57	-0.22	0.40	0.09	0.15	0.56	-0.21	0.39
Friday	0.16	0.16	0.30	-0.14	0.47	0.16	0.15	0.29	-0.14	0.46
Saturday	-0.10	0.17	0.55	-0.42	0.23	-0.10	0.16	0.54	-0.42	0.22
Bank holiday	-0.45	0.35	0.20	-1.14	0.24	-0.44	0.34	0.20	-1.12	0.23
seassin	0.02	0.05	0.65	-0.08	0.13	0.03	0.05	0.64	-0.08	0.13
seascos	-0.03	0.06	0.60	-0.15	0.09	-0.03	0.06	0.59	-0.15	0.08
seassin1	0.01	0.06	0.93	-0.11	0.12	0.01	0.06	0.90	-0.10	0.12
seascos1	-0.16	0.06	0.00	-0.28	-0.05	-0.16	0.06	0.00	-0.27	-0.05
Rain lag0	-0.01	0.01	0.41	-0.02	0.01	-0.01	0.01	0.40	-0.02	0.01
Rain lag1	-0.02	0.01	0.07	-0.04	0.00	-0.02	0.01	0.06	-0.04	0.00
Rain lag2	0.00	0.01	0.93	-0.02	0.02	0.00	0.01	0.94	-0.02	0.02
Rain lag3	0.00	0.01	1.00	-0.02	0.02	0.00	0.01	1.00	-0.02	0.02
Rain lag4	0.00	0.01	0.64	-0.01	0.02	0.00	0.01	0.64	-0.01	0.02
Rain lag5	0.00	0.01	0.63	-0.02	0.01	0.00	0.01	0.63	-0.02	0.01
Rain lag6	0.00	0.01	0.87	-0.01	0.02	0.00	0.01	0.85	-0.01	0.02
Rain lag7	0.00	0.01	0.70	-0.01	0.02	0.00	0.01	0.70	-0.01	0.02

Table G. 45: Sheffield Admissions Excess - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	1.41	0.01	0.00	1.39	1.43	1.41	0.03	0.00	1.35	1.46
Monday	-0.01	0.02	0.62	-0.04	0.02	-0.01	0.04	0.84	-0.09	0.07
Tuesday	-0.04	0.02	0.03	-0.07	0.00	-0.04	0.04	0.38	-0.11	0.04
Wednesday	-0.04	0.02	0.03	-0.07	0.00	-0.04	0.04	0.38	-0.11	0.04
Thursday	-0.02	0.02	0.12	-0.06	0.01	-0.02	0.04	0.54	-0.10	0.05
Friday	-0.04	0.02	0.02	-0.07	-0.01	-0.04	0.04	0.35	-0.12	0.04
Saturday	-0.03	0.02	0.11	-0.06	0.01	-0.03	0.04	0.53	-0.10	0.05
Bank holiday	0.00	0.03	0.93	-0.06	0.07	0.01	0.08	0.95	-0.16	0.17
seassin	-0.03	0.01	0.00	-0.04	-0.02	-0.03	0.02	0.04	-0.06	0.00
seascos	0.00	0.01	0.62	-0.01	0.01	0.00	0.02	0.84	-0.03	0.03
seassin1	-0.01	0.01	0.32	-0.02	0.01	-0.01	0.02	0.69	-0.04	0.02
seascos1	0.00	0.01	0.41	-0.01	0.02	0.01	0.02	0.74	-0.02	0.03
Model including mean measures of O_3										
constant	1.43	0.02	0.00	1.38	1.47	1.42	0.06	0.00	1.31	1.53
Monday	-0.01	0.02	0.45	-0.05	0.02	-0.01	0.04	0.76	-0.10	0.07
Tuesday	-0.05	0.02	0.01	-0.08	-0.01	-0.05	0.04	0.28	-0.13	0.04
Wednesday	-0.04	0.02	0.03	-0.07	0.00	-0.04	0.04	0.40	-0.12	0.05
Thursday	-0.02	0.02	0.15	-0.06	0.01	-0.02	0.04	0.57	-0.11	0.06
Friday	-0.04	0.02	0.02	-0.08	-0.01	-0.04	0.04	0.34	-0.13	0.04
Saturday	-0.03	0.02	0.11	-0.06	0.01	-0.03	0.04	0.53	-0.11	0.06
Bank holiday	0.01	0.03	0.84	-0.06	0.07	0.01	0.08	0.92	-0.15	0.17
seassin	-0.03	0.01	0.00	-0.04	-0.01	-0.03	0.02	0.10	-0.06	0.01
seascos	0.00	0.01	0.99	-0.01	0.01	0.00	0.02	0.98	-0.04	0.04
seassin1	-0.01	0.01	0.32	-0.02	0.01	-0.01	0.02	0.69	-0.04	0.02
seascos1	0.00	0.01	0.41	-0.01	0.02	0.00	0.02	0.74	-0.02	0.03
O_3 mean lag0	0.00	0.00	0.41	0.00	0.00	0.00	0.00	0.77	0.00	0.00
O_3 mean lag1	0.00	0.00	0.69	0.00	0.00	0.00	0.00	0.90	0.00	0.00
O_3 mean lag2	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.43	0.00	0.00
O_3 mean lag3	0.00	0.00	0.38	0.00	0.00	0.00	0.00	0.74	0.00	0.00
O_3 mean lag4	0.00	0.00	0.32	0.00	0.00	0.00	0.00	0.69	0.00	0.00
O_3 mean lag5	0.00	0.00	0.80	0.00	0.00	0.00	0.00	0.92	0.00	0.00
O_3 mean lag6	0.00	0.00	0.60	0.00	0.00	0.00	0.00	0.83	0.00	0.00
O_3 mean lag7	0.00	0.00	0.72	0.00	0.00	0.00	0.00	0.89	0.00	0.00
Model including rain										
constant	1.41	0.01	0.00	1.38	1.43	1.41	0.03	0.00	1.34	1.47
Monday	-0.01	0.02	0.57	-0.04	0.02	-0.01	0.04	0.82	-0.09	0.07
Tuesday	-0.04	0.02	0.03	-0.07	0.00	-0.04	0.04	0.38	-0.11	0.04
Wednesday	-0.04	0.02	0.03	-0.07	0.00	-0.04	0.04	0.38	-0.11	0.04
Thursday	-0.02	0.02	0.14	-0.06	0.01	-0.02	0.04	0.55	-0.10	0.05
Friday	-0.04	0.02	0.02	-0.07	-0.01	-0.04	0.04	0.34	-0.12	0.04
Saturday	-0.02	0.02	0.14	-0.06	0.01	-0.02	0.04	0.55	-0.10	0.05
Bank holiday	0.01	0.03	0.87	-0.06	0.07	0.01	0.08	0.93	-0.15	0.17
seassin	-0.03	0.01	0.00	-0.04	-0.02	-0.03	0.02	0.04	-0.06	0.00
seascos	0.00	0.01	0.65	-0.01	0.01	0.00	0.02	0.85	-0.03	0.03
seassin1	-0.01	0.01	0.34	-0.02	0.01	-0.01	0.02	0.70	-0.04	0.02
seascos1	0.01	0.01	0.41	-0.01	0.02	0.01	0.02	0.74	-0.02	0.04
Rain lag0	0.00	0.00	0.27	0.00	0.00	0.00	0.00	0.67	0.00	0.01
Rain lag1	0.00	0.00	0.33	0.00	0.00	0.00	0.00	0.72	0.00	0.00
Rain lag2	0.00	0.00	0.72	0.00	0.00	0.00	0.00	0.87	0.00	0.00
Rain lag3	0.00	0.00	0.94	0.00	0.00	0.00	0.00	0.98	0.00	0.00
Rain lag4	0.00	0.00	0.41	0.00	0.00	0.00	0.00	0.75	0.00	0.00
Rain lag5	0.00	0.00	0.21	0.00	0.00	0.00	0.00	0.62	0.00	0.01
Rain lag6	0.00	0.00	0.62	0.00	0.00	0.00	0.00	0.84	0.00	0.00
Rain lag7	0.00	0.00	0.14	0.00	0.00	0.00	0.00	0.55	-0.01	0.00

Table G. 46: Sheffield A&E Counts Asthmatics - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	-0.19	0.06	0.00	-0.32	-0.06	-0.19	0.06	0.00	-0.31	-0.07
Monday	-0.17	0.10	0.08	-0.36	0.02	-0.17	0.09	0.07	-0.35	0.02
Tuesday	-0.36	0.10	0.00	-0.55	-0.16	-0.35	0.10	0.00	-0.54	-0.16
Wednesday	-0.34	0.10	0.00	-0.53	-0.14	-0.34	0.10	0.00	-0.52	-0.15
Thursday	-0.55	0.11	0.00	-0.76	-0.34	-0.55	0.10	0.00	-0.75	-0.35
Friday	-0.49	0.10	0.00	-0.70	-0.29	-0.49	0.10	0.00	-0.69	-0.29
Saturday	-0.19	0.10	0.05	-0.38	0.00	-0.19	0.09	0.04	-0.37	-0.01
Bank holiday	0.32	0.20	0.10	-0.06	0.71	0.26	0.19	0.17	-0.11	0.63
seassin	-0.31	0.04	0.00	-0.39	-0.23	-0.32	0.04	0.00	-0.39	-0.24
seascos	0.05	0.04	0.19	-0.03	0.13	0.05	0.04	0.24	-0.03	0.12
seassin1	-0.10	0.04	0.01	-0.18	-0.03	-0.11	0.04	0.01	-0.18	-0.03
seascos1	-0.01	0.04	0.73	-0.09	0.06	-0.01	0.04	0.78	-0.09	0.06
Model including Minimum measures of NOD										
constant	-0.26	0.08	0.00	-0.43	-0.09	-0.27	0.08	0.00	-0.43	-0.11
Monday	-0.19	0.10	0.05	-0.38	0.00	-0.18	0.09	0.05	-0.37	0.00
Tuesday	-0.37	0.10	0.00	-0.57	-0.16	-0.36	0.10	0.00	-0.55	-0.17
Wednesday	-0.36	0.10	0.00	-0.56	-0.16	-0.36	0.10	0.00	-0.55	-0.17
Thursday	-0.56	0.11	0.00	-0.78	-0.35	-0.57	0.10	0.00	-0.77	-0.36
Friday	-0.51	0.11	0.00	-0.72	-0.30	-0.51	0.10	0.00	-0.71	-0.31
Saturday	-0.18	0.10	0.06	-0.38	0.01	-0.18	0.09	0.05	-0.37	0.00
Bank holiday	0.30	0.20	0.13	-0.08	0.69	0.23	0.19	0.22	-0.14	0.60
seassin	-0.32	0.04	0.00	-0.40	-0.24	-0.32	0.04	0.00	-0.39	-0.24
seascos	0.03	0.04	0.54	-0.06	0.12	0.01	0.04	0.73	-0.07	0.10
seassin1	-0.10	0.04	0.01	-0.18	-0.02	-0.11	0.04	0.01	-0.18	-0.03
seascos1	-0.01	0.04	0.74	-0.09	0.07	-0.01	0.04	0.78	-0.09	0.06
NOD min lag0	0.00	0.00	0.59	0.00	0.00	0.00	0.00	0.54	0.00	0.00
NOD min lag1	0.00	0.00	0.15	-0.01	0.00	0.00	0.00	0.16	-0.01	0.00
NOD min lag2	0.00	0.00	0.19	0.00	0.01	0.00	0.00	0.13	0.00	0.01
NOD min lag3	0.00	0.00	0.55	0.00	0.00	0.00	0.00	0.54	0.00	0.00
NOD min lag4	0.00	0.00	0.75	0.00	0.00	0.00	0.00	0.75	0.00	0.00
NOD min lag5	0.00	0.00	0.21	0.00	0.01	0.00	0.00	0.19	0.00	0.01
NOD min lag6	0.00	0.00	0.67	0.00	0.00	0.00	0.00	0.58	0.00	0.00
NOD min lag7	0.00	0.00	0.53	0.00	0.00	0.00	0.00	0.53	0.00	0.00
Model including maximum measures of NOD										
constant	-0.15	0.10	0.14	-0.34	0.05	-0.13	0.10	0.16	-0.32	0.05
Monday	-0.15	0.10	0.14	-0.36	0.05	-0.15	0.10	0.12	-0.34	0.04
Tuesday	-0.36	0.11	0.00	-0.58	-0.15	-0.37	0.10	0.00	-0.57	-0.16
Wednesday	-0.37	0.11	0.00	-0.58	-0.16	-0.38	0.10	0.00	-0.58	-0.17
Thursday	-0.53	0.11	0.00	-0.75	-0.30	-0.53	0.11	0.00	-0.74	-0.32
Friday	-0.47	0.11	0.00	-0.69	-0.25	-0.46	0.11	0.00	-0.67	-0.25
Saturday	-0.20	0.10	0.05	-0.40	0.00	-0.20	0.10	0.04	-0.39	-0.01
Bank holiday	0.32	0.20	0.10	-0.07	0.71	0.25	0.19	0.19	-0.12	0.62
seassin	-0.32	0.04	0.00	-0.40	-0.24	-0.32	0.04	0.00	-0.40	-0.24
seascos	0.07	0.05	0.18	-0.03	0.17	0.06	0.05	0.19	-0.03	0.16
seassin1	-0.11	0.04	0.01	-0.19	-0.03	-0.11	0.04	0.01	-0.18	-0.03
seascos1	-0.01	0.04	0.74	-0.09	0.07	-0.01	0.04	0.77	-0.09	0.06
NOD max lag0	0.00	0.00	0.67	0.00	0.00	0.00	0.00	0.61	0.00	0.00
NOD max lag1	0.00	0.00	0.68	0.00	0.00	0.00	0.00	0.78	0.00	0.00
NOD max lag2	0.00	0.00	0.83	0.00	0.00	0.00	0.00	0.79	0.00	0.00
NOD max lag3	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.07	0.00	0.00
NOD max lag4	0.00	0.00	0.74	0.00	0.00	0.00	0.00	0.69	0.00	0.00
NOD max lag5	0.00	0.00	0.22	0.00	0.00	0.00	0.00	0.16	0.00	0.00
NOD max lag6	0.00	0.00	0.36	0.00	0.00	0.00	0.00	0.32	0.00	0.00
NOD max lag7	0.00	0.00	0.72	0.00	0.00	0.00	0.00	0.66	0.00	0.00

Table G. 47: Sheffield A&E Counts Non-asthmatics - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	-0.37	0.07	0.00	-0.51	-0.23	-0.37	0.07	0.00	-0.51	-0.24
Monday	0.09	0.10	0.35	-0.10	0.29	0.10	0.10	0.29	-0.09	0.29
Tuesday	-0.10	0.10	0.32	-0.31	0.10	-0.10	0.10	0.32	-0.29	0.10
Wednesday	-0.11	0.10	0.30	-0.31	0.10	-0.10	0.10	0.30	-0.30	0.09
Thursday	-0.05	0.10	0.60	-0.25	0.15	-0.05	0.10	0.59	-0.25	0.14
Friday	-0.01	0.10	0.92	-0.21	0.19	-0.01	0.10	0.94	-0.20	0.18
Saturday	-0.29	0.11	0.01	-0.51	-0.08	-0.29	0.10	0.01	-0.50	-0.09
Bank holiday	-0.17	0.22	0.45	-0.60	0.26	-0.22	0.21	0.29	-0.64	0.19
seassin	-0.08	0.04	0.06	-0.15	0.00	-0.07	0.04	0.05	-0.15	0.00
seascos	-0.11	0.04	0.01	-0.18	-0.03	-0.11	0.04	0.01	-0.18	-0.03
seassin1	-0.14	0.04	0.00	-0.22	-0.06	-0.14	0.04	0.00	-0.22	-0.07
seascos1	0.04	0.04	0.34	-0.04	0.12	0.04	0.04	0.28	-0.03	0.12
Model including Minimum measures of NOD										
constant	-0.40	0.09	0.00	-0.58	-0.23	-0.39	0.09	0.00	-0.56	-0.23
Monday	0.07	0.10	0.51	-0.13	0.26	0.07	0.10	0.44	-0.12	0.26
Tuesday	-0.12	0.11	0.26	-0.32	0.09	-0.12	0.10	0.25	-0.31	0.08
Wednesday	-0.10	0.10	0.32	-0.31	0.10	-0.10	0.10	0.32	-0.30	0.10
Thursday	-0.09	0.10	0.39	-0.29	0.11	-0.09	0.10	0.38	-0.28	0.11
Friday	-0.07	0.10	0.53	-0.27	0.14	-0.06	0.10	0.53	-0.26	0.13
Saturday	-0.32	0.11	0.00	-0.53	-0.10	-0.32	0.11	0.00	-0.53	-0.11
Bank holiday	-0.20	0.22	0.37	-0.63	0.23	-0.25	0.21	0.24	-0.66	0.17
seassin	-0.08	0.04	0.05	-0.16	0.00	-0.08	0.04	0.05	-0.15	0.00
seascos	-0.12	0.04	0.00	-0.21	-0.04	-0.12	0.04	0.00	-0.20	-0.04
seassin1	-0.14	0.04	0.00	-0.22	-0.06	-0.14	0.04	0.00	-0.22	-0.07
seascos1	0.04	0.04	0.29	-0.04	0.12	0.04	0.04	0.26	-0.03	0.12
NOD min lag0	0.00	0.00	0.94	0.00	0.00	0.00	0.00	0.99	0.00	0.00
NOD min lag1	0.00	0.00	0.32	-0.01	0.00	0.00	0.00	0.26	-0.01	0.00
NOD min lag2	0.00	0.00	0.24	0.00	0.01	0.00	0.00	0.22	0.00	0.01
NOD min lag3	0.00	0.00	0.17	0.00	0.01	0.00	0.00	0.14	0.00	0.01
NOD min lag4	-0.01	0.00	0.01	-0.01	0.00	-0.01	0.00	0.01	-0.01	0.00
NOD min lag5	0.00	0.00	0.80	0.00	0.00	0.00	0.00	0.75	0.00	0.00
NOD min lag6	0.00	0.00	0.05	0.00	0.01	0.00	0.00	0.04	0.00	0.01
NOD min lag7	0.00	0.00	0.28	0.00	0.01	0.00	0.00	0.26	0.00	0.01
Model including maximum measures of NOD										
constant	-0.14	0.11	0.18	-0.35	0.07	-0.14	0.10	0.18	-0.34	0.06
Monday	0.05	0.11	0.66	-0.16	0.26	0.06	0.10	0.58	-0.14	0.26
Tuesday	-0.16	0.11	0.16	-0.38	0.06	-0.16	0.11	0.14	-0.37	0.05
Wednesday	-0.13	0.11	0.25	-0.35	0.09	-0.13	0.11	0.24	-0.33	0.08
Thursday	-0.09	0.11	0.43	-0.30	0.13	-0.09	0.11	0.41	-0.29	0.12
Friday	-0.02	0.11	0.82	-0.24	0.19	-0.02	0.11	0.84	-0.23	0.18
Saturday	-0.28	0.11	0.01	-0.51	-0.06	-0.28	0.11	0.01	-0.50	-0.07
Bank holiday	-0.18	0.22	0.41	-0.62	0.25	-0.23	0.21	0.28	-0.64	0.19
seassin	-0.09	0.04	0.02	-0.17	-0.01	-0.09	0.04	0.02	-0.16	-0.01
seascos	-0.03	0.05	0.52	-0.13	0.07	-0.03	0.05	0.57	-0.12	0.07
seassin1	-0.15	0.04	0.00	-0.23	-0.08	-0.15	0.04	0.00	-0.23	-0.08
seascos1	0.04	0.04	0.36	-0.04	0.11	0.04	0.04	0.28	-0.03	0.12
NOD max lag0	0.00	0.00	0.85	0.00	0.00	0.00	0.00	0.96	0.00	0.00
NOD max lag1	0.00	0.00	0.27	0.00	0.00	0.00	0.00	0.24	0.00	0.00
NOD max lag2	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.03	0.00	0.00
NOD max lag3	0.00	0.00	0.86	0.00	0.00	0.00	0.00	0.83	0.00	0.00
NOD max lag4	0.00	0.00	0.29	0.00	0.00	0.00	0.00	0.28	0.00	0.00
NOD max lag5	0.00	0.00	0.67	0.00	0.00	0.00	0.00	0.66	0.00	0.00
NOD max lag6	0.00	0.00	0.66	0.00	0.00	0.00	0.00	0.67	0.00	0.00
NOD max lag7	0.00	0.00	0.93	0.00	0.00	0.00	0.00	0.88	0.00	0.00

Table G. 48: Sheffield A&E Counts Excess - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	LOWER	Upper CI	Estimate	SE	P	Lower CI	Upper CI
					Null model					
constant	1.64	0.01	0.00	1.61	1.67	1.64	0.03	0.00	1.59	1.69
Monday	-0.04	0.02	0.04	-0.08	0.00	-0.04	0.04	0.27	-0.11	0.03
Tuesday	-0.04	0.02	0.05	-0.07	0.00	-0.04	0.04	0.30	-0.11	0.03
Wednesday	-0.03	0.02	0.07	-0.07	0.00	-0.03	0.04	0.33	-0.10	0.04
Thursday	-0.06	0.02	0.00	-0.10	-0.03	-0.07	0.04	0.07	-0.14	0.01
Friday	-0.07	0.02	0.00	-0.10	-0.03	-0.07	0.04	0.07	-0.14	0.01
Saturday	0.01	0.02	0.74	-0.03	0.04	0.01	0.04	0.87	-0.06	0.08
Bank holiday	0.06	0.04	0.14	-0.02	0.13	0.06	0.07	0.39	-0.08	0.20
seassin	-0.03	0.01	0.00	-0.05	-0.02	-0.03	0.01	0.02	-0.06	-0.01
seascos	0.02	0.01	0.00	0.01	0.04	0.02	0.01	0.12	-0.01	0.05
seassin1	0.00	0.01	0.61	-0.01	0.02	0.00	0.01	0.78	-0.02	0.03
seascos1	-0.01	0.01	0.18	-0.02	0.00	-0.01	0.01	0.47	-0.04	0.02
					Model including Minimum measures of NOD					
constant	1.63	0.02	0.00	1.60	1.67	1.63	0.03	0.00	1.57	1.69
Monday	-0.04	0.02	0.05	-0.08	0.00	-0.04	0.04	0.29	-0.11	0.03
Tuesday	-0.04	0.02	0.06	-0.07	0.00	-0.04	0.04	0.32	-0.11	0.04
Wednesday	-0.04	0.02	0.06	-0.08	0.00	-0.04	0.04	0.30	-0.11	0.03
Thursday	-0.06	0.02	0.00	-0.10	-0.02	-0.06	0.04	0.09	-0.13	0.01
Friday	-0.06	0.02	0.00	-0.10	-0.02	-0.06	0.04	0.10	-0.13	0.01
Saturday	0.01	0.02	0.59	-0.03	0.05	0.01	0.04	0.78	-0.06	0.08
Bank holiday	0.06	0.04	0.12	-0.02	0.14	0.06	0.07	0.37	-0.08	0.21
seassin	-0.03	0.01	0.00	-0.05	-0.02	-0.03	0.01	0.02	-0.06	-0.01
seascos	0.02	0.01	0.01	0.00	0.04	0.02	0.01	0.18	-0.01	0.05
seassin1	0.00	0.01	0.60	-0.01	0.02	0.00	0.01	0.78	-0.02	0.03
seascos1	-0.01	0.01	0.18	-0.02	0.00	-0.01	0.01	0.48	-0.04	0.02
NOD min lag0	0.00	0.00	0.76	0.00	0.00	0.00	0.00	0.82	0.00	0.00
NOD min lag1	0.00	0.00	0.78	0.00	0.00	0.00	0.00	0.90	0.00	0.00
NOD min lag2	0.00	0.00	0.86	0.00	0.00	0.00	0.00	0.91	0.00	0.00
NOD min lag3	0.00	0.00	0.18	0.00	0.00	0.00	0.00	0.45	0.00	0.00
NOD min lag4	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.27	0.00	0.00
NOD min lag5	0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.53	0.00	0.00
NOD min lag6	0.00	0.00	0.32	0.00	0.00	0.00	0.00	0.59	0.00	0.00
NOD min lag7	0.00	0.00	0.74	0.00	0.00	0.00	0.00	0.86	0.00	0.00
					Model including maximum measures of NOD					
constant	1.62	0.02	0.00	1.58	1.66	1.62	0.04	0.00	1.55	1.69
Monday	-0.03	0.02	0.12	-0.07	0.01	-0.03	0.04	0.39	-0.11	0.04
Tuesday	-0.03	0.02	0.12	-0.07	0.01	-0.03	0.04	0.40	-0.11	0.04
Wednesday	-0.04	0.02	0.08	-0.08	0.00	-0.04	0.04	0.34	-0.11	0.04
Thursday	-0.06	0.02	0.01	-0.10	-0.02	-0.06	0.04	0.13	-0.13	0.02
Friday	-0.06	0.02	0.00	-0.10	-0.02	-0.06	0.04	0.12	-0.14	0.02
Saturday	0.00	0.02	0.85	-0.03	0.04	0.00	0.04	0.93	-0.07	0.08
Bank holiday	0.06	0.04	0.13	-0.02	0.13	0.06	0.07	0.39	-0.08	0.21
seassin	-0.03	0.01	0.00	-0.05	-0.02	-0.03	0.01	0.02	-0.06	0.00
seascos	0.01	0.01	0.10	0.00	0.03	0.01	0.02	0.39	-0.02	0.05
seassin1	0.00	0.01	0.53	-0.01	0.02	0.00	0.01	0.73	-0.02	0.03
seascos1	-0.01	0.01	0.17	-0.02	0.00	-0.01	0.01	0.46	-0.04	0.02
NOD max lag0	0.00	0.00	0.63	0.00	0.00	0.00	0.00	0.83	0.00	0.00
NOD max lag1	0.00	0.00	0.37	0.00	0.00	0.00	0.00	0.63	0.00	0.00
NOD max lag2	0.00	0.00	0.21	0.00	0.00	0.00	0.00	0.51	0.00	0.00
NOD max lag3	0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.54	0.00	0.00
NOD max lag4	0.00	0.00	0.30	0.00	0.00	0.00	0.00	0.60	0.00	0.00
NOD max lag5	0.00	0.00	0.23	0.00	0.00	0.00	0.00	0.49	0.00	0.00
NOD max lag6	0.00	0.00	0.35	0.00	0.00	0.00	0.00	0.60	0.00	0.00
NOD max lag7	0.00	0.00	0.86	0.00	0.00	0.00	0.00	0.93	0.00	0.00

Table G. 49: Scotland All Counts Asthmatics - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	1.87	0.05	0.00	1.78	1.97	1.88	0.02	0.00	1.83	1.92
Monday	2.76	0.05	0.00	2.66	2.86	2.76	0.02	0.00	2.71	2.80
Tuesday	2.72	0.05	0.00	2.63	2.82	2.72	0.02	0.00	2.68	2.77
Wednesday	2.63	0.05	0.00	2.54	2.73	2.63	0.02	0.00	2.59	2.68
Thursday	2.70	0.05	0.00	2.60	2.79	2.70	0.02	0.00	2.65	2.74
Friday	2.56	0.05	0.00	2.46	2.66	2.56	0.02	0.00	2.51	2.61
Saturday	0.60	0.06	0.00	0.49	0.72	0.60	0.03	0.00	0.55	0.65
Bank holiday	-0.76	0.05	0.00	-0.86	-0.66	-0.77	0.02	0.00	-0.82	-0.73
seassin	0.01	0.01	0.26	-0.01	0.02	0.01	0.00	0.01	0.00	0.02
seascos	0.07	0.01	0.00	0.05	0.08	0.07	0.00	0.00	0.06	0.07
seassin1	-0.06	0.01	0.00	-0.08	-0.05	-0.06	0.00	0.00	-0.06	-0.05
seascos1	0.01	0.01	0.48	-0.01	0.02	0.00	0.00	0.44	0.00	0.01
Model including Minimum measures of NO_2										
constant	1.90	0.05	0.00	1.80	1.99	1.90	0.02	0.00	1.86	1.95
Monday	2.76	0.05	0.00	2.66	2.86	2.76	0.02	0.00	2.72	2.81
Tuesday	2.72	0.05	0.00	2.63	2.82	2.72	0.02	0.00	2.68	2.77
Wednesday	2.64	0.05	0.00	2.54	2.73	2.63	0.02	0.00	2.59	2.68
Thursday	2.70	0.05	0.00	2.60	2.80	2.70	0.02	0.00	2.65	2.74
Friday	2.56	0.05	0.00	2.46	2.66	2.56	0.02	0.00	2.51	2.60
Saturday	0.60	0.06	0.00	0.49	0.72	0.60	0.03	0.00	0.55	0.65
Bank holiday	-0.76	0.05	0.00	-0.86	-0.66	-0.77	0.02	0.00	-0.82	-0.73
seassin	0.01	0.01	0.17	0.00	0.03	0.01	0.00	0.00	0.00	0.02
seascos	0.07	0.01	0.00	0.06	0.09	0.07	0.00	0.00	0.07	0.08
seassin1	-0.06	0.01	0.00	-0.07	-0.04	-0.06	0.00	0.00	-0.06	-0.05
seascos1	0.01	0.01	0.44	-0.01	0.02	0.00	0.00	0.30	0.00	0.01
NO_2 min lag0	0.00	0.00	0.93	0.00	0.00	0.00	0.00	0.81	0.00	0.00
NO_2 min lag1	0.00	0.00	0.94	0.00	0.00	0.00	0.00	0.64	0.00	0.00
NO_2 min lag2	0.00	0.00	0.56	0.00	0.00	0.00	0.00	0.44	0.00	0.00
NO_2 min lag3	0.00	0.00	0.77	0.00	0.00	0.00	0.00	0.63	0.00	0.00
NO_2 min lag4	0.00	0.00	0.75	0.00	0.00	0.00	0.00	0.44	0.00	0.00
NO_2 min lag5	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NO_2 min lag6	0.00	0.00	0.44	0.00	0.00	0.00	0.00	0.04	0.00	0.00
NO_2 min lag7	0.00	0.00	0.45	0.00	0.00	0.00	0.00	0.14	0.00	0.00
Model including mean measures of NO_2										
constant	1.92	0.05	0.00	1.82	2.03	1.93	0.02	0.00	1.88	1.98
Monday	2.76	0.05	0.00	2.67	2.86	2.76	0.02	0.00	2.72	2.81
Tuesday	2.73	0.05	0.00	2.63	2.82	2.73	0.02	0.00	2.68	2.77
Wednesday	2.63	0.05	0.00	2.54	2.73	2.63	0.02	0.00	2.59	2.68
Thursday	2.69	0.05	0.00	2.60	2.79	2.69	0.02	0.00	2.65	2.74
Friday	2.56	0.05	0.00	2.46	2.65	2.56	0.02	0.00	2.51	2.60
Saturday	0.60	0.06	0.00	0.49	0.72	0.60	0.03	0.00	0.54	0.65
Bank holiday	-0.76	0.05	0.00	-0.86	-0.66	-0.77	0.02	0.00	-0.82	-0.73
seassin	0.01	0.01	0.16	0.00	0.03	0.01	0.00	0.00	0.00	0.02
seascos	0.08	0.01	0.00	0.06	0.10	0.08	0.00	0.00	0.07	0.09
seassin1	-0.06	0.01	0.00	-0.08	-0.04	-0.06	0.00	0.00	-0.06	-0.05
seascos1	0.01	0.01	0.41	-0.01	0.02	0.00	0.00	0.28	0.00	0.01
NO_2 mean lag0	0.00	0.00	0.79	0.00	0.00	0.00	0.00	0.30	0.00	0.00
NO_2 mean lag1	0.00	0.00	0.59	0.00	0.00	0.00	0.00	0.10	0.00	0.00
NO_2 mean lag2	0.00	0.00	0.44	0.00	0.00	0.00	0.00	0.10	0.00	0.00
NO_2 mean lag3	0.00	0.00	0.46	0.00	0.00	0.00	0.00	0.08	0.00	0.00
NO_2 mean lag4	0.00	0.00	0.44	0.00	0.00	0.00	0.00	0.11	0.00	0.00
NO_2 mean lag5	0.00	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NO_2 mean lag6	0.00	0.00	0.53	0.00	0.00	0.00	0.00	0.06	0.00	0.00
NO_2 mean lag7	0.00	0.00	0.97	0.00	0.00	0.00	0.00	0.72	0.00	0.00

Table G. 50: Scotland All Counts Non-asthmatics - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	1.31	0.05	0.00	1.22	1.40	1.31	0.03	0.00	1.25	1.37
Monday	2.63	0.05	0.00	2.54	2.73	2.63	0.03	0.00	2.57	2.69
Tuesday	2.52	0.05	0.00	2.43	2.62	2.53	0.03	0.00	2.47	2.59
Wednesday	2.49	0.05	0.00	2.40	2.58	2.49	0.03	0.00	2.43	2.55
Thursday	2.53	0.05	0.00	2.43	2.62	2.53	0.03	0.00	2.46	2.59
Friday	2.42	0.05	0.00	2.33	2.51	2.42	0.03	0.00	2.36	2.48
Saturday	0.49	0.06	0.00	0.37	0.60	0.49	0.04	0.00	0.42	0.57
Bank holiday	-0.71	0.05	0.00	-0.81	-0.60	-0.74	0.03	0.00	-0.81	-0.68
seassin	0.06	0.01	0.00	0.05	0.08	0.07	0.01	0.00	0.06	0.08
seascos	0.04	0.01	0.00	0.02	0.06	0.04	0.01	0.00	0.03	0.05
seassin1	-0.04	0.01	0.00	-0.05	-0.02	-0.03	0.01	0.00	-0.05	-0.02
seascos1	0.00	0.01	0.92	-0.02	0.02	0.00	0.01	0.87	-0.01	0.01
Model including Minimum measures of NO_2										
constant	1.31	0.05	0.00	1.22	1.41	1.31	0.03	0.00	1.25	1.37
Monday	2.63	0.05	0.00	2.54	2.73	2.63	0.03	0.00	2.57	2.69
Tuesday	2.52	0.05	0.00	2.43	2.62	2.52	0.03	0.00	2.46	2.59
Wednesday	2.49	0.05	0.00	2.40	2.58	2.49	0.03	0.00	2.43	2.55
Thursday	2.53	0.05	0.00	2.43	2.62	2.53	0.03	0.00	2.47	2.59
Friday	2.42	0.05	0.00	2.33	2.51	2.42	0.03	0.00	2.36	2.48
Saturday	0.49	0.06	0.00	0.37	0.60	0.49	0.04	0.00	0.42	0.57
Bank holiday	-0.71	0.05	0.00	-0.81	-0.61	-0.74	0.03	0.00	-0.81	-0.68
seassin	0.07	0.01	0.00	0.05	0.08	0.07	0.01	0.00	0.06	0.08
seascos	0.04	0.01	0.00	0.02	0.06	0.04	0.01	0.00	0.03	0.05
seassin1	-0.04	0.01	0.00	-0.05	-0.02	-0.03	0.01	0.00	-0.05	-0.02
seascos1	0.00	0.01	0.89	-0.01	0.02	0.00	0.01	0.91	-0.01	0.01
NO_2 min lag0	0.00	0.00	0.33	0.00	0.00	0.00	0.00	0.13	0.00	0.00
NO_2 min lag1	0.00	0.00	0.67	0.00	0.00	0.00	0.00	0.80	0.00	0.00
NO_2 min lag2	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.37	0.00	0.00
NO_2 min lag3	0.00	0.00	0.91	0.00	0.00	0.00	0.00	0.84	0.00	0.00
NO_2 min lag4	0.00	0.00	0.65	0.00	0.00	0.00	0.00	0.57	0.00	0.00
NO_2 min lag5	0.00	0.00	0.93	0.00	0.00	0.00	0.00	0.86	0.00	0.00
NO_2 min lag6	0.00	0.00	0.73	0.00	0.00	0.00	0.00	0.58	0.00	0.00
NO_2 min lag7	0.00	0.00	0.13	0.00	0.00	0.00	0.00	0.04	0.00	0.00
Model including mean measures of NO_2										
constant	1.32	0.05	0.00	1.22	1.42	1.32	0.03	0.00	1.25	1.38
Monday	2.63	0.05	0.00	2.54	2.73	2.63	0.03	0.00	2.57	2.69
Tuesday	2.52	0.05	0.00	2.42	2.61	2.52	0.03	0.00	2.46	2.58
Wednesday	2.49	0.05	0.00	2.39	2.58	2.49	0.03	0.00	2.42	2.55
Thursday	2.53	0.05	0.00	2.43	2.62	2.52	0.03	0.00	2.46	2.58
Friday	2.41	0.05	0.00	2.32	2.51	2.41	0.03	0.00	2.35	2.48
Saturday	0.49	0.06	0.00	0.37	0.60	0.49	0.04	0.00	0.42	0.57
Bank holiday	-0.71	0.05	0.00	-0.81	-0.60	-0.74	0.03	0.00	-0.81	-0.68
seassin	0.06	0.01	0.00	0.05	0.08	0.07	0.01	0.00	0.06	0.08
seascos	0.04	0.01	0.00	0.02	0.06	0.04	0.01	0.00	0.03	0.05
seassin1	-0.04	0.01	0.00	-0.05	-0.02	-0.03	0.01	0.00	-0.05	-0.02
seascos1	0.00	0.01	0.93	-0.02	0.02	0.00	0.01	0.87	-0.01	0.01
NO_2 mean lag0	0.00	0.00	0.37	0.00	0.00	0.00	0.00	0.21	0.00	0.00
NO_2 mean lag1	0.00	0.00	0.62	0.00	0.00	0.00	0.00	0.81	0.00	0.00
NO_2 mean lag2	0.00	0.00	0.62	0.00	0.00	0.00	0.00	0.79	0.00	0.00
NO_2 mean lag3	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.14	0.00	0.00
NO_2 mean lag4	0.00	0.00	0.31	0.00	0.00	0.00	0.00	0.19	0.00	0.00
NO_2 mean lag5	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.05	0.00	0.00
NO_2 mean lag6	0.00	0.00	0.43	0.00	0.00	0.00	0.00	0.21	0.00	0.00
NO_2 mean lag7	0.00	0.00	0.38	0.00	0.00	0.00	0.00	0.36	0.00	0.00

Table G. 51: Scotland All Counts Excess - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	LOWER	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	2.17	0.04	0.00	2.09	2.26	2.18	0.02	0.00	2.14	2.21
Monday	1.88	0.05	0.00	1.78	1.97	1.88	0.02	0.00	1.84	1.92
Tuesday	1.90	0.05	0.00	1.81	2.00	1.90	0.02	0.00	1.86	1.94
Wednesday	1.78	0.05	0.00	1.68	1.87	1.78	0.02	0.00	1.74	1.82
Thursday	1.86	0.05	0.00	1.77	1.95	1.86	0.02	0.00	1.82	1.90
Friday	1.71	0.05	0.00	1.62	1.81	1.71	0.02	0.00	1.67	1.75
Saturday	0.30	0.06	0.00	0.18	0.41	0.30	0.03	0.00	0.25	0.34
Bank holiday	-0.67	0.07	0.00	-0.81	-0.54	-0.68	0.03	0.00	-0.74	-0.62
seassin	-0.04	0.01	0.00	-0.06	-0.02	-0.04	0.00	0.00	-0.05	-0.03
seascos	0.08	0.01	0.00	0.06	0.10	0.08	0.00	0.00	0.07	0.09
seassin1	-0.07	0.01	0.00	-0.09	-0.05	-0.07	0.00	0.00	-0.08	-0.06
seascos1	0.01	0.01	0.41	-0.01	0.03	0.01	0.00	0.17	0.00	0.02
Model including Minimum measures of NO_2										
constant	2.21	0.05	0.00	2.12	2.31	2.22	0.02	0.00	2.18	2.26
Monday	1.88	0.05	0.00	1.78	1.97	1.88	0.02	0.00	1.84	1.92
Tuesday	1.91	0.05	0.00	1.81	2.00	1.91	0.02	0.00	1.87	1.95
Wednesday	1.78	0.05	0.00	1.69	1.87	1.78	0.02	0.00	1.74	1.82
Thursday	1.86	0.05	0.00	1.77	1.96	1.86	0.02	0.00	1.82	1.90
Friday	1.71	0.05	0.00	1.61	1.80	1.71	0.02	0.00	1.67	1.75
Saturday	0.30	0.06	0.00	0.18	0.41	0.29	0.03	0.00	0.25	0.34
Bank holiday	-0.67	0.07	0.00	-0.81	-0.53	-0.68	0.03	0.00	-0.74	-0.62
seassin	-0.04	0.01	0.00	-0.06	-0.02	-0.04	0.00	0.00	-0.04	-0.03
seascos	0.09	0.01	0.00	0.07	0.11	0.09	0.01	0.00	0.08	0.10
seassin1	-0.07	0.01	0.00	-0.09	-0.05	-0.06	0.00	0.00	-0.07	-0.05
seascos1	0.01	0.01	0.37	-0.01	0.03	0.01	0.00	0.09	0.00	0.02
NO_2 min lag0	0.00	0.00	0.67	0.00	0.00	0.00	0.00	0.09	0.00	0.00
NO_2 min lag1	0.00	0.00	0.79	0.00	0.00	0.00	0.00	0.42	0.00	0.00
NO_2 min lag2	0.00	0.00	0.32	0.00	0.00	0.00	0.00	0.06	0.00	0.00
NO_2 min lag3	0.00	0.00	0.81	0.00	0.00	0.00	0.00	0.65	0.00	0.00
NO_2 min lag4	0.00	0.00	0.88	0.00	0.00	0.00	0.00	0.59	0.00	0.00
NO_2 min lag5	0.00	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00
NO_2 min lag6	0.00	0.00	0.46	0.00	0.00	0.00	0.00	0.03	0.00	0.00
NO_2 min lag7	0.00	0.00	0.92	0.00	0.00	0.00	0.00	0.86	0.00	0.00
Model including mean measures of NO_2										
constant	2.25	0.05	0.00	2.15	2.36	2.26	0.02	0.00	2.22	2.31
Monday	1.88	0.05	0.00	1.79	1.97	1.88	0.02	0.00	1.84	1.92
Tuesday	1.91	0.05	0.00	1.82	2.01	1.91	0.02	0.00	1.87	1.95
Wednesday	1.78	0.05	0.00	1.68	1.87	1.78	0.02	0.00	1.74	1.82
Thursday	1.85	0.05	0.00	1.76	1.95	1.86	0.02	0.00	1.81	1.90
Friday	1.71	0.05	0.00	1.61	1.80	1.71	0.02	0.00	1.67	1.75
Saturday	0.30	0.06	0.00	0.18	0.41	0.29	0.03	0.00	0.24	0.34
Bank holiday	-0.68	0.07	0.00	-0.81	-0.54	-0.68	0.03	0.00	-0.74	-0.62
seassin	-0.04	0.01	0.00	-0.06	-0.02	-0.04	0.00	0.00	-0.04	-0.03
seascos	0.10	0.01	0.00	0.07	0.13	0.10	0.01	0.00	0.09	0.11
seassin1	-0.07	0.01	0.00	-0.09	-0.05	-0.07	0.00	0.00	-0.07	-0.06
seascos1	0.01	0.01	0.33	-0.01	0.03	0.01	0.00	0.07	0.00	0.02
NO_2 mean lag0	0.00	0.00	0.45	0.00	0.00	0.00	0.00	0.01	0.00	0.00
NO_2 mean lag1	0.00	0.00	0.35	0.00	0.00	0.00	0.00	0.02	0.00	0.00
NO_2 mean lag2	0.00	0.00	0.26	0.00	0.00	0.00	0.00	0.02	0.00	0.00
NO_2 mean lag3	0.00	0.00	0.66	0.00	0.00	0.00	0.00	0.34	0.00	0.00
NO_2 mean lag4	0.00	0.00	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NO_2 mean lag5	0.00	0.00	0.33	0.00	0.00	0.00	0.00	0.05	0.00	0.00
NO_2 mean lag6	0.00	0.00	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NO_2 mean lag7	0.00	0.00	0.65	0.00	0.00	0.00	0.00	0.23	0.00	0.00

Table G. 52: Scotland Acute Visits Asthmatics - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	-2.50	0.23	0.00	-2.96	-2.05	-2.52	0.20	0.00	-2.90	-2.13
Monday	1.95	0.25	0.00	1.46	2.44	2.00	0.21	0.00	1.59	2.41
Tuesday	1.59	0.25	0.00	1.09	2.08	1.62	0.21	0.00	1.20	2.04
Wednesday	1.82	0.25	0.00	1.33	2.31	1.84	0.21	0.00	1.43	2.25
Thursday	1.65	0.25	0.00	1.15	2.15	1.67	0.21	0.00	1.25	2.09
Friday	1.47	0.26	0.00	0.96	1.97	1.49	0.22	0.00	1.06	1.92
Saturday	-0.26	0.35	0.46	-0.95	0.43	-0.25	0.30	0.40	-0.84	0.33
Bank holiday	-0.11	0.29	0.70	-0.69	0.47	-0.19	0.25	0.44	-0.68	0.29
seassin	0.11	0.06	0.08	-0.01	0.24	0.11	0.05	0.05	0.00	0.21
seascos	0.26	0.06	0.00	0.14	0.37	0.28	0.05	0.00	0.18	0.38
seassin1	0.20	0.06	0.00	0.08	0.32	0.20	0.05	0.00	0.10	0.30
seascos1	0.13	0.06	0.03	0.01	0.25	0.15	0.05	0.00	0.05	0.26
Model including mean measures of NOD										
constant	-2.45	0.25	0.00	-2.95	-1.96	-2.41	0.21	0.00	-2.84	-1.99
Monday	1.95	0.25	0.00	1.46	2.44	2.00	0.21	0.00	1.59	2.42
Tuesday	1.59	0.26	0.00	1.09	2.10	1.63	0.22	0.00	1.21	2.06
Wednesday	1.82	0.25	0.00	1.32	2.31	1.83	0.21	0.00	1.41	2.25
Thursday	1.63	0.26	0.00	1.13	2.13	1.65	0.22	0.00	1.22	2.07
Friday	1.46	0.26	0.00	0.95	1.97	1.49	0.22	0.00	1.06	1.92
Saturday	-0.25	0.35	0.48	-0.93	0.44	-0.23	0.30	0.44	-0.82	0.35
Bank holiday	-0.13	0.29	0.67	-0.70	0.45	-0.23	0.25	0.36	-0.72	0.26
seassin	0.11	0.06	0.08	-0.01	0.23	0.10	0.05	0.06	0.00	0.21
seascos	0.28	0.08	0.00	0.13	0.43	0.32	0.06	0.00	0.20	0.45
seassin1	0.20	0.06	0.00	0.08	0.32	0.20	0.05	0.00	0.10	0.30
seascos1	0.14	0.06	0.03	0.01	0.26	0.16	0.05	0.00	0.06	0.27
NOD mean lag0	0.00	0.00	0.44	0.00	0.00	0.00	0.00	0.20	0.00	0.00
NOD mean lag1	0.00	0.00	0.90	0.00	0.00	0.00	0.00	0.70	0.00	0.00
NOD mean lag2	0.00	0.00	0.88	0.00	0.00	0.00	0.00	0.94	0.00	0.00
NOD mean lag3	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.75	0.00	0.00
NOD mean lag4	0.00	0.00	0.68	0.00	0.00	0.00	0.00	0.40	0.00	0.00
NOD mean lag5	0.00	0.00	0.35	0.00	0.00	0.00	0.00	0.34	0.00	0.00
NOD mean lag6	0.00	0.00	0.26	0.00	0.00	0.00	0.00	0.21	0.00	0.00
NOD mean lag7	0.00	0.00	0.72	0.00	0.00	0.00	0.00	0.48	0.00	0.00
Model including maximum measures of NOD										
constant	-2.53	0.25	0.00	-3.02	-2.04	-2.50	0.21	0.00	-2.92	-2.08
Monday	1.96	0.25	0.00	1.48	2.45	2.01	0.21	0.00	1.60	2.42
Tuesday	1.60	0.26	0.00	1.10	2.10	1.64	0.22	0.00	1.21	2.06
Wednesday	1.81	0.25	0.00	1.32	2.31	1.83	0.21	0.00	1.41	2.25
Thursday	1.64	0.25	0.00	1.14	2.13	1.65	0.22	0.00	1.23	2.08
Friday	1.47	0.26	0.00	0.97	1.98	1.50	0.22	0.00	1.07	1.93
Saturday	-0.24	0.35	0.50	-0.92	0.45	-0.22	0.30	0.45	-0.81	0.36
Bank holiday	-0.12	0.29	0.67	-0.70	0.45	-0.23	0.25	0.36	-0.72	0.26
seassin	0.11	0.06	0.08	-0.01	0.24	0.10	0.05	0.06	0.00	0.21
seascos	0.25	0.08	0.00	0.10	0.39	0.29	0.06	0.00	0.16	0.41
seassin1	0.20	0.06	0.00	0.08	0.32	0.20	0.05	0.00	0.10	0.30
seascos1	0.13	0.06	0.03	0.01	0.25	0.16	0.05	0.00	0.05	0.26
NOD max lag0	0.00	0.00	0.33	0.00	0.00	0.00	0.00	0.14	0.00	0.00
NOD max lag1	0.00	0.00	0.88	0.00	0.00	0.00	0.00	0.94	0.00	0.00
NOD max lag2	0.00	0.00	0.61	0.00	0.00	0.00	0.00	0.68	0.00	0.00
NOD max lag3	0.00	0.00	0.84	0.00	0.00	0.00	0.00	0.58	0.00	0.00
NOD max lag4	0.00	0.00	0.95	0.00	0.00	0.00	0.00	0.65	0.00	0.00
NOD max lag5	0.00	0.00	0.35	0.00	0.00	0.00	0.00	0.34	0.00	0.00
NOD max lag6	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.05	0.00	0.00
NOD max lag7	0.00	0.00	0.67	0.00	0.00	0.00	0.00	0.39	0.00	0.00

Table G. 53: Scotland Acute Visits Non-asthmatics - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
					Null model					
constant	-3.84	0.41	0.00	-4.66	-3.03	-3.85	0.38	0.00	-4.59	-3.11
Monday	2.55	0.43	0.00	1.71	3.40	2.57	0.39	0.00	1.80	3.34
Tuesday	2.46	0.43	0.00	1.62	3.31	2.48	0.39	0.00	1.70	3.25
Wednesday	2.42	0.43	0.00	1.57	3.27	2.42	0.39	0.00	1.65	3.19
Thursday	2.26	0.43	0.00	1.41	3.11	2.28	0.40	0.00	1.50	3.06
Friday	2.18	0.44	0.00	1.32	3.03	2.20	0.40	0.00	1.42	2.98
Saturday	0.70	0.51	0.17	-0.29	1.70	0.70	0.46	0.13	-0.21	1.61
Bank holiday	-0.21	0.39	0.59	-0.98	0.56	-0.30	0.36	0.40	-1.01	0.41
seassin	0.37	0.09	0.00	0.20	0.54	0.34	0.08	0.00	0.19	0.49
seascos	0.14	0.08	0.06	-0.01	0.30	0.13	0.07	0.06	0.00	0.27
seassin1	0.24	0.08	0.00	0.08	0.39	0.26	0.07	0.00	0.11	0.40
seascos1	0.19	0.08	0.02	0.03	0.35	0.20	0.07	0.01	0.06	0.34
					Model including mean measures of NOD					
constant	-3.87	0.43	0.00	-4.71	-3.03	-3.85	0.40	0.00	-4.62	-3.07
Monday	2.54	0.43	0.00	1.70	3.38	2.56	0.40	0.00	1.78	3.33
Tuesday	2.45	0.43	0.00	1.61	3.30	2.49	0.40	0.00	1.71	3.27
Wednesday	2.44	0.43	0.00	1.60	3.29	2.45	0.40	0.00	1.67	3.23
Thursday	2.22	0.43	0.00	1.37	3.07	2.25	0.40	0.00	1.46	3.03
Friday	2.18	0.43	0.00	1.33	3.03	2.22	0.40	0.00	1.43	3.00
Saturday	0.77	0.50	0.13	-0.22	1.75	0.77	0.46	0.10	-0.14	1.68
Bank holiday	-0.18	0.39	0.65	-0.94	0.59	-0.27	0.36	0.45	-0.99	0.44
seassin	0.37	0.08	0.00	0.20	0.53	0.34	0.08	0.00	0.18	0.49
seascos	0.12	0.10	0.21	-0.07	0.32	0.12	0.09	0.17	-0.05	0.30
seassin1	0.23	0.08	0.00	0.08	0.39	0.25	0.07	0.00	0.11	0.39
seascos1	0.18	0.08	0.03	0.02	0.34	0.19	0.07	0.01	0.05	0.34
NOD mean	0.00	0.00	0.63	0.00	0.00	0.00	0.00	0.46	0.00	0.00
NOD mean	0.00	0.00	0.80	0.00	0.00	0.00	0.00	0.80	0.00	0.00
NOD mean	0.00	0.00	0.34	-0.01	0.00	0.00	0.00	0.33	-0.01	0.00
NOD mean	0.00	0.00	0.10	0.00	0.01	0.00	0.00	0.09	0.00	0.01
NOD mean	0.00	0.00	0.31	-0.01	0.00	0.00	0.00	0.22	-0.01	0.00
NOD mean	0.00	0.00	0.22	-0.01	0.00	0.00	0.00	0.17	-0.01	0.00
NOD mean	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01
NOD mean	0.00	0.00	0.58	0.00	0.00	0.00	0.00	0.48	0.00	0.00
					Model including maximum measures of NOD					
constant	-3.92	0.43	0.00	-4.76	-3.08	-3.90	0.40	0.00	-4.68	-3.13
Monday	2.53	0.43	0.00	1.69	3.37	2.55	0.39	0.00	1.78	3.32
Tuesday	2.44	0.43	0.00	1.60	3.29	2.47	0.40	0.00	1.69	3.25
Wednesday	2.42	0.43	0.00	1.57	3.26	2.42	0.40	0.00	1.64	3.20
Thursday	2.21	0.43	0.00	1.36	3.06	2.24	0.40	0.00	1.45	3.02
Friday	2.18	0.43	0.00	1.32	3.03	2.21	0.40	0.00	1.42	3.00
Saturday	0.75	0.50	0.14	-0.24	1.73	0.75	0.46	0.11	-0.16	1.66
Bank holiday	-0.18	0.39	0.64	-0.95	0.59	-0.28	0.36	0.44	-0.99	0.43
seassin	0.37	0.08	0.00	0.21	0.54	0.34	0.08	0.00	0.19	0.49
seascos	0.10	0.10	0.31	-0.09	0.29	0.10	0.09	0.28	-0.08	0.27
seassin1	0.23	0.08	0.00	0.08	0.39	0.25	0.07	0.00	0.11	0.40
seascos1	0.18	0.08	0.02	0.03	0.34	0.20	0.07	0.01	0.05	0.34
NOD max lag0	0.00	0.00	0.73	0.00	0.00	0.00	0.00	0.65	0.00	0.00
NOD max lag1	0.00	0.00	0.57	0.00	0.00	0.00	0.00	0.59	0.00	0.00
NOD max lag2	0.00	0.00	0.28	0.00	0.00	0.00	0.00	0.24	0.00	0.00
NOD max lag3	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.08	0.00	0.00
NOD max lag4	0.00	0.00	0.26	0.00	0.00	0.00	0.00	0.17	0.00	0.00
NOD max lag5	0.00	0.00	0.75	0.00	0.00	0.00	0.00	0.66	0.00	0.00
NOD max lag6	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.01	0.00	0.00
NOD max lag7	0.00	0.00	0.76	0.00	0.00	0.00	0.00	0.85	0.00	0.00

Table G. 54: Scotland Acute Visits Non-asthmatics - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	1.40	0.01	0.00	1.38	1.42	1.40	0.03	0.00	1.35	1.46
Monday	0.06	0.01	0.00	0.03	0.09	0.06	0.04	0.11	-0.02	0.14
Tuesday	0.02	0.01	0.15	-0.01	0.05	0.02	0.04	0.56	-0.05	0.10
Wednesday	0.05	0.01	0.00	0.02	0.08	0.05	0.04	0.20	-0.03	0.13
Thursday	0.04	0.01	0.01	0.01	0.07	0.04	0.04	0.32	-0.04	0.12
Friday	0.02	0.01	0.09	0.00	0.05	0.03	0.04	0.51	-0.05	0.10
Saturday	-0.01	0.01	0.49	-0.04	0.02	-0.01	0.04	0.80	-0.09	0.07
Bank holiday	0.00	0.03	0.96	-0.06	0.06	-0.01	0.08	0.94	-0.16	0.15
seassin	0.00	0.01	0.44	-0.01	0.01	0.00	0.01	0.82	-0.03	0.03
seascos	0.02	0.01	0.00	0.01	0.03	0.02	0.01	0.22	-0.01	0.05
seassin1	0.01	0.01	0.35	-0.01	0.02	0.01	0.01	0.66	-0.02	0.04
seascos1	0.00	0.01	0.40	-0.01	0.02	0.01	0.01	0.65	-0.02	0.04
Model including mean measures of NOD										
constant	1.41	0.01	0.00	1.38	1.44	1.41	0.04	0.00	1.34	1.49
Monday	0.06	0.01	0.00	0.03	0.09	0.06	0.04	0.12	-0.02	0.14
Tuesday	0.02	0.02	0.17	-0.01	0.05	0.02	0.04	0.59	-0.06	0.10
Wednesday	0.05	0.02	0.00	0.02	0.08	0.05	0.04	0.24	-0.03	0.13
Thursday	0.04	0.02	0.01	0.01	0.07	0.04	0.04	0.35	-0.04	0.12
Friday	0.02	0.02	0.11	-0.01	0.05	0.03	0.04	0.54	-0.06	0.11
Saturday	-0.01	0.01	0.38	-0.04	0.02	-0.01	0.04	0.75	-0.09	0.07
Bank holiday	0.00	0.03	0.87	-0.06	0.05	-0.01	0.08	0.90	-0.17	0.15
seassin	0.00	0.01	0.43	-0.02	0.01	0.00	0.01	0.80	-0.03	0.03
seascos	0.02	0.01	0.01	0.00	0.03	0.02	0.02	0.24	-0.02	0.06
seassin1	0.00	0.01	0.37	-0.01	0.02	0.01	0.01	0.68	-0.02	0.04
seascos1	0.01	0.01	0.35	-0.01	0.02	0.01	0.02	0.61	-0.02	0.04
NOD mean lag0	0.00	0.00	0.77	0.00	0.00	0.00	0.00	0.84	0.00	0.00
NOD mean lag1	0.00	0.00	0.76	0.00	0.00	0.00	0.00	0.87	0.00	0.00
NOD mean lag2	0.00	0.00	0.49	0.00	0.00	0.00	0.00	0.83	0.00	0.00
NOD mean lag3	0.00	0.00	0.30	0.00	0.00	0.00	0.00	0.64	0.00	0.00
NOD mean lag4	0.00	0.00	0.95	0.00	0.00	0.00	0.00	0.95	0.00	0.00
NOD mean lag5	0.00	0.00	0.66	0.00	0.00	0.00	0.00	0.89	0.00	0.00
NOD mean lag6	0.00	0.00	0.16	0.00	0.00	0.00	0.00	0.60	0.00	0.00
NOD mean lag7	0.00	0.00	0.37	0.00	0.00	0.00	0.00	0.66	0.00	0.00
Model including maximum measures of NOD										
constant	1.40	0.01	0.00	1.38	1.43	1.41	0.04	0.00	1.33	1.48
Monday	0.06	0.01	0.00	0.03	0.09	0.06	0.04	0.11	-0.02	0.14
Tuesday	0.02	0.02	0.14	-0.01	0.05	0.02	0.04	0.56	-0.06	0.10
Wednesday	0.05	0.01	0.00	0.02	0.08	0.05	0.04	0.22	-0.03	0.13
Thursday	0.04	0.01	0.01	0.01	0.07	0.04	0.04	0.33	-0.04	0.12
Friday	0.03	0.02	0.09	0.00	0.05	0.03	0.04	0.52	-0.05	0.11
Saturday	-0.01	0.01	0.49	-0.04	0.02	-0.01	0.04	0.80	-0.09	0.07
Bank holiday	0.00	0.03	0.89	-0.06	0.05	-0.01	0.08	0.91	-0.17	0.15
seassin	0.00	0.01	0.43	-0.02	0.01	0.00	0.01	0.80	-0.03	0.03
seascos	0.02	0.01	0.02	0.00	0.03	0.02	0.02	0.28	-0.02	0.06
seassin1	0.00	0.01	0.36	-0.01	0.02	0.01	0.01	0.68	-0.02	0.04
seascos1	0.00	0.01	0.39	-0.01	0.02	0.01	0.02	0.64	-0.02	0.04
NOD max lag0	0.00	0.00	0.46	0.00	0.00	0.00	0.00	0.72	0.00	0.00
NOD max lag1	0.00	0.00	0.83	0.00	0.00	0.00	0.00	0.88	0.00	0.00
NOD max lag2	0.00	0.00	0.28	0.00	0.00	0.00	0.00	0.73	0.00	0.00
NOD max lag3	0.00	0.00	0.21	0.00	0.00	0.00	0.00	0.58	0.00	0.00
NOD max lag4	0.00	0.00	0.50	0.00	0.00	0.00	0.00	0.88	0.00	0.00
NOD max lag5	0.00	0.00	0.70	0.00	0.00	0.00	0.00	0.89	0.00	0.00
NOD max lag6	0.00	0.00	0.97	0.00	0.00	0.00	0.00	0.98	0.00	0.00
NOD max lag7	0.00	0.00	0.71	0.00	0.00	0.00	0.00	0.80	0.00	0.00

Table G. 55: Scotland Casualty Counts Asthmatics - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	-0.15	0.07	0.03	-0.28	-0.01	-0.15	0.06	0.01	-0.27	-0.03
Monday	0.35	0.09	0.00	0.17	0.52	0.35	0.08	0.00	0.19	0.51
Tuesday	0.28	0.09	0.00	0.10	0.46	0.28	0.08	0.00	0.12	0.44
Wednesday	0.27	0.09	0.00	0.10	0.45	0.27	0.08	0.00	0.11	0.43
Thursday	0.25	0.09	0.01	0.07	0.43	0.25	0.08	0.00	0.09	0.41
Friday	0.19	0.09	0.04	0.01	0.37	0.19	0.08	0.02	0.03	0.35
Saturday	-0.05	0.10	0.61	-0.24	0.14	-0.05	0.09	0.58	-0.22	0.12
Bank holiday	-0.06	0.18	0.74	-0.42	0.30	-0.10	0.16	0.54	-0.42	0.22
seassin	-0.06	0.03	0.05	-0.13	0.00	-0.07	0.03	0.02	-0.13	-0.01
seascos	-0.13	0.03	0.00	-0.19	-0.06	-0.12	0.03	0.00	-0.18	-0.06
seassin1	-0.02	0.03	0.58	-0.08	0.05	-0.02	0.03	0.43	-0.08	0.03
seascos1	-0.09	0.03	0.01	-0.15	-0.02	-0.09	0.03	0.00	-0.15	-0.03
Model including Minimum measures of O_3										
constant	-0.52	0.08	0.00	-0.67	-0.37	-0.56	0.07	0.00	-0.69	-0.43
Monday	0.36	0.09	0.00	0.19	0.54	0.36	0.08	0.00	0.20	0.52
Tuesday	0.29	0.09	0.00	0.11	0.47	0.29	0.08	0.00	0.13	0.45
Wednesday	0.28	0.09	0.00	0.11	0.46	0.27	0.08	0.00	0.11	0.43
Thursday	0.26	0.09	0.00	0.08	0.44	0.26	0.08	0.00	0.10	0.42
Friday	0.20	0.09	0.03	0.01	0.38	0.19	0.08	0.02	0.03	0.35
Saturday	-0.05	0.10	0.58	-0.25	0.14	-0.05	0.09	0.54	-0.23	0.12
Bank holiday	-0.07	0.18	0.69	-0.43	0.29	-0.10	0.16	0.55	-0.42	0.22
seassin	-0.09	0.03	0.01	-0.16	-0.03	-0.11	0.03	0.00	-0.17	-0.05
seascos	-0.06	0.04	0.10	-0.13	0.01	-0.04	0.03	0.18	-0.10	0.02
seassin1	-0.02	0.03	0.53	-0.09	0.04	-0.03	0.03	0.32	-0.09	0.03
seascos1	-0.08	0.03	0.03	-0.14	-0.01	-0.08	0.03	0.01	-0.14	-0.02
O_3 min lag0	0.00	0.00	0.28	0.00	0.00	0.00	0.00	0.00	0.00	0.01
O_3 min lag1	0.00	0.00	0.03	0.00	0.01	0.00	0.00	0.00	0.00	0.01
O_3 min lag2	0.00	0.00	0.12	0.00	0.01	0.00	0.00	0.04	0.00	0.01
O_3 min lag3	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.01
O_3 min lag4	0.00	0.00	0.56	0.00	0.00	0.00	0.00	0.68	0.00	0.00
O_3 min lag5	0.00	0.00	0.03	0.00	0.01	0.00	0.00	0.01	0.00	0.01
O_3 min lag6	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01
O_3 min lag7	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01
Model including rain										
constant	-0.13	0.07	0.08	-0.27	0.02	-0.11	0.07	0.10	-0.23	0.02
Monday	0.35	0.09	0.00	0.17	0.52	0.35	0.08	0.00	0.19	0.51
Tuesday	0.28	0.09	0.00	0.10	0.46	0.28	0.08	0.00	0.12	0.44
Wednesday	0.27	0.09	0.00	0.10	0.45	0.27	0.08	0.00	0.11	0.43
Thursday	0.25	0.09	0.01	0.07	0.43	0.25	0.08	0.00	0.09	0.41
Friday	0.19	0.09	0.04	0.01	0.37	0.19	0.08	0.02	0.03	0.35
Saturday	-0.05	0.10	0.61	-0.24	0.14	-0.05	0.09	0.57	-0.22	0.12
Bank holiday	-0.06	0.18	0.74	-0.42	0.30	-0.10	0.16	0.55	-0.42	0.22
seassin	-0.07	0.03	0.04	-0.13	0.00	-0.08	0.03	0.01	-0.14	-0.02
seascos	-0.12	0.03	0.00	-0.19	-0.05	-0.12	0.03	0.00	-0.18	-0.06
seassin1	-0.02	0.03	0.51	-0.09	0.04	-0.03	0.03	0.26	-0.09	0.03
seascos1	-0.09	0.03	0.01	-0.15	-0.02	-0.09	0.03	0.00	-0.15	-0.03
Rain lag0	0.00	0.01	0.98	-0.01	0.01	0.00	0.00	0.66	-0.01	0.01
Rain lag1	0.00	0.01	0.64	-0.01	0.01	0.00	0.00	0.96	-0.01	0.01
Rain lag2	0.00	0.01	0.71	-0.01	0.01	0.00	0.00	0.91	-0.01	0.01
Rain lag3	0.00	0.01	0.82	-0.01	0.01	0.00	0.00	0.63	-0.01	0.01
Rain lag4	0.00	0.01	0.99	-0.01	0.01	0.00	0.00	0.76	-0.01	0.01
Rain lag5	0.00	0.01	0.44	-0.02	0.01	-0.01	0.01	0.29	-0.02	0.00
Rain lag6	0.00	0.01	0.65	-0.01	0.01	0.00	0.00	0.65	-0.01	0.01
Rain lag7	-0.01	0.01	0.05	-0.02	0.00	-0.01	0.01	0.03	-0.02	0.00

Table G. 56: Scotland Casualty Counts Non-asthmatics - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	-0.55	0.08	0.00	-0.71	-0.38	-0.55	0.07	0.00	-0.70	-0.40
Monday	0.46	0.11	0.00	0.25	0.67	0.46	0.10	0.00	0.27	0.64
Tuesday	0.36	0.11	0.00	0.15	0.57	0.36	0.10	0.00	0.17	0.55
Wednesday	0.53	0.10	0.00	0.33	0.73	0.53	0.09	0.00	0.35	0.72
Thursday	0.32	0.11	0.00	0.11	0.53	0.32	0.10	0.00	0.13	0.51
Friday	0.35	0.11	0.00	0.14	0.56	0.35	0.10	0.00	0.16	0.54
Saturday	0.02	0.12	0.85	-0.21	0.25	0.02	0.10	0.84	-0.18	0.23
Bank holiday	-0.38	0.24	0.11	-0.84	0.08	-0.41	0.21	0.05	-0.83	0.01
seassin	-0.06	0.04	0.09	-0.14	0.01	-0.07	0.03	0.04	-0.14	0.00
seascos	-0.17	0.04	0.00	-0.25	-0.10	-0.18	0.04	0.00	-0.25	-0.11
seassin1	-0.09	0.04	0.02	-0.16	-0.01	-0.09	0.03	0.01	-0.16	-0.03
seascos1	-0.02	0.04	0.58	-0.10	0.05	-0.02	0.03	0.48	-0.09	0.04
Model including Minimum measures of O_3										
constant	-0.91	0.09	0.00	-1.08	-0.73	-0.93	0.08	0.00	-1.09	-0.77
Monday	0.46	0.11	0.00	0.25	0.67	0.45	0.10	0.00	0.27	0.64
Tuesday	0.37	0.11	0.00	0.16	0.58	0.37	0.10	0.00	0.18	0.56
Wednesday	0.54	0.10	0.00	0.33	0.74	0.54	0.09	0.00	0.35	0.72
Thursday	0.32	0.11	0.00	0.11	0.54	0.32	0.10	0.00	0.13	0.52
Friday	0.35	0.11	0.00	0.14	0.56	0.35	0.10	0.00	0.16	0.54
Saturday	0.02	0.12	0.86	-0.21	0.25	0.02	0.10	0.84	-0.18	0.23
Bank holiday	-0.37	0.24	0.12	-0.83	0.10	-0.39	0.21	0.07	-0.81	0.03
seassin	-0.10	0.04	0.01	-0.17	-0.02	-0.10	0.03	0.00	-0.17	-0.04
seascos	-0.11	0.04	0.01	-0.18	-0.03	-0.10	0.04	0.00	-0.17	-0.03
seassin1	-0.09	0.04	0.01	-0.17	-0.02	-0.10	0.03	0.00	-0.16	-0.03
seascos1	-0.01	0.04	0.82	-0.08	0.07	-0.01	0.03	0.77	-0.08	0.06
O_3 min lag0	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.28	0.00	0.00
O_3 min lag1	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.01
O_3 min lag2	0.00	0.00	0.21	0.00	0.01	0.00	0.00	0.11	0.00	0.01
O_3 min lag3	0.00	0.00	0.13	0.00	0.01	0.00	0.00	0.08	0.00	0.01
O_3 min lag4	0.00	0.00	0.30	0.00	0.00	0.00	0.00	0.26	0.00	0.00
O_3 min lag5	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.01	0.00	0.01
O_3 min lag6	0.00	0.00	0.03	0.00	0.01	0.00	0.00	0.04	0.00	0.01
O_3 min lag7	0.01	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.01
Model including rain										
constant	-0.50	0.09	0.00	-0.67	-0.33	-0.50	0.08	0.00	-0.65	-0.34
Monday	0.46	0.11	0.00	0.25	0.67	0.46	0.10	0.00	0.27	0.65
Tuesday	0.36	0.11	0.00	0.15	0.57	0.36	0.10	0.00	0.17	0.55
Wednesday	0.54	0.10	0.00	0.33	0.74	0.53	0.09	0.00	0.35	0.71
Thursday	0.33	0.11	0.00	0.11	0.54	0.32	0.10	0.00	0.13	0.51
Friday	0.35	0.11	0.00	0.14	0.56	0.35	0.10	0.00	0.16	0.54
Saturday	0.02	0.12	0.86	-0.21	0.25	0.02	0.10	0.85	-0.19	0.22
Bank holiday	-0.39	0.24	0.10	-0.85	0.07	-0.43	0.21	0.05	-0.84	-0.01
seassin	-0.08	0.04	0.05	-0.15	0.00	-0.08	0.03	0.02	-0.15	-0.01
seascos	-0.16	0.04	0.00	-0.24	-0.09	-0.17	0.04	0.00	-0.24	-0.10
seassin1	-0.10	0.04	0.01	-0.17	-0.02	-0.11	0.03	0.00	-0.18	-0.04
seascos1	-0.02	0.04	0.52	-0.10	0.05	-0.03	0.03	0.43	-0.10	0.04
Rain lag0	-0.01	0.01	0.13	-0.02	0.00	-0.01	0.01	0.09	-0.02	0.00
Rain lag1	-0.01	0.01	0.14	-0.02	0.00	-0.01	0.01	0.09	-0.02	0.00
Rain lag2	0.00	0.01	0.94	-0.01	0.01	0.00	0.01	0.99	-0.01	0.01
Rain lag3	0.00	0.01	0.92	-0.01	0.01	0.00	0.01	0.84	-0.01	0.01
Rain lag4	0.01	0.01	0.18	0.00	0.02	0.01	0.01	0.15	0.00	0.02
Rain lag5	0.00	0.01	0.63	-0.02	0.01	0.00	0.01	0.70	-0.01	0.01
Rain lag6	-0.01	0.01	0.30	-0.02	0.01	-0.01	0.01	0.28	-0.02	0.01
Rain lag7	0.00	0.01	0.78	-0.01	0.01	0.00	0.01	0.72	-0.01	0.01

Table G. 57: Scotland Casualty Counts Excess - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	1.84	0.01	0.00	1.81	1.86	1.84	0.02	0.00	1.79	1.88
Monday	0.00	0.02	0.80	-0.03	0.04	0.00	0.03	0.88	-0.06	0.07
Tuesday	0.00	0.02	0.82	-0.03	0.04	0.00	0.03	0.89	-0.06	0.07
Wednesday	-0.02	0.02	0.22	-0.06	0.01	-0.02	0.03	0.49	-0.09	0.04
Thursday	0.00	0.02	0.84	-0.03	0.04	0.00	0.03	0.90	-0.06	0.07
Friday	-0.01	0.02	0.56	-0.05	0.03	-0.01	0.03	0.74	-0.07	0.05
Saturday	-0.01	0.02	0.63	-0.04	0.03	-0.01	0.03	0.79	-0.07	0.05
Bank holiday	0.03	0.04	0.39	-0.04	0.10	0.03	0.06	0.64	-0.10	0.16
seassin	0.00	0.01	0.55	-0.02	0.01	0.00	0.01	0.73	-0.03	0.02
seascos	0.00	0.01	0.76	-0.01	0.02	0.00	0.01	0.87	-0.02	0.03
seassin1	0.01	0.01	0.25	-0.01	0.02	0.01	0.01	0.52	-0.02	0.03
seascos1	-0.01	0.01	0.07	-0.03	0.00	-0.01	0.01	0.30	-0.04	0.01
Model including Minimum measures of O_3										
constant	1.81	0.01	0.00	1.79	1.84	1.81	0.03	0.00	1.76	1.86
Monday	0.01	0.02	0.76	-0.03	0.04	0.01	0.03	0.85	-0.06	0.07
Tuesday	0.00	0.02	0.82	-0.03	0.04	0.00	0.03	0.89	-0.06	0.07
Wednesday	-0.02	0.02	0.21	-0.06	0.01	-0.02	0.03	0.48	-0.09	0.04
Thursday	0.01	0.02	0.76	-0.03	0.04	0.01	0.03	0.85	-0.06	0.07
Friday	-0.01	0.02	0.58	-0.05	0.03	-0.01	0.03	0.76	-0.07	0.05
Saturday	-0.01	0.02	0.60	-0.05	0.03	-0.01	0.03	0.77	-0.07	0.05
Bank holiday	0.03	0.04	0.41	-0.04	0.10	0.03	0.06	0.65	-0.10	0.16
seassin	-0.01	0.01	0.42	-0.02	0.01	-0.01	0.01	0.64	-0.03	0.02
seascos	0.01	0.01	0.39	-0.01	0.02	0.01	0.01	0.63	-0.02	0.03
seassin1	0.01	0.01	0.26	-0.01	0.02	0.01	0.01	0.53	-0.02	0.03
seascos1	-0.01	0.01	0.08	-0.03	0.00	-0.01	0.01	0.31	-0.04	0.01
O_3 min lag0	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.38	0.00	0.00
O_3 min lag1	0.00	0.00	0.63	0.00	0.00	0.00	0.00	0.83	0.00	0.00
O_3 min lag2	0.00	0.00	0.52	0.00	0.00	0.00	0.00	0.71	0.00	0.00
O_3 min lag3	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.22	0.00	0.00
O_3 min lag4	0.00	0.00	0.36	0.00	0.00	0.00	0.00	0.58	0.00	0.00
O_3 min lag5	0.00	0.00	0.93	0.00	0.00	0.00	0.00	0.97	0.00	0.00
O_3 min lag6	0.00	0.00	0.32	0.00	0.00	0.00	0.00	0.57	0.00	0.00
O_3 min lag7	0.00	0.00	0.79	0.00	0.00	0.00	0.00	0.88	0.00	0.00
Model including rain										
constant	1.84	0.01	0.00	1.81	1.87	1.84	0.02	0.00	1.79	1.89
Monday	0.00	0.02	0.82	-0.03	0.04	0.00	0.03	0.89	-0.06	0.07
Tuesday	0.00	0.02	0.83	-0.03	0.04	0.00	0.03	0.90	-0.06	0.07
Wednesday	-0.02	0.02	0.22	-0.06	0.01	-0.02	0.03	0.49	-0.09	0.04
Thursday	0.00	0.02	0.85	-0.03	0.04	0.00	0.03	0.91	-0.06	0.07
Friday	-0.01	0.02	0.57	-0.05	0.03	-0.01	0.03	0.75	-0.07	0.05
Saturday	-0.01	0.02	0.64	-0.04	0.03	-0.01	0.03	0.80	-0.07	0.05
Bank holiday	0.03	0.04	0.37	-0.04	0.11	0.03	0.07	0.62	-0.10	0.16
seassin	0.00	0.01	0.55	-0.02	0.01	0.00	0.01	0.73	-0.03	0.02
seascos	0.00	0.01	0.74	-0.01	0.02	0.00	0.01	0.86	-0.02	0.03
seassin1	0.01	0.01	0.27	-0.01	0.02	0.01	0.01	0.54	-0.02	0.03
seascos1	-0.01	0.01	0.08	-0.03	0.00	-0.01	0.01	0.30	-0.04	0.01
Rain lag0	0.00	0.00	0.43	0.00	0.00	0.00	0.00	0.67	0.00	0.00
Rain lag1	0.00	0.00	0.28	0.00	0.00	0.00	0.00	0.54	0.00	0.01
Rain lag2	0.00	0.00	0.93	0.00	0.00	0.00	0.00	0.95	0.00	0.00
Rain lag3	0.00	0.00	0.87	0.00	0.00	0.00	0.00	0.90	0.00	0.00
Rain lag4	0.00	0.00	0.26	0.00	0.00	0.00	0.00	0.53	-0.01	0.00
Rain lag5	0.00	0.00	0.60	0.00	0.00	0.00	0.00	0.77	0.00	0.00
Rain lag6	0.00	0.00	0.33	0.00	0.00	0.00	0.00	0.58	0.00	0.00
Rain lag7	0.00	0.00	0.18	0.00	0.00	0.00	0.00	0.45	-0.01	0.00

Table G. 58: Scotland Emergency Consultations Asthmatics - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	-19.85	524.41	0.97	-1048.27	1008.56	-19.75	1093.77	0.99	-2163.50	2124.00
Monday	20.01	524.41	0.97	-1008.40	1048.42	20.25	1093.77	0.99	-2123.50	2163.99
Tuesday	19.87	524.41	0.97	-1008.54	1048.28	20.15	1093.77	0.99	-2123.60	2163.90
Wednesday	19.76	524.41	0.97	-1008.65	1048.18	19.99	1093.77	0.99	-2123.75	2163.74
Thursday	19.67	524.41	0.97	-1008.74	1048.08	19.90	1093.77	0.99	-2123.85	2163.65
Friday	19.68	524.41	0.97	-1008.73	1048.10	19.87	1093.77	0.99	-2123.88	2163.61
Saturday	18.97	524.41	0.97	-1009.44	1047.38	18.95	1093.77	0.99	-2124.80	2162.70
Bank holiday	-0.88	0.18	0.00	-1.23	-0.52	-1.05	0.22	0.00	-1.48	-0.62
seassin	0.05	0.03	0.03	0.00	0.10	0.11	0.03	0.00	0.05	0.17
seascos	0.17	0.03	0.00	0.11	0.22	0.23	0.03	0.00	0.16	0.29
seassin1	-0.11	0.03	0.00	-0.16	-0.06	-0.11	0.03	0.00	-0.17	-0.05
seascos1	-0.01	0.03	0.68	-0.06	0.04	-0.03	0.03	0.30	-0.09	0.03
Model including mean measures of O_3										
constant	-20.63	473.62	0.97	-949.43	908.17	-20.44	853.16	0.98	-1692.61	1651.73
Monday	19.82	473.62	0.97	-908.98	948.62	19.77	853.16	0.98	-1652.40	1691.94
Tuesday	19.68	473.62	0.97	-909.12	948.48	19.67	853.16	0.98	-1652.50	1691.83
Wednesday	19.56	473.62	0.97	-909.24	948.36	19.50	853.16	0.98	-1652.67	1691.67
Thursday	19.47	473.62	0.97	-909.33	948.27	19.42	853.16	0.98	-1652.75	1691.59
Friday	19.48	473.62	0.97	-909.32	948.28	19.38	853.16	0.98	-1652.79	1691.55
Saturday	18.74	473.62	0.97	-910.06	947.54	18.44	853.16	0.98	-1653.73	1690.61
Bank holiday	-0.89	0.19	0.00	-1.26	-0.53	-1.05	0.22	0.00	-1.49	-0.62
seassin	-0.04	0.03	0.13	-0.09	0.01	0.00	0.03	0.91	-0.06	0.06
seascos	0.28	0.03	0.00	0.23	0.34	0.38	0.03	0.00	0.32	0.45
seassin1	-0.08	0.03	0.00	-0.13	-0.03	-0.07	0.03	0.02	-0.13	-0.01
seascos1	0.01	0.03	0.69	-0.04	0.06	0.00	0.03	0.95	-0.06	0.06
O_3 mean lag0	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.01
O_3 mean lag1	0.00	0.00	0.21	0.00	0.00	0.00	0.00	0.11	0.00	0.00
O_3 mean lag2	0.00	0.00	0.17	0.00	0.00	0.00	0.00	0.03	0.00	0.01
O_3 mean lag3	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.01
O_3 mean lag4	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.01	0.00	0.01
O_3 mean lag5	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01
O_3 mean lag6	0.01	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.01
O_3 mean lag7	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01
Model including maximum measures of O_3										
constant	-21.20	503.54	0.97	-1008.68	966.27	-20.34	624.82	0.97	-1244.97	1204.28
Monday	19.94	503.54	0.97	-967.54	1007.41	19.13	624.82	0.98	-1205.49	1243.76
Tuesday	19.79	503.54	0.97	-967.69	1007.26	19.03	624.82	0.98	-1205.60	1243.65
Wednesday	19.67	503.54	0.97	-967.81	1007.14	18.86	624.82	0.98	-1205.76	1243.49
Thursday	19.58	503.54	0.97	-967.89	1007.06	18.78	624.82	0.98	-1205.84	1243.41
Friday	19.59	503.54	0.97	-967.88	1007.07	18.75	624.82	0.98	-1205.88	1243.37
Saturday	18.86	503.54	0.97	-968.62	1006.33	17.81	624.82	0.98	-1206.82	1242.44
Bank holiday	-0.90	0.19	0.00	-1.26	-0.53	-1.05	0.22	0.00	-1.48	-0.61
seassin	-0.01	0.03	0.82	-0.06	0.05	0.03	0.03	0.26	-0.03	0.09
seascos	0.25	0.03	0.00	0.20	0.31	0.34	0.03	0.00	0.27	0.40
seassin1	-0.08	0.03	0.00	-0.14	-0.03	-0.08	0.03	0.01	-0.14	-0.02
seascos1	0.00	0.03	0.87	-0.05	0.06	-0.01	0.03	0.86	-0.07	0.06
O_3 max lag0	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.01
O_3 max lag1	0.00	0.00	0.60	0.00	0.00	0.00	0.00	0.24	0.00	0.00
O_3 max lag2	0.00	0.00	0.17	0.00	0.00	0.00	0.00	0.03	0.00	0.00
O_3 max lag3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
O_3 max lag4	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01
O_3 max lag5	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01
O_3 max lag6	0.01	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.01
O_3 max lag7	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01

Table G. 59: Scotland Emergency Consultations Non-asthmatics - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	-19.13	522.43	0.97	-1043.67	1005.40	-18.26	520.63	0.97	-1038.68	1002.16
Monday	19.10	522.43	0.97	-1005.43	1043.63	18.08	520.63	0.97	-1002.34	1038.50
Tuesday	18.97	522.43	0.97	-1005.56	1043.50	18.01	520.63	0.97	-1002.41	1038.43
Wednesday	18.72	522.43	0.97	-1005.81	1043.26	17.76	520.63	0.97	-1002.66	1038.18
Thursday	18.71	522.43	0.97	-1005.82	1043.24	17.80	520.63	0.97	-1002.62	1038.22
Friday	18.76	522.43	0.97	-1005.78	1043.29	17.82	520.63	0.97	-1002.60	1038.24
Saturday	17.84	522.43	0.97	-1006.69	1042.37	16.86	520.63	0.97	-1003.55	1037.28
Bank holiday	-0.66	0.26	0.01	-1.18	-0.15	-0.76	0.26	0.00	-1.28	-0.25
seassin	0.10	0.04	0.02	0.02	0.18	0.09	0.04	0.03	0.01	0.17
seascos	0.19	0.04	0.00	0.11	0.28	0.17	0.04	0.00	0.09	0.25
seassin1	-0.13	0.04	0.00	-0.21	-0.04	-0.13	0.04	0.00	-0.21	-0.04
seascos1	0.07	0.04	0.11	-0.02	0.15	0.07	0.04	0.12	-0.02	0.15
Model including mean measures of O_3										
constant	-21.19	802.90	0.98	-1595.74	1553.37	-20.35	808.87	0.98	-1605.71	1565.00
Monday	20.01	802.90	0.98	-1554.55	1594.56	18.98	808.87	0.98	-1566.38	1604.34
Tuesday	19.86	802.90	0.98	-1554.70	1594.42	18.89	808.87	0.98	-1566.46	1604.25
Wednesday	19.64	802.90	0.98	-1554.92	1594.19	18.64	808.87	0.98	-1566.71	1604.00
Thursday	19.62	802.90	0.98	-1554.94	1594.17	18.70	808.87	0.98	-1566.66	1604.05
Friday	19.63	802.90	0.98	-1554.93	1594.19	18.70	808.87	0.98	-1566.66	1604.05
Saturday	18.68	802.90	0.98	-1555.88	1593.24	17.72	808.87	0.98	-1567.64	1603.08
Bank holiday	-0.68	0.26	0.01	-1.19	-0.17	-0.76	0.26	0.00	-1.28	-0.25
seassin	-0.02	0.04	0.71	-0.10	0.07	-0.03	0.04	0.53	-0.11	0.06
seascos	0.33	0.04	0.00	0.25	0.42	0.33	0.04	0.00	0.24	0.41
seassin1	-0.09	0.04	0.04	-0.17	-0.01	-0.09	0.04	0.04	-0.17	-0.01
seascos1	0.09	0.04	0.03	0.01	0.18	0.10	0.04	0.02	0.02	0.19
O_3 mean lag0	0.00	0.00	0.09	0.00	0.01	0.00	0.00	0.01	0.00	0.01
O_3 mean lag1	0.00	0.00	0.83	0.00	0.00	0.00	0.00	0.67	0.00	0.00
O_3 mean lag2	0.00	0.00	0.08	0.00	0.01	0.00	0.00	0.05	0.00	0.01
O_3 mean lag3	0.00	0.00	0.10	0.00	0.01	0.00	0.00	0.04	0.00	0.01
O_3 mean lag4	0.00	0.00	0.11	0.00	0.01	0.00	0.00	0.11	0.00	0.01
O_3 mean lag5	0.01	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.01
O_3 mean lag6	0.01	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.01
O_3 mean lag7	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.03	0.00	0.01
Model including maximum measures of O_3										
constant	-20.77	489.88	0.97	-981.47	939.93	-19.93	492.89	0.97	-985.97	946.11
Monday	19.02	489.88	0.97	-941.68	979.72	17.97	492.89	0.97	-948.07	984.01
Tuesday	18.87	489.88	0.97	-941.83	979.57	17.89	492.89	0.97	-948.14	983.93
Wednesday	18.63	489.88	0.97	-942.07	979.33	17.64	492.89	0.97	-948.40	983.68
Thursday	18.62	489.88	0.97	-942.08	979.31	17.69	492.89	0.97	-948.35	983.73
Friday	18.63	489.88	0.97	-942.07	979.33	17.70	492.89	0.97	-948.34	983.74
Saturday	17.70	489.88	0.97	-943.00	978.40	16.73	492.89	0.97	-949.31	982.76
Bank holiday	-0.69	0.26	0.01	-1.20	-0.18	-0.76	0.26	0.00	-1.28	-0.25
seassin	0.02	0.04	0.59	-0.06	0.11	0.01	0.04	0.81	-0.07	0.09
seascos	0.29	0.04	0.00	0.21	0.38	0.29	0.04	0.00	0.20	0.37
seassin1	-0.10	0.04	0.02	-0.18	-0.02	-0.10	0.04	0.02	-0.18	-0.01
seascos1	0.09	0.04	0.04	0.01	0.17	0.09	0.04	0.03	0.01	0.18
O_3 max lag0	0.00	0.00	0.02	0.00	0.01	0.00	0.00	0.00	0.00	0.01
O_3 max lag1	0.00	0.00	0.56	0.00	0.00	0.00	0.00	0.38	0.00	0.01
O_3 max lag2	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.01	0.00	0.01
O_3 max lag3	0.00	0.00	0.15	0.00	0.01	0.00	0.00	0.06	0.00	0.01
O_3 max lag4	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01
O_3 max lag5	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01
O_3 max lag6	0.01	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.01
O_3 max lag7	0.00	0.00	0.03	0.00	0.01	0.00	0.00	0.07	0.00	0.01

Table G. 60: Scotland Emergency Consultations Excess - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	LOWER	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	1.61	0.01	0.00	1.58	1.64	1.61	0.03	0.00	1.56	1.66
Monday	0.15	0.02	0.00	0.12	0.19	0.15	0.04	0.00	0.08	0.22
Tuesday	0.14	0.02	0.00	0.10	0.18	0.14	0.03	0.00	0.07	0.20
Wednesday	0.13	0.02	0.00	0.09	0.17	0.13	0.03	0.00	0.06	0.20
Thursday	0.10	0.02	0.00	0.07	0.14	0.10	0.04	0.00	0.03	0.17
Friday	0.09	0.02	0.00	0.06	0.13	0.09	0.04	0.01	0.03	0.16
Saturday	0.04	0.02	0.04	0.00	0.08	0.04	0.04	0.25	-0.03	0.11
Bank holiday	-0.10	0.04	0.01	-0.18	-0.02	-0.11	0.07	0.15	-0.25	0.04
seassin	0.01	0.01	0.12	0.00	0.03	0.01	0.01	0.39	-0.01	0.04
seascos	0.02	0.01	0.00	0.01	0.04	0.02	0.01	0.07	0.00	0.05
seassin1	-0.01	0.01	0.39	-0.02	0.01	-0.01	0.01	0.61	-0.03	0.02
seascos1	-0.01	0.01	0.13	-0.03	0.00	-0.01	0.01	0.38	-0.04	0.01
Model including mean measures of O_3										
constant	1.50	0.02	0.00	1.46	1.54	1.50	0.03	0.00	1.43	1.57
Monday	0.16	0.02	0.00	0.12	0.19	0.16	0.04	0.00	0.09	0.22
Tuesday	0.14	0.02	0.00	0.10	0.18	0.14	0.04	0.00	0.07	0.21
Wednesday	0.13	0.02	0.00	0.09	0.17	0.13	0.04	0.00	0.06	0.20
Thursday	0.11	0.02	0.00	0.07	0.14	0.11	0.04	0.00	0.04	0.18
Friday	0.10	0.02	0.00	0.06	0.13	0.10	0.04	0.01	0.03	0.17
Saturday	0.04	0.02	0.04	0.00	0.08	0.04	0.04	0.25	-0.03	0.11
Bank holiday	-0.10	0.04	0.01	-0.18	-0.02	-0.11	0.07	0.14	-0.25	0.04
seassin	0.00	0.01	0.73	-0.01	0.02	0.00	0.01	0.86	-0.02	0.03
seascos	0.04	0.01	0.00	0.02	0.05	0.04	0.01	0.01	0.01	0.06
seassin1	0.00	0.01	0.70	-0.02	0.01	0.00	0.01	0.81	-0.03	0.02
seascos1	-0.01	0.01	0.29	-0.02	0.01	-0.01	0.01	0.54	-0.03	0.02
O_3 mean lag0	0.00	0.00	0.22	0.00	0.00	0.00	0.00	0.47	0.00	0.00
O_3 mean lag1	0.00	0.00	0.37	0.00	0.00	0.00	0.00	0.57	0.00	0.00
O_3 mean lag2	0.00	0.00	0.63	0.00	0.00	0.00	0.00	0.73	0.00	0.00
O_3 mean lag3	0.00	0.00	0.35	0.00	0.00	0.00	0.00	0.62	0.00	0.00
O_3 mean lag4	0.00	0.00	0.29	0.00	0.00	0.00	0.00	0.57	0.00	0.00
O_3 mean lag5	0.00	0.00	0.22	0.00	0.00	0.00	0.00	0.56	0.00	0.00
O_3 mean lag6	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.44	0.00	0.00
O_3 mean lag7	0.00	0.00	0.21	0.00	0.00	0.00	0.00	0.50	0.00	0.00
Model including maximum measures of O_3										
constant	1.46	0.02	0.00	1.41	1.50	1.46	0.04	0.00	1.37	1.54
Monday	0.16	0.02	0.00	0.12	0.19	0.15	0.04	0.00	0.09	0.22
Tuesday	0.14	0.02	0.00	0.10	0.18	0.14	0.03	0.00	0.07	0.20
Wednesday	0.13	0.02	0.00	0.09	0.17	0.13	0.03	0.00	0.06	0.20
Thursday	0.11	0.02	0.00	0.07	0.14	0.10	0.04	0.00	0.04	0.17
Friday	0.09	0.02	0.00	0.06	0.13	0.09	0.04	0.01	0.03	0.16
Saturday	0.04	0.02	0.04	0.00	0.08	0.04	0.04	0.27	-0.03	0.11
Bank holiday	-0.10	0.04	0.01	-0.18	-0.02	-0.10	0.07	0.15	-0.25	0.04
seassin	0.01	0.01	0.36	-0.01	0.02	0.01	0.01	0.62	-0.02	0.03
seascos	0.03	0.01	0.00	0.02	0.05	0.03	0.01	0.01	0.01	0.06
seassin1	0.00	0.01	0.58	-0.02	0.01	0.00	0.01	0.75	-0.03	0.02
seascos1	-0.01	0.01	0.30	-0.02	0.01	-0.01	0.01	0.56	-0.03	0.02
O_3 max lag0	0.00	0.00	0.28	0.00	0.00	0.00	0.00	0.50	0.00	0.00
O_3 max lag1	0.00	0.00	0.77	0.00	0.00	0.00	0.00	0.82	0.00	0.00
O_3 max lag2	0.00	0.00	0.90	0.00	0.00	0.00	0.00	0.99	0.00	0.00
O_3 max lag3	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.43	0.00	0.00
O_3 max lag4	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.66	0.00	0.00
O_3 max lag5	0.00	0.00	0.13	0.00	0.00	0.00	0.00	0.44	0.00	0.00
O_3 max lag6	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.33	0.00	0.00
O_3 max lag7	0.00	0.00	0.14	0.00	0.00	0.00	0.00	0.43	0.00	0.00

Table G. 61: Scotland Emergency Counts Asthmatics - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
					Null model					
constant	1.38	0.03	0.00	1.32	1.45	1.39	0.03	0.00	1.33	1.44
Monday	0.24	0.04	0.00	0.15	0.33	0.24	0.04	0.00	0.17	0.32
Tuesday	0.07	0.05	0.15	-0.02	0.16	0.07	0.04	0.08	-0.01	0.15
Wednesday	0.05	0.05	0.31	-0.04	0.14	0.04	0.04	0.32	-0.04	0.12
Thursday	0.00	0.05	1.00	-0.09	0.09	0.00	0.04	0.93	-0.08	0.08
Friday	-0.08	0.05	0.09	-0.18	0.01	-0.08	0.04	0.04	-0.16	0.00
Saturday	-0.02	0.05	0.61	-0.12	0.07	-0.02	0.04	0.65	-0.10	0.06
Bank holiday	-0.12	0.10	0.22	-0.30	0.07	-0.12	0.08	0.14	-0.28	0.04
seassin	0.02	0.02	0.26	-0.01	0.05	0.02	0.01	0.18	-0.01	0.05
seascos	0.10	0.02	0.00	0.07	0.13	0.10	0.02	0.00	0.07	0.13
seassin1	-0.02	0.02	0.26	-0.05	0.01	-0.02	0.01	0.17	-0.05	0.01
seascos1	-0.02	0.02	0.30	-0.05	0.02	-0.02	0.02	0.24	-0.05	0.01
					Model including Minimum measures of NO					
constant	1.39	0.03	0.00	1.33	1.46	1.40	0.03	0.00	1.34	1.45
Monday	0.24	0.04	0.00	0.15	0.33	0.24	0.04	0.00	0.17	0.32
Tuesday	0.07	0.05	0.12	-0.02	0.16	0.07	0.04	0.06	0.00	0.15
Wednesday	0.05	0.05	0.29	-0.04	0.14	0.04	0.04	0.28	-0.03	0.12
Thursday	0.00	0.05	0.94	-0.09	0.10	0.00	0.04	0.98	-0.08	0.08
Friday	-0.08	0.05	0.11	-0.17	0.02	-0.08	0.04	0.06	-0.16	0.00
Saturday	-0.02	0.05	0.62	-0.12	0.07	-0.02	0.04	0.71	-0.09	0.06
Bank holiday	-0.12	0.09	0.19	-0.31	0.06	-0.12	0.08	0.15	-0.28	0.04
seassin	0.02	0.02	0.24	-0.01	0.05	0.02	0.01	0.16	-0.01	0.05
seascos	0.11	0.02	0.00	0.07	0.14	0.11	0.02	0.00	0.08	0.14
seassin1	-0.02	0.02	0.33	-0.05	0.02	-0.02	0.01	0.22	-0.05	0.01
seascos1	-0.01	0.02	0.47	-0.05	0.02	-0.01	0.02	0.47	-0.04	0.02
NO min lag0	0.00	0.01	0.56	-0.02	0.01	0.00	0.01	0.55	-0.01	0.01
NO min lag1	0.00	0.01	0.50	-0.01	0.02	0.01	0.01	0.35	-0.01	0.02
NO min lag2	0.00	0.01	0.76	-0.01	0.02	0.00	0.01	0.80	-0.01	0.01
NO min lag3	-0.01	0.01	0.44	-0.02	0.01	-0.01	0.01	0.28	-0.02	0.01
NO min lag4	0.01	0.01	0.12	0.00	0.02	0.01	0.01	0.06	0.00	0.02
NO min lag5	0.00	0.01	0.54	-0.02	0.01	-0.01	0.01	0.37	-0.02	0.01
NO min lag6	-0.01	0.01	0.09	-0.03	0.00	-0.01	0.01	0.04	-0.03	0.00
NO min lag7	0.00	0.01	0.55	-0.02	0.01	0.00	0.01	0.41	-0.02	0.01
					Model including mean measures of NO					
constant	1.33	0.04	0.00	1.26	1.41	1.32	0.03	0.00	1.26	1.38
Monday	0.24	0.05	0.00	0.15	0.33	0.23	0.04	0.00	0.16	0.31
Tuesday	0.07	0.05	0.16	-0.03	0.16	0.06	0.04	0.12	-0.02	0.14
Wednesday	0.05	0.05	0.27	-0.04	0.15	0.04	0.04	0.32	-0.04	0.12
Thursday	0.01	0.05	0.91	-0.09	0.10	0.00	0.04	0.96	-0.08	0.08
Friday	-0.08	0.05	0.08	-0.18	0.01	-0.09	0.04	0.03	-0.17	-0.01
Saturday	-0.02	0.05	0.64	-0.12	0.07	-0.02	0.04	0.65	-0.10	0.06
Bank holiday	-0.11	0.10	0.27	-0.29	0.08	-0.11	0.08	0.20	-0.27	0.05
seassin	0.02	0.02	0.19	-0.01	0.06	0.03	0.01	0.09	0.00	0.05
seascos	0.07	0.02	0.00	0.02	0.11	0.06	0.02	0.00	0.02	0.09
seassin1	-0.02	0.02	0.26	-0.05	0.01	-0.02	0.01	0.19	-0.05	0.01
seascos1	-0.03	0.02	0.10	-0.07	0.01	-0.03	0.02	0.03	-0.06	0.00
NO mean lag0	0.00	0.00	0.91	0.00	0.00	0.00	0.00	0.23	0.00	0.00
NO mean lag1	0.00	0.00	0.81	0.00	0.00	0.00	0.00	0.66	0.00	0.00
NO mean lag2	0.00	0.00	0.59	0.00	0.00	0.00	0.00	0.38	0.00	0.00
NO mean lag3	0.00	0.00	0.63	0.00	0.00	0.00	0.00	0.56	0.00	0.00
NO mean lag4	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.01	0.00	0.00
NO mean lag5	0.00	0.00	0.83	0.00	0.00	0.00	0.00	0.85	0.00	0.00
NO mean lag6	0.00	0.00	0.44	0.00	0.00	0.00	0.00	0.34	0.00	0.00
NO mean lag7	0.00	0.00	0.43	0.00	0.00	0.00	0.00	0.36	0.00	0.00

Table G. 62: Scotland Emergency Counts Non-asthmatics - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	0.82	0.04	0.00	0.73	0.90	0.82	0.04	0.00	0.74	0.89
Monday	0.26	0.06	0.00	0.14	0.38	0.26	0.05	0.00	0.16	0.36
Tuesday	0.13	0.06	0.03	0.01	0.25	0.14	0.05	0.01	0.03	0.24
Wednesday	0.10	0.06	0.10	-0.02	0.22	0.10	0.05	0.06	-0.01	0.20
Thursday	-0.03	0.06	0.59	-0.16	0.09	-0.04	0.05	0.51	-0.14	0.07
Friday	-0.02	0.06	0.74	-0.14	0.10	-0.02	0.05	0.73	-0.12	0.09
Saturday	-0.01	0.06	0.85	-0.13	0.11	0.00	0.05	0.94	-0.11	0.10
Bank holiday	-0.19	0.13	0.12	-0.44	0.05	-0.19	0.11	0.07	-0.41	0.02
seassin	0.07	0.02	0.00	0.02	0.11	0.07	0.02	0.00	0.03	0.11
seascos	0.04	0.02	0.05	0.00	0.09	0.04	0.02	0.03	0.01	0.08
seassin1	-0.04	0.02	0.07	-0.09	0.00	-0.04	0.02	0.03	-0.08	0.00
seascos1	0.04	0.02	0.09	-0.01	0.08	0.04	0.02	0.06	0.00	0.08
Model including Minimum measures of NO										
constant	0.83	0.05	0.00	0.74	0.92	0.83	0.04	0.00	0.75	0.91
Monday	0.26	0.06	0.00	0.14	0.37	0.26	0.05	0.00	0.16	0.36
Tuesday	0.14	0.06	0.02	0.02	0.25	0.14	0.05	0.01	0.04	0.24
Wednesday	0.10	0.06	0.10	-0.02	0.22	0.10	0.05	0.06	0.00	0.20
Thursday	-0.03	0.06	0.61	-0.15	0.09	-0.03	0.05	0.53	-0.14	0.07
Friday	-0.02	0.06	0.74	-0.14	0.10	-0.02	0.05	0.72	-0.12	0.09
Saturday	-0.01	0.06	0.83	-0.14	0.11	0.00	0.05	0.93	-0.11	0.10
Bank holiday	-0.20	0.13	0.12	-0.44	0.05	-0.19	0.11	0.07	-0.41	0.02
seassin	0.07	0.02	0.00	0.03	0.12	0.07	0.02	0.00	0.03	0.11
seascos	0.05	0.02	0.04	0.00	0.10	0.05	0.02	0.01	0.01	0.09
seassin1	-0.04	0.02	0.08	-0.08	0.00	-0.04	0.02	0.04	-0.08	0.00
seascos1	0.04	0.02	0.07	0.00	0.09	0.04	0.02	0.03	0.00	0.08
NO min lag0	0.00	0.01	0.94	-0.02	0.02	0.00	0.01	0.99	-0.01	0.01
NO min lag1	0.00	0.01	0.57	-0.02	0.01	0.00	0.01	0.55	-0.02	0.01
NO min lag2	0.02	0.01	0.03	0.00	0.04	0.02	0.01	0.01	0.00	0.03
NO min lag3	-0.01	0.01	0.22	-0.03	0.01	-0.01	0.01	0.12	-0.03	0.00
NO min lag4	0.01	0.01	0.27	-0.01	0.03	0.01	0.01	0.31	-0.01	0.02
NO min lag5	-0.01	0.01	0.18	-0.03	0.01	-0.01	0.01	0.08	-0.03	0.00
NO min lag6	-0.01	0.01	0.46	-0.03	0.01	0.00	0.01	0.60	-0.02	0.01
NO min lag7	0.00	0.01	0.63	-0.02	0.01	-0.01	0.01	0.42	-0.02	0.01
Model including mean measures of NO										
constant	0.77	0.05	0.00	0.67	0.87	0.75	0.04	0.00	0.66	0.83
Monday	0.25	0.06	0.00	0.13	0.37	0.25	0.05	0.00	0.15	0.35
Tuesday	0.12	0.06	0.06	-0.01	0.24	0.12	0.05	0.03	0.01	0.22
Wednesday	0.10	0.06	0.12	-0.03	0.22	0.09	0.05	0.10	-0.02	0.19
Thursday	-0.03	0.06	0.60	-0.16	0.09	-0.04	0.06	0.46	-0.15	0.07
Friday	-0.03	0.06	0.60	-0.16	0.09	-0.03	0.05	0.55	-0.14	0.08
Saturday	-0.01	0.06	0.82	-0.14	0.11	-0.01	0.05	0.92	-0.11	0.10
Bank holiday	-0.18	0.13	0.15	-0.43	0.07	-0.18	0.11	0.10	-0.39	0.03
seassin	0.07	0.02	0.00	0.03	0.12	0.07	0.02	0.00	0.03	0.11
seascos	0.01	0.03	0.75	-0.05	0.06	-0.01	0.02	0.83	-0.05	0.04
seassin1	-0.04	0.02	0.07	-0.09	0.00	-0.04	0.02	0.03	-0.08	0.00
seascos1	0.02	0.02	0.30	-0.02	0.07	0.02	0.02	0.33	-0.02	0.06
NO mean lag0	0.00	0.00	0.81	0.00	0.00	0.00	0.00	0.24	0.00	0.00
NO mean lag1	0.00	0.00	0.50	0.00	0.00	0.00	0.00	0.31	0.00	0.00
NO mean lag2	0.00	0.00	0.80	0.00	0.00	0.00	0.00	0.93	0.00	0.00
NO mean lag3	0.00	0.00	0.90	0.00	0.00	0.00	0.00	0.97	0.00	0.00
NO mean lag4	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.02	0.00	0.00
NO mean lag5	0.00	0.00	0.49	0.00	0.00	0.00	0.00	0.53	0.00	0.00
NO mean lag6	0.00	0.00	0.53	0.00	0.00	0.00	0.00	0.17	0.00	0.00
NO mean lag7	0.00	0.00	0.31	0.00	0.00	0.00	0.00	0.38	0.00	0.00

Table G. 63: Scotland Emergency Counts Excess - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	2.37	0.01	0.00	2.35	2.40	2.37	0.02	0.00	2.34	2.41
Monday	0.04	0.02	0.07	0.00	0.08	0.04	0.02	0.12	-0.01	0.09
Tuesday	0.00	0.02	0.82	-0.05	0.04	0.00	0.02	0.88	-0.05	0.04
Wednesday	-0.01	0.02	0.78	-0.05	0.03	-0.01	0.02	0.80	-0.05	0.04
Thursday	0.01	0.02	0.78	-0.03	0.05	0.01	0.02	0.81	-0.04	0.05
Friday	-0.03	0.02	0.21	-0.07	0.01	-0.03	0.02	0.29	-0.07	0.02
Saturday	-0.01	0.02	0.78	-0.05	0.03	-0.01	0.02	0.81	-0.05	0.04
Bank holiday	-0.01	0.04	0.90	-0.09	0.08	0.00	0.05	0.92	-0.10	0.09
seassin	-0.01	0.01	0.34	-0.02	0.01	-0.01	0.01	0.44	-0.03	0.01
seascos	0.03	0.01	0.00	0.01	0.04	0.03	0.01	0.00	0.01	0.05
seassin1	0.00	0.01	0.84	-0.01	0.02	0.00	0.01	0.85	-0.02	0.02
seascos1	-0.01	0.01	0.06	-0.03	0.00	-0.01	0.01	0.12	-0.03	0.00
Model including Minimum measures of NO										
constant	2.38	0.02	0.00	2.35	2.41	2.38	0.02	0.00	2.34	2.41
Monday	0.04	0.02	0.06	0.00	0.08	0.04	0.02	0.10	-0.01	0.09
Tuesday	0.00	0.02	0.86	-0.04	0.04	0.00	0.02	0.92	-0.05	0.05
Wednesday	-0.01	0.02	0.81	-0.05	0.04	-0.01	0.02	0.83	-0.05	0.04
Thursday	0.01	0.02	0.73	-0.03	0.05	0.01	0.02	0.76	-0.04	0.06
Friday	-0.02	0.02	0.25	-0.06	0.02	-0.02	0.02	0.34	-0.07	0.02
Saturday	0.00	0.02	0.83	-0.04	0.04	0.00	0.02	0.86	-0.05	0.04
Bank holiday	-0.01	0.04	0.90	-0.09	0.08	0.00	0.05	0.93	-0.10	0.09
seassin	-0.01	0.01	0.35	-0.02	0.01	-0.01	0.01	0.44	-0.03	0.01
seascos	0.03	0.01	0.00	0.01	0.05	0.03	0.01	0.00	0.01	0.05
seassin1	0.00	0.01	0.81	-0.01	0.02	0.00	0.01	0.82	-0.02	0.02
seascos1	-0.01	0.01	0.09	-0.03	0.00	-0.01	0.01	0.17	-0.03	0.01
NO min lag0	0.00	0.00	0.60	-0.01	0.00	0.00	0.00	0.67	-0.01	0.01
NO min lag1	0.00	0.00	0.29	0.00	0.01	0.00	0.00	0.36	0.00	0.01
NO min lag2	0.00	0.00	0.25	-0.01	0.00	0.00	0.00	0.31	-0.01	0.00
NO min lag3	0.00	0.00	0.98	-0.01	0.01	0.00	0.00	0.97	-0.01	0.01
NO min lag4	0.00	0.00	0.42	0.00	0.01	0.00	0.00	0.52	0.00	0.01
NO min lag5	0.00	0.00	0.81	-0.01	0.01	0.00	0.00	0.82	-0.01	0.01
NO min lag6	0.00	0.00	0.30	-0.01	0.00	0.00	0.00	0.31	-0.01	0.00
NO min lag7	0.00	0.00	0.86	-0.01	0.01	0.00	0.00	0.92	-0.01	0.01
Model including mean measures of NO										
constant	2.36	0.02	0.00	2.33	2.39	2.36	0.02	0.00	2.32	2.40
Monday	0.04	0.02	0.07	0.00	0.08	0.04	0.02	0.13	-0.01	0.09
Tuesday	0.00	0.02	0.91	-0.04	0.04	0.00	0.03	0.95	-0.05	0.05
Wednesday	0.00	0.02	0.88	-0.04	0.04	0.00	0.03	0.88	-0.05	0.05
Thursday	0.01	0.02	0.69	-0.03	0.05	0.01	0.03	0.75	-0.04	0.06
Friday	-0.02	0.02	0.25	-0.07	0.02	-0.03	0.03	0.31	-0.08	0.02
Saturday	-0.01	0.02	0.81	-0.05	0.04	-0.01	0.02	0.82	-0.05	0.04
Bank holiday	0.00	0.04	0.93	-0.09	0.08	0.00	0.05	0.95	-0.10	0.10
seassin	-0.01	0.01	0.40	-0.02	0.01	-0.01	0.01	0.50	-0.02	0.01
seascos	0.02	0.01	0.03	0.00	0.04	0.02	0.01	0.05	0.00	0.05
seassin1	0.00	0.01	0.83	-0.01	0.02	0.00	0.01	0.84	-0.02	0.02
seascos1	-0.02	0.01	0.03	-0.03	0.00	-0.02	0.01	0.08	-0.04	0.00
NO mean lag0	0.00	0.00	0.87	0.00	0.00	0.00	0.00	0.84	0.00	0.00
NO mean lag1	0.00	0.00	0.85	0.00	0.00	0.00	0.00	0.83	0.00	0.00
NO mean lag2	0.00	0.00	0.56	0.00	0.00	0.00	0.00	0.62	0.00	0.00
NO mean lag3	0.00	0.00	0.69	0.00	0.00	0.00	0.00	0.68	0.00	0.00
NO mean lag4	0.00	0.00	0.50	0.00	0.00	0.00	0.00	0.57	0.00	0.00
NO mean lag5	0.00	0.00	0.71	0.00	0.00	0.00	0.00	0.83	0.00	0.00
NO mean lag6	0.00	0.00	0.88	0.00	0.00	0.00	0.00	0.97	0.00	0.00
NO mean lag7	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.89	0.00	0.00

Table G. 64: Scotland Out of Hours Counts Asthmatics - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	1.13	0.04	0.00	1.06	1.21	1.14	0.03	0.00	1.07	1.20
Monday	-0.70	0.06	0.00	-0.83	-0.58	-0.71	0.06	0.00	-0.82	-0.59
Tuesday	-0.96	0.07	0.00	-1.09	-0.82	-0.95	0.06	0.00	-1.07	-0.83
Wednesday	-0.95	0.07	0.00	-1.09	-0.81	-0.96	0.06	0.00	-1.08	-0.84
Thursday	-0.96	0.07	0.00	-1.09	-0.82	-0.96	0.06	0.00	-1.08	-0.84
Friday	-1.03	0.07	0.00	-1.17	-0.89	-1.03	0.06	0.00	-1.15	-0.91
Saturday	-0.20	0.05	0.00	-0.31	-0.09	-0.20	0.05	0.00	-0.29	-0.10
Bank holiday	0.38	0.13	0.00	0.12	0.65	0.40	0.12	0.00	0.17	0.63
seassin	0.01	0.03	0.60	-0.04	0.07	0.01	0.02	0.82	-0.04	0.05
seascos	0.12	0.03	0.00	0.07	0.18	0.13	0.02	0.00	0.08	0.17
seassin1	-0.03	0.03	0.34	-0.08	0.03	-0.02	0.02	0.31	-0.07	0.02
seascos1	-0.01	0.03	0.73	-0.06	0.04	-0.01	0.02	0.66	-0.06	0.04
Model including mean measures of PM_{10}										
constant	1.00	0.06	0.00	0.88	1.13	1.02	0.06	0.00	0.90	1.13
Monday	-0.70	0.06	0.00	-0.83	-0.58	-0.71	0.06	0.00	-0.82	-0.59
Tuesday	-0.97	0.07	0.00	-1.11	-0.83	-0.97	0.06	0.00	-1.09	-0.85
Wednesday	-0.97	0.07	0.00	-1.10	-0.83	-0.97	0.06	0.00	-1.09	-0.85
Thursday	-0.97	0.07	0.00	-1.11	-0.83	-0.97	0.06	0.00	-1.09	-0.85
Friday	-1.04	0.07	0.00	-1.18	-0.90	-1.04	0.06	0.00	-1.16	-0.91
Saturday	-0.20	0.05	0.00	-0.31	-0.09	-0.20	0.05	0.00	-0.29	-0.10
Bank holiday	0.38	0.13	0.00	0.12	0.64	0.39	0.12	0.00	0.17	0.62
seassin	0.01	0.03	0.82	-0.05	0.06	0.00	0.02	0.94	-0.05	0.04
seascos	0.11	0.03	0.00	0.06	0.16	0.11	0.02	0.00	0.07	0.16
seassin1	-0.02	0.03	0.49	-0.07	0.03	-0.02	0.02	0.47	-0.06	0.03
seascos1	0.00	0.03	0.90	-0.05	0.06	0.00	0.02	0.93	-0.04	0.05
PM_{10} mean lag0	0.00	0.00	0.21	0.00	0.01	0.00	0.00	0.18	0.00	0.01
PM_{10} mean lag1	0.00	0.00	0.48	0.00	0.01	0.00	0.00	0.47	0.00	0.01
PM_{10} mean lag2	0.00	0.00	0.24	0.00	0.01	0.00	0.00	0.24	0.00	0.01
PM_{10} mean lag3	0.00	0.00	0.05	-0.01	0.00	0.00	0.00	0.02	-0.01	0.00
PM_{10} mean lag4	0.00	0.00	0.53	0.00	0.01	0.00	0.00	0.39	0.00	0.01
PM_{10} mean lag5	0.00	0.00	0.51	0.00	0.01	0.00	0.00	0.55	0.00	0.01
PM_{10} mean lag6	0.00	0.00	0.71	0.00	0.01	0.00	0.00	0.71	0.00	0.00
PM_{10} mean lag7	0.00	0.00	0.58	0.00	0.01	0.00	0.00	0.49	0.00	0.01
Model including maximum measures of PM_{10}										
constant	0.99	0.07	0.00	0.85	1.13	0.99	0.06	0.00	0.87	1.12
Monday	-0.70	0.06	0.00	-0.83	-0.58	-0.70	0.06	0.00	-0.82	-0.59
Tuesday	-0.97	0.07	0.00	-1.11	-0.83	-0.97	0.06	0.00	-1.09	-0.85
Wednesday	-0.96	0.07	0.00	-1.10	-0.82	-0.97	0.06	0.00	-1.09	-0.85
Thursday	-0.97	0.07	0.00	-1.11	-0.83	-0.97	0.06	0.00	-1.09	-0.85
Friday	-1.03	0.07	0.00	-1.17	-0.89	-1.03	0.06	0.00	-1.15	-0.91
Saturday	-0.20	0.05	0.00	-0.31	-0.09	-0.20	0.05	0.00	-0.29	-0.10
Bank holiday	0.38	0.13	0.01	0.12	0.64	0.39	0.12	0.00	0.16	0.62
seassin	0.01	0.03	0.71	-0.04	0.06	0.00	0.02	0.95	-0.04	0.05
seascos	0.11	0.03	0.00	0.05	0.16	0.11	0.02	0.00	0.06	0.16
seassin1	-0.02	0.03	0.42	-0.07	0.03	-0.02	0.02	0.41	-0.06	0.03
seascos1	0.00	0.03	0.91	-0.05	0.06	0.00	0.02	0.93	-0.04	0.05
PM_{10} max lag0	0.00	0.00	0.47	0.00	0.00	0.00	0.00	0.42	0.00	0.00
PM_{10} max lag1	0.00	0.00	0.50	0.00	0.00	0.00	0.00	0.47	0.00	0.00
PM_{10} max lag2	0.00	0.00	0.21	0.00	0.00	0.00	0.00	0.16	0.00	0.00
PM_{10} max lag3	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.02	0.00	0.00
PM_{10} max lag4	0.00	0.00	0.42	0.00	0.00	0.00	0.00	0.32	0.00	0.00
PM_{10} max lag5	0.00	0.00	0.27	0.00	0.00	0.00	0.00	0.24	0.00	0.00
PM_{10} max lag6	0.00	0.00	0.13	0.00	0.00	0.00	0.00	0.10	0.00	0.00
PM_{10} max lag7	0.00	0.00	0.54	0.00	0.00	0.00	0.00	0.54	0.00	0.00

Table G. 65: Scotland Out of Hours Counts Non-asthmatics - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	0.51	0.05	0.00	0.41	0.61	0.51	0.04	0.00	0.43	0.60
Monday	-0.66	0.09	0.00	-0.83	-0.49	-0.66	0.08	0.00	-0.80	-0.51
Tuesday	-0.87	0.09	0.00	-1.06	-0.69	-0.87	0.08	0.00	-1.03	-0.71
Wednesday	-1.00	0.10	0.00	-1.19	-0.81	-1.00	0.08	0.00	-1.17	-0.84
Thursday	-1.18	0.10	0.00	-1.39	-0.98	-1.19	0.09	0.00	-1.36	-1.01
Friday	-1.15	0.10	0.00	-1.35	-0.95	-1.15	0.09	0.00	-1.33	-0.98
Saturday	-0.22	0.08	0.00	-0.37	-0.08	-0.21	0.07	0.00	-0.34	-0.08
Bank holiday	0.34	0.18	0.06	-0.01	0.70	0.36	0.16	0.02	0.05	0.67
seassin	0.12	0.04	0.00	0.05	0.19	0.12	0.03	0.00	0.06	0.19
seascos	0.13	0.04	0.00	0.05	0.20	0.13	0.03	0.00	0.07	0.19
seassin1	-0.03	0.04	0.42	-0.10	0.04	-0.03	0.03	0.36	-0.09	0.03
seascos1	0.03	0.04	0.37	-0.04	0.11	0.04	0.03	0.27	-0.03	0.10
Model including mean measures of PM_{10}										
constant	0.39	0.09	0.00	0.22	0.57	0.39	0.08	0.00	0.23	0.54
Monday	-0.65	0.09	0.00	-0.82	-0.48	-0.65	0.08	0.00	-0.80	-0.50
Tuesday	-0.86	0.09	0.00	-1.04	-0.68	-0.86	0.08	0.00	-1.02	-0.70
Wednesday	-0.98	0.10	0.00	-1.17	-0.79	-0.99	0.09	0.00	-1.16	-0.82
Thursday	-1.17	0.10	0.00	-1.37	-0.97	-1.17	0.09	0.00	-1.35	-0.99
Friday	-1.14	0.10	0.00	-1.34	-0.94	-1.15	0.09	0.00	-1.32	-0.97
Saturday	-0.23	0.07	0.00	-0.38	-0.08	-0.22	0.07	0.00	-0.35	-0.09
Bank holiday	0.33	0.18	0.07	-0.02	0.68	0.35	0.16	0.03	0.04	0.66
seassin	0.11	0.04	0.00	0.04	0.18	0.11	0.03	0.00	0.05	0.18
seascos	0.11	0.04	0.00	0.04	0.19	0.12	0.03	0.00	0.05	0.18
seassin1	-0.03	0.04	0.43	-0.10	0.04	-0.03	0.03	0.40	-0.09	0.04
seascos1	0.05	0.04	0.19	-0.02	0.12	0.05	0.03	0.12	-0.01	0.12
PM_{10} mean lag0	0.00	0.00	0.89	-0.01	0.01	0.00	0.00	0.94	-0.01	0.00
PM_{10} mean lag1	0.00	0.00	0.40	0.00	0.01	0.00	0.00	0.30	0.00	0.01
PM_{10} mean lag2	0.00	0.00	0.66	0.00	0.01	0.00	0.00	0.64	0.00	0.01
PM_{10} mean lag3	0.00	0.00	0.38	0.00	0.01	0.00	0.00	0.33	0.00	0.01
PM_{10} mean lag4	0.00	0.00	0.57	0.00	0.01	0.00	0.00	0.48	0.00	0.01
PM_{10} mean lag5	0.00	0.00	0.38	0.00	0.01	0.00	0.00	0.41	0.00	0.01
PM_{10} mean lag6	0.00	0.00	0.16	-0.01	0.00	0.00	0.00	0.13	-0.01	0.00
PM_{10} mean lag7	0.00	0.00	0.96	-0.01	0.01	0.00	0.00	0.96	-0.01	0.01
Model including maximum measures of PM_{10}										
constant	0.39	0.10	0.00	0.20	0.59	0.39	0.09	0.00	0.22	0.57
Monday	-0.66	0.09	0.00	-0.83	-0.49	-0.65	0.08	0.00	-0.80	-0.50
Tuesday	-0.87	0.09	0.00	-1.05	-0.69	-0.87	0.08	0.00	-1.03	-0.71
Wednesday	-1.00	0.10	0.00	-1.18	-0.81	-1.00	0.09	0.00	-1.17	-0.84
Thursday	-1.17	0.10	0.00	-1.37	-0.97	-1.17	0.09	0.00	-1.35	-0.99
Friday	-1.14	0.10	0.00	-1.34	-0.94	-1.15	0.09	0.00	-1.32	-0.97
Saturday	-0.22	0.07	0.00	-0.37	-0.07	-0.21	0.07	0.00	-0.34	-0.08
Bank holiday	0.35	0.18	0.05	-0.01	0.70	0.37	0.16	0.02	0.05	0.68
seassin	0.12	0.04	0.00	0.05	0.19	0.12	0.03	0.00	0.06	0.18
seascos	0.11	0.04	0.00	0.04	0.19	0.12	0.03	0.00	0.05	0.18
seassin1	-0.03	0.04	0.39	-0.10	0.04	-0.03	0.03	0.34	-0.09	0.03
seascos1	0.04	0.04	0.23	-0.03	0.12	0.05	0.03	0.16	-0.02	0.11
PM_{10} max lag0	0.00	0.00	0.81	0.00	0.00	0.00	0.00	0.86	0.00	0.00
PM_{10} max lag1	0.00	0.00	0.46	0.00	0.00	0.00	0.00	0.29	0.00	0.00
PM_{10} max lag2	0.00	0.00	0.82	0.00	0.00	0.00	0.00	0.86	0.00	0.00
PM_{10} max lag3	0.00	0.00	0.54	0.00	0.00	0.00	0.00	0.51	0.00	0.00
PM_{10} max lag4	0.00	0.00	0.67	0.00	0.00	0.00	0.00	0.70	0.00	0.00
PM_{10} max lag5	0.00	0.00	0.03	0.00	0.01	0.00	0.00	0.02	0.00	0.00
PM_{10} max lag6	0.00	0.00	0.53	0.00	0.00	0.00	0.00	0.45	0.00	0.00
PM_{10} max lag7	0.00	0.00	0.45	0.00	0.00	0.00	0.00	0.35	0.00	0.00

Table G. 66: Scotland Out of Hours Counts Excess - comparison of autoregression and regression results.

	Autoregressive Results					Regression Results				
	Estimate	SE	P	Lower CI	Upper CI	Estimate	SE	P	Lower CI	Upper CI
Null model										
constant	1.86	0.02	0.00	1.83	1.89	1.86	0.02	0.00	1.82	1.91
Monday	-0.13	0.02	0.00	-0.17	-0.08	-0.13	0.03	0.00	-0.19	-0.06
Tuesday	-0.16	0.02	0.00	-0.20	-0.11	-0.16	0.03	0.00	-0.22	-0.09
Wednesday	-0.14	0.02	0.00	-0.19	-0.10	-0.14	0.03	0.00	-0.21	-0.08
Thursday	-0.12	0.02	0.00	-0.17	-0.08	-0.13	0.03	0.00	-0.19	-0.06
Friday	-0.14	0.02	0.00	-0.19	-0.10	-0.14	0.03	0.00	-0.21	-0.08
Saturday	-0.04	0.02	0.10	-0.08	0.01	-0.04	0.03	0.25	-0.10	0.03
Bank holiday	0.05	0.05	0.25	-0.04	0.15	0.06	0.07	0.39	-0.07	0.19
seassin	-0.02	0.01	0.05	-0.03	0.00	-0.02	0.01	0.18	-0.04	0.01
seascos	0.02	0.01	0.05	0.00	0.03	0.02	0.01	0.18	-0.01	0.04
seassin1	0.00	0.01	0.69	-0.02	0.01	0.00	0.01	0.79	-0.03	0.02
seascos1	-0.01	0.01	0.41	-0.02	0.01	-0.01	0.01	0.56	-0.03	0.02
Model including mean measures of PM_{10}										
constant	1.84	0.02	0.00	1.80	1.89	1.85	0.03	0.00	1.78	1.92
Monday	-0.13	0.02	0.00	-0.17	-0.08	-0.13	0.03	0.00	-0.19	-0.06
Tuesday	-0.17	0.02	0.00	-0.21	-0.12	-0.16	0.03	0.00	-0.23	-0.10
Wednesday	-0.15	0.02	0.00	-0.20	-0.11	-0.15	0.03	0.00	-0.22	-0.09
Thursday	-0.13	0.02	0.00	-0.18	-0.09	-0.13	0.03	0.00	-0.20	-0.07
Friday	-0.15	0.02	0.00	-0.19	-0.10	-0.15	0.03	0.00	-0.21	-0.08
Saturday	-0.04	0.02	0.11	-0.08	0.01	-0.04	0.03	0.25	-0.10	0.03
Bank holiday	0.05	0.05	0.26	-0.04	0.14	0.06	0.07	0.40	-0.08	0.19
seassin	-0.02	0.01	0.04	-0.04	0.00	-0.02	0.01	0.16	-0.04	0.01
seascos	0.01	0.01	0.10	0.00	0.03	0.02	0.01	0.25	-0.01	0.04
seassin1	0.00	0.01	0.78	-0.02	0.01	0.00	0.01	0.85	-0.03	0.02
seascos1	-0.01	0.01	0.57	-0.02	0.01	-0.01	0.01	0.67	-0.03	0.02
PM_{10} mean lag0	0.00	0.00	0.19	0.00	0.00	0.00	0.00	0.44	0.00	0.00
PM_{10} mean lag1	0.00	0.00	0.94	0.00	0.00	0.00	0.00	0.98	0.00	0.00
PM_{10} mean lag2	0.00	0.00	0.48	0.00	0.00	0.00	0.00	0.64	0.00	0.00
PM_{10} mean lag3	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.10	0.00	0.00
PM_{10} mean lag4	0.00	0.00	0.79	0.00	0.00	0.00	0.00	0.82	0.00	0.00
PM_{10} mean lag5	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.99	0.00	0.00
PM_{10} mean lag6	0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.42	0.00	0.00
PM_{10} mean lag7	0.00	0.00	0.58	0.00	0.00	0.00	0.00	0.69	0.00	0.00
Model including maximum measures of PM_{10}										
constant	1.84	0.03	0.00	1.79	1.89	1.84	0.04	0.00	1.77	1.91
Monday	-0.13	0.02	0.00	-0.17	-0.08	-0.13	0.03	0.00	-0.19	-0.06
Tuesday	-0.16	0.02	0.00	-0.21	-0.12	-0.16	0.03	0.00	-0.23	-0.10
Wednesday	-0.15	0.02	0.00	-0.19	-0.10	-0.15	0.03	0.00	-0.21	-0.08
Thursday	-0.13	0.02	0.00	-0.18	-0.09	-0.13	0.03	0.00	-0.20	-0.07
Friday	-0.15	0.02	0.00	-0.19	-0.10	-0.14	0.03	0.00	-0.21	-0.08
Saturday	-0.04	0.02	0.09	-0.08	0.01	-0.04	0.03	0.24	-0.10	0.03
Bank holiday	0.05	0.05	0.29	-0.04	0.14	0.05	0.07	0.42	-0.08	0.19
seassin	-0.02	0.01	0.05	-0.03	0.00	-0.02	0.01	0.17	-0.04	0.01
seascos	0.01	0.01	0.12	0.00	0.03	0.01	0.01	0.28	-0.01	0.04
seassin1	0.00	0.01	0.73	-0.02	0.01	0.00	0.01	0.83	-0.03	0.02
seascos1	0.00	0.01	0.58	-0.02	0.01	-0.01	0.01	0.69	-0.03	0.02
PM_{10} max lag0	0.00	0.00	0.33	0.00	0.00	0.00	0.00	0.62	0.00	0.00
PM_{10} max lag1	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.97	0.00	0.00
PM_{10} max lag2	0.00	0.00	0.31	0.00	0.00	0.00	0.00	0.47	0.00	0.00
PM_{10} max lag3	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.11	0.00	0.00
PM_{10} max lag4	0.00	0.00	0.56	0.00	0.00	0.00	0.00	0.67	0.00	0.00
PM_{10} max lag5	0.00	0.00	0.64	0.00	0.00	0.00	0.00	0.73	0.00	0.00
PM_{10} max lag6	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.23	0.00	0.00
PM_{10} max lag7	0.00	0.00	0.35	0.00	0.00	0.00	0.00	0.53	0.00	0.00

G3. Results for Remaining datasets

G3.1. England and Wales Autoregressive results

G3.1.1. England and Wales Autoregressive results Asthmatics and Non-asthmatics

Model P-value distributions

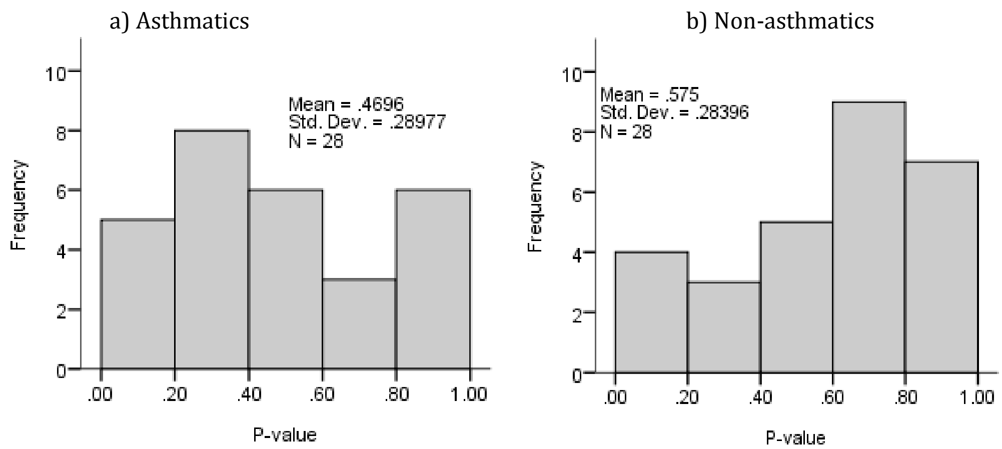


Figure G3. 1: England and Wales Emergency Consultations - distribution of chi-squared P-values a) Asthmatics and b) Non-asthmatics.

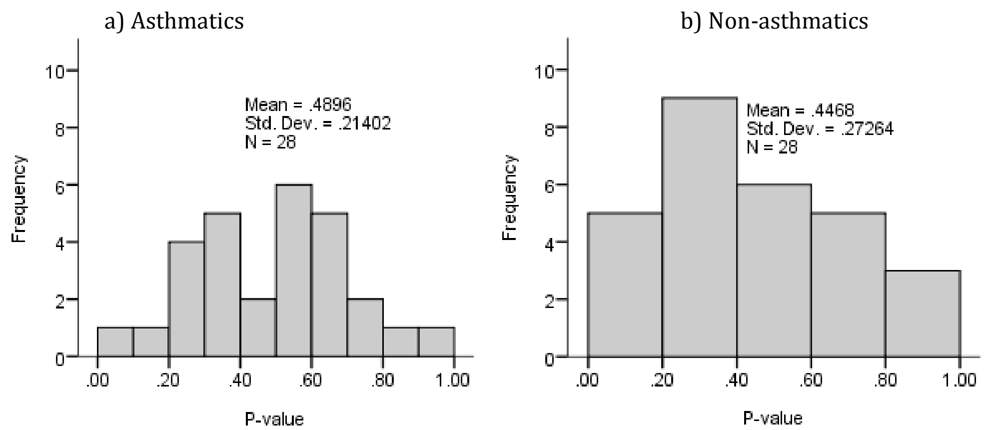


Figure G3. 2: England and Wales Emergency Counts - distribution of chi-squared P-values a) Asthmatics and Non-asthmatics.

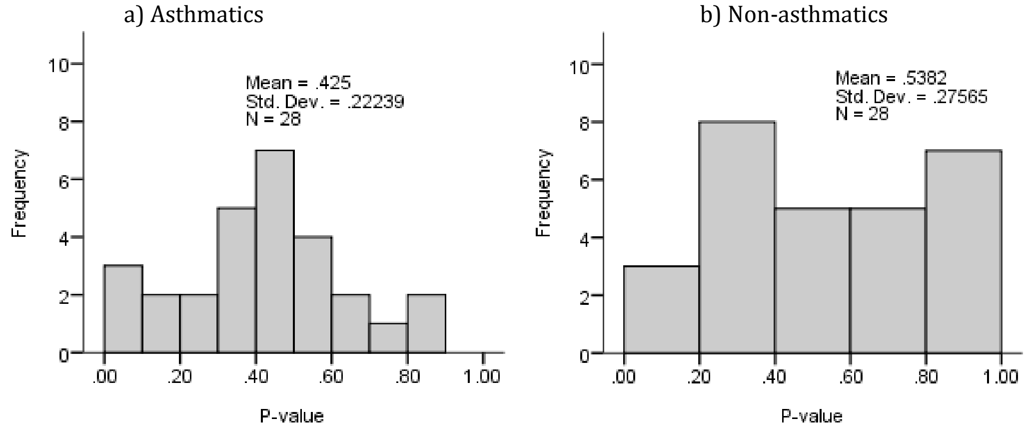


Figure G3. 3: England and Wales Out of Hours Counts - distribution of chi-squared P-values a) Asthmatics and b) Non-asthmatics.

Point-estimate distributions

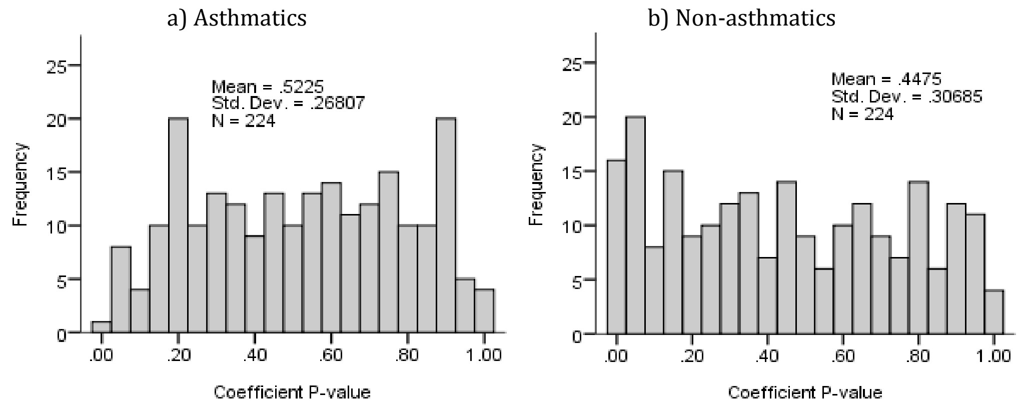


Figure G3. 4: England and Wales Acute Visits - distribution of the autoregressive point-estimate P-values a) Asthmatics and b) Non-asthmatics.

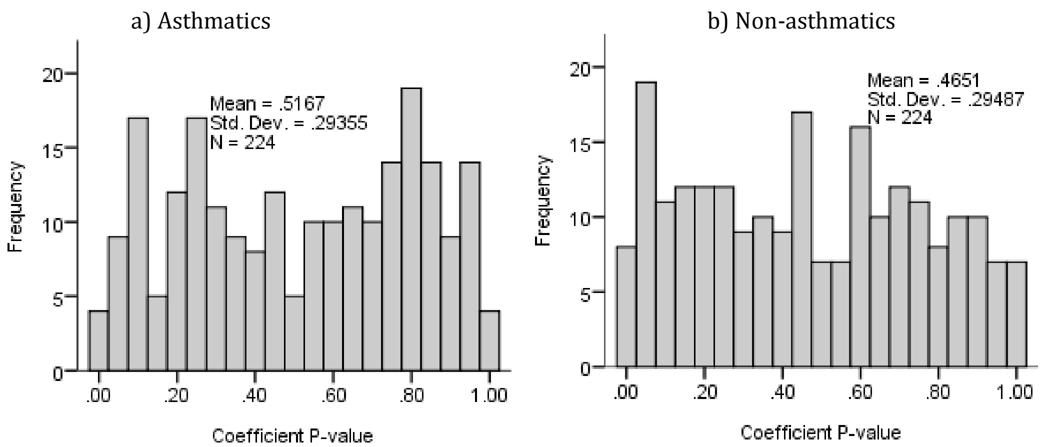


Figure G3. 5: England and Wales Casualty Counts - distribution of the autoregressive point-estimate P-values a) Asthmatics and b) Non-asthmatics.

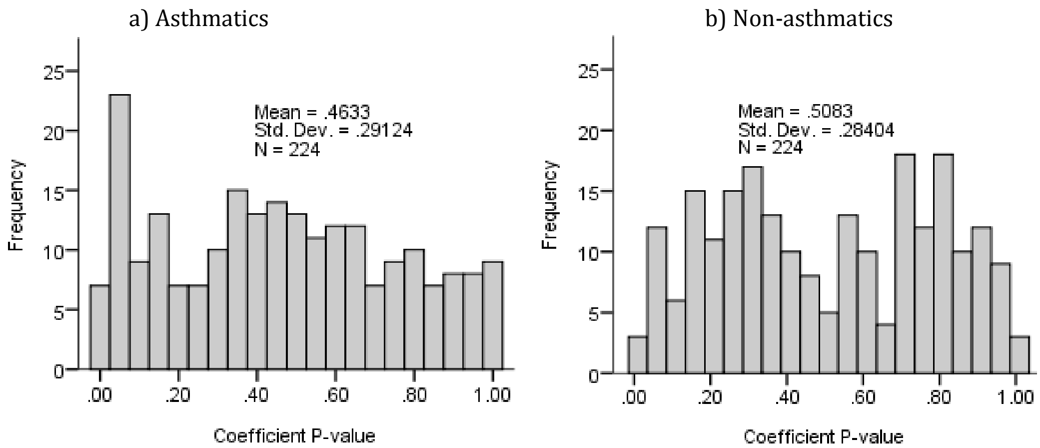


Figure G3. 6: England and Wales Emergency Consultations - distribution of the autoregressive point-estimate P-values a) Asthmatics and b) Non-asthmatics.

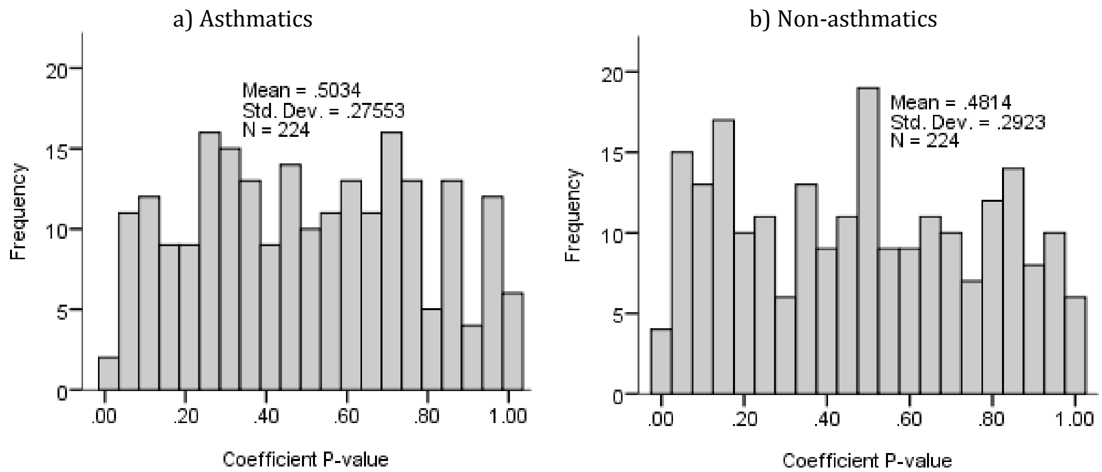


Figure G3. 7: England and Wales Emergency Counts - distribution of the point-estimate P-values a) Asthmatics and b) Non-asthmatics.

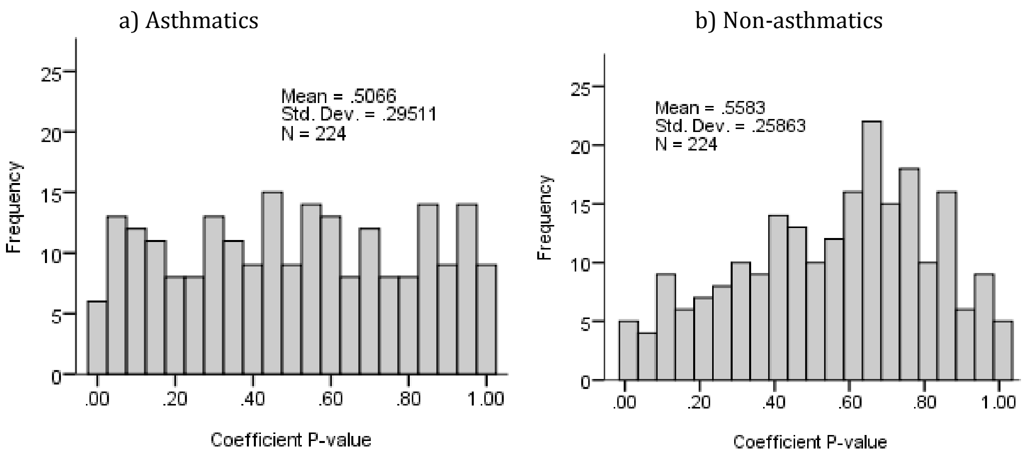


Figure G3. 8: England and Wales Out of Hours Counts - distribution of the autoregressive point-estimate P-values a) Asthmatics and b) Non-asthmatics.

Lag effects

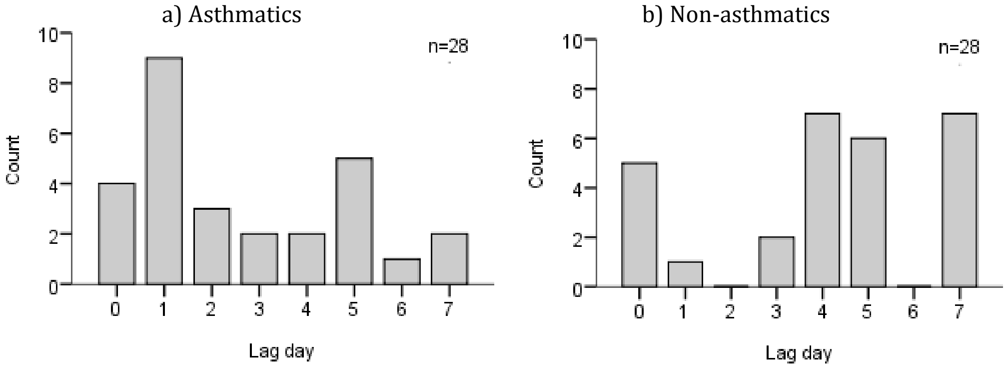


Figure G3. 9: England and Wales Acute Visits - number of the most significant autoregressive point-estimates per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

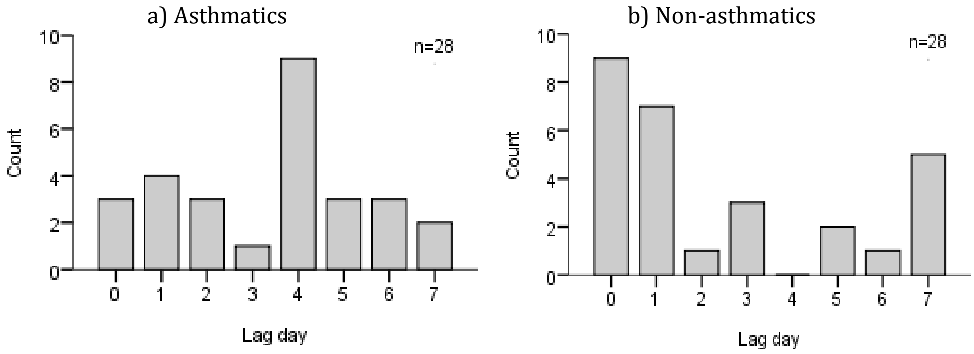


Figure G3. 10: England and Wales Casualty Counts - number of the most significant autoregressive point-estimates per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

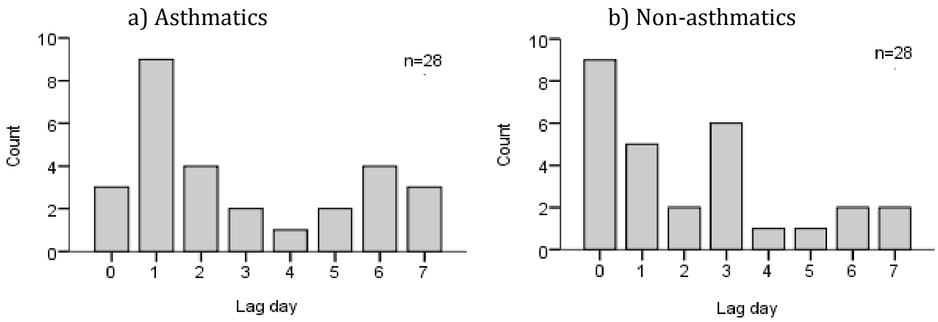


Figure G3. 11: England and Wales Emergency Consultations - number of the most significant autoregressive point-estimates per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

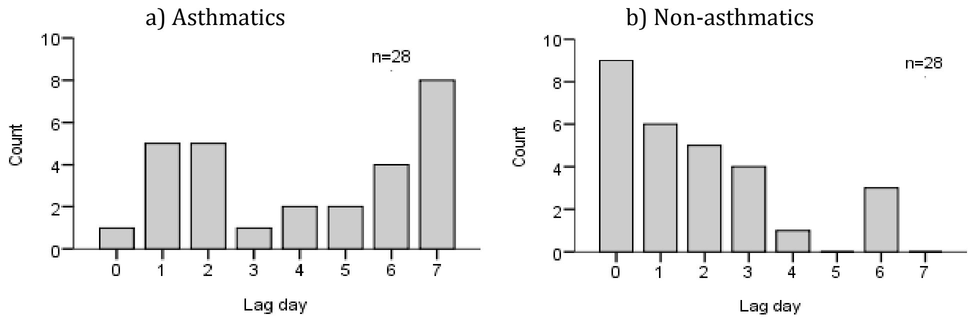


Figure G3. 12: England and Wales Emergency Counts - number of the most significant autoregressive point-estimates per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

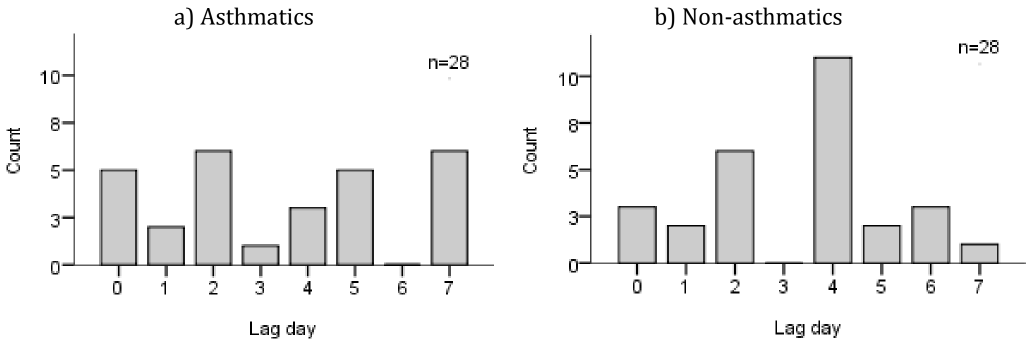


Figure G3. 13: England and Wales Out of Hours Counts - Number of the most significant autoregressive point-estimates per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

G3.1.1. England and Wales Excess

Model P-value distributions

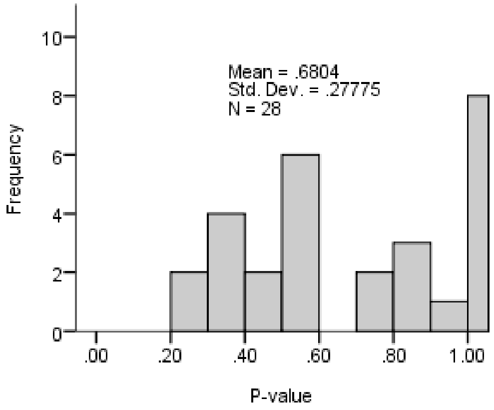


Figure 6.31: England and Wales Acute Visits - distribution of chi-squared P-values, Excess.

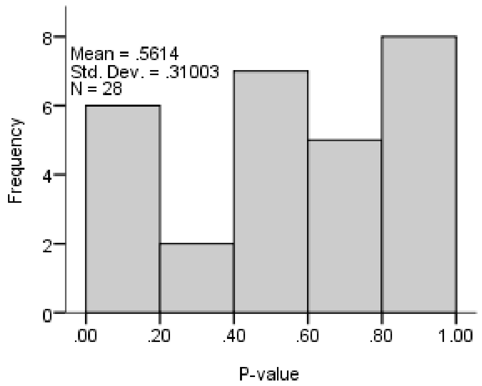


Figure G3. 14: England and Wales Casualty Counts - distribution of chi-squared P-values; Excess.

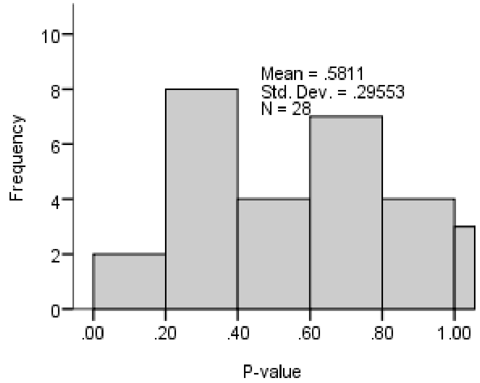


Figure G3. 15: England and Wales Emergency Counts - distribution of chi-squared P-values; Excess.

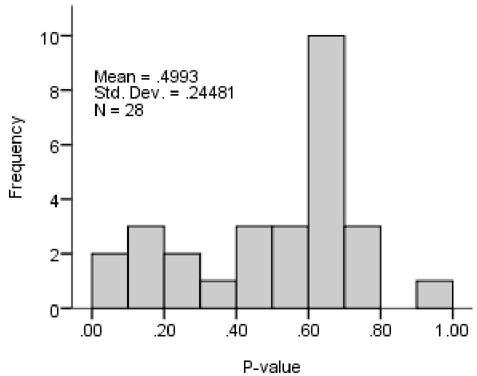


Figure G3. 16: England and Wales Out of Hours Counts - distribution of chi-squared P-values; Excess.

Point-estimate P-value distributions

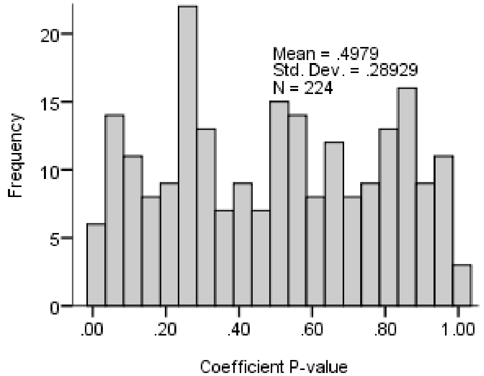


Figure G3. 17: England and Wales Acute Visits - distribution of the autoregressive point-estimate P-values, Excess.

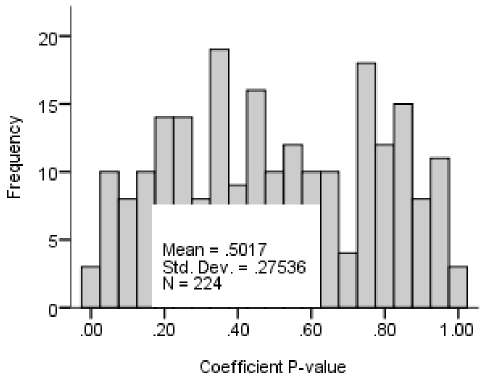


Figure G3. 18: England and Wales Casualty Counts - distribution of the autoregressive point-estimate P-values, Excess.

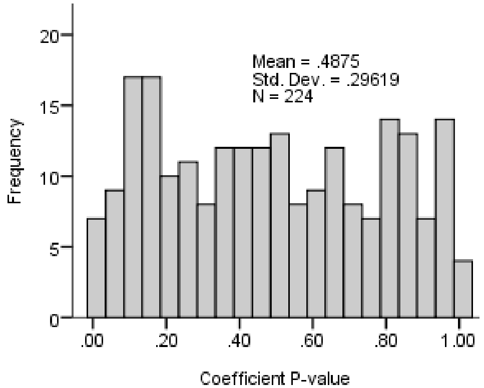


Figure G3. 19: England and Wales Emergency Counts - distribution of the autoregressive point-estimate P-values, Excess.

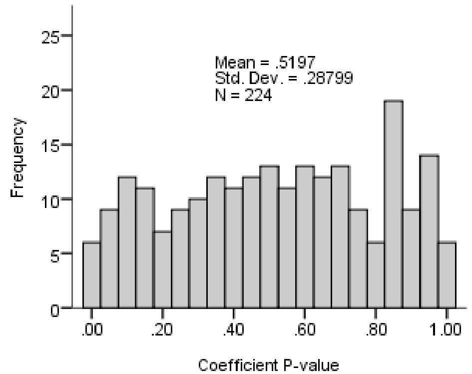


Figure G3. 20: England and Wales Out of Hours Counts - distribution of the autoregressive point-estimate P-values, Excess.

Lag effects

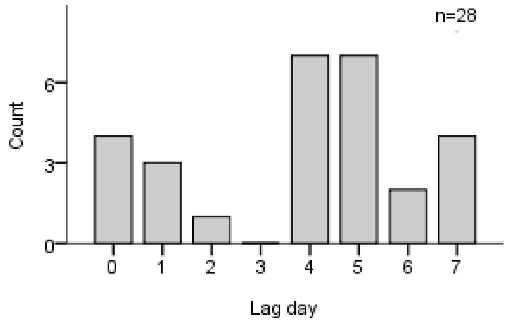


Figure G3. 21: England and Wales Acute Visits - number of the most significant autoregressive point-estimates per environmental exposure by lag day, Excess.

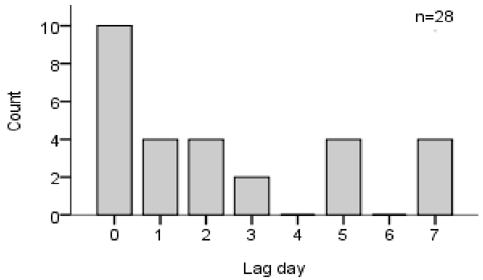


Figure G3. 22: England and Wales Casualty Counts - number of the most significant autoregressive point-estimates per environmental exposure by lag day, Excess.

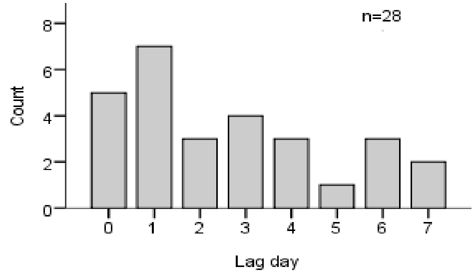


Figure G3. 23: England and Wales Emergency Consultations - number of the most significant autoregressive point-estimates per environmental exposure by lag day, Excess.

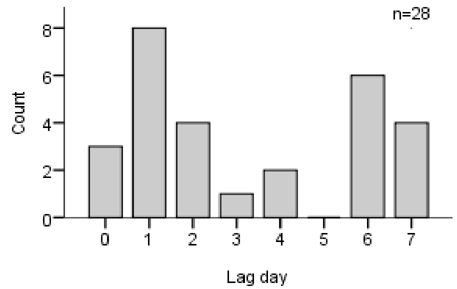


Figure G3. 24: England and Wales Emergency Counts - number of the most significant autoregressive point-estimates per environmental exposure by lag day, Excess.

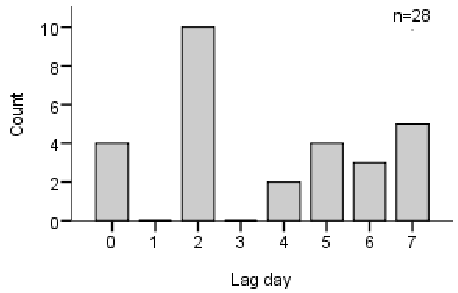


Figure G3. 25: England and Wales Out of Hours Counts - number of the most significant autoregressive point-estimates per environmental exposure by lag day, Excess.

G3.2. Trent Region Autoregressive results

G3.2.1. Trent Region Autoregressive results Asthmatics and Non-asthmatics

Table G. 67: Trent Region - F-values and P-values (on 8 and 2156) degrees of freedom) from comparison of null model against model including each predictor lagged by 7 days, a) Asthmatics and b) Non-asthmatics.

a) Asthmatics	Exposure		Acute Visits		Casualty Counts		Emergency Consultations		Emergency Counts		Out of Hours Counts	
			F-value	P-value	F-value	P-value	F-value	P-value	F-value	P-value	F-value	P-value
Outdoor air pollutants	Min'	NO	-2.02	1.000	0.10	0.999	3.74	*<0.001	0.68	0.712	0.19	0.992
		NO_2	-1.65	1.000	-0.71	1.000	10.67	*<0.001	0.39	0.928	-0.70	1.000
		NOD	-2.13	1.000	0.15	0.996	6.92	*<0.001	0.47	0.875	-0.78	1.000
		SO_2	0.83	0.574	2.27	*0.020	5.12	*<0.001	0.75	0.646	1.53	0.140
		PM_{10}	6.42	*<0.001	0.86	0.547	16.10	*<0.001	0.09	1.000	0.22	0.988
		O_3	3.59	*<0.001	-1.11	1.000	4.70	*<0.001	0.97	0.456	2.45	**0.012
		CO	9.18	*<0.001	1.99	*0.044	10.65	*<0.001	0.20	0.991	-0.58	1.000
	Mean	NO	3.65	*<0.001	3.12	*0.002	-2.77	1.000	1.50	0.151	0.54	0.825
		NO_2	2.32	0.018	2.11	*0.032	-1.05	1.000	0.60	0.777	0.90	0.515
		NOD	4.01	*<0.001	2.86	*0.004	-3.50	1.000	1.22	0.284	0.44	0.898
		SO_2	8.15	*<0.001	3.25	*0.001	5.61	*<0.001	2.80	**0.004	0.76	0.637
		PM_{10}	10.59	**<0.001	0.42	0.909	16.00	*<0.001	1.27	0.252	1.88	0.059
		O_3	-1.08	1.000	1.31	0.232	-0.13	1.000	1.65	0.107	0.65	0.735
		CO	5.99	*<0.001	3.57	*<0.001	-8.58	1.000	0.94	0.479	0.50	0.856
	Max'	NO	5.26	*<0.001	1.19	0.299	0.07	1.000	1.31	0.233	0.38	0.930
		NO_2	6.28	*<0.001	1.16	0.321	-1.91	1.000	1.03	0.414	1.67	0.100
		NOD	5.28	*<0.001	1.17	0.316	-1.06	1.000	1.16	0.320	0.43	0.903
		SO_2	1.86	0.063	1.60	0.119	5.94	*<0.001	2.37	*0.016	2.06	*0.036
		PM_{10}	7.54	*<0.001	1.28	0.249	17.84	*<0.001	1.26	0.263	1.15	0.328
		O_3	-1.20	1.000	1.14	0.335	-1.21	1.000	1.20	0.293	0.17	0.994
		CO	6.67	*<0.001	1.09	0.367	-18.63	1.000	0.97	0.456	1.02	0.419
Weather	Min'	Temperature	2.75	0.005	1.07	0.380	2.71	*0.006	0.77	0.626	0.36	0.939
	Max'	Temperature	2.75	0.005	-0.26	1.000	6.56	*<0.001	0.95	0.473	1.20	0.298
		Sun	1.67	0.101	0.67	0.721	2.64	*0.007	0.43	0.905	1.22	0.285
		Rain	6.10	*<0.001	0.20	0.990	6.46	*<0.001	1.14	0.333	0.97	0.457
		Pressure	3.52	*<0.001	1.42	0.181	6.86	*<0.001	0.97	0.457	1.08	0.376
		Wind speed	0.44	0.895	-0.75	1.000	10.20	*<0.001	0.83	0.573	0.32	0.958
Pollen		Grass	-0.80	1.000	-0.64	1.000	6.85	*<0.001	0.73	0.668	2.35	*0.016
Total number of statistically significant models				18		7		18		2		3

Table G.64 continued

b) Non-asthmatics Exposure			Acute Visits		Casualty Counts		Emergency Consultations		Emergency Counts		Out of Hours Counts	
			F-value	P-value	F-value	P-value	F-value	P-value	F-value	P-value	F-value	P-value
Outdoor air pollutants	Min’	**NO**	-3.98	1.000	3.93	*<0.001	0.49	0.865	0.88	0.532	1.33	0.226
		NO_2	-3.55	1.000	2.60	*0.008	1.07	0.381	0.41	0.915	0.74	0.657
		NOD	-4.16	1.000	2.46	*0.012	3.20	*0.001	0.85	0.556	1.23	0.277
		SO_2	-3.81	1.000	0.85	0.557	-3.29	1.000	1.04	0.401	-0.82	1.000
		PM_{10}	-5.03	1.000	0.27	0.976	5.83	*<0.001	0.50	0.860	-0.24	1.000
		O_3	4.69	*<0.001	2.63	*0.007	0.67	0.715	-0.46	1.000	0.69	0.697
		CO	-2.19	1.000	1.44	0.174	6.08	*<0.001	0.03	1.000	-0.49	1.000
	Mean	**NO**	2.20	*0.025	0.14	0.997	4.00	**<0.001	0.46	0.884	2.21	*0.024
		NO_2	8.24	*<0.001	0.92	0.495	10.93	*<0.001	0.34	0.949	1.34	0.217
		NOD	4.01	*<0.001	0.16	0.995	2.52	*0.010	0.14	0.998	2.01	*0.042
		SO_2	1.13	0.336	-0.51	1.000	2.86	*0.004	1.38	0.201	1.05	0.394
		PM_{10}	3.69	*<0.001	3.86	*<0.001	3.71	*<0.001	0.70	0.688	0.48	0.870
		O_3	3.44	*0.001	1.43	0.181	-11.06	1.000	0.90	0.518	2.34	*0.017
		CO	6.35	*<0.001	-2.35	1.000	-5.85	1.000	0.21	0.990	0.82	0.586
	Max’	**NO**	6.71	*<0.001	-1.06	1.000	10.10	*<0.001	0.07	1.000	2.13	*0.030
		NO_2	6.84	*<0.001	-0.47	1.000	8.98	*<0.001	-0.24	1.000	0.23	0.986
		NOD	6.69	*<0.001	-0.90	1.000	10.43	*<0.001	0.06	1.000	2.19	*0.025
		SO_2	4.52	*<0.001	-3.95	1.000	-8.44	1.000	0.48	0.874	4.24	**<0.001
		PM_{10}	-1.89	1.000	3.57	*<0.001	8.33	*<0.001	1.07	0.385	0.34	0.950
		O_3	-3.10	1.000	-0.01	1.000	-6.45	1.000	0.65	0.740	0.12	0.999
		CO	8.72	*<0.001	-1.76	1.000	-3.93	1.000	0.18	0.994	0.08	1.000
Weather	Min’	**Temperature**	16.30	*<0.001	2.65	*0.007	3.43	*0.001	1.75	0.083	2.50	*0.010
	Max’	**Temperature**	9.60	*<0.001	0.12	0.998	-3.30	1.000	1.36	0.208	1.96	*0.048
		Sun	-3.18	1.000	3.24	*0.001	0.04	1.000	1.51	0.149	1.68	0.097
		Rain	31.15	**<0.001	0.49	0.866	-11.63	1.000	3.89	**<0.001	0.74	0.660
		Pressure	-1.88	1.000	2.15	*0.028	2.66	*0.007	2.19	*0.026	3.83	**<0.001
		Wind speed	-1.50	1.000	4.86	**<0.001	0.76	0.636	0.13	0.998	0.14	0.997
Pollen		**Grass**	7.33	*<0.001	0.16	0.996	6.31	**<0.001	0.86	0.547	-0.08	1.000
Total number of statistically significant models				16		10		15		2		9

** Most significant P-value out of 28 triggers.

* Statistically significant trigger.

Point-estimate statistics

Table G. 68: Trent Region - - autoregressive point-estimate descriptive statistics per one unit increase (n=224), asthmatics and non-asthmatics.

Asthmatics or Non-	Statistic	Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours Counts
Asthmatics	**Mean**	0.00	-0.14	-0.12	-0.06	0.10
	Median	-0.09	-0.25	-0.18	-0.04	0.07
	Minimum	-2.93	-2.92	-2.97	-2.59	-2.18
	Maximum	2.92	3.95	3.64	3.02	3.09
Non-asthmatics	**Mean**	0.15	-0.04	-0.11	0.06	0.11
	Median	0.03	-0.08	-0.21	0.06	0.24
	Minimum	-2.60	-3.03	-2.74	-3.06	-2.14
	Maximum	3.16	2.86	3.33	2.50	2.43

Table G. 69: Trent Region, number of statistically significant autoregressive point-estimates per environmental exposure (n=8), a) Asthmatics and b) Non-asthmatics.

a) Asthmatics	Exposure		Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours Counts
Outdoor air pollutants	**Min'**	**NO**	0	1	1	0	0
		NO_2	0	0	0	0	2
		NOD	0	0	0	0	1
		SO_2	2	0	1	0	0
		PM_{10}	1	0	0	0	0
		O_3	0	0	1	1	0
		CO	0	0	0	0	0
	Mean	**NO**	1	0	0	1	0
		NO_2	1	1	0	0	0
		NOD	1	0	0	1	0
		SO_2	1	2	1	3	0
		PM_{10}	2	1	2	0	1
		O_3	0	1	0	3	1
		CO	3	0	1	0	1
	Max'	**NO**	1	0	0	1	0
		NO_2	1	0	1	0	0
		NOD	1	0	0	1	0
		SO_2	0	3	1	1	0
		PM_{10}	1	2	1	0	0
		O_3	0	1	0	1	2
		CO	1	1	4	1	0
Weather	**Min'**	**Temperature**	0	0	0	0	0
	Max'	**Temperature**	0	0	2	1	1
		Sun	0	1	0	0	0
		Rain	2	1	1	0	1
		Pressure	1	0	3	0	0
		Wind speed	0	0	0	0	0
Pollen		**Grass**	0	0	0	0	0
Total			20	15	20	15	10
Mean			0.71	0.54	0.71	0.54	0.36

Table G.67 continued

b) Non-asthmatics Exposure			Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours Counts
Outdoor air pollutants	Min’	NO	1	1	1	1	0
		NO_2	0	0	0	0	0
		NOD	0	0	1	0	0
		SO_2	0	0	2	0	0
		PM_{10}	0	0	0	1	0
		O_3	0	0	1	1	1
		CO	0	0	1	0	0
	Mean	NO	0	0	1	0	0
		NO_2	1	0	2	0	0
		NOD	0	0	1	0	0
		SO_2	2	0	1	0	0
		PM_{10}	1	0	0	0	0
		O_3	1	0	0	0	1
		CO	2	0	1	0	0
	Max’	NO	1	0	2	0	0
		NO_2	1	0	2	0	0
		NOD	1	1	2	0	0
		SO_2	2	0	0	1	0
		PM_{10}	0	0	1	0	0
		O_3	0	0	2	0	0
		CO	1	0	3	0	0
Weather	Min’	Temperature	1	1	0	0	0
	Max’	Temperature	0	1	0	0	1
		Sun	1	1	0	0	0
		Rain	1	1	0	2	0
		Pressure	0	0	1	1	2
		Wind speed	0	1	1	0	0
Pollen		Grass	0	1	1	1	0
Total			17	8	27	8	5
Mean			0.61	0.29	0.96	0.29	0.18

Model P-value Distributions

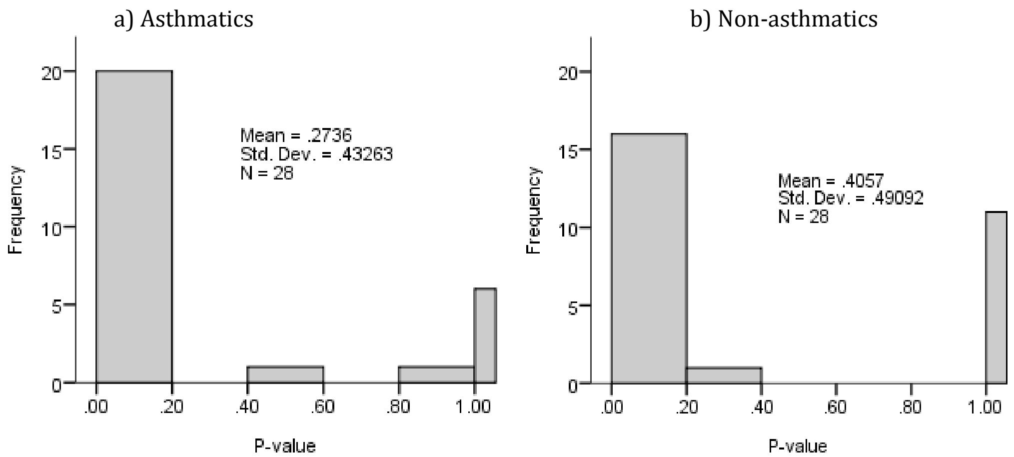


Figure G3. 26: Trent Region Acute Visits - distribution of F-test P-values a) Asthmatics and b) Non-asthmatics.

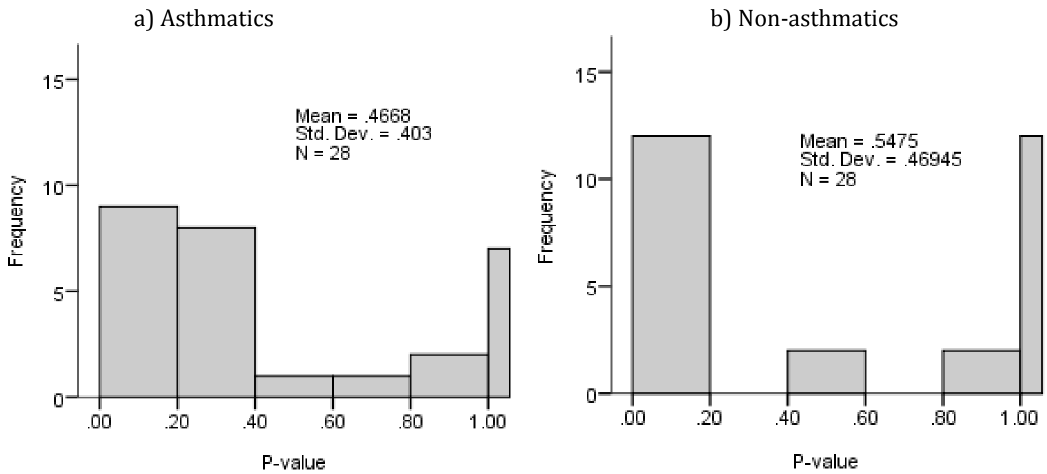


Figure G3. 27: Trent Region Casualty Counts - distribution of F-test P-values a) Asthmatics and b) Non-asthmatics.

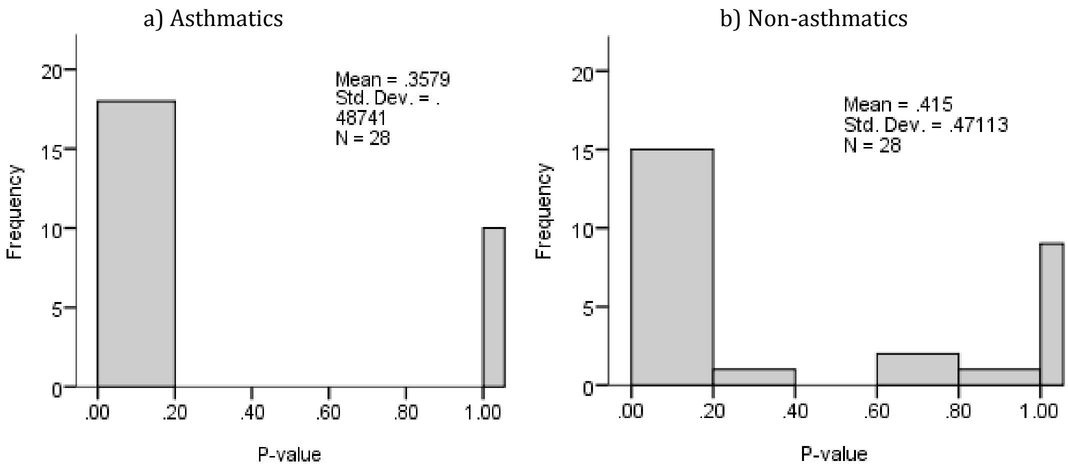


Figure G3. 28: Trent Region Emergency Consultations - distribution of F-test P-values a) Asthmatics and b) Non-asthmatics.

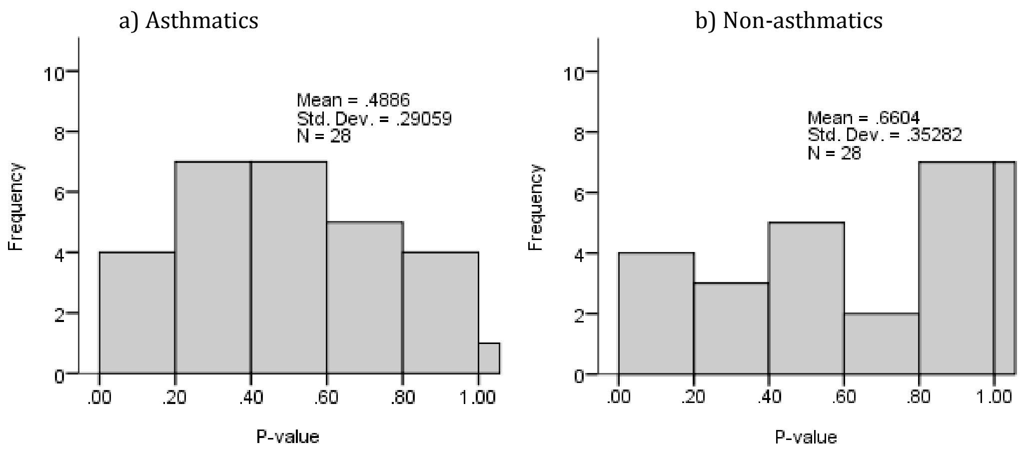


Figure G3. 29: Trent Region Emergency Counts - distribution of F-test P-values a) Asthmatics and Non-asthmatics.

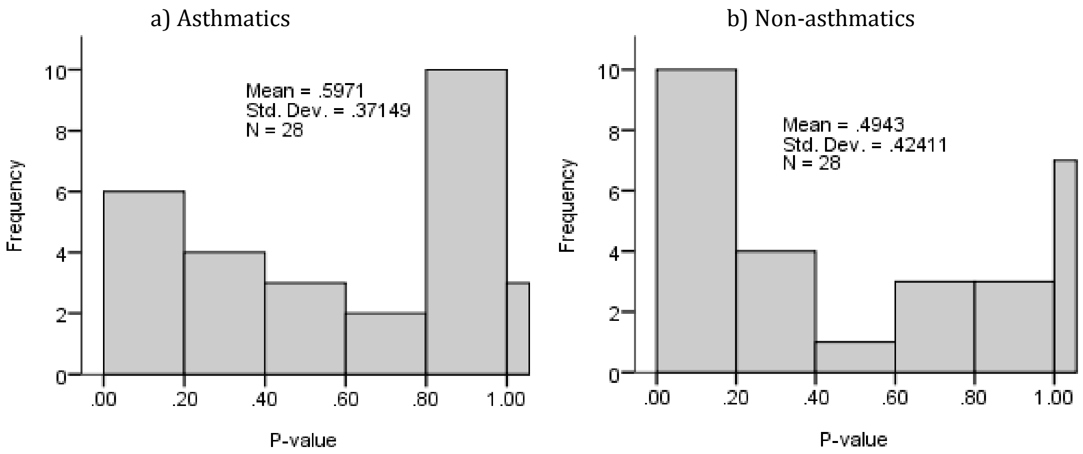


Figure G3. 30: Trent Region Out of Hours Counts - distribution of F-test P-values a) Asthmatics and b) Non-asthmatics.

Point-estimate P-value distributions

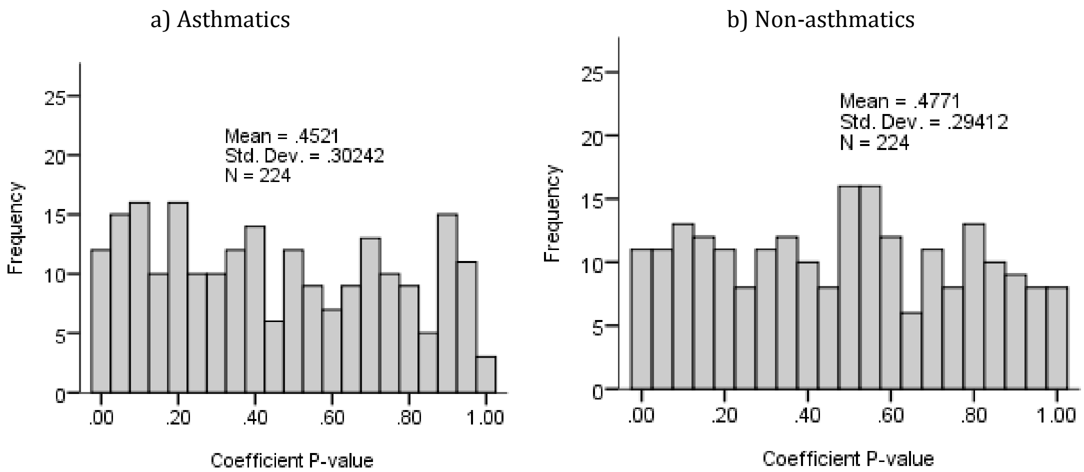


Figure G3. 31: Trent Region Acute Visits - distribution of the autoregressive point-estimate P-values a) Asthmatics and b) Non-asthmatics.

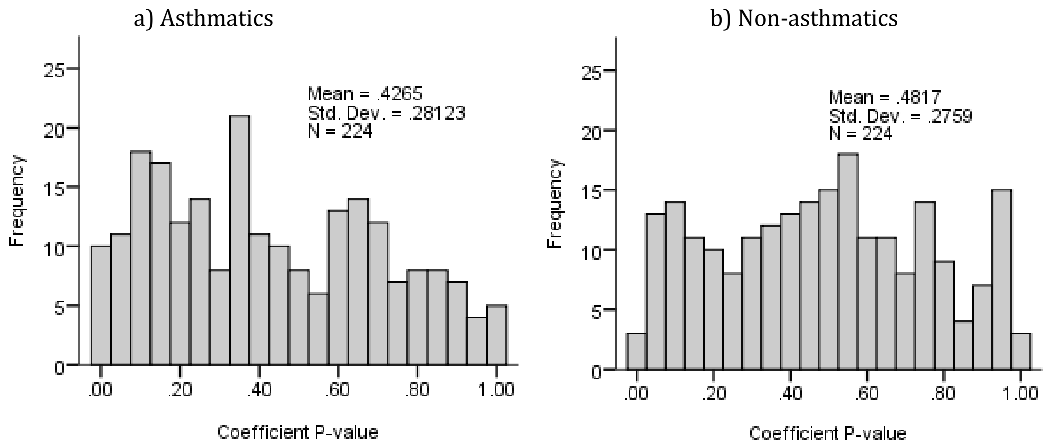


Figure G3. 32: Trent Region Casualty Counts - distribution of the autoregressive point-estimate P-values a) Asthmatics and b) Non-asthmatics.

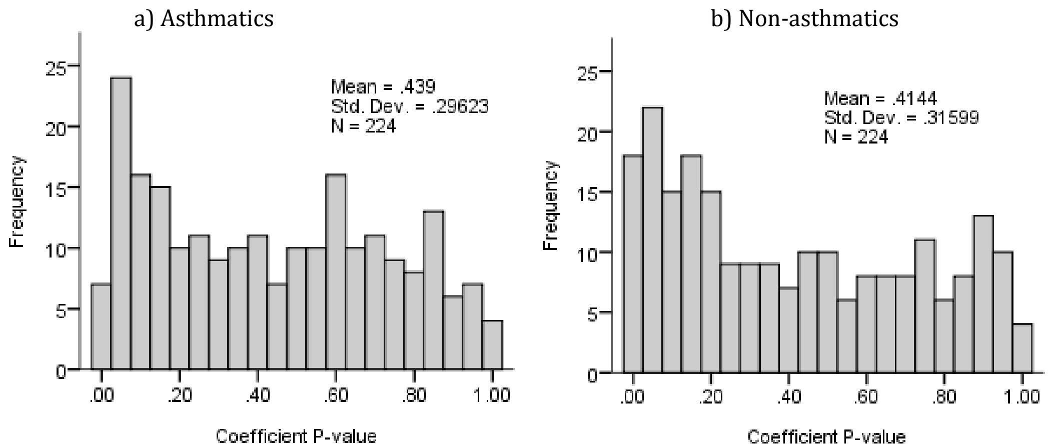


Figure G3. 33: Trent Region Emergency Consultations - distribution of the autoregressive point-estimate P-values a) Asthmatics and b) Non-asthmatics.

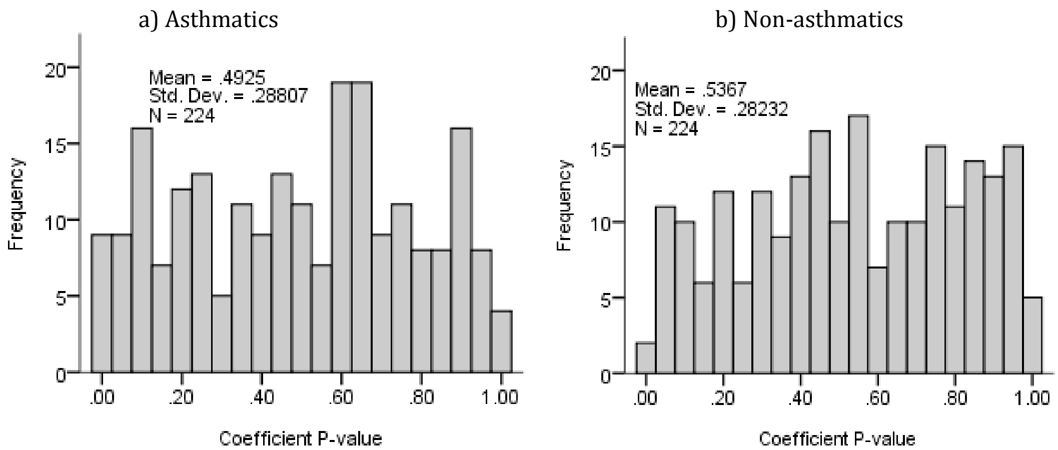


Figure G3. 34: Trent Region Emergency Counts - distribution of the autoregressive point-estimate P-values a) Asthmatics and Non-asthmatics.

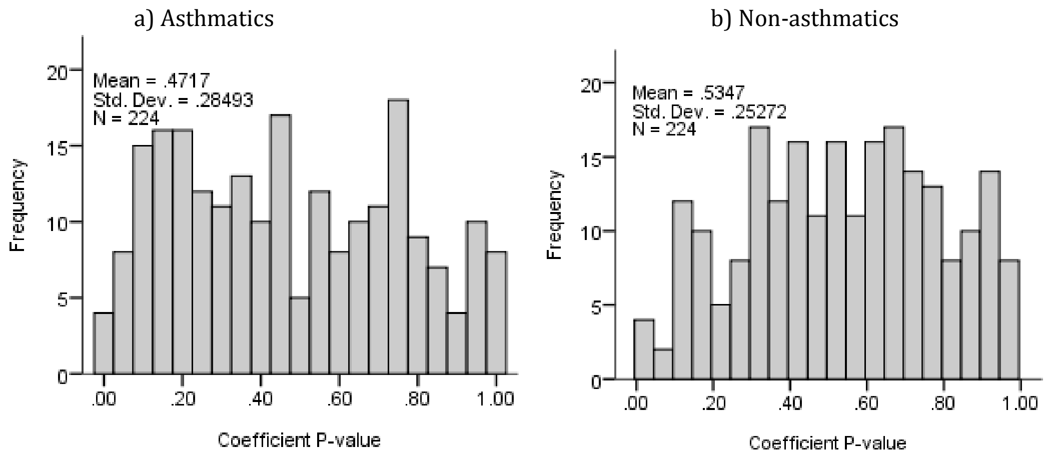


Figure G3. 35: Trent Region Out of Hours Counts - distribution of the autoregressive point-estimate P-values a) Asthmatics and b) Non-asthmatics.

Lag effects

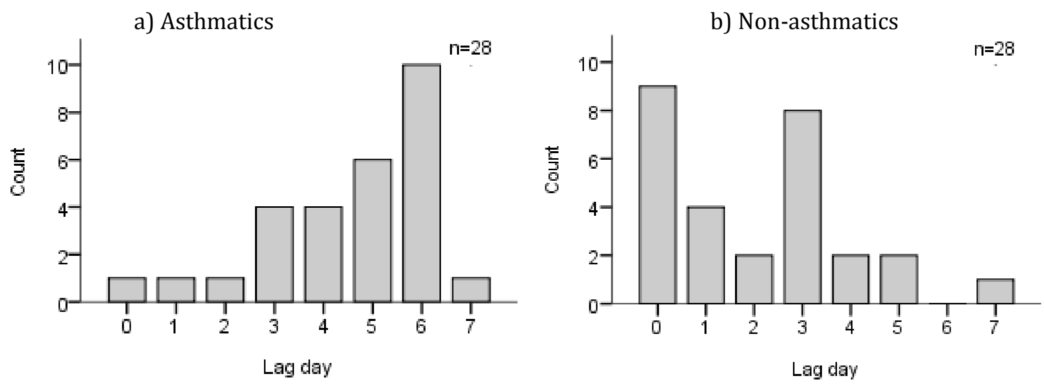


Figure G3. 36: Trent Region Acute Visits - number of the most significant autoregressive point-estimates per environmental exposure by lag day a) asthmatics and b) Non-asthmatics.

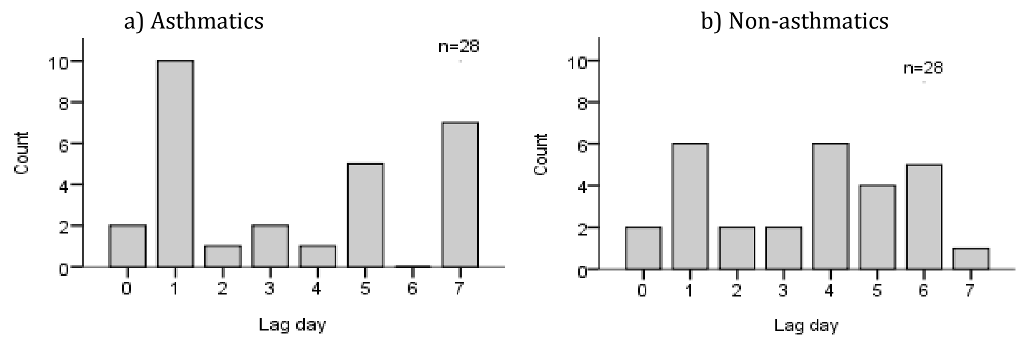


Figure G3. 37: Trent Region Casualty Counts - number of the most significant autoregressive point-estimates per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

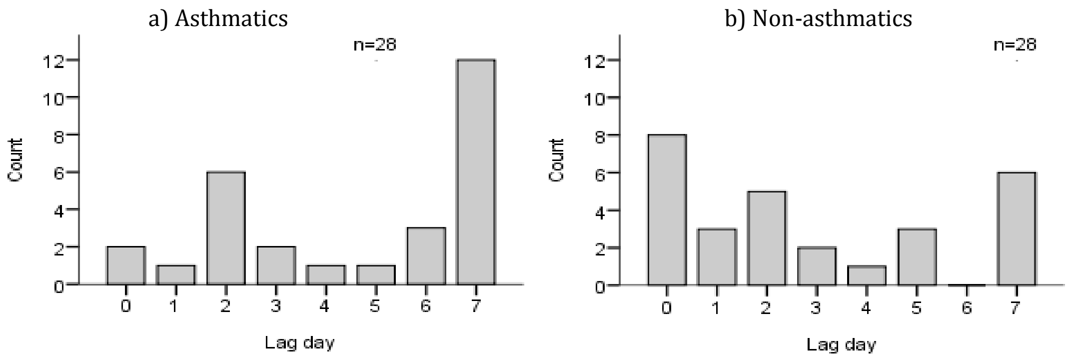


Figure G3. 38: Trent Region Emergency Consultations – number of the most significant autoregressive point-estimates per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

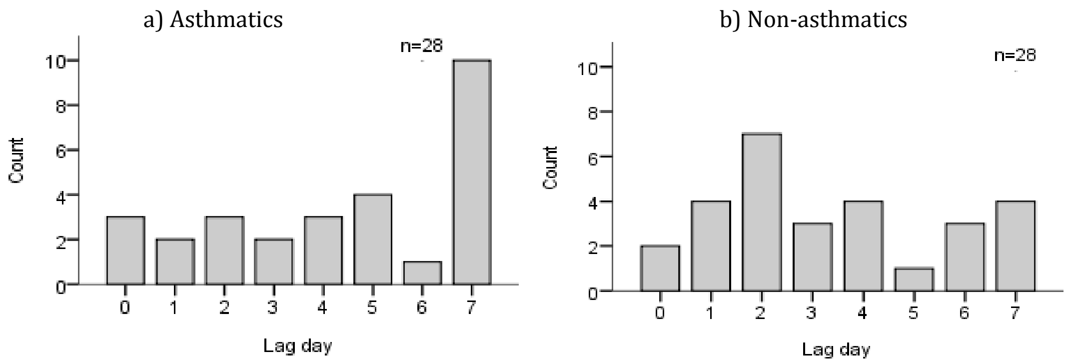


Figure G3. 39: Trent Region Emergency Counts - number of the most significant autoregressive point-estimates per environmental exposure by lag day a) asthmatics and b) Non-asthmatics.

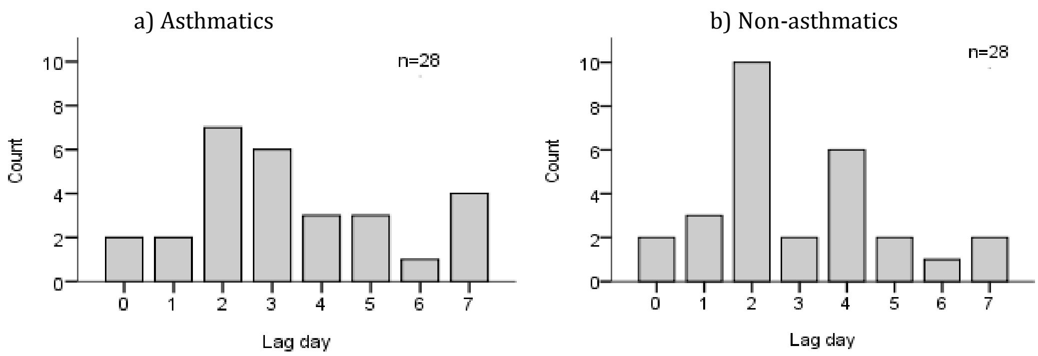


Figure G3. 40: Trent Region Out of Hours Counts - number of the most significant autoregressive point-estimates per environmental exposure by lag day a) asthmatics and b) Non-asthmatics.

G3.2.2. Trent Region Autoregressive results Excess

Table G. 70: Trent Region - F-value and P-values (on 8 and 2156 degrees of freedom) from comparison of null model against model including each predictor lagged by 7 days, Excess.

Exposure			Acute Visits		Casualty Counts		Emergency Consultations		Emergency Counts		Out of Hours Counts	
			F-value	P-value	F-value	P-value	F-value	P-value	F-value	P-value	F-value	P-value
Outdoor air pollutants	Min'	NO	0.95	0.477	1.05	0.397	0.54	0.825	0.66	0.726	1.15	0.329
		NO_2	0.89	0.521	0.73	0.663	1.31	0.233	0.61	0.769	1.29	0.243
		NOD	1.11	0.353	0.66	0.729	0.71	0.680	0.68	0.708	1.49	0.157
		SO_2	1.60	0.121	1.20	0.297	0.97	0.457	1.35	0.213	0.99	0.445
		PM_{10}	1.77	0.079	0.92	0.495	1.25	0.266	0.88	0.530	1.22	0.283
		O_3	1.70	0.093	0.29	0.971	1.34	0.219	0.88	0.530	0.73	0.662
		CO	1.93	0.052	1.08	0.371	0.51	0.847	0.04	1.000	0.64	0.747
	Mean	NO	1.37	0.207	1.16	0.323	0.75	0.649	1.34	0.218	0.73	0.663
		NO_2	1.76	0.081	1.39	0.194	0.45	0.893	0.55	0.816	0.45	0.893
		NOD	1.54	0.138	1.16	0.322	0.59	0.785	1.07	0.383	0.59	0.789
		SO_2	2.64	**0.007	2.53	*0.010	0.74	0.660	2.24	*0.023	0.63	0.751
		PM_{10}	2.43	*0.013	1.16	0.318	1.07	0.384	0.87	0.541	1.57	0.128
		O_3	1.25	0.264	1.42	0.183	0.52	0.840	1.95	*0.050	1.09	0.366
		CO	2.44	*0.012	1.79	0.074	1.02	0.418	0.46	0.885	0.56	0.811
	Max'	NO	1.13	0.336	0.97	0.457	0.47	0.879	1.31	0.234	0.95	0.477
		NO_2	1.55	0.136	0.77	0.630	1.07	0.383	0.57	0.802	0.94	0.480
		NOD	1.18	0.309	0.93	0.488	0.55	0.823	1.21	0.286	0.86	0.552
		SO_2	1.36	0.211	2.12	*0.031	0.79	0.616	1.88	0.059	0.85	0.558
		PM_{10}	1.55	0.137	2.57	**0.009	0.95	0.476	0.59	0.788	0.85	0.556
		O_3	1.13	0.338	0.88	0.532	0.77	0.629	1.81	0.071	1.98	*0.045
		CO	0.97	0.455	1.97	*0.046	1.20	0.297	0.65	0.739	0.70	0.692
Weather	Min'	Temperature	1.09	0.368	0.36	0.944	0.43	0.902	0.69	0.704	0.75	0.646
	Max'	Temperature	0.74	0.660	0.36	0.943	2.32	*0.018	1.47	0.162	1.51	0.149
		Sun	0.81	0.591	0.76	0.635	0.95	0.470	0.71	0.684	0.47	0.875
		Rain	1.51	0.149	0.99	0.442	2.34	**0.017	1.17	0.314	1.05	0.394
		Pressure	2.14	*0.029	0.32	0.958	1.44	0.176	0.98	0.448	1.65	0.105
		Wind speed	1.37	0.203	0.33	0.954	1.19	0.303	0.51	0.850	0.75	0.644
Pollen		Grass	0.61	0.772	0.51	0.849	0.75	0.643	0.89	0.526	0.97	0.456
Total number of statistically significant models				4		4		2		2		1

** Most significant P-value out of 28 triggers.

* Statistically significant trigger.

Point-estimate statistics

Table G. 71: Trent Region - - autoregressive point-estimate descriptive statistics per one unit increase (n=224), Excess.

Statistic	Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours Counts
Mean	-0.10	-0.09	-0.02	-0.07	0.02
Median	-0.16	-0.16	-0.01	-0.11	0.03
Minimum	-3.44	-2.69	-2.35	-2.48	-2.64
Maximum	2.41	2.60	3.38	2.60	2.35

Table G. 72: Trent Region - number of statistically significant autoregressive point-estimates per environmental exposure (n=8), Excess.

Exposure			Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours counts
Outdoor air pollutants	**Min'**	**NO**	1	1	0	0	0
		NO_2	0	0	0	0	1
		NOD	0	0	0	1	1
		SO_2	1	0	0	1	0
		PM_{10}	1	0	1	1	1
		O_3	1	0	0	0	0
		CO	1	0	0	0	0
	Mean	**NO**	1	0	0	1	0
		NO_2	1	1	0	0	0
		NOD	2	0	0	1	0
		SO_2	2	0	0	0	0
		PM_{10}	3	0	0	0	1
		O_3	0	0	0	1	2
		CO	2	0	0	0	0
	Max'	**NO**	1	0	0	1	0
		NO_2	1	0	0	0	0
		NOD	1	0	0	1	0
		SO_2	1	0	0	1	1
		PM_{10}	1	2	0	0	0
		O_3	1	0	0	1	2
		CO	0	0	0	0	0
Weather	**Min'**	**Temperature**	1	0	0	0	0
	Max'	**Temperature**	0	0	2	1	1
		Sun	0	0	0	0	0
		Rain	1	1	1	1	0
		Pressure	3	0	2	0	1
		Wind speed	1	0	0	0	0
Pollen		**Grass**	0	0	0	0	0
Total			28	5	6	12	11
Mean			1.00	0.18	0.21	0.43	0.39

Model P-value distributions

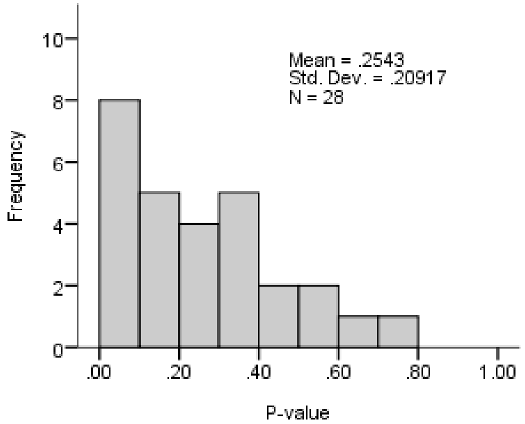


Figure G3. 41: Trent Region Acute Visits - distribution of F-test P-values, Excess.

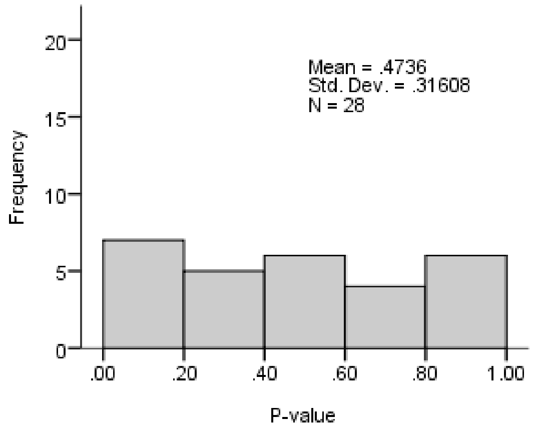


Figure G3. 42: Trent Region Casualty Counts - distribution of F-test P-values, Excess.

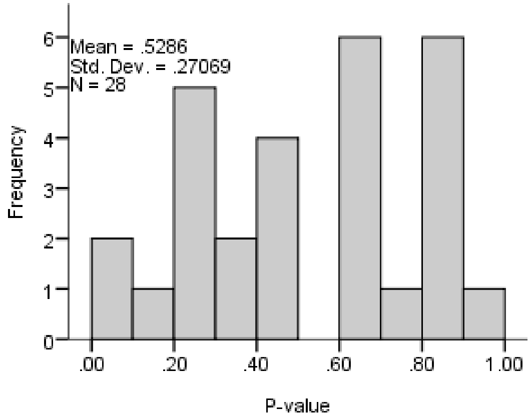


Figure G3. 43: Trent Region Emergency Consultations - distribution of F-test P-values, Excess.

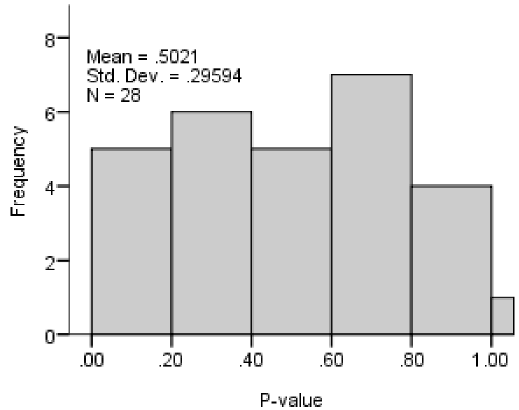


Figure G3. 44: Trent Region Emergency Counts - distribution of F-test P-values, Excess.

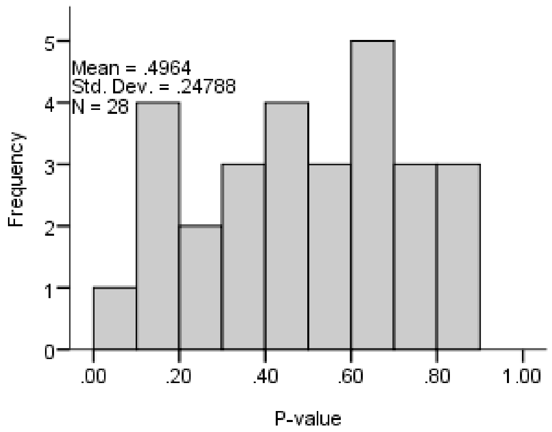


Figure G3. 45: Trent Region Out of Hours Counts - distribution of F-test P-values, Excess.

Point-estimate P-values

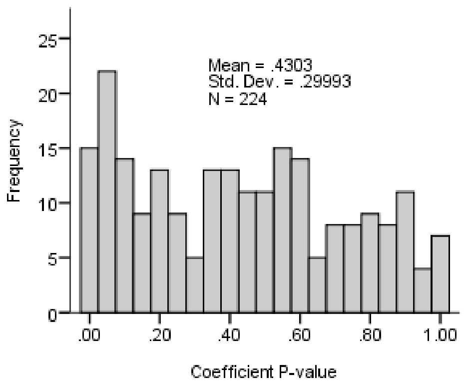


Figure G3. 46: Trent Region Acute Visits - distribution of the autoregressive point-estimate P-values, Excess.

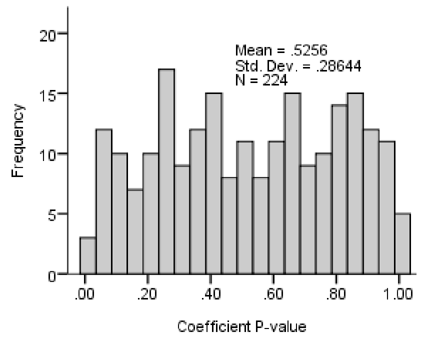


Figure G3. 47: Trent Region Casualty Counts - distribution of the autoregressive point-estimate P-values, Excess.

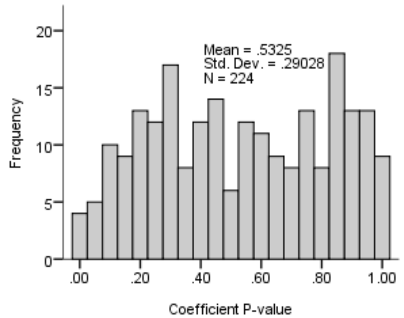


Figure G3. 48: Trent Region Emergency Consultations - distribution of the autoregressive point-estimate P-values, Excess.

All point-estimate histograms appear uniformed thus inferring no or little effect from environmental exposures on daily excess.

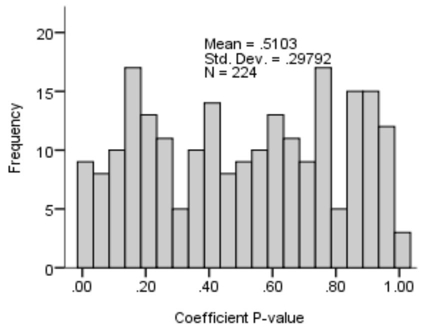


Figure G3. 49: Trent Region Emergency Counts - distribution of the autoregressive point-estimate P-values; Excess.

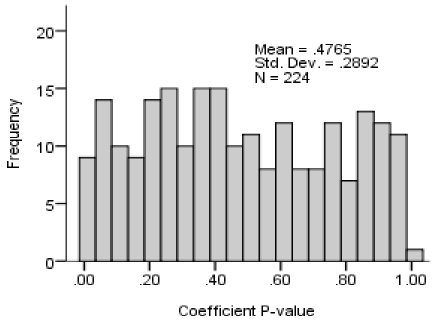


Figure G3. 50: Trent Region Out of Hours Counts - distribution of the autoregressive point-estimate P-values, Excess.

Lag effects

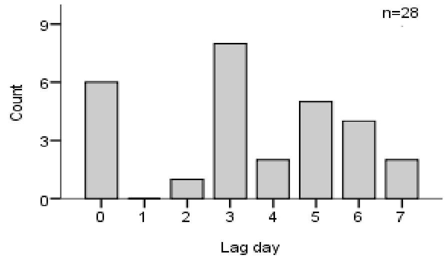


Figure G3. 51: Trent Region Acute Visits - number of the most significant autoregressive point-estimates per environmental exposure by lag day, Excess.

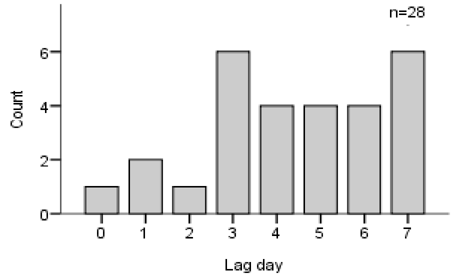


Figure G3. 52: Trent Region Casualty Counts - number of the most significant autoregressive point-estimates per environmental exposure by lag day, Excess.

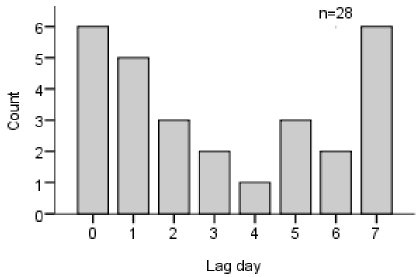


Figure G3. 53: Trent Region Emergency Consultations - number of the most significant autoregressive point-estimates per environmental exposure by lag day, Excess.

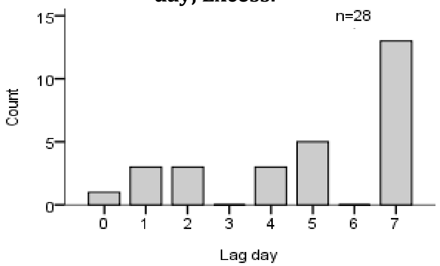


Figure G3. 54: Trent Region Emergency Counts - number of the most significant autoregressive point-estimates per environmental exposure by lag day, Excess.

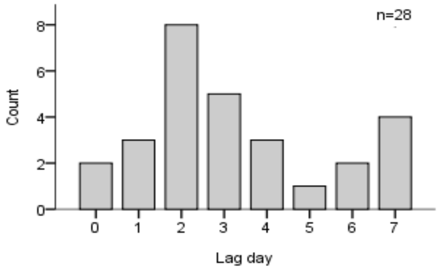


Figure G3. 55: Trent Region Out of Hours Counts - number of the most significant autoregressive point-estimates per environmental exposure by lag day, Excess.

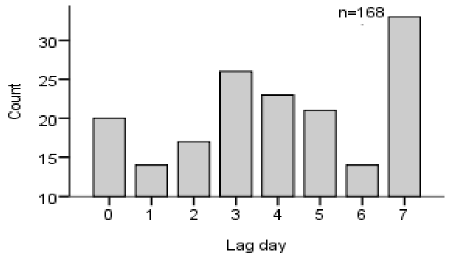


Figure G3. 56: Trent Region All Medical Counts - number of the most significant autoregressive point-estimates per environmental exposure by lag day, Excess.

G3.3. Sheffield Autoregressive results

G3.3.1. Sheffield Autoregressive results Asthmatics and Non-asthmatics

Table G. 73: Sheffield - F-value and P-values (on 8 and 2156 degrees of freedom) from comparison of null model against model including each predictor lagged by 7 days, Asthmatics and Non-asthmatics.

Exposure			Admissions				A&E Counts			
			Asthmatics		Non-asthmatics		Asthmatics		Non-asthmatics	
			F-value	P-value	F-value	P-value	F-value	P-value	F-value	P-value
Outdoor air pollutants	Min'	NO	0.71	0.681	0.65	0.734	-0.30	1.000	4.05	*<0.001
		NO_2	0.68	0.708	0.77	0.628	-0.25	1.000	1.96	*0.049
		NOD	-0.12	1.000	1.29	0.245	-0.47	1.000	4.14	**<0.001
		SO_2	3.96	**<0.001	0.35	0.948	1.79	0.075	0.33	0.964
		PM_{10}	0.65	0.736	1.86	0.062	0.97	0.454	1.10	0.350
		O_3	1.28	0.252	1.75	0.082	1.12	0.347	0.86	0.542
		CO	1.72	0.088	0.41	0.914	-0.55	1.000	0.81	0.573
	Mean	NO	0.03	1.000	2.05	*0.037	0.22	0.987	1.43	0.171
		NO_2	0.15	0.997	1.58	0.124	0.77	0.631	-0.48	1.000
		NOD	-0.18	1.000	2.09	*0.033	0.19	0.992	0.99	0.420
		SO_2	1.50	0.153	0.45	0.891	1.86	0.062	1.51	0.143
		PM_{10}	0.37	0.938	0.62	0.759	0.86	0.554	0.48	0.853
		O_3	0.16	0.996	1.66	0.104	1.83	0.066	0.42	0.913
		CO	0.90	0.513	0.67	0.714	0.00	1.000	0.76	0.644
	Max'	NO	0.24	0.983	0.79	0.608	0.04	1.000	-0.31	1.000
		NO_2	0.03	1.000	1.70	0.093	-0.18	1.000	-0.95	1.000
		NOD	0.37	0.937	0.75	0.651	-0.01	1.000	-0.28	1.000
		SO_2	2.30	*0.019	1.01	0.426	1.37	0.205	-2.03	1.000
		PM_{10}	1.74	0.085	2.76	*0.005	0.91	0.506	0.98	0.444
		O_3	-0.16	1.000	-0.43	1.000	0.58	0.794	0.93	0.492
		CO	0.39	0.926	0.14	0.998	0.86	0.550	0.35	0.936
Weather	Min'	Temperature	0.58	0.797	1.83	0.068	1.58	0.124	2.47	*0.012
	Max'	Temperature	2.15	*0.028	2.24	*0.022	0.96	0.463	0.96	0.479
		Sun	2.69	*0.006	2.94	*0.003	2.11	*0.031	1.23	0.285
		Rain	-0.80	1.000	0.28	0.971	2.06	*0.037	0.33	0.954
		Pressure	1.26	0.259	-0.10	1.000	3.79	*<0.001	-0.33	1.000
		Wind speed	-0.52	1.000	1.95	*0.049	-0.18	1.000	1.41	0.186
Pollen		Grass	0.79	0.613	5.53	**<0.001	3.90	**<0.001	0.05	1.000
Total number of statistically significant models				4		7		4		4

** Most significant P-value out of 28 triggers.

* Statistically significant trigger.

Point estimate statistics

Table G. 74: Sheffield - - autoregressive point-estimate descriptive statistics per one unit increase (n=224), asthmatics and non-asthmatics.

Asthmatics or Non-asthmatics	Statistic	Admissions	A&E Counts
Asthmatics	**Mean**	0.08	-0.08
	Median	0.11	-0.04
	Minimum	-2.79	-3.06
	Maximum	2.25	2.34
Non-asthmatics	**Mean**	0.00	-0.15
	Median	-0.06	-0.19
	Minimum	-2.56	-2.55
	Maximum	3.49	2.14

Table G. 75: Sheffield - number of statistically significant autoregressive point-estimates per environmental exposure (n=8), asthmatics and non-asthmatics.

Exposure			Admissions		A&E Counts	
			Asthmatics	Non-asthmatics	Asthmatics	Non-asthmatics
Outdoor air pollutants	**Min'**	**NO**	0	0	0	3
		NO_2	0	1	0	0
		NOD	0	1	0	2
		SO_2	1	0	1	0
		PM_{10}	0	1	2	0
		O_3	0	1	0	0
		CO	1	0	0	0
	Mean	**NO**	0	1	0	0
		NO_2	0	1	0	0
		NOD	0	1	0	0
		SO_2	0	1	0	1
		PM_{10}	0	1	0	0
		O_3	0	1	2	0
		CO	0	0	0	1
	Max'	**NO**	0	0	0	0
		NO_2	2	2	0	0
		NOD	1	0	0	1
		SO_2	0	0	0	0
		PM_{10}	0	2	0	0
		O_3	0	0	1	0
		CO	0	0	0	0
Weather	**Min'**	**Temperature**	0	0	0	0
	Max'	**Temperature**	1	0	0	0
		Sun	0	1	2	0
		Rain	0	0	0	1
		Pressure	0	1	0	0
		Wind speed	0	1	0	0
Pollen		**Grass**	0	1	0	0
Total			6	18	8	9
Mean			0.21	0.64	0.29	0.32

Model P-value distribution

a) Asthmatics b) Non-asthmatics

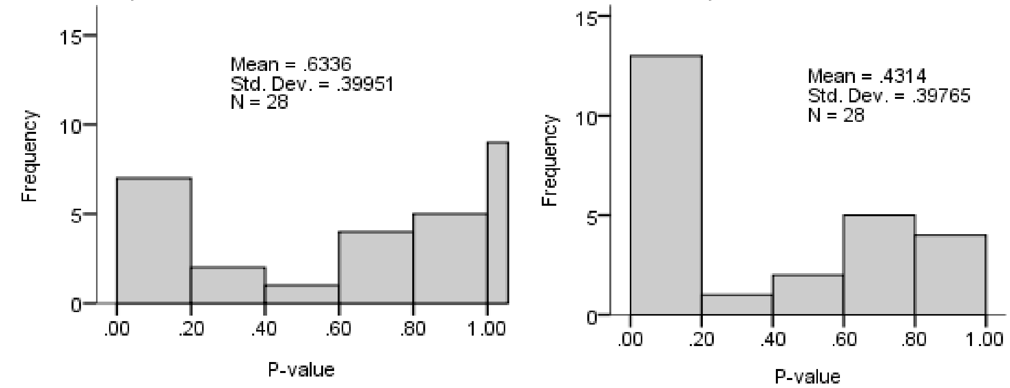


Figure G3. 57: Admissions: Sheffield - distribution of F-test P-values a) Asthmatics and b) Non-asthmatics.

a) Asthmatics b) Non-asthmatics

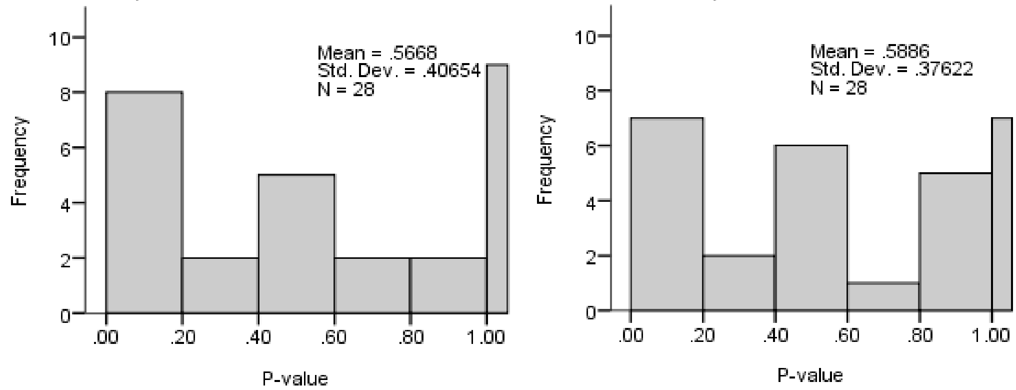


Figure G3. 58: A&E Counts: Sheffield - distribution of F-test P-values a) Asthmatics and b) Non-asthmatics.

Point-estimate P-value distributions

a) Asthmatics b) Non-asthmatics

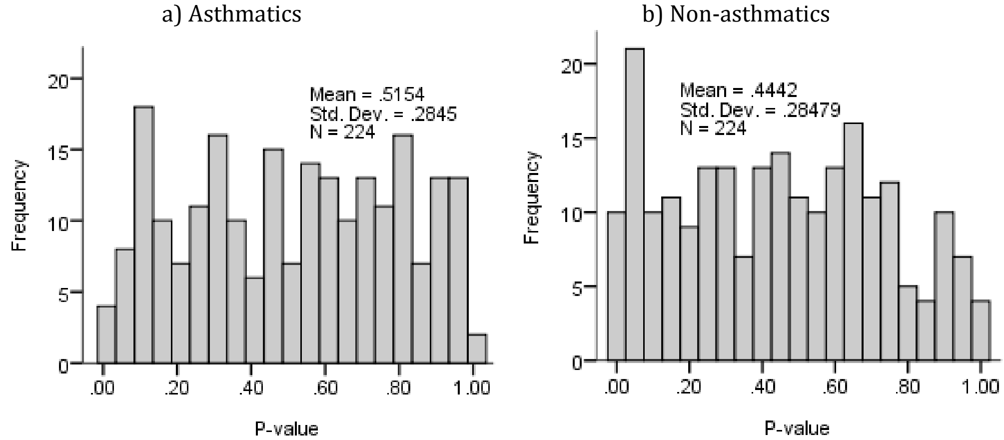


Figure G3. 59: Sheffield Admissions - distribution of the autoregressive point-estimate P-values a) Asthmatics and b) Non-asthmatics.

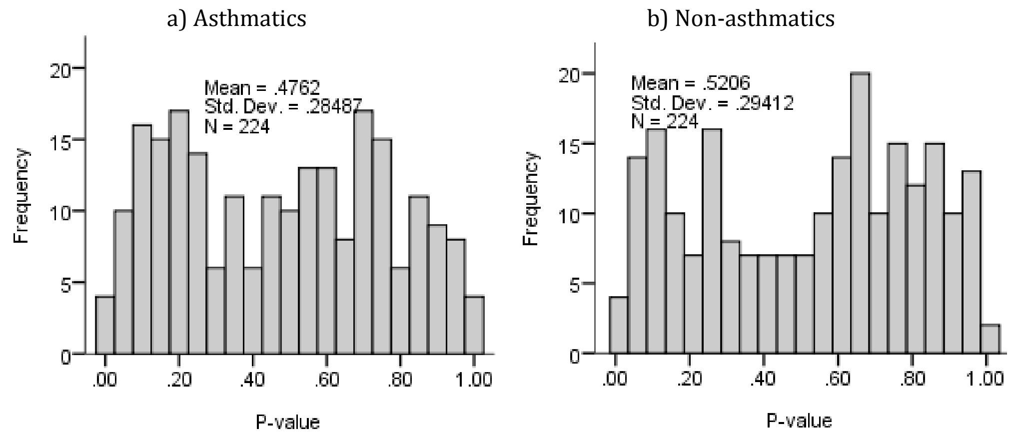


Figure G3. 60: Sheffield A&E Counts - distribution of the autoregressive point-estimate P-values a) Asthmatics and b) Non-asthmatics.

Lag effects

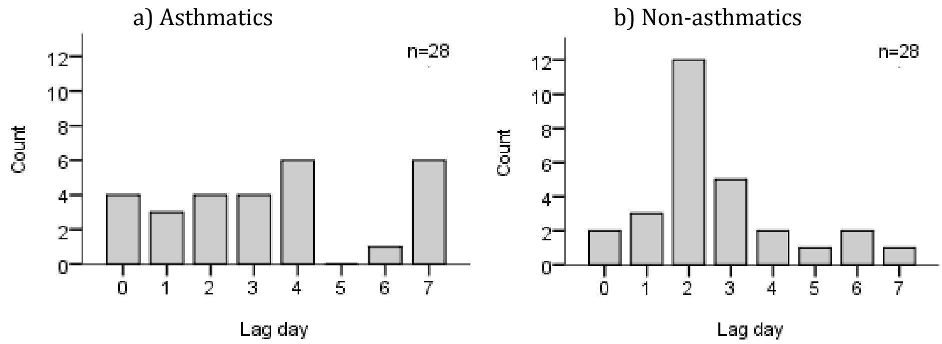


Figure G3. 61: Sheffield Admissions - number of the most significant autoregressive point-estimates per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

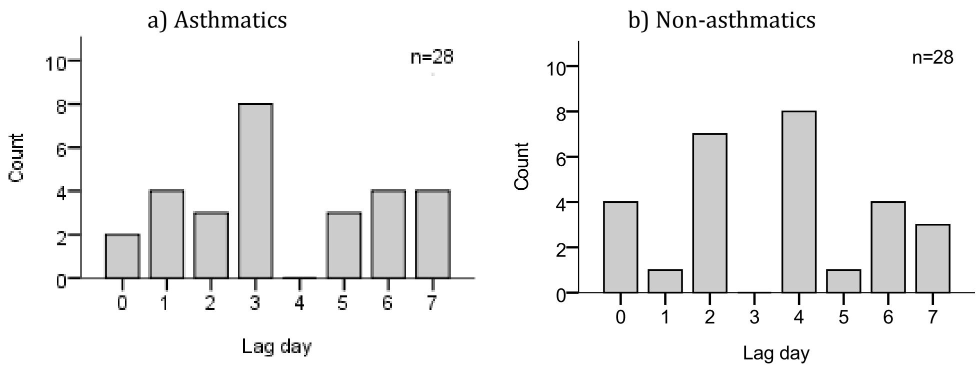


Figure G3. 62: Sheffield A&E Counts - number of the most significant autoregressive point-estimates per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

G3.3.2. Sheffield Autoregressive results Excess

Table G. 76: Sheffield - F-value and P-values (on 8 and 2156 degrees of freedom) from comparison of null model against model including each predictor lagged by 7 days, Excess.

Exposure			Admissions		A&E Counts	
			F-value	P-value	F-value	P-value
Outdoor air pollutants	Min’	NO	0.95	0.477	1.36	0.210
		NO_2	1.66	0.103	0.62	0.762
		NOD	0.94	0.480	0.83	0.575
		SO_2	2.42	**0.013	1.38	0.200
		PM_{10}	1.27	0.252	0.76	0.639
		O_3	0.41	0.914	1.00	0.434
		CO	1.43	0.177	0.50	0.854
	Mean	NO	0.74	0.654	1.57	0.129
		NO_2	1.17	0.317	0.82	0.585
		NOD	0.72	0.677	1.25	0.265
		SO_2	1.23	0.274	0.61	0.771
		PM_{10}	1.42	0.182	0.76	0.635
		O_3	0.83	0.578	1.50	0.151
		CO	0.71	0.682	0.82	0.585
	Max’	NO	0.45	0.888	0.85	0.560
		NO_2	1.23	0.277	0.29	0.970
		NOD	0.55	0.816	0.83	0.576
		SO_2	0.88	0.535	0.32	0.960
		PM_{10}	1.48	0.161	0.68	0.712
		O_3	1.41	0.187	0.93	0.488
		CO	0.77	0.625	1.26	0.263
Weather	Min’	Temperature	1.19	0.302	0.38	0.931
	Max’	Temperature	1.76	0.080	0.24	0.983
		Sun	1.15	0.324	1.95	**0.049
		Rain	0.74	0.655	0.95	0.475
		Pressure	0.94	0.485	1.02	0.420
		Wind speed	1.34	0.218	0.71	0.687
Pollen		Grass	0.37	0.935	1.94	0.050
Total number of statistically significant models				1		1

** Most significant P-value out of 28 triggers.
* Statistically significant trigger.

Point-estimate statistics

Table G. 77: Sheffield- autoregressive point-estimate descriptive statistics per one unit increase (n=224), Excess.

Statistic	Admissions	A&E Counts
Mean	0.00	-0.15
Median	-0.06	-0.19
Minimum	-2.56	-2.55
Maximum	3.49	2.14

Table G. 78: Sheffield - number of statistically significant autoregressive point-estimates per environmental exposure (n=8), Excess.

Exposure			Admissions	A&E Counts
Outdoor air pollutants	Min'	NO	0	2
		NO_2	1	0
		NOD	1	1
		SO_2	1	1
		PM_{10}	2	0
		O_3	0	0
		CO	1	0
	Mean	NO	0	0
		NO_2	1	1
		NOD	0	0
		SO_2	2	0
		PM_{10}	1	0
		O_3	1	1
		CO	0	0
	Max'	NO	0	0
		NO_2	1	0
		NOD	0	0
		SO_2	0	0
		PM_{10}	1	0
		O_3	1	0
		CO	0	0
Weather	Min'	Temperature	0	0
	Max'	Temperature	1	0
		Sun	1	2
		Rain	0	0
		Pressure	0	0
		Wind speed	2	0
Pollen		Grass	1	0
Total			19	8
Mean			0.68	0.29

Model P-value Distributions

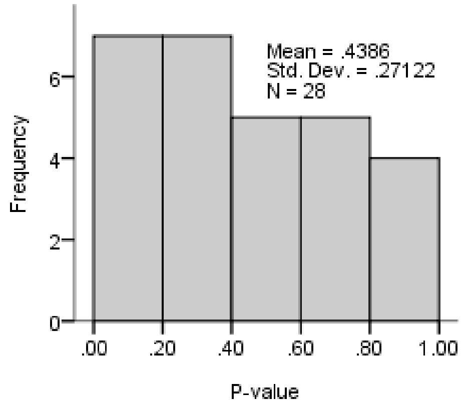


Figure G3. 63: Sheffield Admissions - distribution of F-test P-values, Excess.

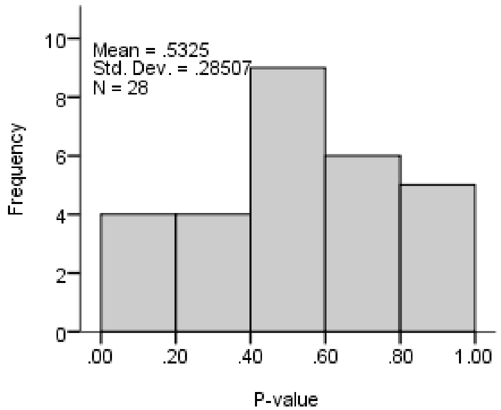


Figure G3. 64: Sheffield A&E Counts - distribution of F-test P-values, Excess.

Point-estimate P-value distributions

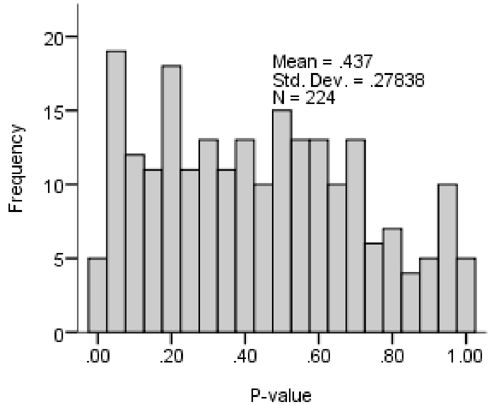


Figure G3. 65: Sheffield Admissions - distribution of the autoregressive point-estimate P-values, Excess.

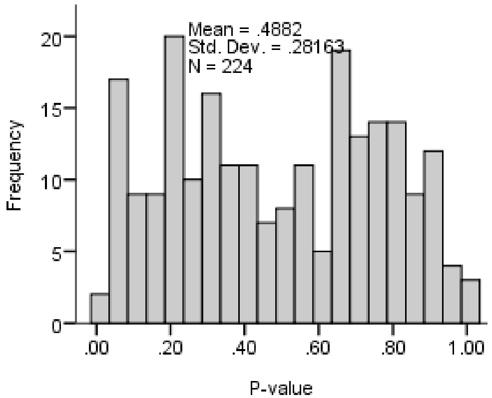


Figure G3. 66: Sheffield A&E Counts - distribution of the autoregressive point-estimate P-values; Excess.

Lag effects

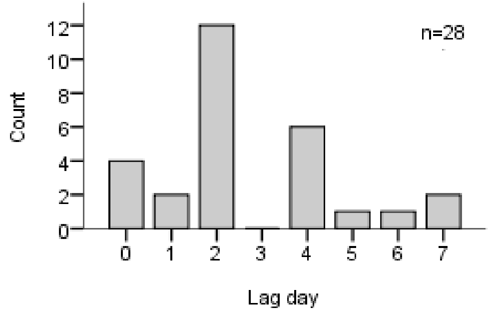


Figure G3. 67: Sheffield Admissions - number of the most significant autoregressive point-estimates per environmental exposure by lag day, Excess.

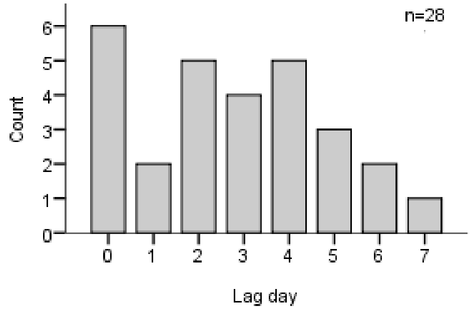


Figure G3. 68: Sheffield A&E Counts - number of the most significant point-estimates per environmental Exposure by lag day, Excess.

G3.4. Scotland Autoregressive results

G3.4.1. Scotland Autoregressive results Asthmatics and Non-asthmatics

Table G. 79: Scotland - F-values and P-values (on 8 and 2153 degrees of freedom) from comparison of null model against model including each predictor lagged by 7 days, a) Asthmatics and b) Non-asthmatics.

a) **Asthmatics**		**Exposure**	**All Counts**		**Acute Visits**		**Casualty Counts**		**Emergency Consultations**		**Emergency Counts**		**Out of Hours Counts**	
			F-value	**P-value**	**F-value**	**P-value**	**F-value**	**P-value**	**F-value**	**P-value**	**F-value**	**P-value**	**F-value**	**P-value**
Outdoor air pollutants	**Min'**	**NO**	0.38	0.931	2.70	*0.006	2.17	*0.027	-1.24	1.000	1.71	0.091	0.27	0.974
		NO_2	2.21	*0.024	1.59	0.124	0.34	0.949	-6.19	1.000	-2.15	1.000	-1.36	1.000
		NOD	1.61	0.115	0.55	0.822	0.31	0.962	-5.79	1.000	-1.76	1.000	-1.30	1.000
		SO_2	0.46	0.887	3.19	*0.001	0.68	0.710	-4.60	1.000	0.23	0.986	0.46	0.882
		PM_{10}	1.24	0.269	0.65	0.734	2.36	*0.016	-2.22	1.000	0.81	0.593	7.06	*<0.001
		O_3	0.82	0.583	7.52	*<0.001	0.80	0.602	-9.54	1.000	-2.52	1.000	0.93	0.492
		CO	2.07	*0.036	2.04	*0.039	1.28	0.250	-0.40	1.000	0.33	0.955	1.27	0.255
	Mean	**NO**	0.64	0.742	3.81	*<0.001	0.73	0.661	-0.31	1.000	0.09	0.999	-0.52	1.000
		NO_2	3.11	*0.002	-0.51	1.000	0.86	0.546	-4.46	1.000	-1.00	1.000	2.01	*0.042
		NOD	1.36	0.211	4.02	*<0.001	-0.44	1.000	-3.94	1.000	-1.96	1.000	0.37	0.938
		SO_2	1.27	0.256	2.66	*0.007	2.13	*0.030	-5.59	1.000	0.98	0.450	-0.15	1.000
		PM_{10}	2.83	*0.004	8.13	*<0.001	2.48	*0.011	-1.19	1.000	2.03	*0.040	5.56	*<0.001
		O_3	0.96	0.467	8.03	*<0.001	6.27	*<0.001	-10.56	1.000	-1.01	1.000	1.81	0.072
		CO	0.03	1.000	5.63	*<0.001	-3.07	1.000	-4.50	1.000	-0.25	1.000	2.53	*0.010
	Max'	**NO**	0.65	0.738	3.72	*<0.001	0.27	0.976	-0.30	1.000	0.39	0.928	0.74	0.654
		NO_2	2.19	*0.025	0.94	0.485	0.79	0.611	-1.01	1.000	0.39	0.925	2.90	*0.003
		NOD	0.65	0.736	5.93	*<0.001	-1.05	1.000	-3.59	1.000	-1.22	1.000	1.81	0.070
		SO_2	1.83	0.067	3.65	*<0.001	1.71	0.092	-1.51	1.000	1.20	0.296	-0.75	1.000
		PM_{10}	0.28	0.974	9.68	*<0.001	2.38	*0.015	-102.89	1.000	0.95	0.475	4.53	*<0.001
		O_3	1.14	0.335	7.06	*<0.001	5.47	*<0.001	-9.37	1.000	-1.57	1.000	2.15	*0.029
		CO	-0.30	1.000	7.59	*<0.001	-4.67	1.000	-5.60	1.000	0.04	1.000	0.68	0.712
Weather	**Min'**	**Temperature**	2.05	*0.037	1.06	0.391	0.12	0.999	0.86	**0.549	0.84	0.565	0.70	0.691
	Max'	**Temperature**	3.99	**<0.001	3.51	*<0.001	3.22	*0.001	-1.46	1.000	2.03	*0.040	5.08	*<0.001
		Sun	1.34	0.221	2.20	*0.025	1.80	0.073	-0.91	1.000	0.11	0.999	0.21	0.989
		Rain	1.09	0.364	10.16	**<0.001	0.81	0.596	0.36	0.942	1.32	0.228	4.83	*<0.001
		Pressure	1.69	0.097	5.55	*<0.001	4.25	*<0.001	-0.91	1.000	1.26	0.258	8.35	**<0.001
		Wind speed	-0.51	1.000	4.67	*<0.001	1.77	0.078	-0.13	1.000	0.53	0.832	3.36	*0.001
Pollen		**Grass**	1.56	0.131	-0.90	1.000	0.83	0.578	0.57	0.805	3.26	*0.001	3.85	*<0.001
		Birch	1.30	0.241	0.64	0.743	0.27	0.975	0.71	0.684	0.42	0.912	2.09	*0.034
		Oak	0.70	0.688	4.51	*<0.001	2.31	*0.018	0.46	0.883	3.54	**<0.001	1.53	0.143
		Nettle	1.70	0.093	6.03	*<0.001	0.42	0.912	0.56	0.814	1.29	0.244	2.59	*0.008
Total number of statistically significant models				7		23		10		0		4		14

b) Non-asthmatics		Exposure	All Counts		Acute Visits		Casualty Counts		Emergency Consultations		Emergency Counts		Out of Hours Counts	
			F-value	P-value	F-value	P-value	F-value	P-value	F-value	P-value	F-value	P-value	F-value	P-value
Outdoor air pollutants	Min’	NO	0.55	0.819	3.44	*0.001	1.52	0.144	4.00	*<0.001	0.74	0.659	2.65	0.007
		NO_2	0.58	0.796	5.88	*<0.001	4.34	*<0.001	4.71	*<0.001	0.27	0.976	-0.84	1.000
		NOD	2.10	*0.032	1.99	*0.044	2.83	*0.004	7.05	*<0.001	-0.07	1.000	0.75	0.650
		SO_2	1.96	*0.048	1.31	0.235	0.21	0.990	-3.02	1.000	1.81	0.071	1.23	0.278
		PM_{10}	1.63	0.111	9.84	*<0.001	2.96	*0.003	-1.18	1.000	3.16	*0.001	12.33	**<0.001
		O_3	1.15	0.324	-3.42	1.000	0.04	1.000	1.67	0.101	-1.22	1.000	1.28	0.250
		CO	0.62	0.763	5.18	*<0.001	-0.06	1.000	0.05	1.000	0.41	0.915	1.47	0.165
	Mean	NO	0.83	0.572	9.73	*<0.001	1.67	0.100	1.80	0.074	0.24	0.982	0.79	0.609
		NO_2	0.50	0.859	11.15	*<0.001	3.34	*0.001	1.89	0.057	1.43	0.179	0.84	0.566
		NOD	1.06	0.385	8.67	*<0.001	1.35	0.214	2.76	*0.005	-0.18	1.000	3.38	0.001
		SO_2	2.87	*0.004	6.23	*<0.001	0.58	0.797	-2.12	1.000	1.78	0.077	1.80	0.072
		PM_{10}	1.46	0.168	14.32	**<0.001	1.38	0.199	3.02	*0.002	1.70	0.094	7.31	*<0.001
		O_3	0.93	0.492	1.67	0.101	4.16	*<0.001	6.82	*<0.001	-0.44	1.000	2.00	0.043
		CO	0.30	0.965	10.58	*<0.001	0.24	0.984	-2.08	1.000	0.00	1.000	3.35	0.001
	Max’	NO	1.97	*0.047	7.58	*<0.001	2.38	*0.015	1.33	0.223	0.38	0.930	1.11	0.353
		NO_2	1.06	0.387	9.21	*<0.001	2.18	*0.026	1.66	0.103	1.00	0.430	1.52	0.144
		NOD	2.21	*0.024	6.43	*<0.001	2.32	80.018	98.05	*<0.001	-0.53	1.000	3.86	*<0.001
		SO_2	3.19	**0.001	4.75	*<0.001	1.60	0.121	-0.32	1.000	1.74	0.085	1.88	0.059
		PM_{10}	1.76	0.080	1.58	0.125	0.40	0.922	3.14	*0.002	0.54	0.826	5.04	*<0.001
		O_3	0.56	0.812	2.98	*0.003	5.14	**<0.001	6.17	*<0.001	-0.28	1.000	2.90	0.003
		CO	1.60	0.120	10.34	*<0.001	3.04	*0.002	-0.29	1.000	0.70	0.690	3.59	*<0.001
Weather	Min’	Temperature	0.66	0.728	2.86	*0.004	1.20	0.293	1.37	0.206	1.90	0.057	0.59	0.783
	Max’	Temperature	1.27	0.252	0.03	1.000	2.60	*0.008	3.23	*0.001	1.37	0.203	0.50	0.856
		Sun	2.02	*0.041	8.15	*<0.001	1.34	0.220	-1.20	1.000	0.90	0.515	1.30	0.240
		Rain	1.50	0.150	-0.62	1.000	2.75	*0.005	2.68	*0.006	0.74	0.655	9.61	*<0.001
		Pressure	1.88	0.059	3.34	*0.001	2.86	*0.004	-0.23	1.000	1.16	0.319	6.06	*<0.001
		Wind speed	1.15	0.328	2.95	*0.003	1.26	0.259	0.59	0.789	1.63	0.112	6.02	*<0.001
Pollen		Grass	1.90	0.056	0.23	0.984	-2.60	1.000	-0.88	1.000	0.12	0.999	0.70	0.694
		Birch	0.39	0.926	-0.45	1.000	1.19	0.304	0.86	0.549	0.73	0.661	0.60	0.781
		Oak	1.27	0.254	0.63	0.753	0.78	0.621	99.34	*<0.001	2.83	**0.004	1.21	0.288
		Nettle	1.56	0.130	9.59	*<0.001	-0.96	1.000	-0.15	1.000	0.55	0.816	0.67	0.719
Total number of statistically significant models				7		22		13		12		2		13

** Most significant P-value out of 28 triggers.

* Statistically significant trigger.

Table G.79 displays F-values and corresponding P-values for Scotland's medical contacts. For All Counts, seven environmental exposures were associated with daily counts of both asthmatics and non-asthmatics. Results for the other medical contacts varied. Acute Visits asthmatics and non-asthmatics had the highest number of statistically significant models including environmental triggers compared to any other medical contact.

Point-estimate statistics

Table G. 80: Scotland - - autoregressive point-estimate descriptive statistics per one unit increase (n=248), asthmatics and non-asthmatics

Asthmatics or Non-asthmatics	Statistic	All Counts	Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours Counts
Asthmatics	Mean	-0.11	-0.15	0.37	0.44	0.50	0.30
	Median	-0.04	-0.16	0.17	0.30	0.48	0.22
	Minimum	-2.70	-2.50	-3.46	-4.01	-2.86	-2.28
	Maximum	2.00	2.18	4.78	6.19	4.48	4.28
Non-asthmatics	Mean	0.08	-0.03	0.44	0.37	0.39	0.06
	Median	0.14	-0.13	0.43	0.40	0.42	0.10
	Minimum	-2.73	-3.23	-3.34	-2.06	-2.88	-2.52
	Maximum	2.73	4.39	3.88	4.74	3.12	2.66

Table G. 81: Scotland - number of statistically significant autoregressive point-estimates per environmental exposure (n=8), a) Asthmatics and b) Non-asthmatics.

a) Asthmatics Exposure			All Counts	Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours Counts
Outdoor air pollutants	Min'	NO	0	0	0	0	0	0
		NO_2	1	0	1	3	1	1
		NOD	0	0	2	2	2	0
		SO_2	0	0	1	3	0	0
		PM_{10}	1	0	2	2	3	0
		O_3	0	1	5	6	4	0
		CO	0	0	1	0	0	0
	Mean	NO	0	0	0	0	1	0
		NO_2	0	0	1	2	1	2
		NOD	0	0	1	0	1	1
		SO_2	0	0	1	3	1	0
		PM_{10}	1	2	1	2	3	1
		O_3	0	0	4	5	2	0
		CO	0	0	1	2	1	2
	Max'	NO	0	0	0	1	1	2
		NO_2	0	0	0	1	0	1
		NOD	0	0	0	1	2	2
		SO_2	0	1	1	2	0	0
		PM_{10}	0	1	0	0	0	1
		O_3	0	0	6	6	2	0
		CO	0	1	1	2	0	1
Weather	Min'	Temperature	1	0	0	1	0	0
	Max'	Temperature	0	1	1	1	1	3
		Sun	0	0	0	0	0	0
		Rain	0	2	1	0	0	1
		Pressure	0	1	1	3	0	0
		Wind speed	0	1	0	0	0	0
Pollen		Grass	1	0	1	0	1	2
		Birch	0	0	0	1	0	1
		Oak	0	0	1	1	1	0
		Nettle	0	0	0	0	1	1
Total			5	11	34	50	29	22
Mean			0.16	0.35	1.10	1.61	0.94	0.71

Table G.82 continued.

b) Non-asthmatics Exposure			All Counts	Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours Counts
Outdoor air pollutants	Min’	NO	0	0	1	1	1	1
		NO_2	0	0	2	2	1	0
		NOD	0	1	1	2	1	0
		SO_2	2	0	0	0	1	0
		PM_{10}	2	3	1	1	2	0
		O_3	0	0	4	4	3	0
		CO	0	1	0	2	0	1
	Mean	NO	0	1	1	0	1	0
		NO_2	0	2	1	1	1	0
		NOD	0	1	1	0	0	0
		SO_2	2	0	0	0	0	0
		PM_{10}	1	2	1	0	0	0
		O_3	0	1	1	3	3	1
		CO	0	1	1	1	0	0
	Max’	NO	0	1	1	0	1	0
		NO_2	1	1	1	0	0	0
		NOD	1	1	2	1	3	1
		SO_2	2	0	0	0	0	0
		PM_{10}	0	0	1	0	0	1
		O_3	0	1	5	6	3	0
		CO	1	1	2	1	1	2
Weather	Min’	Temperature	0	0	0	0	0	0
	Max’	Temperature	0	0	2	0	1	0
		Sun	3	1	1	0	2	1
		Rain	0	0	0	0	0	1
		Pressure	1	1	1	0	0	1
		Wind speed	1	0	0	0	0	0
Pollen		Grass	0	1	0	0	0	1
		Birch	0	0	0	0	0	0
		Oak	1	0	0	2	1	0
		Nettle	0	2	0	0	0	0
Total			18	23	31	27	26	11
Mean			0.58	0.74	1.00	0.87	0.84	0.35

Table G.81 shows the number of statistically significant point estimates for each environmental exposures out of the number of lag days (n=8). Results appeared varied, All Counts asthmatics and non-asthmatics have quite a low total number of statistically significant point-estimates compared to the other medical contacts (except Out of Hours non-asthmatics).

Model P-value distributions

a) Asthmatics b) Non-asthmatics

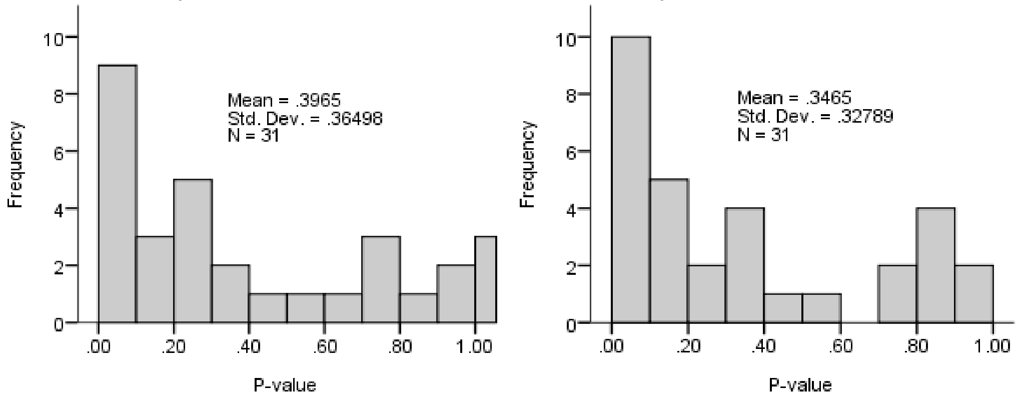


Figure G3. 69: Scotland All Counts - distribution of F-test P-values a) Asthmatics and b) Non-asthmatics.

a) Asthmatics b) Non-asthmatics

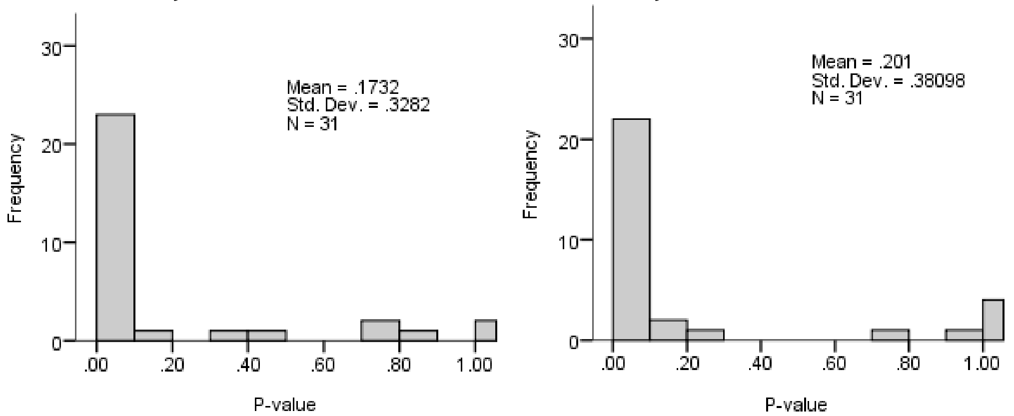


Figure G3. 70: Scotland Acute Visits - distribution of F-test P-values a) Asthmatics and b) Non-asthmatics.

a) Asthmatics b) Non-asthmatics

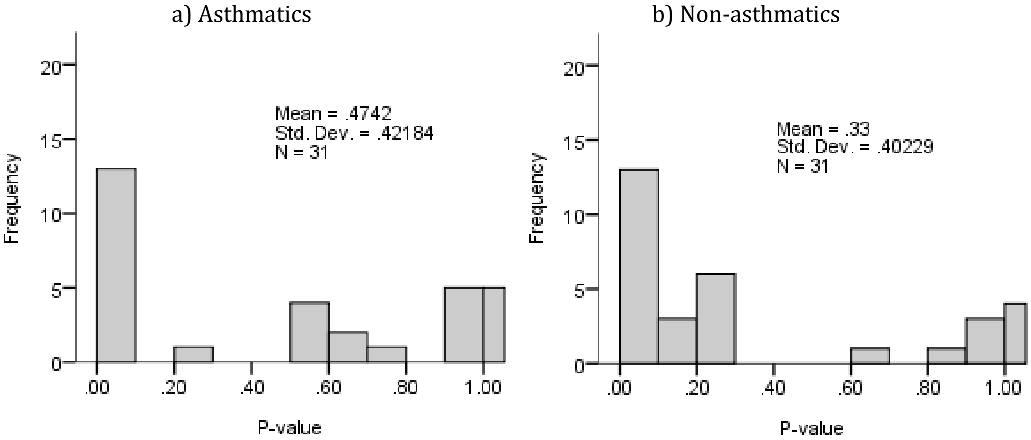


Figure G3. 71: Scotland Casualty Counts - distribution of F-test P-values a) Asthmatics and b) Non-asthmatics.

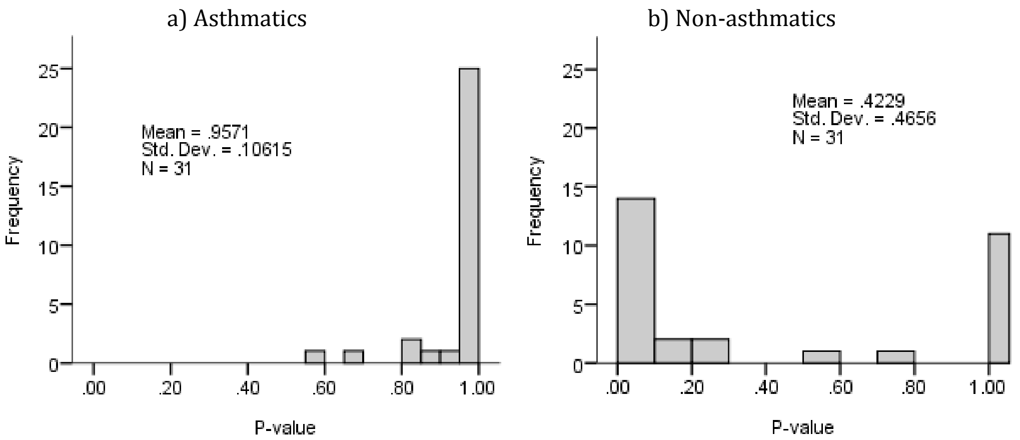


Figure G3. 72: Scotland Emergency Consultations - distribution of F-test P-values a) Asthmatics and b) Non-asthmatics.

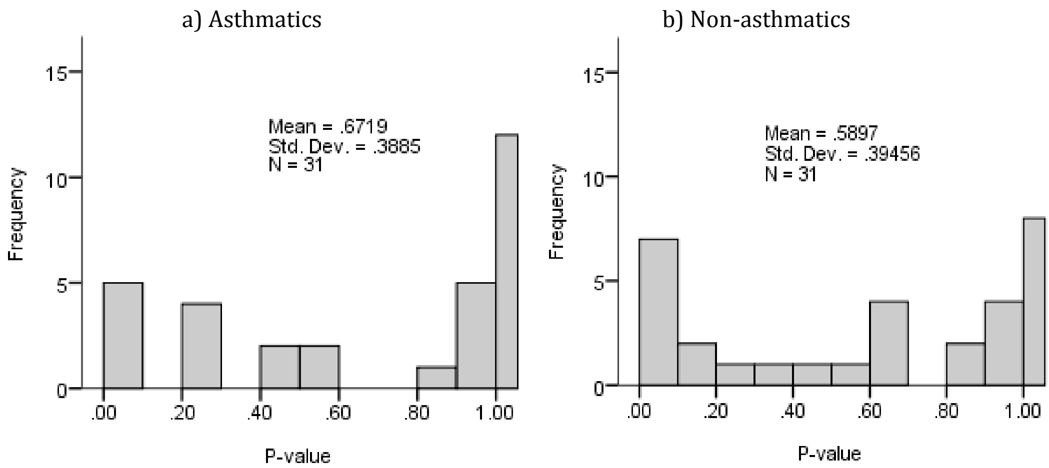


Figure G3. 73: Scotland Emergency Counts - distribution of F-test P-values a) Asthmatics and Non-asthmatics.

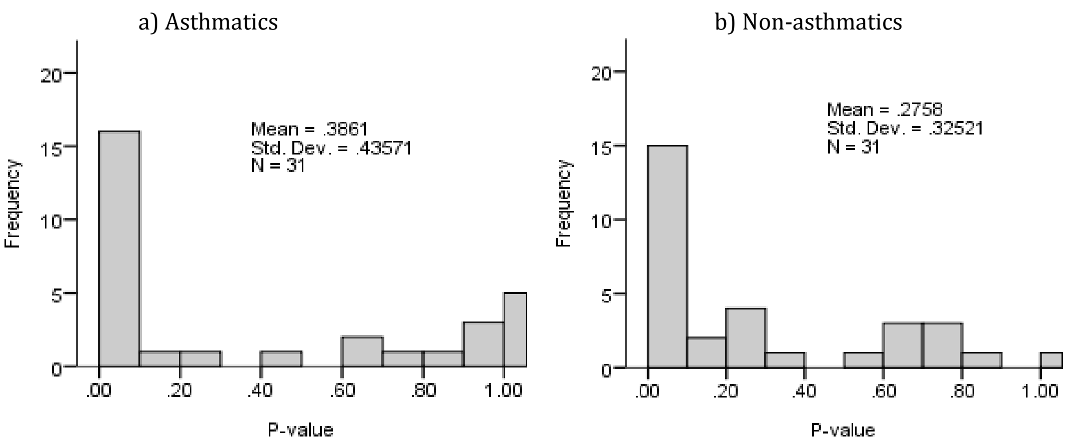


Figure G3. 74: Scotland Out of Hours Counts - distribution of F-test P-values a) Asthmatics and b) Non-asthmatics.

Figures G2.69 to G2.74 display the combined distribution of the overall model P-values including environmental exposures. All Counts, Acute Visits, Casualty Counts and Out of Hours Counts have positively distributed P-values inferring the environmental triggers have some effect on the daily counts. For Emergency Consultations and Emergency Counts, the P-value distribution was fairly uniformed skewed.

Table G.82 shows with the exception of Acute Visits, non-asthmatics have lower mean P-values in comparison to asthmatics signifying that the environmental effect was stronger on non-asthmatics than asthmatics. The majority of the medical contacts (except Emergency Consultations asthmatics, Emergency Counts asthmatics and non-asthmatics) have lower mean P-values than that set at the null value (0.5) inferring that environmental triggers have an effect (varying in severity) on daily counts of medical contact.

Table G. 82: Scotland - Mean F-test P-value's distance from the null value (0.5) and difference between asthmatics and non-asthmatics.

Medical Contact	Asthmatics	0.5-Asthmatics	Non-asthmatics	0.5-Non-asthmatics	Difference between Asthmatics and Non-asthmatics
All Counts	0.40	0.10	0.35	0.15	0.05
Acute Visits	0.17	0.33	0.20	0.30	-0.03
Casualty Counts	0.47	0.03	0.33	0.17	0.14
Emergency Consultations	0.96	-0.46	0.42	0.08	0.53
Emergency Counts	0.67	-0.17	0.59	-0.09	0.08
Out of Hours Counts	0.39	0.11	0.28	0.22	0.11

Point-estimate P-value distributions

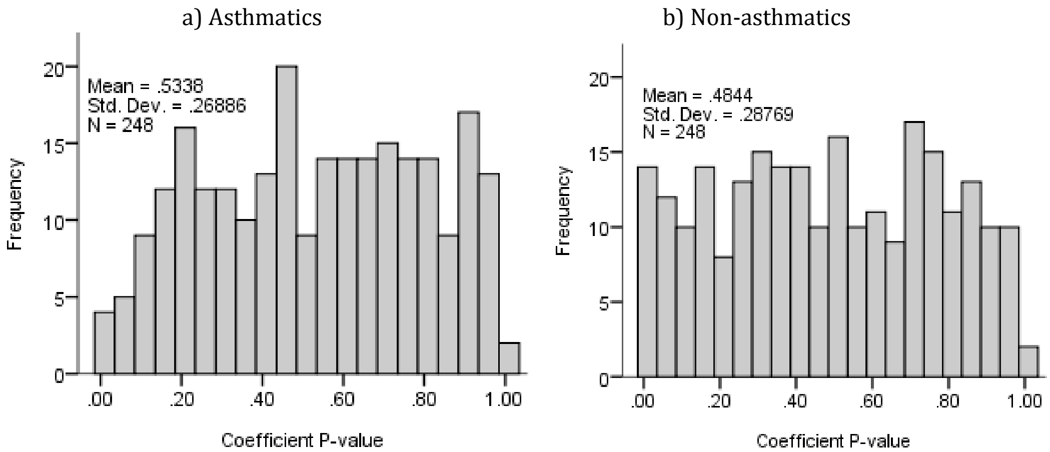


Figure G3. 75: Scotland All Counts - distribution of the autoregressive point-estimate P-values a) Asthmatics and b) Non-asthmatics.

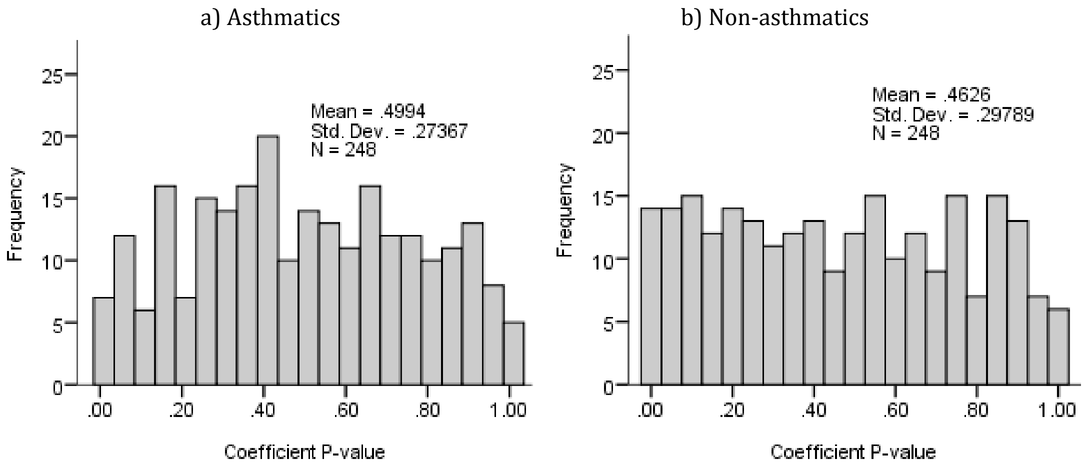


Figure G3. 76: Scotland Acute Visits - distribution of the autoregressive point-estimate P-values a) Asthmatics and b) Non-asthmatics.

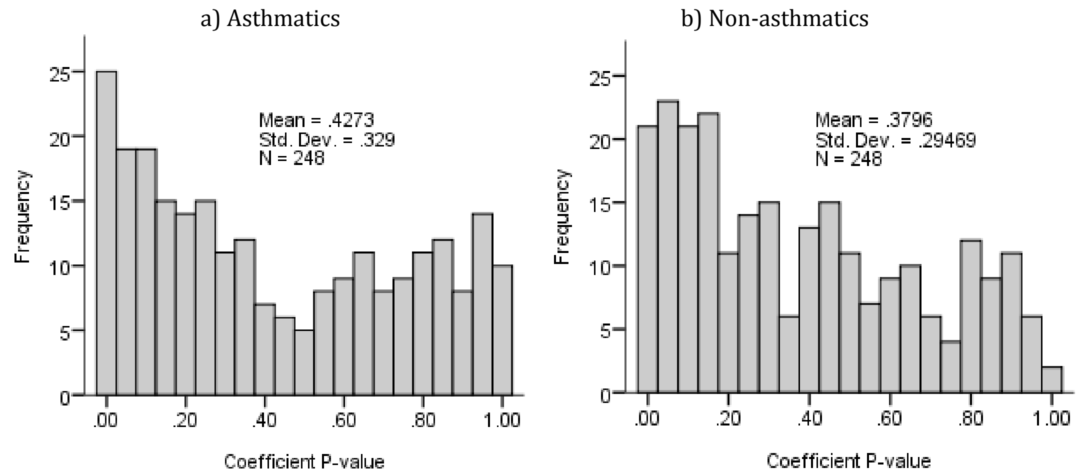


Figure G3. 77: Scotland Casualty Counts - distribution of the autoregressive point-estimate P-values a) Asthmatics and b) Non-asthmatics.

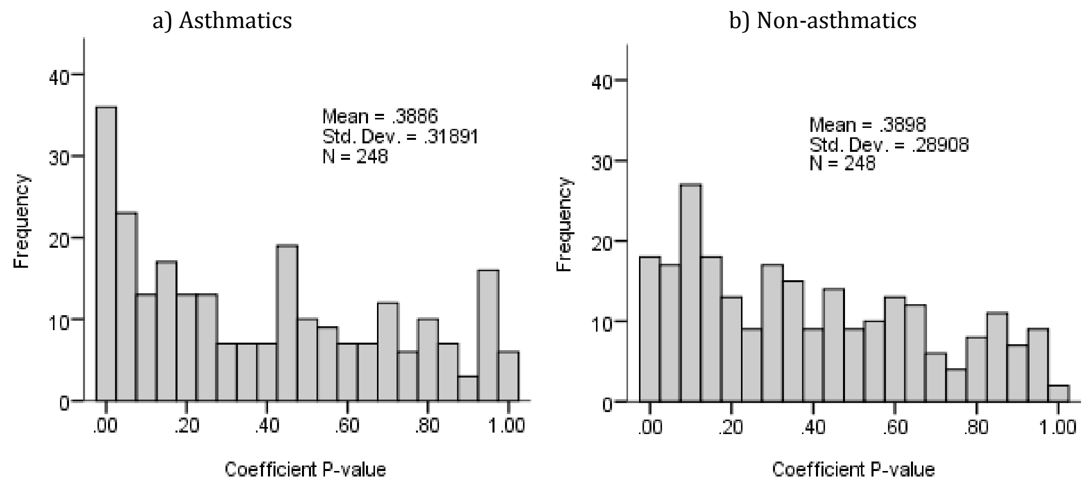


Figure G3. 78: Scotland Emergency Consultations - distribution of the autoregressive point-estimate P-values a) Asthmatics and b) Non-asthmatics.

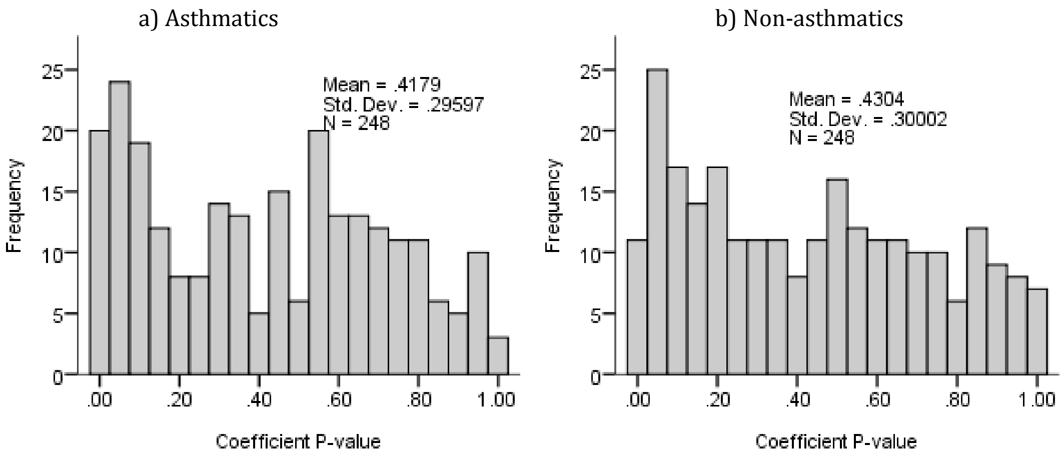


Figure G3. 79: Scotland Emergency Counts - distribution of the autoregressive point-estimate P-values a) Asthmatics and b) Non-asthmatics.

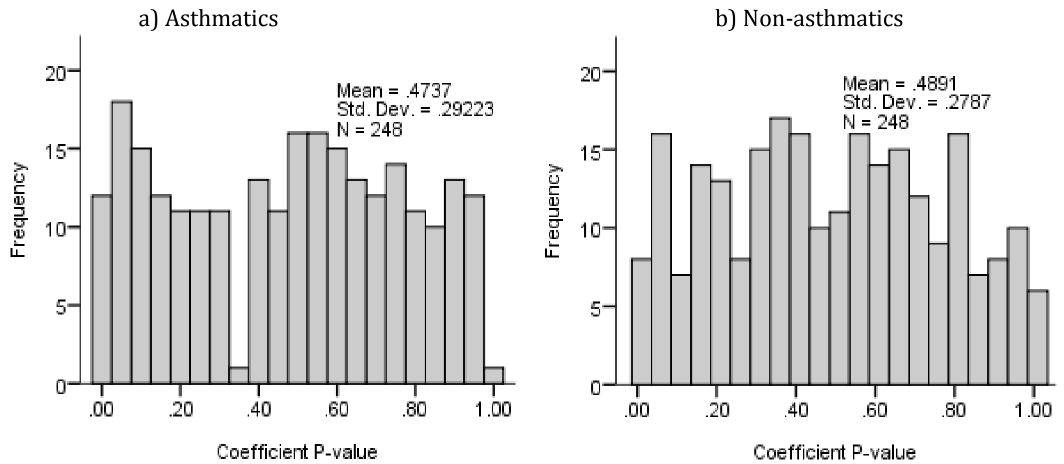


Figure G3. 80: Scotland Out of Hours Counts - distribution of the autoregressive point-estimate P-values a) Asthmatics and b) Non-asthmatics.

Emergency Consultations and Emergency Counts display a very slight positive distribution but for the remaining medical contacts, their distributions were uniformed. Together with the information in Table G.83, bar Emergency Counts and Emergency Consultations, the mean P-values for the point-estimates hover around the 0.5 mark. This infers a weak or non-existent effect from the environmental triggers on daily counts. The mean P-values for Emergency Counts and Emergency Consultations were slightly better and lower than 0.5.

Table G. 83: Scotland autoregressive mean point-estimate P-value's distance from the null value (0.5) and difference between asthmatics and non-asthmatics.

Medical Contact	Asthmatics	0.5-Asthmatics	Non-asthmatics	0.5-Non-asthmatics	Difference between Asthmatics and Non-asthmatics
All Counts	0.53	-0.03	0.48	0.02	0.05
Acute Visits	0.50	0.00	0.46	0.04	0.04
Casualty Counts	0.43	0.07	0.38	0.12	0.05
Emergency Consultations	0.39	0.11	0.39	0.11	0.00
Emergency Counts	0.42	0.08	0.43	0.07	-0.01
Out of Hours Counts	0.47	0.03	0.49	0.01	-0.02

Lag effects

a) Asthmatics b) Non-asthmatics

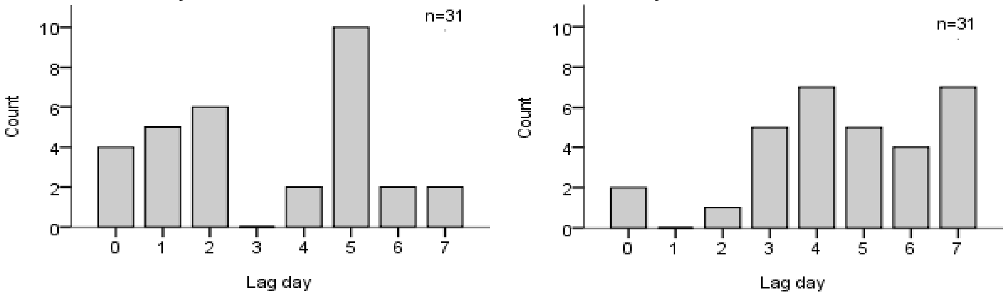


Figure G3. 81: Scotland All Counts - number of the most significant autoregressive point-estimates per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

a) Asthmatics b) Non-asthmatics

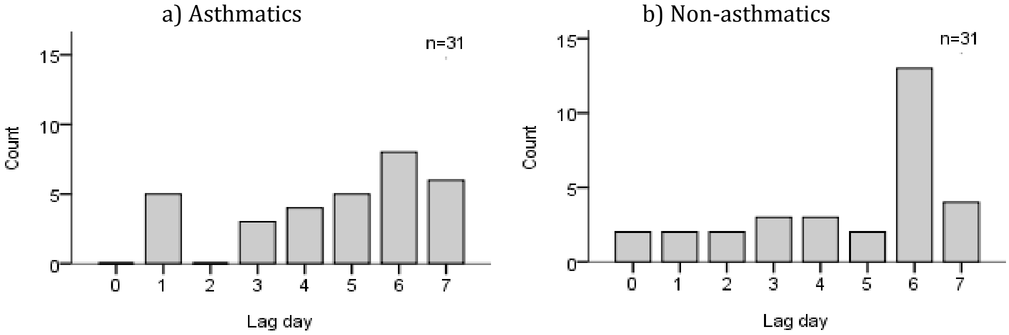


Figure G3. 82: Scotland Acute Visits - number of the most significant autoregressive point-estimates per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

a) Asthmatics b) Non-asthmatics

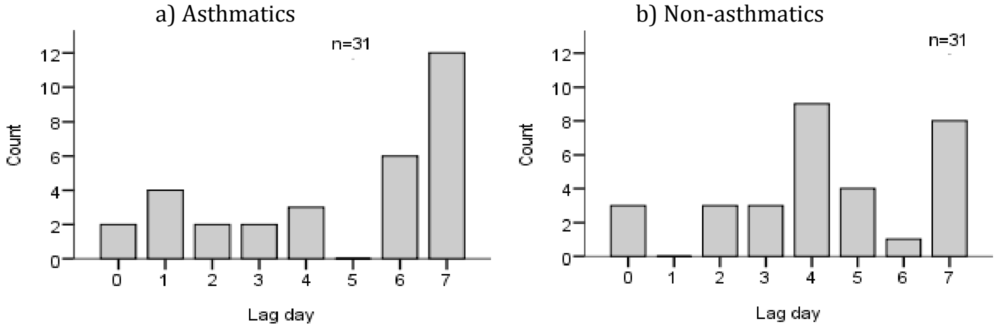


Figure G3. 83: Scotland Casualty Counts - number of the most significant autoregressive point-estimates per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

a) Asthmatics b) Non-asthmatics

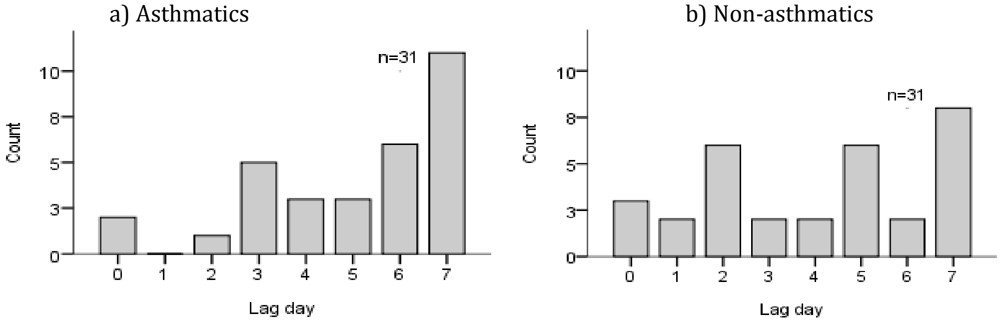


Figure G3. 84: Scotland Emergency Consultations - number of the most significant autoregressive point-estimates per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

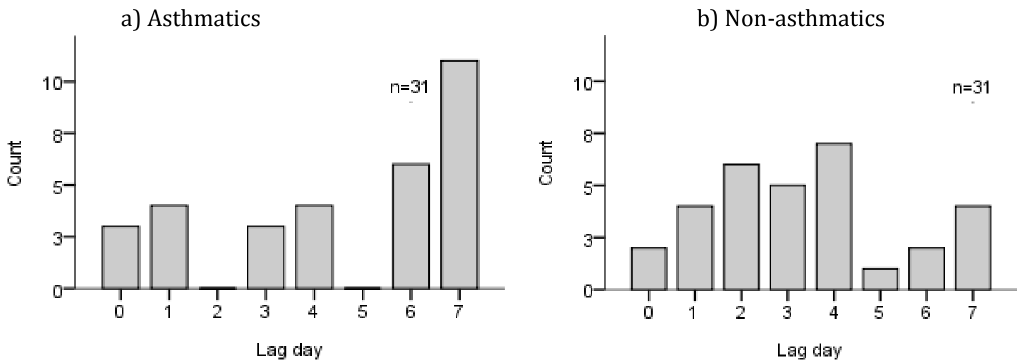


Figure G3. 85: Scotland Emergency Counts - number of the most significant autoregressive point-estimates per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

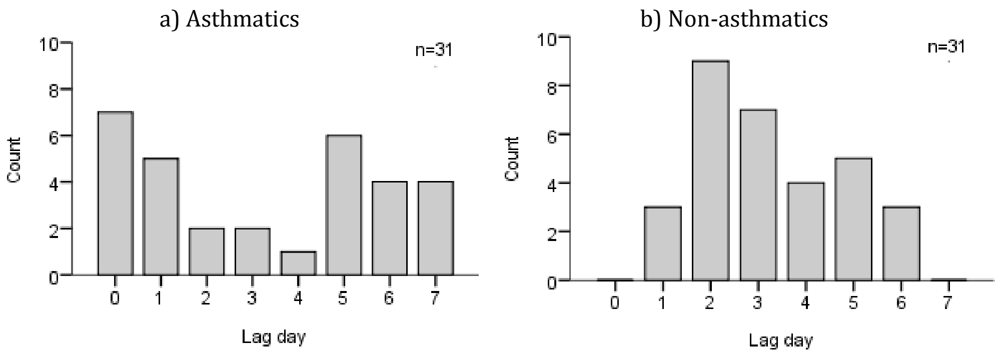


Figure G3. 86: Scotland Out of Hours Counts - number of the most significant autoregressive point-estimates per environmental exposure by lag day a) Asthmatics and b) Non-asthmatics.

No outstanding lag day whereby the most significant lag days fall on. For All Counts asthmatics, the most frequent significant day was lag day 5 and for Non-asthmatics lag day 4 and 7 (Figure G3.81).

G3.4.2. Scotland Autoregressive results Excess

Table G. 84: Scotland - F-values and P-values (on 8 and 2163 degrees of freedom) from comparison of null model against model including each predictor lagged by 7 days, a) Asthmatics, and b) Non-asthmatics.

Exposure			All Counts		Acute Visits		Casualty Counts		Emergency Consultations		Emergency Counts		Out of Hours Counts	
			F-value	P-value	F-value	P-value	F-value	P-value	F-value	P-value	F-value	P-value	F-value	P-value
Outdoor air pollutants	Min'	NO	0.58	0.797	0.54	0.828	1.01	0.423	0.42	0.911	0.79	0.615	1.85	0.064
		NO_2	3.65	*<0.001	0.48	0.872	0.76	0.641	1.94	*0.050	1.07	0.380	0.72	0.674
		NOD	2.15	*0.028	0.45	0.892	0.99	0.439	1.69	0.095	2.43	*0.013	1.33	0.224
		SO_2	0.25	0.981	1.57	0.129	0.78	0.622	1.01	0.423	0.29	0.970	0.77	0.626
		PM_{10}	1.98	*0.045	1.33	0.222	2.07	*0.035	3.86	*<0.001	1.95	*0.049	0.65	0.737
		O_3	0.80	0.604	0.84	0.566	3.76	*<0.001	7.48	*<0.001	2.52	*0.010	0.49	0.866
		CO	1.88	0.059	0.25	0.981	1.64	0.110	1.08	0.372	1.46	0.168	0.68	0.714
	Mean	NO	1.18	0.307	0.79	0.611	0.55	0.820	1.13	0.337	0.33	0.955	1.83	0.067
		NO_2	4.67	**<0.001	0.75	0.649	0.70	0.694	1.29	0.243	0.80	0.599	1.10	0.359
		NOD	2.89	0.003	0.42	0.910	0.53	0.831	0.95	0.471	0.98	0.446	1.89	0.057
		SO_2	0.55	0.816	2.35	**0.016	0.79	0.614	0.78	0.616	0.41	0.915	0.47	0.878
		PM_{10}	4.26	*<0.001	1.78	0.076	1.69	0.097	3.24	*0.001	2.02	*0.040	1.48	0.158
		O_3	1.04	0.402	0.97	0.457	6.01	**<0.001	10.93	*<0.001	4.21	**<0.001	0.68	0.713
		CO	0.73	0.662	0.23	0.985	1.04	0.402	1.76	0.080	0.43	0.904	2.16	*0.028
	Max'	NO	1.00	0.434	0.70	0.688	0.33	0.955	1.16	0.318	0.30	0.966	1.22	0.280
		NO_2	2.70	*0.006	0.33	0.955	0.26	0.979	0.97	0.460	0.52	0.839	0.87	0.544
		NOD	2.22	*0.024	0.52	0.845	0.19	0.993	1.26	0.260	0.91	0.507	1.70	0.094
		SO_2	0.85	0.560	2.10	*0.033	0.51	0.851	0.97	0.456	0.64	0.746	0.61	0.769
		PM_{10}	1.59	0.124	1.89	0.058	0.56	0.814	1.42	0.181	1.42	0.181	1.87	0.061
		O_3	1.11	0.352	1.04	0.405	5.31	*<0.001	10.60	*<0.001	4.30	*<0.001	0.65	0.733
		CO	0.45	0.889	0.30	0.967	1.61	0.117	1.89	0.057	0.72	0.671	1.56	0.131
Weather	Min'	Temperature	1.38	0.202	1.69	0.096	0.53	0.836	0.77	0.627	0.56	0.815	0.51	0.850
	Max'	Temperature	3.42	*0.001	0.71	0.680	0.41	0.916	1.33	0.223	1.21	0.288	1.39	0.194
		Sun	1.41	0.186	1.18	0.305	1.17	0.312	0.58	0.797	1.86	0.063	1.05	0.397
		Rain	2.43	*0.013	1.84	0.065	0.69	0.698	0.61	0.772	1.70	0.095	1.94	0.050
		Pressure	2.19	*0.026	1.82	0.069	1.06	0.387	2.65	*0.007	1.57	0.128	3.32	**0.001
		Wind speed	-0.31	1.000	1.36	0.208	1.04	0.403	0.14	0.998	0.46	0.884	0.67	0.723
Pollen		Grass	1.50	0.151	1.52	0.144	0.47	0.875	1.09	0.370	2.04	*0.038	2.44	*0.013
		Birch	1.42	0.182	0.30	0.965	1.21	0.287	1.13	0.340	1.06	0.389	1.03	0.412
		Oak	1.24	0.273	1.37	0.205	0.63	0.753	1.69	0.096	1.34	0.217	0.60	0.780
		Nettle	0.92	0.501	1.26	0.261	0.39	0.929	0.70	0.694	1.16	0.318	1.87	0.061
Total number of statistically significant models				11		2		4		7		7		3

** Most significant P-value out of 28 triggers.

* Statistically significant trigger.

Table G.84 shows the F-values and corresponding P-values for Scotland's Excess (difference between asthmatics and non-asthmatics). All Counts excess has the highest total number of statistically significant models including environmental exposures.

Point-estimate statistics

Table G. 85: Scotland: - autoregressive point-estimate descriptive statistics per one unit increase (n=248), Excess.

Statistic	All Counts	Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours Counts
Mean	-0.19	-0.09	0.05	0.18	0.22	0.25
Median	-0.25	-0.05	0.09	0.18	0.23	0.20
Minimum	-2.81	-2.59	-2.46	-1.99	-2.23	-2.41
Maximum	2.76	2.29	2.66	2.74	3.61	4.28

Table G. 86: Scotland - number of statistically significant autoregressive point-estimates per environmental exposure (n=8), Excess.

			All Counts	Acute Visits	Casualty Counts	Emergency Consultations	Emergency Counts	Out of Hours Counts
Outdoor air pollutants	**Min'**	**NO**	0	0	0	0	0	1
		NO_2	1	0	1	0	0	0
		NOD	1	0	0	0	1	1
		SO_2	0	1	0	0	0	1
		PM_{10}	1	1	2	1	2	0
		O_3	0	0	1	0	0	0
		CO	0	0	1	0	0	0
	Mean	**NO**	0	0	0	1	0	1
		NO_2	0	0	0	0	0	1
		NOD	0	0	0	0	0	0
		SO_2	0	2	0	0	0	0
		PM_{10}	2	1	1	1	1	1
		O_3	0	0	2	0	1	0
		CO	0	0	1	1	0	1
	Max'	**NO**	0	0	0	0	0	1
		NO_2	0	0	0	0	0	1
		NOD	0	0	0	0	0	1
		SO_2	0	0	0	0	0	1
		PM_{10}	0	1	0	1	1	1
		O_3	0	0	0	0	0	0
		CO	0	0	1	1	0	0
Weather	**Min'**	**Temperature**	2	0	1	0	0	0
	Max'	**Temperature**	0	0	0	1	0	1
		Sun	0	0	0	0	1	0
		Rain	1	0	0	0	1	1
		Pressure	1	0	0	0	0	3
		Wind speed	0	1	0	0	0	0
Pollen		**Grass**	1	0	0	0	1	1
		Birch	1	0	0	1	0	1
		Oak	0	0	0	1	1	0
		Nettle	0	1	0	0	1	2
Total			11	8	11	9	11	21
Mean			0.35	0.26	0.35	0.29	0.35	0.68

Table G.86 illustrates the number of statistically significant autoregressive point-estimates per environmental exposure across the lag days. Out of Hours Counts has the highest total number of statistically significant point-estimates. Looking at exposures individually, PM_{10} mean has the highest number of statistically significant point-estimates.

Model P-value distributions

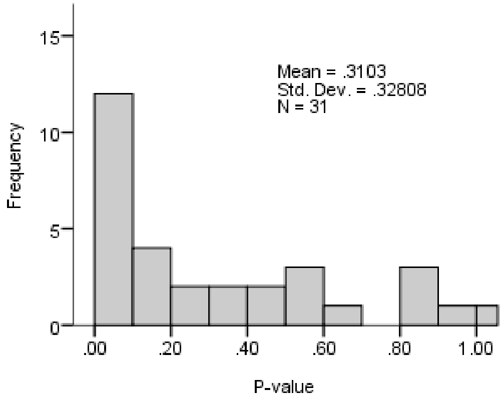


Figure G3. 87: Scotland All Counts - distribution of F-test P-values, Excess.

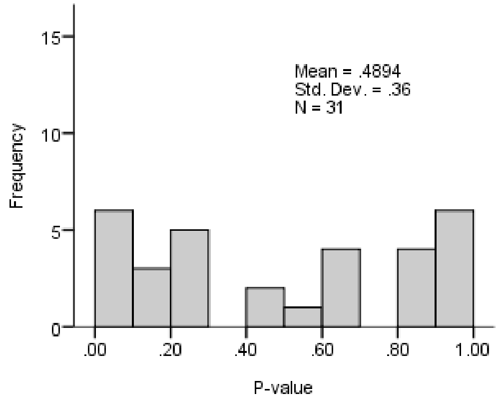


Figure G3. 88: Scotland Acute Visits - distribution of F-test P-values, Excess.

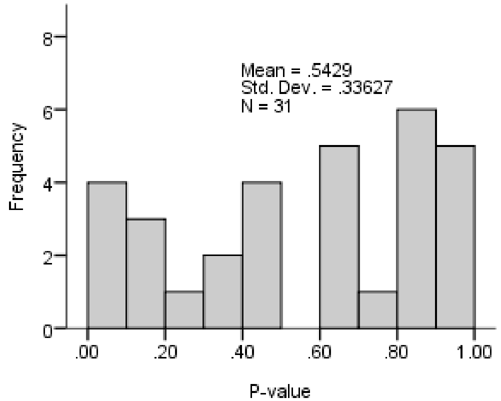


Figure G3. 89: Scotland Casualty Counts - distribution of F-test P-values, Excess.

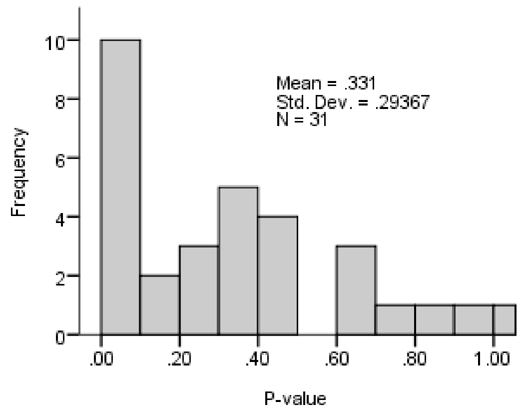


Figure G3. 90: Scotland Emergency Consultations - distribution of F-test P-values, Excess.

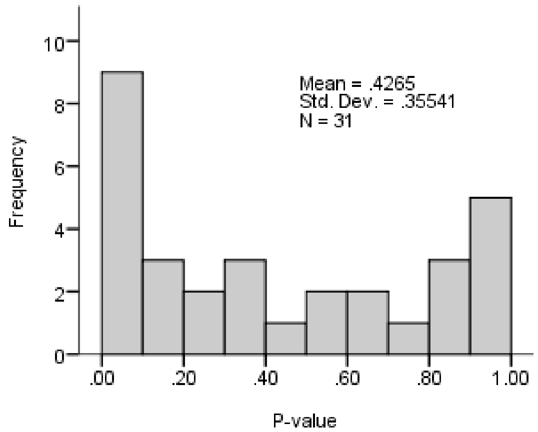


Figure G3. 91: Scotland Emergency Counts - distribution of F-test P-values, Excess.

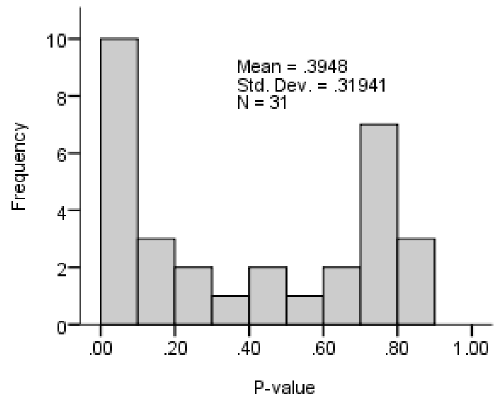


Figure G3. 92: Scotland Out of Hours Counts - distribution of F-test P-values, Excess.

Figures G3.87 to G3.92 illustrate the F-test P-value distributions. All Counts, Emergency Consultations, Emergency Counts and Out of Hours Counts excess have positively skewed distributions though the severity of the skew varies. All other medical contacts excess has uniformed distributions inferring no association between environmental exposures and daily counts. This was supported by Table G.86.

Table G. 87: Scotland Mean F-test P-value's distance from the null value (0.5).

Medical Contact	Excess	0.5-Excess
All Counts	0.31	0.19
Acute Visits	0.49	0.01
Casualty Counts	0.54	-0.04
Emergency Consultations	0.33	0.17
Emergency Counts	0.43	0.07
Out of Hours Counts	0.39	0.11

Point-estimate P-value distributions

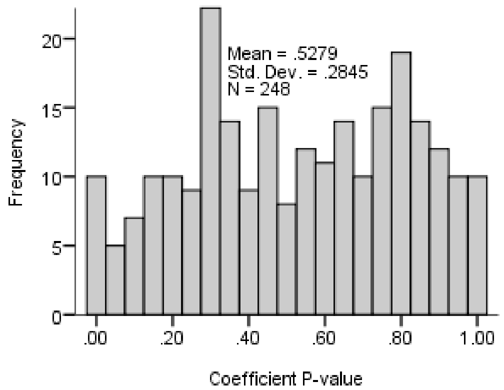


Figure G3. 93: Scotland All Counts - distribution of the autoregressive point-estimate P-values, Excess.

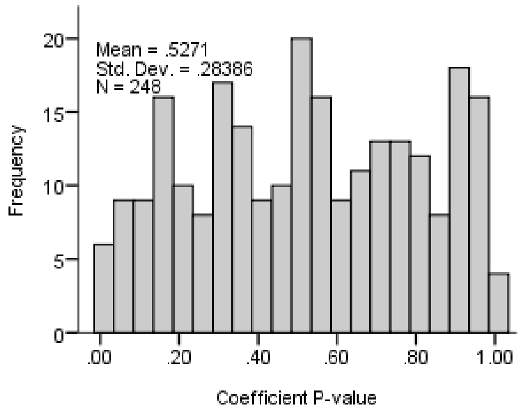


Figure G3. 94: Scotland Acute Visits - distribution of the autoregressive point-estimate P-values, Excess.

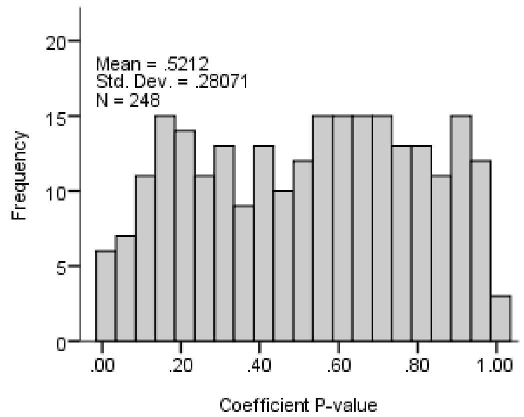


Figure G3. 95: Scotland Casualty Counts - distribution of the autoregressive point-estimate P-values, Excess.

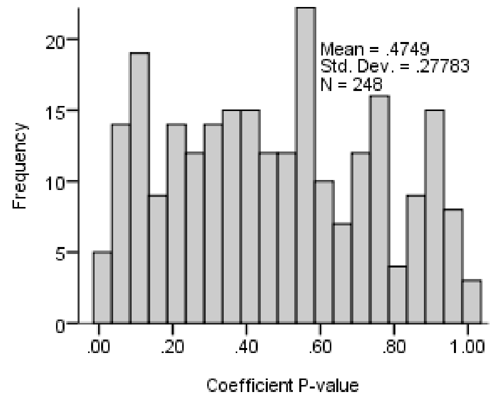


Figure G3. 96: Scotland Emergency Consultations - distribution of the autoregressive point-estimate P-values, Excess.

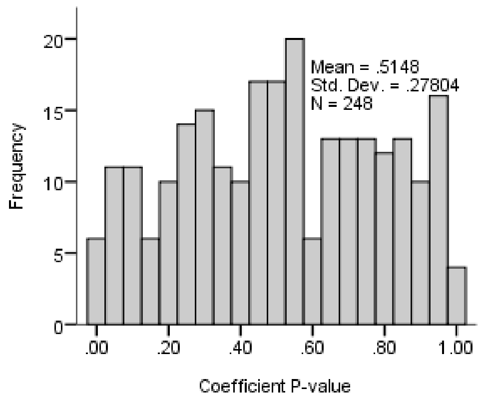


Figure G3. 97: Scotland Emergency Counts- distribution of the autoregressive point-estimate P-values, Excess.

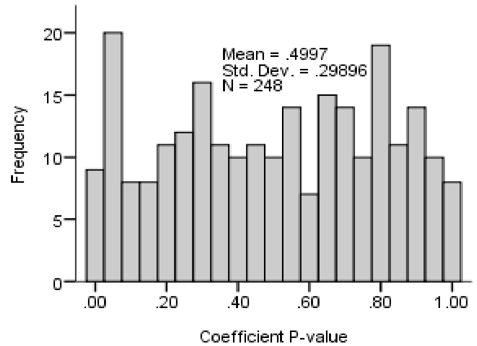


Figure G3. 98: Scotland Out of Hours Counts - distribution of the autoregressive point-estimate P-values, Excess.

Figures G3.92 to G3.98 display fairly uniformed point-estimate P-value distributions. Bar Emergency Consultations and Out of Hours Counts, all other medical contacts have point-estimate mean P-values of 0.5 or higher inferring no association between environmental triggers and daily counts of excess (see Table G.88 for supporting evidence).

Table G. 88: Scotland autoregressive mean point-estimate P-value's distance from the null value (0.5).

Medical Contact	Excess	0.5-Excess
All Counts	0.53	-0.03
Acute Visits	0.53	-0.03
Casualty Counts	0.52	-0.02
Emergency Consultations	0.47	0.03
Emergency Counts	0.51	-0.01
Out of Hours Counts	0.50	0.00

Lag effects

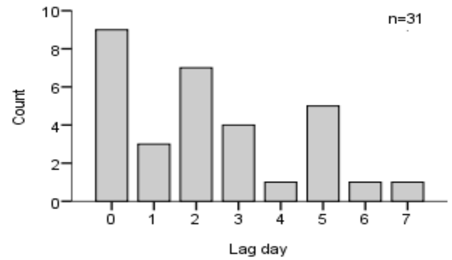


Figure G3. 99: Scotland All Counts - number of the most significant autoregressive point-estimates per environmental exposure by lag day, Excess.

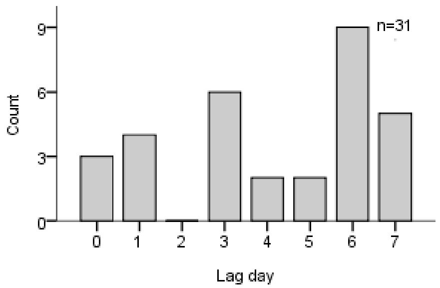


Figure G3. 100: Scotland Acute Visits - number of the most significant autoregressive point-estimates per environmental exposure by lag day, Excess.

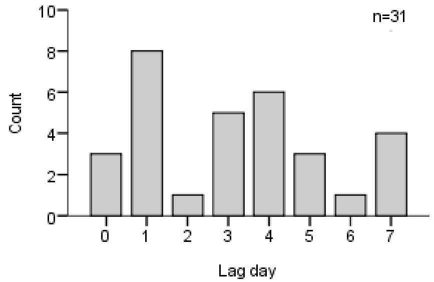


Figure G3. 101: Scotland Casualty Counts - number of the most significant autoregressive point-estimates per environmental exposure by lag day, Excess.

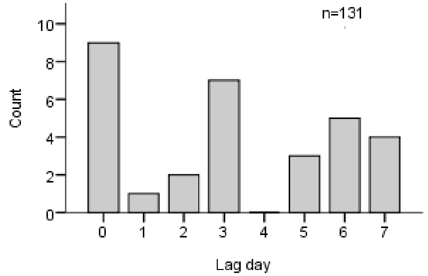


Figure G2. 1: Scotland Emergency Consultations - number of the most significant autoregressive point-estimates per environmental exposure by lag day, Excess.

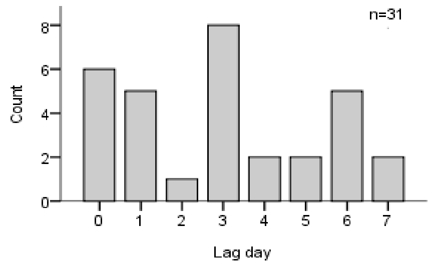


Figure G3. 102: Scotland Emergency Counts - number of the most significant autoregressive point-estimates per environmental exposure by lag day, Excess.

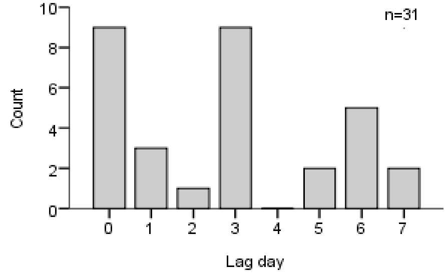


Figure G3. 103: Scotland Out of Hours Counts - number of the most significant autoregressive point-estimates per environmental exposure by lag day, Excess.

Quite a high number of most significant point-estimates land on lag day 0 to 3. For All Counts excess, the most noticeable lag day with the highest number of statistically significant point-estimates was lag day 0.

G4. Autoregressive point-estimates and P-values

Point-estimates standardised thus every unit increase was comparable no matter what measure was originally used. England and Wales = change in daily counts per unit increase. Scotland, Trent Region and Sheffield = standardised percentage change per unit increase.

G4.1. England and Wales autoregressive point-estimates and P-values

Table G. 89: England and Wales All Counts Asthmatics – Autoregressive Standardised estimates and P-values by lag day per exposure.

Exposure		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min'	2.09	0.04	-0.62	0.54	0.04	0.97	-0.52	0.60	1.02	0.31	2.51	0.01	-0.31	0.76	2.78	0.01
	NO_2 Min'	1.74	0.08	0.70	0.48	0.10	0.92	1.95	0.05	-0.94	0.35	-0.39	0.70	1.59	0.11	1.94	0.05
	NOD Min'	2.20	0.03	0.23	0.82	0.30	0.76	0.36	0.72	0.17	0.87	0.77	0.44	0.49	0.62	2.93	0.00
	SO_2 Min'	0.34	0.74	2.45	0.01	1.58	0.12	0.20	0.84	0.63	0.53	0.20	0.84	0.55	0.59	1.01	0.31
	PM_{10} Min'	1.37	0.17	0.70	0.49	1.36	0.18	0.50	0.62	0.47	0.64	-0.99	0.32	-0.12	0.90	1.89	0.06
	O_3 Min'	-0.42	0.68	-1.20	0.23	1.58	0.11	-2.19	0.03	0.35	0.73	-0.89	0.37	-0.54	0.59	-0.84	0.40
	CO Min'	0.69	0.49	-0.24	0.81	1.49	0.14	-0.92	0.36	2.05	0.04	0.15	0.89	-0.20	0.84	1.09	0.27
	NO Mean	2.51	0.01	-0.43	0.67	0.50	0.62	0.99	0.32	-0.68	0.50	1.14	0.26	-0.05	0.96	3.32	0.00
	NO_2 Mean	1.47	0.14	0.60	0.55	-0.37	0.72	1.86	0.06	-0.33	0.75	0.69	0.49	0.14	0.89	1.92	0.06
	NOD Mean	2.39	0.02	-0.18	0.85	0.32	0.75	1.31	0.19	-0.68	0.50	1.21	0.23	-0.04	0.97	3.13	0.00
	SO_2 Mean	2.07	0.04	0.59	0.56	1.75	0.08	0.70	0.48	0.50	0.62	0.68	0.50	0.52	0.60	1.53	0.13
	PM_{10} Mean	1.99	0.05	0.63	0.53	0.30	0.77	1.33	0.18	0.17	0.87	-0.66	0.51	-0.43	0.67	2.85	0.00
	O_3 Mean	-0.97	0.33	-0.37	0.71	0.65	0.52	-1.50	0.13	0.31	0.76	-0.47	0.64	-1.09	0.28	-0.62	0.53
	CO Mean	1.68	0.09	-0.42	0.67	0.34	0.73	1.48	0.14	-0.44	0.66	0.50	0.62	0.61	0.54	2.93	0.00
	NO Max'	0.70	0.49	0.39	0.69	0.36	0.72	1.04	0.30	-0.88	0.38	1.38	0.17	1.46	0.14	1.99	0.05
	NO_2 Max'	0.54	0.59	1.04	0.30	-0.60	0.55	1.53	0.13	-0.39	0.70	1.90	0.06	0.24	0.81	2.13	0.03
	NOD Max'	0.84	0.40	0.24	0.81	0.45	0.65	1.05	0.29	-0.79	0.43	1.70	0.09	1.30	0.19	2.18	0.03
	SO_2 Max'	1.53	0.13	1.36	0.18	1.04	0.30	1.47	0.14	0.42	0.68	0.91	0.36	0.87	0.39	1.21	0.23
	PM_{10} Max'	2.06	0.04	1.18	0.24	0.38	0.71	1.01	0.31	1.06	0.29	-1.08	0.28	0.79	0.43	1.88	0.06
	O_3 Max'	-1.85	0.06	1.85	0.06	-1.65	0.10	0.39	0.70	-0.13	0.90	-0.57	0.57	-1.65	0.10	0.68	0.50
	CO Max'	1.60	0.11	-0.29	0.78	0.20	0.84	0.55	0.58	-0.25	0.80	0.06	0.95	2.47	0.01	2.54	0.01
Weather	Temp Min'	3.68	0.00	-1.05	0.30	1.41	0.16	-1.46	0.14	0.06	0.95	-0.36	0.72	-0.24	0.81	1.32	0.19
	Temp Max'	3.85	0.00	0.24	0.81	0.54	0.59	-0.85	0.40	-0.71	0.48	-0.61	0.54	-0.92	0.36	2.11	0.04
	Sun	0.62	0.53	0.53	0.60	-0.35	0.73	0.18	0.86	-0.24	0.81	0.04	0.97	0.17	0.87	0.44	0.66
	Rain	-1.48	0.14	-0.08	0.93	-0.34	0.73	-1.16	0.25	0.09	0.92	-0.47	0.64	0.54	0.59	-0.15	0.88
	Pressure	1.20	0.23	0.87	0.39	1.17	0.24	-0.24	0.81	-0.15	0.88	1.96	0.05	-0.76	0.45	-0.09	0.93
	Wind	3.03	0.00	-0.61	0.54	0.97	0.33	-1.40	0.16	0.27	0.79	0.62	0.54	-1.46	0.14	-1.35	0.18
Pollen	Grass	1.99	0.05	2.04	0.04	2.11	0.04	0.28	0.78	3.40	0.00	-1.85	0.06	0.18	0.85	2.01	0.04

Table G. 90: England and Wales All Counts Non-asthmatics – Autoregressive Standardised estimates and P-values by lag day per exposure.

Exposure		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min'	2.63	0.01	-1.77	0.08	0.72	0.47	0.26	0.80	0.67	0.50	2.14	0.03	-2.19	0.03	1.98	0.05
	NO_2 Min'	2.78	0.01	0.41	0.68	-0.24	0.81	2.16	0.03	-0.60	0.55	-0.03	0.98	-0.02	0.98	0.78	0.43
	NOD Min'	3.17	0.00	-0.57	0.57	0.47	0.64	1.07	0.28	-0.04	0.97	0.95	0.34	-1.42	0.16	1.64	0.10
	SO_2 Min'	1.61	0.11	2.66	0.01	0.36	0.72	0.05	0.96	0.55	0.58	-0.14	0.89	-0.62	0.54	1.80	0.07
	PM_{10} Min'	2.35	0.02	1.38	0.17	0.42	0.68	1.09	0.27	1.20	0.23	-0.78	0.44	-0.97	0.33	1.36	0.18
	O_3 Min'	-0.14	0.89	-1.83	0.07	0.70	0.49	-1.47	0.14	-0.65	0.51	-0.99	0.32	0.97	0.33	-0.49	0.62
	CO Min'	1.63	0.10	-0.18	0.85	-0.11	0.91	-0.55	0.59	2.06	0.04	0.41	0.69	-0.88	0.38	0.57	0.57
	NO Mean	2.31	0.02	-0.68	0.50	0.45	0.65	1.20	0.23	-0.07	0.95	0.66	0.51	-2.14	0.03	2.86	0.00
	NO_2 Mean	2.67	0.01	0.59	0.55	-0.88	0.38	2.62	0.01	-0.77	0.44	0.82	0.41	-1.17	0.24	1.34	0.18
	NOD Mean	2.53	0.01	-0.34	0.73	0.15	0.88	1.67	0.10	-0.26	0.79	0.79	0.43	-1.99	0.05	2.63	0.01
	SO_2 Mean	3.22	0.00	0.02	0.99	1.94	0.05	0.68	0.50	1.24	0.22	1.05	0.29	-1.80	0.07	2.99	0.00
	PM_{10} Mean	2.99	0.00	0.18	0.86	1.09	0.28	0.64	0.52	0.19	0.85	0.31	0.75	-2.62	0.01	3.25	0.00
	O_3 Mean	-1.62	0.11	0.35	0.73	0.40	0.69	-1.96	0.05	0.07	0.95	-1.23	0.22	1.16	0.25	-0.24	0.81
	CO Mean	1.96	0.05	-0.15	0.88	0.32	0.75	1.19	0.24	-0.35	0.73	1.08	0.28	-1.87	0.06	3.22	0.00
	NO Max'	0.78	0.44	0.38	0.70	-0.12	0.90	1.40	0.16	-0.40	0.69	0.98	0.33	-0.57	0.57	2.00	0.05
	NO_2 Max'	1.00	0.32	1.18	0.24	-0.53	0.60	1.85	0.06	-0.64	0.52	2.14	0.03	-1.44	0.15	1.87	0.06
	NOD Max'	0.77	0.44	0.47	0.64	-0.17	0.87	1.46	0.14	-0.40	0.69	1.39	0.17	-0.92	0.36	2.26	0.02
	SO_2 Max'	2.85	0.00	0.74	0.46	1.19	0.23	1.91	0.06	0.64	0.52	1.75	0.08	-1.32	0.19	1.95	0.05
	PM_{10} Max'	2.62	0.01	0.64	0.52	0.92	0.36	0.86	0.39	0.69	0.49	0.20	0.84	-0.21	0.84	2.14	0.03
	O_3 Max'	-0.98	0.33	2.18	0.03	0.08	0.94	-1.21	0.23	-0.42	0.67	-0.79	0.43	0.32	0.75	1.00	0.32
	CO Max'	0.49	0.62	0.00	1.00	0.24	0.81	0.62	0.54	-0.71	0.48	1.36	0.17	-0.71	0.48	2.97	0.00
Weather	Temp Min'	3.08	0.00	-0.48	0.63	0.83	0.40	-0.96	0.34	-0.78	0.44	0.12	0.91	1.53	0.13	0.66	0.51
	Temp Max'	4.46	0.00	-0.51	0.61	0.79	0.43	-0.46	0.65	-1.12	0.26	-0.73	0.47	-0.17	0.87	1.39	0.16
	Sun	0.49	0.62	-1.11	0.27	0.69	0.49	-1.51	0.13	1.42	0.16	0.42	0.67	0.22	0.83	-1.31	0.19
	Rain	-1.51	0.13	-2.40	0.02	0.14	0.89	-0.65	0.51	-0.25	0.80	-1.46	0.14	0.28	0.78	0.81	0.42
	Pressure	0.82	0.41	1.28	0.20	0.18	0.86	0.07	0.94	0.62	0.54	1.24	0.22	0.15	0.88	-0.92	0.36
	Wind	2.37	0.02	-0.26	0.80	0.90	0.37	-0.95	0.34	-0.15	0.88	-0.26	0.79	-0.30	0.77	0.87	0.38
Pollen	Grass	2.78	0.01	2.58	0.01	3.17	0.00	-0.61	0.54	3.28	0.00	-1.21	0.23	0.02	0.99	2.56	0.01

Table G. 91: England and Wales Acute Visits Asthmatics – Autoregressive Standardised estimates and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
	Exposure	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min'	-0.59	0.56	1.73	0.08	-0.33	0.74	-1.17	0.24	1.06	0.29	0.56	0.57	-0.33	0.74	0.36	0.72
	NO_2 Min'	0.25	0.80	-0.30	0.76	-0.22	0.83	1.02	0.31	-0.73	0.47	0.10	0.92	-0.10	0.92	-0.52	0.60
	NOD Min'	-0.33	0.74	1.08	0.28	-0.56	0.57	-0.17	0.86	0.45	0.65	-0.13	0.90	-0.32	0.75	0.27	0.79
	SO_2 Min'	-1.24	0.21	-0.14	0.89	0.32	0.75	0.76	0.45	-0.41	0.68	-1.44	0.15	0.54	0.59	-0.40	0.69
	PM_{10} Min'	0.60	0.55	-1.08	0.28	-0.48	0.63	0.61	0.55	-0.12	0.91	-0.56	0.57	0.73	0.47	0.55	0.59
	O_3 Min'	-1.23	0.22	-0.53	0.59	0.42	0.67	0.15	0.88	-1.07	0.29	1.36	0.17	-0.56	0.58	-0.88	0.38
	CO Min'	-0.19	0.85	0.02	0.98	-0.85	0.40	-0.84	0.40	1.06	0.29	0.05	0.96	1.95	0.05	-1.27	0.20
	NO Mean	0.56	0.58	-0.33	0.74	1.30	0.19	-1.33	0.18	-0.27	0.79	0.45	0.65	-0.18	0.86	0.65	0.52
	NO_2 Mean	1.23	0.22	-1.37	0.17	0.85	0.39	0.78	0.44	-0.97	0.33	0.32	0.75	-0.24	0.81	1.14	0.25
	NOD Mean	0.82	0.41	-0.77	0.44	1.39	0.16	-0.95	0.34	-0.47	0.64	0.49	0.62	-0.23	0.82	0.81	0.42
	SO_2 Mean	-1.21	0.23	-1.20	0.23	1.78	0.08	-0.96	0.34	0.21	0.84	-1.31	0.19	-1.47	0.14	3.44	0.00
	PM_{10} Mean	1.86	0.06	-1.85	0.06	0.77	0.44	0.19	0.85	-0.94	0.35	-0.26	0.80	0.74	0.46	0.44	0.66
	O_3 Mean	-0.41	0.68	-0.88	0.38	0.66	0.51	-0.29	0.77	-0.47	0.64	1.33	0.18	-0.06	0.95	-0.16	0.87
	CO Mean	0.66	0.51	-1.43	0.15	1.28	0.20	-1.20	0.23	0.04	0.97	-0.14	0.89	1.12	0.26	-0.63	0.53
	NO Max'	1.53	0.13	-0.29	0.77	1.32	0.19	-1.26	0.21	-0.91	0.37	0.52	0.60	0.36	0.72	0.20	0.84
	NO_2 Max'	0.42	0.67	0.48	0.64	1.03	0.30	0.34	0.73	-1.38	0.17	0.50	0.62	0.31	0.76	1.24	0.22
	NOD Max'	1.29	0.20	-0.11	0.92	1.38	0.17	-1.30	0.19	-0.84	0.40	0.53	0.60	0.25	0.80	0.41	0.68
	SO_2 Max'	-1.13	0.26	-1.23	0.22	1.03	0.30	-0.14	0.89	0.70	0.49	-1.40	0.16	-0.63	0.53	1.28	0.20
	PM_{10} Max'	1.09	0.28	0.38	0.70	0.26	0.79	0.02	0.98	-0.41	0.68	-0.39	0.70	0.72	0.47	0.22	0.83
	O_3 Max'	0.89	0.37	-1.10	0.27	-0.14	0.89	0.15	0.88	-0.15	0.88	0.70	0.48	0.28	0.78	0.90	0.37
	CO Max'	1.55	0.12	-0.50	0.62	1.22	0.22	-1.29	0.20	-0.74	0.46	0.90	0.37	0.69	0.49	0.00	1.00
Weather	Temp Min'	0.74	0.46	0.26	0.80	-0.48	0.63	0.70	0.49	-0.13	0.89	-0.99	0.32	0.13	0.89	-0.68	0.50
	Temp Max'	-1.12	0.27	0.03	0.98	2.20	0.03	-1.80	0.07	0.31	0.76	1.25	0.21	-2.11	0.04	0.40	0.69
	Sun	0.45	0.65	-0.96	0.34	-0.10	0.92	0.07	0.94	0.49	0.62	0.49	0.62	-0.58	0.56	-0.12	0.91
	Rain	-0.30	0.76	1.92	0.06	0.90	0.37	0.94	0.35	-0.10	0.92	-0.60	0.55	0.11	0.91	0.77	0.44
	Pressure	-0.61	0.54	1.34	0.18	-1.72	0.09	-0.92	0.36	1.82	0.07	-1.04	0.30	0.20	0.84	-0.39	0.69
	Wind speed	-0.85	0.40	-0.73	0.47	0.55	0.58	0.14	0.89	-0.75	0.46	1.04	0.30	-0.29	0.77	0.59	0.55
Pollen	Grass	0.05	0.96	0.15	0.88	0.71	0.48	0.65	0.52	1.09	0.28	0.57	0.57	-0.36	0.72	-1.11	0.27

Table G. 92: England and Wales Acute Visits Non-asthmatics – Autoregressive Standardised estimates and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
	Exposure	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min'	1.75	0.08	0.52	0.60	-0.90	0.37	-0.68	0.50	2.16	0.03	5.50	0.00	-1.98	0.05	-0.86	0.39
	NO_2 Min'	1.04	0.30	0.52	0.60	-0.27	0.79	0.86	0.39	2.00	0.05	-0.55	0.58	0.07	0.94	-1.37	0.17
	NOD Min'	1.42	0.16	0.93	0.35	-0.95	0.34	0.06	0.96	2.39	0.02	2.45	0.01	-1.46	0.15	-1.06	0.29
	SO_2 Min'	-0.57	0.57	1.74	0.08	-1.49	0.14	0.34	0.74	1.25	0.21	-0.01	0.99	-0.34	0.74	-0.36	0.72
	PM_{10} Min'	0.03	0.97	-0.48	0.64	-0.26	0.79	1.19	0.23	2.40	0.02	-0.46	0.64	0.61	0.54	-0.91	0.37
	O_3 Min'	-0.75	0.45	-0.13	0.90	-0.73	0.47	-1.80	0.07	0.38	0.70	1.29	0.20	0.18	0.86	0.46	0.65
	CO Min'	1.70	0.09	-0.39	0.69	-1.02	0.31	0.02	0.99	1.29	0.20	1.94	0.05	-0.26	0.80	-1.87	0.06
	NO Mean	1.58	0.11	0.47	0.64	0.14	0.89	-1.19	0.24	1.89	0.06	-0.40	0.69	0.72	0.47	-2.30	0.02
	NO_2 Mean	0.71	0.48	0.80	0.43	0.11	0.91	1.08	0.28	1.33	0.19	-0.88	0.38	0.56	0.58	-1.02	0.31
	NOD Mean	1.45	0.15	0.49	0.62	0.31	0.76	-0.78	0.44	1.91	0.06	-0.60	0.55	0.78	0.44	-2.13	0.03
	SO_2 Mean	-1.44	0.15	0.65	0.52	-0.81	0.42	0.15	0.88	1.90	0.06	0.99	0.32	-1.26	0.21	3.78	0.00
	PM_{10} Mean	1.79	0.07	-2.09	0.04	0.78	0.43	0.08	0.94	2.37	0.02	-1.33	0.19	0.48	0.63	-0.44	0.66
	O_3 Mean	-0.82	0.41	-0.23	0.82	-0.18	0.86	-1.06	0.29	-0.44	0.66	0.24	0.81	0.28	0.78	1.41	0.16
	CO Mean	2.25	0.02	-0.78	0.44	1.00	0.32	-0.98	0.33	1.89	0.06	-0.92	0.36	0.45	0.65	-2.92	0.00
	NO Max'	2.88	0.00	-0.24	0.81	0.78	0.44	-1.18	0.24	1.45	0.15	-1.53	0.13	1.00	0.32	-1.34	0.18
	NO_2 Max'	1.05	0.30	1.54	0.12	-0.06	0.95	-0.07	0.95	2.05	0.04	-1.54	0.13	1.39	0.17	-0.88	0.38
	NOD Max'	2.75	0.01	0.09	0.93	0.65	0.51	-1.14	0.25	1.62	0.11	-1.61	0.11	1.16	0.24	-1.43	0.15
	SO_2 Max'	-2.31	0.02	0.22	0.83	0.39	0.70	-0.97	0.33	3.34	0.00	1.18	0.24	-0.33	0.74	1.65	0.10
	PM_{10} Max'	1.81	0.07	-1.12	0.26	-0.42	0.67	0.70	0.48	1.83	0.07	-1.82	0.07	1.00	0.32	-0.29	0.78
	O_3 Max'	-0.28	0.78	-0.60	0.55	0.65	0.52	-0.52	0.60	-0.74	0.46	-0.64	0.52	0.07	0.95	2.38	0.02
	CO Max'	2.98	0.00	-0.10	0.92	0.23	0.82	-1.53	0.13	2.21	0.03	-1.41	0.16	0.14	0.89	-2.19	0.03
Weather	Temp Min'	-0.17	0.86	-0.76	0.45	-1.03	0.31	2.14	0.03	-0.34	0.73	-0.74	0.46	-0.37	0.71	-0.26	0.79
	Temp Max'	-0.42	0.67	0.11	0.92	0.14	0.89	0.14	0.89	-0.14	0.89	0.00	1.00	0.34	0.74	-1.16	0.25
	Sun	0.96	0.34	0.42	0.68	0.13	0.90	0.23	0.82	-0.64	0.52	1.20	0.23	-0.10	0.92	-0.46	0.64
	Rain	0.06	0.95	-0.03	0.98	1.18	0.24	-0.52	0.60	0.93	0.35	-1.31	0.19	1.31	0.19	0.44	0.66
	Pressure	0.96	0.34	-0.27	0.79	-0.04	0.96	-0.42	0.68	-0.55	0.58	0.52	0.60	0.60	0.55	-0.73	0.46
	Wind speed	0.07	0.94	-0.76	0.45	-0.82	0.41	-0.93	0.35	-0.53	0.59	1.44	0.15	0.95	0.34	0.32	0.75
Pollen	Grass	3.46	0.00	-0.98	0.33	-0.17	0.87	-0.72	0.48	0.28	0.78	0.39	0.70	-0.57	0.57	-0.21	0.84

Table G. 93: England and Wales Casualty Counts Asthmatics – Autoregressive Standardised estimates and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	0.81	0.42	-1.66	0.10	0.03	0.98	-1.10	0.27	-0.79	0.43	2.81	0.01	-1.90	0.06	1.19	0.24
	NO_2 Min’	1.24	0.21	-1.06	0.29	0.99	0.32	-0.51	0.61	-2.27	0.02	1.18	0.24	-1.58	0.12	0.73	0.47
	NOD Min’	1.00	0.32	-1.18	0.24	0.58	0.56	-0.89	0.37	-1.50	0.13	2.08	0.04	-2.11	0.04	1.05	0.29
	SO_2 Min’	0.14	0.89	0.33	0.74	-0.65	0.51	-2.01	0.04	0.42	0.67	0.42	0.67	-0.27	0.78	0.28	0.78
	PM_{10} Min’	1.66	0.10	1.08	0.28	-1.67	0.10	-0.50	0.62	0.05	0.96	-0.59	0.56	-0.41	0.68	1.08	0.28
	O_3 Min’	0.29	0.77	-0.73	0.47	1.64	0.10	-0.04	0.97	0.46	0.65	1.55	0.12	0.55	0.58	0.10	0.92
	CO Min’	1.27	0.20	0.24	0.81	-0.89	0.37	-0.60	0.55	-1.29	0.20	1.18	0.24	-0.84	0.40	1.23	0.22
	NO Mean	-0.17	0.86	-0.40	0.69	0.32	0.75	0.39	0.70	-1.47	0.14	1.13	0.26	-1.08	0.28	1.34	0.18
	NO_2 Mean	0.52	0.60	0.55	0.59	-0.44	0.66	-0.16	0.87	-0.94	0.35	0.07	0.94	-0.30	0.77	0.93	0.35
	NOD Mean	0.12	0.91	-0.29	0.78	0.28	0.78	0.27	0.79	-1.58	0.11	0.98	0.33	-0.99	0.32	1.34	0.18
	SO_2 Mean	-0.20	0.85	0.47	0.64	0.21	0.83	0.03	0.97	-0.35	0.73	-0.08	0.94	-0.71	0.48	0.93	0.35
	PM_{10} Mean	1.16	0.25	1.24	0.21	-1.09	0.27	-0.56	0.58	-0.77	0.44	0.19	0.85	-0.18	0.85	0.75	0.46
	O_3 Mean	0.04	0.97	-0.02	0.99	0.44	0.66	-1.16	0.25	1.46	0.15	0.43	0.66	-0.24	0.81	0.26	0.79
	CO Mean	-0.23	0.82	0.41	0.68	0.24	0.81	-0.02	0.98	-1.15	0.25	0.37	0.72	-1.12	0.27	1.67	0.09
	NO Max’	-0.29	0.77	0.23	0.82	1.01	0.31	-0.07	0.95	-1.28	0.20	0.51	0.61	-0.09	0.93	0.05	0.96
	NO_2 Max’	-0.02	0.98	1.30	0.19	0.07	0.95	-1.21	0.23	-0.18	0.86	-0.56	0.58	-0.14	0.89	1.11	0.27
	NOD Max’	-0.39	0.70	0.59	0.56	0.84	0.40	-0.20	0.84	-1.25	0.21	0.33	0.74	-0.06	0.96	0.24	0.81
	SO_2 Max’	-0.64	0.53	0.68	0.50	0.48	0.63	-0.28	0.78	0.45	0.65	-0.60	0.55	-0.62	0.54	0.46	0.65
	PM_{10} Max’	0.15	0.88	2.31	0.02	0.37	0.71	-1.61	0.11	-0.69	0.49	0.72	0.47	-0.35	0.73	0.55	0.58
	O_3 Max’	-0.27	0.79	0.61	0.54	-1.13	0.26	0.21	0.84	1.61	0.11	-0.92	0.36	-0.23	0.82	0.64	0.53
	CO Max’	-0.69	0.49	-0.14	0.89	0.45	0.65	-0.22	0.82	-0.19	0.85	-0.14	0.89	-0.20	0.84	0.26	0.79
Weather	Temp Min’	0.31	0.76	-0.72	0.47	-0.56	0.58	-0.06	0.95	0.94	0.35	1.08	0.28	0.14	0.89	0.73	0.47
	Temp Max’	0.78	0.43	-0.08	0.94	-1.86	0.06	1.32	0.19	-1.45	0.15	-0.25	0.80	1.96	0.05	1.75	0.08
	Sun	0.75	0.45	-0.20	0.84	-0.83	0.41	-0.19	0.85	0.33	0.74	-0.74	0.46	1.70	0.09	0.35	0.73
	Rain	-0.83	0.41	0.04	0.97	-1.05	0.30	0.84	0.40	-0.14	0.89	1.12	0.26	0.36	0.72	-0.36	0.72
	Pressure	1.69	0.09	0.96	0.34	-0.34	0.74	0.86	0.39	-1.49	0.14	-0.16	0.87	1.54	0.12	-1.18	0.24
	Wind speed	3.11	0.00	-1.22	0.22	2.02	0.04	-1.14	0.26	1.65	0.10	-0.38	0.70	0.58	0.57	0.34	0.73
Pollen	Grass	1.98	0.05	1.60	0.11	-2.24	0.03	-0.88	0.38	0.24	0.81	-0.34	0.73	1.61	0.11	0.73	0.47

Table G. 94: England and Wales Casualty Counts Non-asthmatics – Autoregressive Standardised estimates and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	-0.31	0.75	1.17	0.24	-0.71	0.48	-0.69	0.49	-0.20	0.84	-0.99	0.32	0.26	0.80	0.47	0.64
	NO_2 Min’	-1.02	0.31	1.49	0.14	-0.33	0.74	0.79	0.43	-0.26	0.80	-0.23	0.82	-1.51	0.13	1.88	0.06
	NOD Min’	-0.75	0.45	1.78	0.08	-0.77	0.44	0.30	0.76	-0.02	0.98	-0.67	0.50	-0.70	0.49	0.96	0.34
	SO_2 Min’	-0.72	0.47	0.77	0.44	-0.19	0.85	0.33	0.74	0.13	0.90	0.05	0.96	-0.55	0.58	0.74	0.46
	PM_{10} Min’	1.35	0.18	-0.36	0.72	-0.02	0.99	0.69	0.49	-0.52	0.60	-1.14	0.25	0.05	0.96	1.55	0.12
	O_3 Min’	0.72	0.47	0.86	0.39	-0.82	0.41	-2.41	0.02	1.19	0.24	0.56	0.58	-0.54	0.59	-0.55	0.58
	CO Min’	-0.46	0.65	1.95	0.05	-1.20	0.23	0.51	0.61	-0.46	0.64	-0.56	0.58	0.39	0.70	0.17	0.87
	NO Mean	-1.64	0.10	1.39	0.17	0.34	0.74	-0.39	0.70	-0.47	0.64	0.46	0.64	-0.95	0.34	0.28	0.78
	NO_2 Mean	-2.04	0.04	1.50	0.13	-0.35	0.73	1.22	0.22	-0.76	0.45	0.91	0.36	-1.85	0.06	2.03	0.04
	NOD Mean	-1.85	0.07	1.55	0.12	0.17	0.87	0.02	0.98	-0.59	0.55	0.58	0.57	-1.17	0.24	0.73	0.47
	SO_2 Mean	-1.65	0.10	0.75	0.45	0.40	0.69	0.65	0.52	-0.02	0.98	-0.22	0.82	-0.02	0.98	0.83	0.41
	PM_{10} Mean	-0.20	0.85	0.68	0.50	0.56	0.58	0.76	0.45	-0.84	0.40	-0.93	0.35	-0.29	0.77	1.68	0.09
	O_3 Mean	1.84	0.07	-1.25	0.21	1.17	0.24	-3.45	0.00	1.87	0.06	-0.26	0.79	0.84	0.40	-0.89	0.37
	CO Mean	-2.01	0.04	1.59	0.11	-0.20	0.84	0.36	0.72	-0.42	0.68	0.29	0.77	-1.23	0.22	1.16	0.24
	NO Max’	-1.85	0.07	2.02	0.04	-0.04	0.97	-0.15	0.88	-0.79	0.43	1.26	0.21	-1.20	0.23	0.46	0.64
	NO_2 Max’	-1.80	0.07	0.90	0.37	0.51	0.61	-0.07	0.94	0.09	0.93	0.56	0.57	-1.48	0.14	2.44	0.02
	NOD Max’	-1.98	0.05	2.04	0.04	0.00	1.00	-0.12	0.90	-0.74	0.46	1.23	0.22	-1.35	0.18	0.81	0.42
	SO_2 Max’	-1.07	0.29	0.48	0.63	0.24	0.81	-0.31	0.76	-0.02	0.98	0.86	0.39	-0.21	0.83	0.60	0.55
	PM_{10} Max’	-0.38	0.71	1.63	0.10	0.99	0.32	-0.58	0.56	-0.74	0.46	0.12	0.90	-0.32	0.75	0.96	0.34
	O_3 Max’	0.39	0.69	-1.29	0.20	2.44	0.02	-1.60	0.11	0.52	0.60	-0.14	0.89	1.07	0.28	-0.39	0.70
	CO Max’	-1.84	0.07	1.03	0.30	0.13	0.90	-0.21	0.83	-0.37	0.71	0.41	0.68	-0.25	0.80	-0.17	0.86
Weather	Temp Min’	0.56	0.58	0.59	0.56	1.07	0.29	-1.39	0.17	0.15	0.88	3.58	0.00	-1.53	0.13	-0.55	0.58
	Temp Max’	2.45	0.01	-1.09	0.27	-0.49	0.63	2.16	0.03	-2.08	0.04	1.33	0.18	1.41	0.16	0.77	0.44
	Sun	0.82	0.41	-1.36	0.18	-0.52	0.60	0.60	0.55	-0.15	0.88	-0.90	0.37	2.69	0.01	2.08	0.04
	Rain	-1.18	0.24	-0.81	0.42	-1.56	0.12	0.12	0.91	-0.46	0.65	1.10	0.27	-1.35	0.18	-3.24	0.00
	Pressure	1.07	0.29	0.35	0.73	-0.94	0.35	1.70	0.09	-1.49	0.14	1.43	0.15	0.55	0.58	-0.74	0.46
	Wind speed	2.01	0.04	0.51	0.61	-0.21	0.83	-0.75	0.46	1.45	0.15	-0.35	0.72	-0.53	0.60	0.44	0.66
Pollen	Grass	1.32	0.19	0.06	0.95	-0.11	0.91	-0.06	0.95	1.04	0.30	1.47	0.14	0.92	0.36	-1.11	0.27

Table G. 95: England and Wales Emergency Consultations Asthmatics – Autoregressive Standardised estimates and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	2.01	0.05	-3.35	0.00	0.00	1.00	1.36	0.18	-0.41	0.68	-0.40	0.69	0.85	0.39	0.31	0.76
	NO_2 Min’	0.74	0.46	-0.93	0.35	0.84	0.40	-0.16	0.88	-0.39	0.70	0.53	0.60	-0.28	0.78	2.13	0.03
	NOD Min’	1.85	0.06	-2.36	0.02	0.93	0.35	0.34	0.74	-0.58	0.56	-0.14	0.89	1.11	0.27	1.13	0.26
	SO_2 Min’	-0.08	0.94	-0.04	0.97	0.49	0.63	2.41	0.02	-1.56	0.12	0.33	0.74	1.02	0.31	-0.02	0.98
	PM_{10} Min’	0.74	0.46	-0.11	0.91	-0.46	0.65	-1.83	0.07	2.45	0.01	0.49	0.62	-0.40	0.69	0.88	0.38
	O_3 Min’	-0.29	0.78	1.99	0.05	-1.98	0.05	0.62	0.54	0.78	0.44	-0.90	0.37	0.33	0.74	0.09	0.93
	CO Min’	0.50	0.62	-0.78	0.44	-0.46	0.65	-0.88	0.38	0.86	0.39	-1.10	0.27	0.59	0.55	0.85	0.39
	NO Mean	1.54	0.12	-2.08	0.04	0.92	0.36	-0.43	0.66	1.40	0.16	-2.07	0.04	1.60	0.11	0.98	0.33
	NO_2 Mean	0.97	0.33	-0.97	0.33	0.57	0.57	-0.45	0.66	-0.08	0.94	-0.70	0.49	1.48	0.14	-0.41	0.69
	NOD Mean	1.52	0.13	-1.89	0.06	0.89	0.37	-0.46	0.65	1.10	0.27	-1.88	0.06	1.74	0.08	0.65	0.51
	SO_2 Mean	1.31	0.19	-0.76	0.45	0.93	0.35	1.03	0.30	-0.45	0.65	0.01	0.99	1.00	0.32	-0.75	0.45
	PM_{10} Mean	1.27	0.20	-0.81	0.42	-0.64	0.52	0.01	1.00	1.97	0.05	-2.16	0.03	1.92	0.06	-0.01	0.99
	O_3 Mean	-0.90	0.37	2.17	0.03	-1.91	0.06	0.68	0.50	-0.20	0.84	0.74	0.46	0.17	0.87	-0.68	0.50
	CO Mean	0.66	0.51	-0.68	0.50	0.49	0.63	-0.67	0.51	0.15	0.88	-0.52	0.61	0.03	0.98	1.51	0.13
	NO Max’	0.62	0.54	-1.47	0.14	1.78	0.08	-0.26	0.79	-0.61	0.54	-0.17	0.87	1.42	0.16	1.06	0.29
	NO_2 Max’	0.51	0.61	-0.77	0.44	0.94	0.35	-1.09	0.27	-0.58	0.56	0.82	0.41	0.72	0.47	0.07	0.95
	NOD Max’	0.83	0.41	-1.78	0.08	1.94	0.05	-0.46	0.64	-0.60	0.55	-0.15	0.88	1.40	0.16	1.01	0.31
	SO_2 Max’	-0.52	0.60	-0.02	0.98	0.91	0.36	0.50	0.62	-0.23	0.82	-0.20	0.84	0.24	0.81	-0.73	0.46
	PM_{10} Max’	1.83	0.07	-0.54	0.59	-0.50	0.62	0.70	0.49	0.12	0.90	-0.36	0.72	1.43	0.15	-0.07	0.95
	O_3 Max’	-0.42	0.67	1.99	0.05	-0.42	0.68	-0.57	0.57	-1.79	0.07	1.78	0.08	0.28	0.78	-0.83	0.40
	CO Max’	0.55	0.58	-0.65	0.52	0.80	0.42	-0.78	0.43	-0.21	0.83	-0.56	0.58	0.85	0.40	1.08	0.28
Weather	Temp Min’	1.51	0.13	0.20	0.84	-0.62	0.54	1.86	0.06	-0.86	0.39	1.22	0.22	-2.01	0.05	1.09	0.28
	Temp Max’	1.01	0.31	1.55	0.12	-2.77	0.01	1.85	0.07	0.61	0.54	1.25	0.21	-2.84	0.01	1.25	0.21
	Sun	-0.07	0.94	0.46	0.64	-1.52	0.13	0.29	0.77	0.64	0.52	-0.03	0.98	-0.93	0.35	0.28	0.78
	Rain	-0.13	0.90	-1.03	0.30	0.53	0.59	-1.00	0.32	-0.25	0.80	-0.65	0.51	2.36	0.02	-0.34	0.74
	Pressure	1.26	0.21	-1.48	0.14	1.14	0.26	0.72	0.47	0.08	0.94	0.18	0.85	-0.25	0.80	0.12	0.90
	Wind speed	1.59	0.11	0.95	0.34	-0.33	0.74	0.02	0.98	-0.48	0.63	1.47	0.14	0.31	0.76	-0.31	0.76
Pollen	Grass	0.26	0.80	2.03	0.04	1.17	0.24	0.75	0.45	-0.79	0.43	-0.95	0.34	0.64	0.52	1.43	0.15

Table G. 96: England and Wales Emergency Consultations Non-asthmatics – Autoregressive Standardised estimates and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	-0.38	0.70	0.35	0.73	-0.48	0.63	-1.51	0.13	-0.29	0.77	0.29	0.78	0.85	0.40	0.50	0.61
	NO_2 Min’	-1.33	0.18	1.15	0.25	-0.36	0.72	-1.04	0.30	-0.40	0.69	0.08	0.94	0.92	0.36	-0.82	0.41
	NOD Min’	-0.65	0.52	0.79	0.43	-0.34	0.73	-1.46	0.14	-0.29	0.77	0.15	0.88	0.92	0.36	-0.17	0.86
	SO_2 Min’	-0.28	0.78	0.50	0.62	-0.40	0.69	0.77	0.44	-0.47	0.64	-0.21	0.83	-0.25	0.80	-0.36	0.72
	PM_{10} Min’	0.00	1.00	1.27	0.20	-0.74	0.46	-0.61	0.55	1.07	0.29	-0.39	0.70	1.39	0.17	0.17	0.86
	O_3 Min’	-0.29	0.78	1.15	0.25	1.08	0.28	-1.13	0.26	-0.12	0.90	0.59	0.56	-0.35	0.73	0.64	0.52
	CO Min’	-0.45	0.65	0.40	0.69	-1.03	0.30	-1.21	0.23	0.22	0.82	0.07	0.95	0.56	0.58	0.13	0.90
	NO Mean	-1.12	0.26	1.05	0.29	0.27	0.78	-1.23	0.22	0.01	0.99	-0.31	0.76	0.99	0.32	-0.23	0.82
	NO_2 Mean	-1.86	0.06	1.42	0.16	-0.21	0.83	-0.63	0.53	0.57	0.57	-0.34	0.73	0.72	0.47	-0.98	0.33
	NOD Mean	-1.49	0.14	1.31	0.19	0.08	0.94	-1.11	0.27	0.15	0.88	-0.34	0.73	1.01	0.32	-0.52	0.60
	SO_2 Mean	-1.56	0.12	0.93	0.35	-0.34	0.74	-0.55	0.59	1.89	0.06	-1.46	0.14	-0.24	0.81	-0.23	0.82
	PM_{10} Mean	1.11	0.27	-0.10	0.92	0.21	0.83	-0.40	0.69	0.83	0.41	-0.94	0.35	0.94	0.35	0.59	0.56
	O_3 Mean	1.12	0.26	-0.82	0.41	1.40	0.16	-1.03	0.30	-0.09	0.93	-0.06	0.95	-0.94	0.35	1.06	0.29
	CO Mean	-1.31	0.19	1.73	0.08	-0.62	0.54	-0.73	0.47	0.10	0.92	-0.18	0.85	0.40	0.69	-0.34	0.73
	NO Max’	-1.80	0.07	2.17	0.03	0.14	0.89	-1.15	0.25	-0.25	0.80	0.44	0.66	-0.80	0.42	0.08	0.93
	NO_2 Max’	-0.97	0.33	0.40	0.69	0.38	0.70	-0.23	0.82	-0.48	0.63	0.11	0.91	-0.62	0.54	-0.51	0.61
	NOD Max’	-1.64	0.10	1.89	0.06	0.27	0.79	-1.17	0.24	-0.22	0.82	0.19	0.85	-0.70	0.49	0.06	0.96
	SO_2 Max’	-1.69	0.09	0.26	0.80	0.05	0.96	-1.17	0.24	1.40	0.16	-0.52	0.60	-0.61	0.54	-1.01	0.32
	PM_{10} Max’	1.04	0.30	0.35	0.72	1.81	0.07	-1.04	0.30	-0.57	0.57	0.75	0.46	-0.95	0.34	0.54	0.59
	O_3 Max’	0.74	0.46	-0.21	0.84	1.04	0.30	-0.20	0.84	-0.48	0.63	0.07	0.95	-1.24	0.22	1.35	0.18
	CO Max’	-2.25	0.02	2.09	0.04	0.15	0.88	-1.26	0.21	-0.26	0.79	0.11	0.91	-1.22	0.22	-0.25	0.80
Weather	Temp Min’	2.57	0.01	0.22	0.82	-1.15	0.25	0.56	0.57	-0.92	0.36	1.19	0.23	1.43	0.15	-1.13	0.26
	Temp Max’	0.75	0.46	1.20	0.23	-0.82	0.41	-0.12	0.91	-0.21	0.83	-0.61	0.54	1.72	0.09	-0.44	0.66
	Sun	-0.26	0.79	-1.74	0.08	1.39	0.17	-0.95	0.34	-1.29	0.20	0.69	0.49	0.90	0.37	-1.15	0.25
	Rain	1.01	0.31	0.32	0.75	0.01	0.99	-0.84	0.40	-0.19	0.85	-0.82	0.41	-0.11	0.91	0.28	0.78
	Pressure	-1.39	0.17	1.42	0.16	-1.78	0.07	0.05	0.96	1.15	0.25	-0.72	0.47	0.31	0.76	-1.86	0.06
	Wind speed	-0.91	0.37	-0.28	0.78	0.95	0.34	0.91	0.36	-0.14	0.89	1.37	0.17	-0.06	0.95	1.36	0.17
Pollen	Grass	0.59	0.55	1.84	0.07	1.02	0.31	-1.98	0.05	1.63	0.10	0.61	0.54	-1.01	0.31	0.81	0.42

Table G. 97: England and Wales Emergency Counts Asthmatics – Autoregressive Standardised estimates and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	0.49	0.63	-1.49	0.14	-1.82	0.07	-0.34	0.73	-0.97	0.33	0.70	0.48	-1.14	0.25	0.07	0.95
	NO_2 Min’	1.76	0.08	-1.66	0.10	0.63	0.53	-0.51	0.61	-1.83	0.07	1.59	0.11	-0.88	0.38	1.94	0.05
	NOD Min’	1.04	0.30	-1.31	0.19	-0.75	0.45	-0.44	0.66	-1.45	0.15	1.08	0.28	-0.61	0.55	1.12	0.26
	SO_2 Min’	-0.61	0.54	0.04	0.97	-0.92	0.36	0.52	0.60	0.30	0.77	0.74	0.46	0.17	0.86	0.19	0.85
	PM_{10} Min’	0.43	0.67	0.36	0.72	-1.82	0.07	-0.78	0.44	1.03	0.30	-0.15	0.88	0.00	1.00	1.19	0.23
	O_3 Min’	-1.17	0.24	1.06	0.29	-0.57	0.57	-0.49	0.62	0.75	0.45	-0.39	0.70	0.20	0.84	-1.43	0.15
	CO Min’	-0.11	0.91	-0.60	0.55	-1.75	0.08	-0.96	0.34	-0.28	0.78	1.05	0.29	-0.33	0.74	0.32	0.75
	NO Mean	-0.12	0.91	-1.10	0.27	-0.46	0.65	-0.42	0.67	-0.01	1.00	0.02	0.99	0.36	0.72	1.04	0.30
	NO_2 Mean	1.18	0.24	-0.68	0.50	-0.45	0.65	0.31	0.76	-1.21	0.22	1.10	0.27	0.01	0.99	1.56	0.12
	NOD Mean	0.31	0.75	-1.09	0.27	-0.36	0.72	-0.21	0.84	-0.40	0.69	0.35	0.72	0.33	0.74	1.20	0.23
	SO_2 Mean	-0.31	0.76	-1.05	0.29	0.53	0.60	0.68	0.50	-0.89	0.37	-0.03	0.98	-0.43	0.67	1.70	0.09
	PM_{10} Mean	0.80	0.42	0.08	0.94	-2.51	0.01	1.06	0.29	0.49	0.62	-1.07	0.29	1.11	0.27	0.34	0.73
	O_3 Mean	-1.51	0.13	1.66	0.10	-0.53	0.60	-0.19	0.85	0.58	0.56	0.04	0.97	0.11	0.91	-1.54	0.12
	CO Mean	-0.92	0.36	-0.26	0.80	-0.67	0.50	-0.51	0.61	-0.98	0.33	0.94	0.35	-0.86	0.39	1.40	0.16
	NO Max’	-0.32	0.75	-0.41	0.68	0.79	0.43	-0.39	0.70	-0.81	0.42	0.60	0.55	1.62	0.10	0.54	0.59
	NO_2 Max’	0.73	0.46	0.62	0.53	0.36	0.72	-1.19	0.23	-0.75	0.45	1.18	0.24	0.87	0.38	1.88	0.06
	NOD Max’	-0.14	0.89	-0.40	0.69	0.99	0.32	-0.65	0.52	-0.84	0.40	0.65	0.51	1.47	0.14	0.86	0.39
	SO_2 Max’	-1.22	0.22	-0.78	0.44	0.62	0.54	1.11	0.27	-0.04	0.97	-0.76	0.45	-0.60	0.55	1.90	0.06
	PM_{10} Max’	0.33	0.74	1.59	0.11	-0.92	0.36	0.08	0.94	-0.69	0.49	0.30	0.76	1.07	0.28	0.67	0.50
	O_3 Max’	-0.70	0.48	1.79	0.07	-0.26	0.79	0.04	0.97	-0.07	0.94	0.39	0.70	0.01	0.99	-0.44	0.66
	CO Max’	-1.04	0.30	-0.57	0.57	0.32	0.75	-0.98	0.33	-0.63	0.53	0.25	0.80	1.08	0.28	0.03	0.98
Weather	Temp Min’	1.43	0.15	-0.08	0.94	0.73	0.46	0.73	0.47	0.47	0.64	0.25	0.80	-1.16	0.25	0.96	0.34
	Temp Max’	0.41	0.68	0.76	0.45	-1.28	0.20	1.61	0.11	0.28	0.78	-0.35	0.73	-1.04	0.30	1.22	0.22
	Sun	0.58	0.56	0.59	0.55	-1.72	0.09	-0.17	0.87	0.76	0.45	-2.10	0.04	1.05	0.30	0.00	1.00
	Rain	-0.19	0.85	-0.50	0.62	-0.40	0.69	0.23	0.82	-0.15	0.88	1.90	0.06	1.13	0.26	-0.21	0.84
	Pressure	0.41	0.68	0.82	0.41	-0.18	0.86	0.94	0.35	-1.39	0.17	0.53	0.59	0.20	0.84	-0.04	0.97
	Wind speed	1.43	0.15	-0.39	0.70	0.87	0.38	-1.32	0.19	0.35	0.73	0.48	0.63	1.52	0.13	-1.45	0.15
Pollen	Grass	0.51	0.61	2.55	0.01	-0.80	0.42	-0.17	0.87	0.87	0.38	-1.16	0.25	0.92	0.36	0.83	0.41

Table G. 98: England and Wales Emergency Counts Non-asthmatics – Autoregressive Standardised estimates and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	-0.64	0.52	1.12	0.26	-0.37	0.71	-1.53	0.13	0.63	0.53	0.08	0.94	-0.70	0.48	-0.12	0.90
	NO_2 Min’	-0.46	0.64	0.85	0.40	0.25	0.81	-0.51	0.61	0.73	0.47	0.27	0.79	-0.96	0.34	0.17	0.86
	NOD Min’	-0.68	0.50	1.39	0.16	-0.17	0.86	-1.24	0.21	1.14	0.26	0.12	0.90	-1.11	0.27	0.07	0.95
	SO_2 Min’	-0.68	0.50	1.42	0.16	-0.70	0.49	0.04	0.97	0.04	0.97	0.24	0.81	-0.27	0.79	0.15	0.88
	PM_{10} Min’	0.43	0.67	-0.06	0.96	0.08	0.94	0.22	0.83	1.39	0.17	-0.76	0.45	1.39	0.17	0.37	0.71
	O_3 Min’	0.47	0.64	0.76	0.45	-0.90	0.37	-2.59	0.01	0.63	0.53	0.03	0.97	0.08	0.94	0.48	0.64
	CO Min’	-0.36	0.72	1.23	0.22	-1.57	0.12	-0.81	0.42	0.63	0.53	0.17	0.87	0.22	0.83	-1.13	0.26
	NO Mean	-1.51	0.13	1.64	0.10	0.19	0.85	-1.51	0.13	1.37	0.17	-0.26	0.80	-0.49	0.63	-0.53	0.59
	NO_2 Mean	-2.10	0.04	1.56	0.12	-0.17	0.87	0.24	0.81	1.17	0.24	0.10	0.92	-0.62	0.54	-0.80	0.42
	NOD Mean	-1.80	0.07	1.72	0.09	0.16	0.87	-1.15	0.25	1.45	0.15	-0.23	0.82	-0.49	0.62	-0.67	0.51
	SO_2 Mean	-2.30	0.02	0.99	0.32	0.22	0.83	0.00	1.00	1.18	0.24	-0.51	0.61	-0.33	0.74	0.58	0.56
	PM_{10} Mean	0.46	0.65	-0.74	0.46	1.21	0.23	-0.33	0.74	1.90	0.06	-1.35	0.18	0.64	0.52	0.77	0.44
	O_3 Mean	1.48	0.14	-0.75	0.46	0.97	0.33	-3.16	0.00	0.68	0.50	-0.94	0.35	0.73	0.47	0.38	0.71
	CO Mean	-1.87	0.06	1.97	0.05	-0.42	0.68	-0.70	0.48	0.97	0.33	-0.24	0.81	-0.70	0.49	-0.72	0.47
	NO Max’	-1.23	0.22	1.96	0.05	-0.28	0.78	-0.98	0.33	0.94	0.35	0.71	0.48	-1.37	0.17	-0.25	0.81
	NO_2 Max’	-1.57	0.12	1.50	0.13	-0.01	0.99	0.17	0.86	0.94	0.35	0.58	0.56	-1.32	0.19	-0.42	0.68
	NOD Max’	-1.33	0.18	2.10	0.04	-0.27	0.78	-0.92	0.36	1.01	0.31	0.66	0.51	-1.38	0.17	-0.21	0.83
	SO_2 Max’	-2.13	0.03	0.55	0.58	0.87	0.38	-1.09	0.28	1.55	0.12	0.86	0.39	-0.66	0.51	-0.16	0.88
	PM_{10} Max’	-0.01	0.99	0.76	0.45	1.81	0.07	-0.69	0.49	0.69	0.49	0.07	0.95	-0.53	0.60	0.73	0.46
	O_3 Max’	1.11	0.27	-0.52	0.60	1.83	0.07	-1.32	0.19	-0.52	0.60	0.08	0.93	0.01	0.99	1.16	0.25
	CO Max’	-1.85	0.07	1.74	0.08	-0.21	0.83	-1.39	0.16	1.09	0.28	-0.21	0.83	-1.52	0.13	-0.92	0.36
Weather	Temp Min’	2.22	0.03	0.51	0.61	-0.85	0.40	0.12	0.91	-0.29	0.77	1.70	0.09	0.71	0.48	-0.98	0.33
	Temp Max’	2.22	0.03	0.81	0.42	-1.72	0.09	1.75	0.08	-0.67	0.50	-0.42	0.67	1.09	0.28	0.58	0.57
	Sun	0.31	0.76	-1.29	0.20	0.17	0.87	-0.32	0.75	-0.41	0.68	-0.67	0.50	1.56	0.12	-0.27	0.79
	Rain	-0.43	0.67	-0.43	0.67	-0.95	0.34	-0.36	0.72	-0.41	0.68	0.32	0.75	-0.75	0.46	-0.83	0.40
	Pressure	0.43	0.67	1.26	0.21	-1.93	0.05	1.13	0.26	-0.44	0.66	0.71	0.48	0.36	0.72	-1.79	0.07
	Wind speed	1.44	0.15	0.12	0.91	0.93	0.35	-1.51	0.13	0.61	0.55	-0.02	0.99	0.85	0.40	0.57	0.57
Pollen	Grass	3.03	0.00	-0.02	0.98	0.33	0.74	-1.54	0.12	1.61	0.11	1.31	0.19	-1.04	0.30	-0.16	0.88

Table G. 99: England and Wales Out of Hours Counts Asthmatics – Autoregressive Standardised estimates and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min'	-0.98	0.33	0.17	0.86	-2.02	0.04	0.68	0.50	-0.92	0.36	-0.32	0.75	-0.19	0.85	-1.04	0.30
	NO_2 Min'	0.58	0.56	-1.03	0.30	-0.15	0.88	0.08	0.93	-0.49	0.63	1.03	0.30	-0.27	0.78	1.02	0.31
	NOD Min'	-0.62	0.53	0.06	0.95	-1.56	0.12	0.64	0.52	-0.72	0.47	0.43	0.66	-0.06	0.96	0.03	0.98
	SO_2 Min'	-0.61	0.54	0.17	0.86	-0.75	0.45	0.19	0.85	1.50	0.13	1.42	0.16	-0.52	0.61	0.75	0.45
	PM_{10} Min'	-1.56	0.12	-0.15	0.88	-1.08	0.28	0.81	0.42	0.39	0.70	0.36	0.72	0.45	0.65	-0.02	0.98
	O_3 Min'	-0.71	0.48	1.39	0.16	-1.53	0.13	-1.85	0.06	0.82	0.41	-1.21	0.23	0.03	0.98	-2.05	0.04
	CO Min'	-1.07	0.29	-0.13	0.90	-0.91	0.36	0.30	0.77	-0.67	0.51	1.57	0.12	-1.06	0.29	-0.15	0.88
	NO Mean	-1.54	0.12	0.48	0.63	-1.89	0.06	0.64	0.52	0.83	0.41	0.20	0.84	0.20	0.85	-0.07	0.94
	NO_2 Mean	0.19	0.85	-0.21	0.83	-0.77	0.44	1.04	0.30	-0.51	0.61	2.10	0.04	-1.00	0.32	1.84	0.07
	NOD Mean	-1.14	0.25	0.38	0.71	-1.71	0.09	0.88	0.38	0.52	0.60	0.76	0.45	-0.03	0.98	0.38	0.71
	SO_2 Mean	-0.40	0.69	-0.50	0.62	-0.09	0.93	1.13	0.26	-0.72	0.47	1.04	0.30	-0.04	0.97	1.89	0.06
	PM_{10} Mean	-1.54	0.12	0.58	0.56	-2.52	0.01	2.66	0.01	0.47	0.64	-0.04	0.97	-0.40	0.69	0.02	0.98
	O_3 Mean	-1.16	0.25	1.45	0.15	-0.20	0.84	-0.54	0.59	0.13	0.90	-1.14	0.25	0.31	0.76	-2.08	0.04
	CO Mean	-1.68	0.09	0.89	0.37	-1.75	0.08	0.97	0.33	-0.50	0.61	1.57	0.12	-0.95	0.34	0.77	0.44
	NO Max'	-1.28	0.20	0.64	0.52	-0.89	0.37	0.75	0.45	1.26	0.21	0.17	0.87	1.24	0.21	0.23	0.82
	NO_2 Max'	0.64	0.52	0.25	0.80	0.06	0.95	0.07	0.94	0.60	0.55	1.29	0.20	0.61	0.54	1.83	0.07
	NOD Max'	-1.07	0.28	0.47	0.64	-0.58	0.56	0.63	0.53	1.07	0.29	0.38	0.71	1.05	0.30	0.53	0.59
	SO_2 Max'	-0.04	0.97	-0.84	0.40	0.17	0.86	2.29	0.02	-0.12	0.90	0.76	0.45	-0.09	0.93	3.16	0.00
	PM_{10} Max'	-1.50	0.13	1.11	0.27	-0.74	0.46	1.18	0.24	-0.29	0.77	0.15	0.88	0.02	0.98	0.81	0.42
	O_3 Max'	-1.26	0.21	1.50	0.13	0.86	0.39	-0.21	0.84	0.10	0.92	-0.31	0.76	-0.41	0.68	-1.24	0.21
	CO Max'	-1.67	0.10	0.51	0.61	-0.28	0.78	0.33	0.74	0.53	0.60	0.52	0.60	0.73	0.47	-0.38	0.70
Weather	Temp Min'	0.22	0.83	-0.24	0.81	1.97	0.05	-0.76	0.45	0.79	0.43	-0.76	0.45	-0.62	0.54	-0.30	0.77
	Temp Max'	0.22	0.82	-0.08	0.94	0.53	0.60	0.37	0.71	0.69	0.49	-1.46	0.15	0.41	0.68	-0.91	0.36
	Sun	0.27	0.78	1.13	0.26	-0.85	0.40	-0.53	0.60	0.24	0.81	-2.66	0.01	1.60	0.11	-0.64	0.53
	Rain	0.93	0.35	-0.83	0.41	-0.97	0.33	-0.07	0.94	-0.61	0.54	2.33	0.02	-0.14	0.89	-0.03	0.98
	Pressure	-1.56	0.12	0.63	0.53	0.16	0.87	0.69	0.49	-1.87	0.06	1.49	0.14	-0.57	0.57	0.47	0.64
	Wind speed	-1.32	0.19	0.50	0.61	-0.41	0.68	-1.36	0.17	-0.29	0.77	-0.02	0.98	1.82	0.07	-2.00	0.05
Pollen	Grass	-0.93	0.35	1.33	0.19	-0.46	0.65	0.01	0.99	1.52	0.13	-0.60	0.55	0.08	0.94	0.80	0.43

Table G. 100: England and Wales Out of Hours Counts Non-asthmatics – Autoregressive Standardised estimates and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min'	-1.16	0.25	0.28	0.78	0.38	0.70	-0.18	0.85	0.59	0.55	-0.33	0.74	-0.89	0.38	-0.29	0.77
	NO_2 Min'	0.79	0.43	-0.94	0.35	1.37	0.17	-0.77	0.44	0.82	0.41	0.62	0.53	-0.71	0.48	0.50	0.62
	NOD Min'	-0.50	0.62	-0.11	0.91	1.06	0.29	-0.71	0.48	1.19	0.23	-0.01	1.00	-0.93	0.35	0.35	0.73
	SO_2 Min'	0.41	0.68	1.24	0.22	0.60	0.55	-0.30	0.76	-0.40	0.69	0.38	0.71	0.84	0.40	1.12	0.26
	PM_{10} Min'	0.05	0.96	-0.32	0.75	0.73	0.46	-0.17	0.86	0.79	0.43	0.42	0.68	0.87	0.39	-0.44	0.66
	O_3 Min'	0.46	0.65	-0.53	0.60	-1.51	0.13	-0.72	0.47	-0.15	0.88	-1.21	0.23	0.87	0.38	-0.26	0.79
	CO Min'	-0.40	0.69	0.48	0.63	-0.12	0.91	-0.55	0.59	0.53	0.59	0.01	1.00	-0.19	0.85	-0.70	0.48
	NO Mean	-0.31	0.76	0.91	0.36	0.32	0.75	-0.16	0.87	2.38	0.02	-0.31	0.75	-0.52	0.60	0.83	0.41
	NO_2 Mean	0.45	0.65	0.25	0.80	0.51	0.61	-0.44	0.66	1.61	0.11	0.04	0.97	0.13	0.90	-0.42	0.67
	NOD Mean	-0.16	0.87	0.69	0.49	0.48	0.63	-0.32	0.75	2.36	0.02	-0.28	0.78	-0.40	0.69	0.55	0.58
	SO_2 Mean	0.97	0.33	0.86	0.39	1.12	0.26	0.37	0.71	-0.15	0.88	0.83	0.41	0.63	0.53	0.55	0.59
	PM_{10} Mean	-0.18	0.86	-0.46	0.65	1.17	0.24	-0.80	0.42	2.09	0.04	-0.19	0.85	0.19	0.85	-0.29	0.77
	O_3 Mean	0.03	0.98	0.60	0.55	-0.62	0.54	-0.81	0.42	-0.35	0.73	-1.35	0.18	0.84	0.40	-1.05	0.29
	CO Mean	-0.52	0.60	1.36	0.17	0.25	0.80	0.04	0.97	1.43	0.15	-0.12	0.90	-0.27	0.79	0.29	0.77
	NO Max'	0.39	0.69	0.62	0.54	-0.03	0.98	0.44	0.66	2.12	0.03	0.11	0.91	-0.66	0.51	0.49	0.62
	NO_2 Max'	0.50	0.62	1.61	0.11	-0.24	0.81	0.78	0.44	1.22	0.22	1.00	0.32	-0.49	0.63	-0.60	0.55
	NOD Max'	0.36	0.72	0.95	0.34	-0.16	0.88	0.47	0.64	2.08	0.04	0.27	0.79	-0.68	0.49	0.43	0.67
	SO_2 Max'	0.99	0.32	0.95	0.34	1.68	0.09	0.57	0.57	0.57	0.57	1.53	0.13	0.45	0.65	0.68	0.50
	PM_{10} Max'	-0.81	0.42	0.59	0.56	1.48	0.14	0.48	0.63	1.58	0.12	-0.29	0.77	-0.18	0.86	0.43	0.67
	O_3 Max'	0.83	0.41	0.63	0.53	-0.13	0.89	-0.31	0.75	-0.75	0.46	0.19	0.85	-0.43	0.67	-0.65	0.52
	CO Max'	0.06	0.95	0.99	0.32	0.22	0.83	0.56	0.57	1.96	0.05	0.01	0.99	-1.05	0.29	0.64	0.52
Weather	Temp Min'	1.03	0.30	0.31	0.76	-0.90	0.37	-0.06	0.95	0.18	0.86	-1.22	0.22	1.17	0.24	-0.15	0.88
	Temp Max'	1.00	0.32	1.46	0.14	-1.68	0.09	0.18	0.86	0.75	0.45	-1.30	0.19	-0.76	0.45	0.70	0.48
	Sun	-0.46	0.65	0.27	0.79	-0.47	0.64	-0.38	0.71	1.11	0.27	-0.70	0.48	-0.22	0.82	-1.03	0.30
	Rain	-0.40	0.69	0.01	0.99	-0.60	0.55	0.31	0.76	-1.16	0.24	0.03	0.98	-1.31	0.19	0.37	0.71
	Pressure	-0.02	0.99	0.45	0.65	-0.95	0.34	0.37	0.71	0.32	0.75	0.48	0.64	-0.66	0.51	-0.39	0.70
	Wind speed	0.45	0.66	0.43	0.67	1.58	0.12	-2.04	0.04	0.28	0.78	-1.19	0.24	2.13	0.03	-0.74	0.46
Pollen	Grass	2.75	0.01	-0.85	0.39	0.42	0.67	-0.22	0.83	0.54	0.59	0.43	0.67	-1.71	0.09	0.08	0.94

Table G. 101: England and Wales All Counts Excess – Autoregressive Standardised estimates and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	0.91	0.36	0.11	0.91	-0.34	0.74	-0.70	0.49	0.58	0.56	1.22	0.22	0.63	0.53	1.87	0.06
	NO_2 Min’	-0.20	0.84	0.91	0.36	0.00	1.00	1.01	0.31	-0.62	0.54	-0.48	0.63	1.45	0.15	1.88	0.06
	NOD Min’	0.35	0.73	0.58	0.56	0.03	0.98	-0.10	0.92	0.12	0.91	0.29	0.78	1.06	0.29	2.31	0.02
	SO_2 Min’	-0.86	0.39	1.46	0.14	1.45	0.15	0.16	0.87	0.37	0.71	0.19	0.85	1.09	0.27	0.02	0.98
	PM_{10} Min’	0.26	0.80	-0.04	0.97	1.23	0.22	-0.06	0.95	0.01	0.99	-0.81	0.42	0.30	0.76	1.78	0.08
	O_3 Min’	-0.08	0.93	-0.53	0.60	1.45	0.15	-1.74	0.08	0.75	0.45	-0.31	0.76	-1.10	0.27	-0.70	0.49
	CO Min’	-0.09	0.93	-0.35	0.72	1.56	0.12	-0.50	0.62	1.13	0.26	-0.30	0.76	0.32	0.75	0.96	0.34
	NO Mean	1.45	0.15	-0.10	0.92	0.31	0.76	0.79	0.43	-1.03	0.30	0.85	0.40	1.04	0.30	2.22	0.03
	NO_2 Mean	-0.46	0.65	0.61	0.54	-0.05	0.96	0.94	0.35	-0.13	0.90	0.39	0.70	0.42	0.68	1.41	0.16
	NOD Mean	1.05	0.30	0.04	0.97	0.22	0.82	0.90	0.37	-0.90	0.37	0.88	0.38	0.87	0.38	2.12	0.03
	SO_2 Mean	0.39	0.70	0.77	0.44	0.98	0.33	0.30	0.76	-0.10	0.92	0.33	0.74	1.54	0.12	0.11	0.91
	PM_{10} Mean	0.41	0.68	0.56	0.57	-0.20	0.84	1.40	0.16	-0.17	0.87	-0.78	0.43	0.64	0.52	1.63	0.10
	O_3 Mean	0.28	0.78	-1.18	0.24	0.69	0.49	-0.70	0.49	0.33	0.74	0.25	0.80	-1.75	0.08	-0.66	0.51
	CO Mean	0.98	0.33	-0.48	0.63	0.20	0.84	1.36	0.17	-0.49	0.63	-0.08	0.94	1.59	0.11	1.68	0.09
	NO Max’	0.44	0.66	0.37	0.71	0.59	0.56	0.53	0.59	-0.96	0.34	0.84	0.40	1.67	0.10	1.39	0.16
	NO_2 Max’	-0.11	0.91	0.59	0.55	-0.46	0.65	1.00	0.32	-0.27	0.78	0.84	0.40	0.80	0.42	1.56	0.12
	NOD Max’	0.61	0.54	0.11	0.91	0.71	0.48	0.53	0.60	-0.89	0.37	0.94	0.35	1.65	0.10	1.49	0.14
	SO_2 Max’	0.12	0.90	1.29	0.20	0.50	0.61	0.52	0.60	0.18	0.86	0.22	0.83	1.68	0.09	0.43	0.67
	PM_{10} Max’	0.69	0.49	1.18	0.24	-0.37	0.71	1.05	0.29	0.62	0.53	-1.50	0.13	0.63	0.53	1.03	0.30
	O_3 Max’	-1.38	0.17	0.70	0.49	-2.14	0.03	0.94	0.35	0.46	0.65	-0.32	0.75	-2.10	0.04	0.38	0.70
	CO Max’	1.94	0.05	-0.09	0.92	0.21	0.84	0.39	0.69	0.04	0.97	-0.62	0.54	2.57	0.01	1.72	0.09
Weather	Temp Min’	2.52	0.01	-1.00	0.32	0.87	0.38	-1.07	0.29	1.00	0.32	-0.72	0.47	-1.37	0.17	1.34	0.18
	Temp Max’	1.28	0.20	0.89	0.37	0.27	0.79	-1.23	0.22	0.06	0.95	-0.01	0.99	-1.04	0.30	1.44	0.15
	Sun	0.37	0.71	1.31	0.19	-0.73	0.46	1.05	0.30	-1.40	0.16	0.01	0.99	0.19	0.85	1.04	0.30
	Rain	-0.71	0.48	1.40	0.16	-0.78	0.44	-0.52	0.60	0.37	0.71	-0.28	0.78	0.65	0.51	-0.73	0.46
	Pressure	0.71	0.48	0.40	0.69	1.17	0.24	-0.22	0.82	-0.68	0.50	1.70	0.09	-1.24	0.21	0.55	0.58
	Wind speed	2.08	0.04	-0.63	0.53	0.62	0.54	-0.94	0.35	0.26	0.80	1.16	0.25	-1.42	0.16	-1.91	0.06
Pollen	Grass	1.29	0.20	0.77	0.44	1.05	0.30	0.71	0.48	2.41	0.02	-1.55	0.12	0.25	0.80	1.03	0.30

Table G. 102: England and Wales Acute Visits Excess – Autoregressive Standardised estimates and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	-1.50	0.14	0.97	0.33	0.27	0.79	-1.02	0.31	-0.43	0.67	-1.18	0.24	0.74	0.46	1.02	0.31
	NO_2 Min’	-0.32	0.75	-0.66	0.51	0.02	0.98	0.46	0.64	-1.80	0.07	0.44	0.66	-0.06	0.95	0.45	0.65
	NOD Min’	-1.11	0.27	0.30	0.76	0.08	0.93	-0.22	0.83	-1.04	0.30	-1.08	0.28	0.55	0.58	1.10	0.27
	SO_2 Min’	-0.67	0.50	-1.17	0.24	1.23	0.22	0.60	0.55	-0.96	0.34	-1.30	0.20	0.75	0.45	0.01	1.00
	PM_{10} Min’	0.72	0.47	-0.71	0.48	-0.28	0.78	0.04	0.97	-1.60	0.11	-0.14	0.89	0.28	0.78	1.05	0.29
	O_3 Min’	-0.78	0.43	-0.42	0.68	0.85	0.39	1.20	0.23	-1.25	0.21	0.47	0.64	-0.62	0.54	-1.09	0.28
	CO Min’	-1.14	0.26	0.24	0.81	-0.17	0.86	-0.82	0.41	0.19	0.85	-1.07	0.28	1.98	0.05	0.25	0.80
	NO Mean	-0.44	0.66	-0.68	0.50	1.17	0.24	-0.45	0.65	-1.40	0.16	0.67	0.50	-0.63	0.53	1.96	0.05
	NO_2 Mean	0.89	0.37	-1.75	0.08	0.69	0.49	0.17	0.87	-1.68	0.09	0.91	0.37	-0.53	0.60	1.73	0.08
	NOD Mean	-0.07	0.95	-1.10	0.27	1.13	0.26	-0.32	0.75	-1.61	0.11	0.85	0.40	-0.68	0.50	2.03	0.04
	SO_2 Mean	0.61	0.54	-1.22	0.22	2.13	0.03	-0.50	0.62	-0.58	0.56	-1.59	0.11	-0.31	0.76	2.32	0.02
	PM_{10} Mean	0.88	0.38	-0.43	0.67	0.28	0.78	0.21	0.83	-2.39	0.02	0.58	0.57	0.37	0.71	0.60	0.55
	O_3 Mean	-0.05	0.96	-0.64	0.53	0.64	0.52	0.36	0.72	-0.23	0.82	1.05	0.29	-0.27	0.79	-1.02	0.31
	CO Mean	-0.11	0.92	-0.49	0.63	0.93	0.36	-0.18	0.86	-0.90	0.37	0.73	0.47	1.06	0.29	1.70	0.09
	NO Max’	0.20	0.84	0.13	0.89	1.00	0.32	-0.21	0.83	-1.48	0.14	1.74	0.08	-0.04	0.97	1.11	0.27
	NO_2 Max’	-0.26	0.80	-0.49	0.62	1.06	0.29	0.47	0.64	-2.45	0.01	1.51	0.13	-0.56	0.57	1.75	0.08
	NOD Max’	0.06	0.95	0.11	0.92	1.15	0.25	-0.28	0.78	-1.50	0.13	1.80	0.07	-0.22	0.83	1.40	0.16
	SO_2 Max’	1.29	0.20	-0.78	0.43	1.07	0.29	1.25	0.21	-0.65	0.52	-1.68	0.09	0.15	0.89	1.48	0.14
	PM_{10} Max’	-0.05	0.96	1.15	0.25	0.55	0.58	-0.37	0.71	-1.33	0.18	0.51	0.61	0.05	0.96	0.21	0.83
	O_3 Max’	0.89	0.38	-0.61	0.54	-0.48	0.63	0.47	0.64	0.21	0.83	1.08	0.28	0.11	0.91	-0.66	0.51
	CO Max’	0.36	0.72	0.18	0.86	1.55	0.12	0.18	0.85	-1.67	0.10	2.18	0.03	1.02	0.31	1.82	0.07
Weather	Temp Min’	1.08	0.28	0.68	0.50	0.20	0.85	-0.61	0.54	-0.06	0.96	-0.55	0.58	0.27	0.79	-0.42	0.68
	Temp Max’	-0.67	0.50	0.02	0.98	1.95	0.05	-1.77	0.08	0.32	0.75	1.11	0.27	-2.22	0.03	1.09	0.28
	Sun	-0.13	0.90	-1.15	0.25	-0.20	0.84	-0.20	0.84	0.81	0.42	-0.37	0.71	-0.51	0.61	0.19	0.85
	Rain	-0.41	0.69	1.75	0.08	0.16	0.88	1.22	0.22	-0.63	0.53	0.19	0.85	-0.60	0.55	0.39	0.70
	Pressure	-0.99	0.32	1.36	0.17	-1.62	0.11	-0.53	0.60	1.92	0.06	-1.27	0.21	-0.15	0.88	0.10	0.92
	Wind speed	-0.84	0.40	-0.02	0.99	1.13	0.26	0.82	0.41	-0.17	0.86	0.19	0.85	-0.69	0.49	0.61	0.54
Pollen	Grass	-1.48	0.14	0.73	0.47	0.79	0.43	1.10	0.27	0.76	0.45	0.35	0.72	0.00	1.00	-1.13	0.26

Table G. 103: England and Wales Casualty Counts Excess – Autoregressive Standardised estimates and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	0.96	0.34	-2.10	0.04	0.55	0.59	-0.37	0.71	-0.59	0.55	3.12	0.00	-1.55	0.12	0.75	0.45
	NO_2 Min’	1.84	0.07	-2.04	0.04	1.34	0.18	-1.11	0.27	-1.70	0.09	1.13	0.26	-0.30	0.77	-0.77	0.44
	NOD Min’	1.40	0.16	-2.26	0.02	1.18	0.24	-1.09	0.28	-1.26	0.21	2.24	0.03	-1.22	0.22	0.20	0.84
	SO_2 Min’	0.51	0.61	-0.18	0.85	-0.33	0.74	-1.90	0.06	0.23	0.82	0.31	0.76	0.00	1.00	-0.29	0.77
	PM_{10} Min’	0.76	0.45	1.10	0.27	-1.42	0.16	-0.75	0.46	0.24	0.81	0.46	0.64	-0.47	0.64	-0.32	0.75
	O_3 Min’	-0.36	0.72	-1.15	0.25	1.96	0.05	1.44	0.15	-0.30	0.76	0.78	0.44	0.83	0.41	0.63	0.53
	CO Min’	1.53	0.13	-1.05	0.29	0.33	0.74	-0.83	0.41	-0.80	0.43	1.38	0.17	-1.03	0.31	0.90	0.37
	NO Mean	1.27	0.20	-1.34	0.18	0.09	0.93	0.71	0.48	-1.19	0.24	0.62	0.53	-0.32	0.75	0.82	0.41
	NO_2 Mean	1.94	0.05	-0.67	0.50	0.02	0.99	-0.99	0.32	-0.53	0.60	-0.43	0.67	0.82	0.41	-0.65	0.51
	NOD Mean	1.64	0.10	-1.37	0.17	0.19	0.85	0.28	0.78	-1.19	0.23	0.46	0.65	-0.14	0.89	0.54	0.59
	SO_2 Mean	0.98	0.33	-0.21	0.84	-0.05	0.96	-0.32	0.75	-0.27	0.79	0.08	0.94	-0.56	0.58	-0.16	0.88
	PM_{10} Mean	1.28	0.20	0.57	0.57	-1.17	0.24	-0.88	0.38	-0.23	0.82	0.90	0.37	-0.06	0.95	-0.58	0.56
	O_3 Mean	-1.21	0.23	0.98	0.33	-0.62	0.54	1.43	0.15	0.17	0.86	0.43	0.67	-0.66	0.51	0.95	0.34
	CO Mean	1.57	0.12	-0.81	0.42	0.49	0.62	-0.23	0.82	-0.92	0.36	0.14	0.89	-0.27	0.78	0.57	0.57
	NO Max’	1.25	0.21	-1.18	0.24	0.90	0.37	0.08	0.94	-0.71	0.48	-0.44	0.66	0.54	0.59	-0.31	0.76
	NO_2 Max’	1.41	0.16	0.48	0.63	-0.34	0.74	-0.80	0.43	-0.54	0.59	-0.70	0.49	0.76	0.45	-0.90	0.37
	NOD Max’	1.30	0.19	-0.88	0.38	0.72	0.47	-0.03	0.97	-0.75	0.46	-0.55	0.58	0.67	0.50	-0.41	0.68
	SO_2 Max’	0.02	0.98	0.27	0.79	0.22	0.83	0.07	0.95	0.34	0.73	-0.97	0.33	-0.33	0.74	-0.34	0.73
	PM_{10} Max’	0.47	0.64	0.88	0.38	-0.24	0.81	-0.75	0.46	-0.15	0.88	0.60	0.55	-0.19	0.85	-0.17	0.86
	O_3 Max’	-0.53	0.60	1.62	0.11	-2.70	0.01	1.34	0.18	1.28	0.20	-0.73	0.46	-0.94	0.35	0.89	0.37
	CO Max’	1.12	0.26	-0.83	0.41	0.26	0.79	0.13	0.89	-0.18	0.86	-0.30	0.76	-0.19	0.85	0.24	0.81
Weather	Temp Min’	-0.25	0.80	-0.92	0.36	-1.07	0.29	0.94	0.35	0.73	0.47	-1.82	0.07	1.23	0.22	1.03	0.30
	Temp Max’	-1.24	0.21	0.89	0.37	-0.95	0.34	-0.62	0.53	0.47	0.64	-1.27	0.20	0.22	0.83	1.30	0.19
	Sun	-0.05	0.96	0.73	0.46	-0.22	0.83	-0.59	0.56	0.33	0.74	0.04	0.97	-0.66	0.51	-0.96	0.34
	Rain	0.15	0.88	0.69	0.49	0.08	0.94	0.16	0.87	-0.10	0.92	-0.06	0.95	1.10	0.27	1.80	0.07
	Pressure	0.79	0.43	0.60	0.55	0.35	0.73	-0.34	0.73	-0.20	0.84	-1.03	0.30	0.97	0.33	-0.42	0.67
	Wind speed	1.70	0.09	-1.10	0.27	1.80	0.07	-0.61	0.54	0.66	0.51	-0.35	0.72	1.17	0.24	-0.10	0.92
Pollen	Grass	1.00	0.32	1.59	0.11	-1.53	0.13	-0.92	0.36	-0.19	0.85	-1.41	0.16	0.72	0.47	1.69	0.09

Table G. 104: England and Wales Emergency Consultations Excess – Autoregressive Standardised estimates and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	2.02	0.04	-3.37	0.00	0.65	0.52	3.17	0.00	-0.29	0.78	0.14	0.89	0.50	0.62	-0.06	0.95
	NO_2 Min’	1.58	0.11	-1.60	0.11	1.37	0.17	1.14	0.25	0.09	0.93	0.18	0.86	-0.79	0.43	2.16	0.03
	NOD Min’	2.00	0.05	-2.77	0.01	1.49	0.14	2.28	0.02	-0.32	0.75	0.03	0.98	0.46	0.65	0.87	0.39
	SO_2 Min’	-0.10	0.92	0.57	0.57	1.13	0.26	1.69	0.09	-1.17	0.24	0.24	0.81	1.16	0.25	0.11	0.91
	PM_{10} Min’	0.81	0.42	-0.36	0.72	-0.02	0.99	-1.26	0.21	2.30	0.02	0.44	0.66	-1.29	0.20	0.70	0.48
	O_3 Min’	-0.37	0.71	0.73	0.47	-2.66	0.01	0.95	0.34	0.49	0.62	-1.01	0.31	0.79	0.43	-0.37	0.71
	CO Min’	0.92	0.36	-0.56	0.58	0.26	0.80	0.16	0.87	1.11	0.27	-1.06	0.29	-0.14	0.89	0.69	0.49
	NO Mean	1.94	0.05	-2.08	0.04	1.02	0.31	1.10	0.27	1.58	0.12	-1.63	0.10	0.90	0.37	0.90	0.37
	NO_2 Mean	1.95	0.05	-1.38	0.17	0.76	0.45	0.26	0.80	0.09	0.93	-0.52	0.61	0.51	0.61	0.31	0.76
	NOD Mean	2.10	0.04	-2.08	0.04	1.07	0.29	0.91	0.36	1.28	0.20	-1.50	0.14	0.89	0.37	0.84	0.40
	SO_2 Mean	1.71	0.09	-0.65	0.52	1.10	0.27	1.43	0.15	-1.73	0.08	1.40	0.16	0.63	0.53	-0.80	0.43
	PM_{10} Mean	0.59	0.56	-0.26	0.80	-0.70	0.48	0.57	0.57	1.38	0.17	-1.44	0.15	1.08	0.28	-0.38	0.71
	O_3 Mean	-1.45	0.15	2.29	0.02	-2.84	0.00	0.95	0.34	-0.65	0.52	0.83	0.41	1.11	0.27	-1.33	0.18
	CO Mean	0.98	0.33	-1.14	0.25	0.95	0.34	0.45	0.65	0.39	0.70	-0.73	0.47	-0.45	0.66	1.52	0.13
	NO Max’	1.59	0.11	-1.88	0.06	1.85	0.06	0.94	0.35	0.10	0.92	-0.75	0.45	1.47	0.14	0.89	0.37
	NO_2 Max’	0.97	0.33	-0.31	0.76	0.87	0.38	-0.86	0.39	-0.01	0.99	0.93	0.35	0.52	0.60	0.30	0.76
	NOD Max’	1.70	0.09	-1.98	0.05	1.92	0.06	0.74	0.46	0.03	0.97	-0.55	0.59	1.41	0.16	0.90	0.37
	SO_2 Max’	0.27	0.78	0.09	0.93	0.81	0.42	1.21	0.23	-1.19	0.23	0.96	0.34	0.09	0.93	-0.41	0.68
	PM_{10} Max’	1.09	0.28	-0.25	0.81	-1.18	0.24	1.72	0.09	0.46	0.65	-1.24	0.21	1.70	0.09	-0.48	0.63
	O_3 Max’	-0.81	0.42	1.84	0.07	-1.47	0.14	-0.85	0.39	-1.28	0.20	1.52	0.13	1.15	0.25	-1.54	0.12
	CO Max’	1.46	0.14	-1.33	0.18	0.83	0.41	0.62	0.54	0.69	0.49	-0.89	0.37	1.40	0.16	0.98	0.33
Weather	Temp Min’	0.25	0.80	-0.12	0.91	-0.31	0.76	1.27	0.21	-0.01	1.00	0.79	0.43	-2.57	0.01	1.60	0.11
	Temp Max’	0.60	0.55	0.96	0.34	-1.86	0.06	1.22	0.22	0.35	0.73	1.66	0.10	-3.37	0.00	1.67	0.10
	Sun	-0.36	0.72	1.30	0.19	-2.44	0.02	1.01	0.31	1.32	0.19	-0.57	0.57	-1.06	0.29	0.97	0.33
	Rain	-0.70	0.49	-1.06	0.29	0.22	0.83	-0.55	0.58	-0.42	0.68	-0.71	0.48	1.13	0.26	-0.49	0.62
	Pressure	2.14	0.03	-2.32	0.02	2.05	0.04	0.80	0.42	-0.20	0.84	0.93	0.35	-0.64	0.52	0.84	0.40
	Wind	2.35	0.02	0.90	0.37	-0.74	0.46	-0.98	0.33	-0.68	0.50	0.80	0.43	0.35	0.72	-1.04	0.30
Pollen	Grass	-0.05	0.96	0.58	0.56	0.08	0.93	1.92	0.06	-1.41	0.16	-0.98	0.33	1.06	0.29	0.72	0.47

Table G. 105: England and Wales Emergency Counts Excess – Autoregressive Standardised estimates and P-values by lag day per exposure.

Exposure		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	0.92	0.36	-2.12	0.03	-0.47	0.64	1.58	0.11	-1.10	0.27	1.36	0.18	-0.20	0.84	0.45	0.65
	NO_2 Min’	1.73	0.08	-2.19	0.03	0.88	0.38	0.48	0.63	-1.87	0.06	1.23	0.22	-0.48	0.63	1.07	0.28
	NOD Min’	1.25	0.21	-2.33	0.02	0.24	0.81	1.21	0.23	-1.84	0.07	1.29	0.20	0.02	0.99	0.70	0.48
	SO_2 Min’	-0.67	0.50	-0.52	0.61	0.02	0.98	0.14	0.89	0.11	0.91	0.52	0.60	-0.05	0.96	-0.24	0.81
	PM_{10} Min’	0.15	0.88	0.32	0.75	-1.72	0.09	-0.41	0.68	0.88	0.38	0.59	0.55	-1.04	0.30	0.69	0.49
	O_3 Min’	-1.01	0.31	0.66	0.51	-0.30	0.77	0.86	0.39	0.41	0.68	-0.19	0.85	0.47	0.64	-1.01	0.31
	CO Min’	0.55	0.58	-0.90	0.37	-0.15	0.88	-0.27	0.79	-0.30	0.77	0.95	0.34	-0.85	0.40	1.09	0.28
	NO Mean	0.95	0.34	-2.05	0.04	-0.22	0.83	1.35	0.18	-0.77	0.44	0.11	0.91	0.30	0.76	1.19	0.23
	NO_2 Mean	2.14	0.03	-1.65	0.10	-0.07	0.94	0.49	0.63	-1.62	0.11	0.94	0.35	-0.16	0.87	1.56	0.12
	NOD Mean	1.43	0.15	-2.12	0.03	-0.15	0.88	1.26	0.21	-1.14	0.25	0.36	0.72	0.19	0.85	1.34	0.18
	SO_2 Mean	0.69	0.49	-1.49	0.14	0.69	0.49	0.72	0.47	-1.67	0.10	0.51	0.61	-0.29	0.77	0.42	0.68
	PM_{10} Mean	0.36	0.72	0.66	0.51	-2.81	0.01	1.65	0.10	-0.66	0.51	0.00	1.00	0.19	0.85	-0.17	0.86
	O_3 Mean	-2.06	0.04	1.90	0.06	-1.51	0.13	1.33	0.19	-0.05	0.96	0.71	0.48	0.08	0.94	-1.12	0.26
	CO Mean	0.35	0.73	-1.32	0.19	-0.17	0.87	0.48	0.63	-1.55	0.12	0.68	0.50	-0.81	0.42	1.46	0.14
	NO Max’	0.56	0.57	-1.43	0.15	1.16	0.25	0.78	0.44	-0.95	0.34	-0.04	0.97	1.85	0.07	0.35	0.73
	NO_2 Max’	1.37	0.17	-0.46	0.65	0.54	0.59	-0.88	0.38	-1.16	0.25	0.81	0.42	1.06	0.29	1.43	0.15
	NOD Max’	0.75	0.46	-1.56	0.12	1.31	0.19	0.53	0.60	-1.08	0.28	0.05	0.96	1.72	0.09	0.57	0.57
	SO_2 Max’	-0.26	0.79	-0.89	0.37	0.24	0.81	1.71	0.09	-0.99	0.32	-0.84	0.40	-0.41	0.68	0.84	0.40
	PM_{10} Max’	0.20	0.84	1.11	0.27	-1.58	0.11	0.76	0.45	-1.02	0.31	0.06	0.96	0.60	0.55	0.05	0.96
	O_3 Max’	-1.70	0.09	2.01	0.04	-1.99	0.05	0.23	0.82	0.45	0.65	0.26	0.80	-0.01	0.99	-0.77	0.44
	CO Max’	0.25	0.81	-1.18	0.24	0.60	0.55	0.43	0.67	-0.70	0.48	0.10	0.92	1.43	0.15	0.40	0.69
Weather	Temp Min’	-0.28	0.78	-0.86	0.39	0.73	0.47	0.47	0.64	0.62	0.53	-0.58	0.57	-1.43	0.15	0.91	0.36
	Temp Max’	-0.76	0.45	0.19	0.85	0.04	0.97	-0.08	0.93	0.57	0.57	0.24	0.81	-1.55	0.12	0.93	0.35
	Sun	0.43	0.67	1.47	0.14	-1.36	0.17	0.15	0.88	0.80	0.42	-1.38	0.17	0.01	0.99	0.34	0.73
	Rain	0.66	0.51	-0.14	0.89	-0.04	0.97	-0.04	0.97	-0.29	0.77	1.00	0.32	1.39	0.17	0.76	0.45
	Pressure	0.34	0.73	-0.26	0.79	1.27	0.20	0.40	0.69	-0.83	0.41	0.25	0.80	0.09	0.93	0.69	0.49
	Wind speed	1.03	0.30	0.06	0.95	0.06	0.95	-0.66	0.51	-0.23	0.81	0.64	0.52	0.86	0.39	-1.17	0.24
Pollen	Grass	-1.71	0.09	2.50	0.01	-0.84	0.40	0.79	0.43	0.27	0.79	-1.51	0.13	1.42	0.16	1.39	0.17

Table G. 106: England and Wales Out of Hours Counts Excess – Autoregressive Standardised estimates and P-values by lag day per exposure.

Exposure		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	-0.06	0.96	0.15	0.88	-1.86	0.06	0.83	0.41	-0.91	0.36	0.01	0.99	0.36	0.72	-0.54	0.59
	NO_2 Min’	0.08	0.93	-0.32	0.75	-0.98	0.33	0.56	0.58	-0.92	0.36	0.58	0.57	0.13	0.90	0.51	0.61
	NOD Min’	-0.10	0.92	0.24	0.81	-2.01	0.05	1.12	0.26	-1.23	0.22	0.47	0.64	0.48	0.63	-0.10	0.92
	SO_2 Min’	-0.92	0.36	-0.68	0.50	-1.15	0.25	0.40	0.69	1.60	0.11	1.06	0.29	-1.16	0.25	-0.01	1.00
	PM_{10} Min’	-1.38	0.17	0.14	0.89	-1.37	0.17	0.85	0.40	0.08	0.94	0.20	0.85	-0.22	0.82	0.41	0.68
	O_3 Min’	-0.97	0.33	1.59	0.11	-0.50	0.62	-1.16	0.25	0.80	0.42	-0.33	0.74	-0.53	0.60	-1.65	0.10
	CO Min’	-0.65	0.52	-0.38	0.70	-0.75	0.45	0.48	0.63	-0.91	0.36	1.34	0.18	-1.10	0.27	0.19	0.85
	NO Mean	-0.65	0.52	0.17	0.86	-1.63	0.10	0.81	0.42	-0.40	0.69	0.59	0.56	0.63	0.53	-0.07	0.95
	NO_2 Mean	0.17	0.86	-0.24	0.81	-1.00	0.32	1.27	0.20	-1.34	0.18	1.98	0.05	-0.94	0.35	2.20	0.03
	NOD Mean	-0.45	0.66	0.17	0.87	-1.65	0.10	1.08	0.28	-0.69	0.49	1.02	0.31	0.35	0.73	0.48	0.63
	SO_2 Mean	-0.61	0.54	-0.68	0.50	-0.51	0.61	0.78	0.43	-0.34	0.73	0.56	0.58	-0.18	0.86	1.65	0.10
	PM_{10} Mean	-1.16	0.25	0.88	0.38	-3.02	0.00	2.91	0.00	-0.75	0.45	0.16	0.88	-0.59	0.56	0.39	0.69
	O_3 Mean	-1.25	0.21	0.79	0.43	0.08	0.93	0.00	1.00	0.19	0.85	-0.20	0.84	-0.39	0.70	-1.25	0.21
	CO Mean	-0.65	0.51	0.21	0.84	-1.52	0.13	0.89	0.37	-1.02	0.31	1.68	0.09	-0.58	0.57	0.99	0.32
	NO Max’	-0.92	0.36	0.43	0.67	-0.44	0.66	0.61	0.54	0.02	0.99	0.31	0.76	1.79	0.07	0.34	0.73
	NO_2 Max’	0.72	0.47	-0.66	0.51	0.34	0.73	-0.21	0.84	0.04	0.97	0.61	0.54	1.12	0.26	2.57	0.01
	NOD Max’	-0.69	0.49	0.06	0.95	-0.09	0.93	0.48	0.63	-0.08	0.94	0.38	0.71	1.65	0.10	0.70	0.49
	SO_2 Max’	-0.21	0.84	-0.93	0.35	-0.56	0.58	1.63	0.10	-0.10	0.92	0.07	0.95	-0.10	0.92	3.05	0.00
	PM_{10} Max’	-0.76	0.45	0.70	0.48	-1.51	0.13	0.75	0.45	-1.17	0.24	0.34	0.73	0.01	0.99	0.64	0.52
	O_3 Max’	-1.98	0.05	0.76	0.45	0.65	0.52	-0.19	0.85	0.42	0.67	-0.55	0.58	-0.17	0.86	-0.79	0.43
	CO Max’	-1.03	0.30	0.29	0.77	0.06	0.96	0.17	0.86	-0.38	0.70	0.74	0.46	1.73	0.08	-0.22	0.83
Weather	Temp Min’	-0.89	0.37	-0.51	0.61	2.31	0.02	-0.83	0.41	0.48	0.63	0.01	0.99	-1.48	0.14	-0.38	0.71
	Temp Max’	-0.49	0.62	-1.23	0.22	1.48	0.14	0.24	0.81	0.06	0.95	-0.53	0.60	0.83	0.41	-1.44	0.15
	Sun	0.53	0.60	0.97	0.33	-0.37	0.71	-0.19	0.85	-0.73	0.47	-1.81	0.07	1.59	0.11	0.07	0.95
	Rain	1.38	0.17	-0.89	0.38	-0.57	0.57	-0.28	0.78	0.07	0.95	1.98	0.05	0.82	0.41	-0.27	0.79
	Pressure	-1.44	0.15	0.20	0.84	0.88	0.38	0.38	0.71	-1.89	0.06	1.09	0.28	-0.18	0.86	0.66	0.51
	Wind speed	-1.40	0.16	0.44	0.66	-1.41	0.16	0.17	0.87	-0.38	0.71	0.77	0.44	0.47	0.64	-1.03	0.30
Pollen	Grass	-2.96	0.00	1.70	0.09	-0.61	0.54	0.14	0.89	0.85	0.39	-0.61	0.54	1.10	0.27	1.02	0.31

G4.2. Trent Region autoregressive point-estimates and P-values

Table G. 107: Trent Region All Counts Asthmatics – Autoregressive Standardised percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	0.40	0.69	-0.54	0.59	-0.34	0.74	-0.63	0.53	3.66	0.00	0.23	0.82	0.89	0.38	1.76	0.08
	NO_2 Min’	-1.12	0.26	0.51	0.61	1.40	0.16	-0.32	0.75	1.68	0.09	-1.07	0.28	0.47	0.64	-0.44	0.66
	NOD Min’	-0.76	0.45	0.08	0.93	0.47	0.64	-0.81	0.42	3.19	0.00	-0.65	0.52	0.33	0.74	0.90	0.37
	SO_2 Min’	-0.68	0.50	0.68	0.50	0.14	0.89	0.25	0.80	-0.77	0.44	-0.97	0.33	0.30	0.77	0.44	0.66
	PM_{10} Min’	0.38	0.71	0.14	0.89	0.06	0.95	-1.09	0.28	1.66	0.10	0.20	0.84	-0.28	0.78	-1.32	0.19
	O_3 Min’	-0.13	0.90	0.00	1.00	0.39	0.70	-1.43	0.15	-0.07	0.94	-0.52	0.61	-0.16	0.87	0.18	0.86
	CO Min’	-0.67	0.50	-0.67	0.51	1.40	0.16	-0.52	0.60	2.41	0.02	-0.66	0.51	0.13	0.90	0.81	0.42
	NO Mean	-0.58	0.56	-0.63	0.53	0.19	0.85	1.05	0.29	0.27	0.79	1.51	0.13	-0.32	0.75	1.48	0.14
	NO_2 Mean	-1.07	0.28	0.77	0.44	-0.42	0.68	0.69	0.49	0.67	0.50	-0.12	0.90	-0.28	0.78	-0.18	0.85
	NOD Mean	-0.74	0.46	-0.30	0.76	0.08	0.94	1.00	0.32	0.29	0.78	1.20	0.23	-0.41	0.68	1.13	0.26
	SO_2 Mean	-1.35	0.18	0.94	0.35	-0.55	0.58	1.72	0.09	-0.47	0.64	-0.77	0.44	0.55	0.58	-0.93	0.35
	PM_{10} Mean	0.14	0.89	-0.23	0.82	-0.42	0.68	0.18	0.86	0.75	0.45	0.39	0.70	-0.50	0.62	-0.02	0.99
	O_3 Mean	0.49	0.62	0.35	0.73	-0.79	0.43	-1.23	0.22	-0.69	0.49	0.98	0.33	-1.58	0.12	0.06	0.95
	CO Mean	-0.40	0.69	-1.15	0.25	1.01	0.31	0.13	0.89	0.74	0.46	0.08	0.94	0.38	0.70	0.20	0.85
	NO Max’	-1.60	0.11	-0.33	0.75	0.96	0.34	0.63	0.53	0.28	0.78	1.13	0.26	-0.19	0.85	1.08	0.28
	NO_2 Max’	-1.22	0.22	-0.11	0.91	-0.38	0.71	0.35	0.73	-0.45	0.65	0.28	0.78	-0.23	0.82	0.16	0.87
	NOD Max’	-1.57	0.12	-0.31	0.76	0.72	0.47	0.63	0.53	0.09	0.93	1.09	0.28	-0.22	0.83	1.09	0.27
	SO_2 Max’	-1.82	0.07	1.28	0.20	0.15	0.88	1.79	0.07	-0.03	0.97	-0.97	0.33	0.25	0.80	-0.73	0.46
	PM_{10} Max’	0.12	0.90	-0.55	0.59	-0.43	0.67	-0.19	0.85	0.22	0.83	1.10	0.27	-1.25	0.21	0.88	0.38
	O_3 Max’	-0.99	0.32	0.49	0.63	-0.60	0.55	-0.78	0.43	-0.48	0.63	0.23	0.82	-1.40	0.16	-1.67	0.10
	CO Max’	-0.30	0.77	-0.62	0.54	-0.30	0.77	1.15	0.25	-0.62	0.53	0.51	0.61	0.51	0.61	-0.04	0.97
Weather	Temp Min’	1.09	0.27	-0.21	0.83	-0.33	0.74	-0.14	0.89	0.53	0.60	-0.65	0.51	0.98	0.33	-1.06	0.29
	Temp Max’	1.64	0.10	-1.32	0.19	1.21	0.23	-0.29	0.77	-1.63	0.10	-0.06	0.96	0.30	0.76	0.34	0.73
	Sun	1.09	0.28	-1.99	0.05	1.20	0.23	-0.17	0.86	-2.09	0.04	0.51	0.61	-0.70	0.48	0.89	0.37
	Rain	-2.01	0.05	0.68	0.50	-0.35	0.73	-1.19	0.23	0.45	0.65	0.62	0.54	-1.72	0.09	-0.37	0.71
	Pressure	-0.37	0.71	-0.05	0.96	1.34	0.18	0.23	0.82	-0.45	0.65	0.89	0.37	-1.46	0.14	2.19	0.03
	Wind speed	0.77	0.44	-0.50	0.62	0.71	0.48	-1.12	0.26	-0.12	0.90	-0.26	0.80	-0.12	0.90	0.93	0.35
Pollen	Grass	-0.11	0.91	1.54	0.12	2.00	0.05	0.20	0.84	2.24	0.03	0.56	0.58	-0.57	0.57	2.68	0.01

Table G. 108: Trent Region All Counts Non-asthmatics – Autoregressive Standardised percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	-0.58	0.56	-1.37	0.17	1.18	0.24	-0.88	0.38	0.21	0.83	-1.33	0.19	2.39	0.02	1.73	0.08
	NO_2 Min’	-1.82	0.07	0.05	0.96	1.55	0.12	0.11	0.91	-0.93	0.35	-0.89	0.37	0.43	0.66	0.45	0.65
	NOD Min’	-1.64	0.10	-0.49	0.62	1.75	0.08	-0.65	0.52	-0.49	0.62	-1.04	0.30	1.39	0.17	1.29	0.20
	SO_2 Min’	-1.53	0.13	0.61	0.54	0.57	0.57	-1.87	0.06	1.13	0.26	-0.77	0.44	0.14	0.89	1.04	0.30
	PM_{10} Min’	-1.07	0.29	-0.77	0.44	1.59	0.11	-1.25	0.21	-0.10	0.92	-0.70	0.48	0.69	0.49	1.71	0.09
	O_3 Min’	-0.78	0.44	-0.59	0.56	0.60	0.55	-1.74	0.08	-0.84	0.40	1.22	0.22	0.85	0.39	-1.25	0.21
	CO Min’	-1.74	0.08	-0.17	0.87	0.54	0.59	-1.27	0.20	0.52	0.60	-0.06	0.95	-0.17	0.87	1.31	0.19
	NO Mean	-1.55	0.12	0.34	0.73	0.91	0.36	-0.26	0.79	-0.16	0.88	-0.90	0.37	0.97	0.33	1.70	0.09
	NO_2 Mean	-0.76	0.45	0.52	0.61	-0.27	0.79	1.01	0.31	-0.35	0.73	-0.35	0.73	0.27	0.79	0.30	0.77
	NOD Mean	-1.51	0.13	0.45	0.65	0.65	0.52	0.06	0.95	-0.11	0.91	-0.91	0.36	0.88	0.38	1.39	0.16
	SO_2 Mean	-0.62	0.53	1.06	0.29	0.15	0.88	-0.77	0.44	-0.13	0.90	1.12	0.26	-0.90	0.37	1.19	0.24
	PM_{10} Mean	-1.32	0.19	0.11	0.91	0.02	0.98	0.50	0.62	-0.84	0.40	-0.25	0.80	0.72	0.47	1.08	0.28
	O_3 Mean	0.02	0.99	-0.17	0.86	0.11	0.92	-1.80	0.07	-0.72	0.48	1.55	0.12	0.77	0.44	-1.14	0.26
	CO Mean	-0.94	0.35	-0.57	0.57	1.48	0.14	-0.52	0.60	-0.66	0.51	0.66	0.51	0.05	0.96	1.71	0.09
	NO Max’	-2.11	0.04	0.53	0.59	0.95	0.34	-0.80	0.42	-0.03	0.97	-0.05	0.96	0.82	0.41	1.36	0.18
	NO_2 Max’	-1.46	0.14	1.34	0.18	-0.50	0.62	0.73	0.47	-0.42	0.68	0.78	0.43	0.35	0.73	0.98	0.33
	NOD Max’	-2.04	0.04	0.71	0.48	0.73	0.47	-0.56	0.58	-0.10	0.92	0.06	0.95	0.67	0.50	1.43	0.15
	SO_2 Max’	-0.64	0.52	1.25	0.21	0.54	0.59	-1.06	0.29	0.60	0.55	1.01	0.31	0.56	0.58	0.43	0.67
	PM_{10} Max’	-1.81	0.07	0.00	1.00	-0.04	0.97	0.69	0.49	-1.49	0.14	-0.22	0.82	0.88	0.38	1.20	0.23
	O_3 Max’	0.42	0.67	0.25	0.81	0.13	0.90	-1.59	0.11	-1.17	0.24	1.68	0.09	0.48	0.63	-0.93	0.35
	CO Max’	-1.60	0.11	0.76	0.45	-0.01	0.99	-0.14	0.89	-0.50	0.61	0.46	0.65	0.53	0.60	1.99	0.05
Weather	Temp Min’	0.19	0.85	-0.17	0.87	0.05	0.96	0.29	0.77	-0.78	0.44	-0.24	0.81	0.15	0.88	0.45	0.66
	Temp Max’	-0.74	0.46	-0.30	0.76	-0.67	0.50	1.37	0.17	-0.19	0.85	-0.56	0.57	0.76	0.45	0.16	0.87
	Sun	-0.02	0.99	-2.15	0.03	-0.52	0.60	1.25	0.21	0.33	0.74	0.81	0.42	0.30	0.76	-1.02	0.31
	Rain	-0.68	0.50	0.87	0.39	1.19	0.23	-1.10	0.27	-0.33	0.74	0.56	0.57	-1.43	0.15	0.30	0.77
	Pressure	-0.09	0.93	-0.31	0.76	-1.30	0.19	1.26	0.21	0.34	0.73	0.69	0.49	-0.88	0.38	0.38	0.70
	Wind speed	-0.78	0.43	-0.79	0.43	1.72	0.09	-1.42	0.16	0.17	0.86	0.27	0.79	-0.10	0.92	0.69	0.49
Pollen	Grass	-0.46	0.64	1.67	0.10	0.91	0.36	1.09	0.28	-0.88	0.38	1.15	0.25	1.21	0.23	1.43	0.15

Table G. 109: Trent Region Acute Visits Asthmatics – Autoregressive Standardised percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	-0.42	0.68	-0.85	0.40	-0.10	0.92	-0.07	0.94	0.17	0.87	-0.89	0.37	0.69	0.49	0.44	0.66
	NO_2 Min’	-0.53	0.60	-1.08	0.28	0.71	0.48	-0.83	0.41	0.06	0.95	-0.64	0.52	0.44	0.66	0.25	0.81
	NOD Min’	-0.28	0.78	-1.00	0.32	0.23	0.82	-0.63	0.53	0.36	0.72	-1.20	0.23	0.70	0.49	0.35	0.73
	SO_2 Min’	-1.96	0.05	-0.04	0.97	-0.72	0.47	1.99	0.05	-0.23	0.82	-1.28	0.20	0.82	0.41	0.83	0.41
	PM_{10} Min’	0.27	0.79	-1.69	0.09	1.64	0.10	-1.58	0.11	0.05	0.96	-2.36	0.02	1.83	0.07	1.10	0.27
	O_3 Min’	-0.11	0.92	-0.67	0.50	0.77	0.44	1.24	0.21	-1.44	0.15	0.39	0.70	-1.59	0.11	1.85	0.07
	CO Min’	-0.87	0.38	-0.98	0.33	-0.20	0.85	-1.31	0.19	1.56	0.12	-1.21	0.23	0.77	0.44	0.51	0.61
	NO Mean	0.86	0.39	-0.93	0.35	-0.32	0.75	-1.03	0.30	0.86	0.39	-0.94	0.35	2.42	0.02	-0.59	0.56
	NO_2 Mean	-0.15	0.88	-0.36	0.72	0.94	0.35	-2.03	0.04	0.52	0.60	-0.82	0.41	1.75	0.08	-0.80	0.43
	NOD Mean	0.67	0.50	-0.83	0.41	0.02	0.99	-1.36	0.18	0.82	0.41	-1.01	0.32	2.42	0.02	-0.68	0.50
	SO_2 Mean	-1.76	0.08	0.57	0.57	0.35	0.73	-0.66	0.51	1.31	0.19	-2.09	0.04	1.06	0.29	0.90	0.37
	PM_{10} Mean	0.73	0.47	-0.72	0.47	-0.06	0.95	-1.73	0.08	1.95	0.05	-2.58	0.01	2.04	0.04	0.29	0.77
	O_3 Mean	0.70	0.48	0.59	0.56	-0.33	0.74	1.15	0.25	-1.14	0.25	0.40	0.69	-1.29	0.20	1.01	0.31
	CO Mean	0.91	0.36	-2.03	0.04	1.17	0.24	-2.01	0.04	1.54	0.12	-1.28	0.20	2.43	0.02	-0.50	0.62
	NO Max’	1.51	0.13	-1.44	0.15	-0.12	0.90	-0.32	0.75	0.10	0.92	-0.39	0.70	2.90	0.00	-1.30	0.19
	NO_2 Max’	0.42	0.68	0.53	0.59	0.17	0.87	-1.19	0.23	-0.93	0.35	0.11	0.91	2.50	0.01	-1.38	0.17
	NOD Max’	1.36	0.17	-1.27	0.21	-0.08	0.94	-0.41	0.68	-0.05	0.96	-0.31	0.76	2.92	0.00	-1.36	0.18
	SO_2 Max’	-1.64	0.10	1.62	0.11	-0.19	0.85	-0.26	0.80	0.95	0.34	-1.30	0.19	0.12	0.90	0.83	0.40
	PM_{10} Max’	-0.15	0.88	-0.71	0.48	-0.55	0.58	-0.01	0.99	0.68	0.49	-1.82	0.07	2.87	0.00	-0.22	0.82
	O_3 Max’	1.43	0.15	-0.05	0.96	0.36	0.72	0.88	0.38	-1.62	0.11	0.56	0.57	0.47	0.64	-1.28	0.20
	CO Max’	1.91	0.06	-1.33	0.18	-0.13	0.90	-0.25	0.80	0.36	0.72	-0.58	0.56	2.62	0.01	-0.98	0.33
Weather	Temp Min’	0.97	0.33	-0.43	0.66	-1.01	0.31	1.88	0.06	0.09	0.93	-0.28	0.78	-0.31	0.76	-0.82	0.41
	Temp Max’	1.07	0.29	-1.60	0.11	-0.51	0.61	-0.59	0.55	1.75	0.08	-0.20	0.84	-0.16	0.88	-0.58	0.56
	Sun	-0.46	0.65	-0.31	0.75	-1.36	0.17	-0.31	0.75	-1.62	0.11	0.13	0.90	1.38	0.17	-0.60	0.55
	Rain	-1.45	0.15	1.54	0.12	2.75	0.01	1.98	0.05	1.09	0.27	-1.12	0.26	-1.24	0.21	0.70	0.48
	Pressure	-0.12	0.91	0.46	0.64	0.39	0.70	-1.09	0.28	1.35	0.18	-2.93	0.00	1.86	0.06	-0.10	0.92
	Wind speed	0.87	0.39	1.19	0.23	0.06	0.95	1.36	0.17	-1.33	0.18	0.94	0.35	-0.13	0.90	-0.06	0.96
Pollen	Grass	-0.43	0.67	0.38	0.70	0.12	0.90	0.02	0.99	0.38	0.71	-0.49	0.63	-1.00	0.32	0.45	0.65

Table G. 110: Trent Region Acute Visits Non-asthmatics – Autoregressive Standardised percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	-0.67	0.50	0.09	0.93	0.28	0.78	2.50	0.01	-1.47	0.14	1.41	0.16	-0.69	0.49	0.33	0.74
	NO_2 Min’	1.28	0.20	-1.17	0.24	1.66	0.10	0.41	0.68	-0.62	0.53	0.10	0.92	0.40	0.69	0.37	0.71
	NOD Min’	0.14	0.89	-0.39	0.70	1.08	0.28	1.56	0.12	-1.34	0.18	1.02	0.31	-0.32	0.75	0.32	0.75
	SO_2 Min’	0.71	0.48	1.33	0.19	-0.98	0.33	1.26	0.21	0.60	0.55	-0.04	0.97	-0.36	0.72	-0.22	0.83
	PM_{10} Min’	-0.23	0.82	-0.70	0.49	0.70	0.48	1.62	0.11	-0.76	0.45	-0.18	0.86	0.97	0.33	0.14	0.89
	O_3 Min’	-1.20	0.23	1.02	0.31	-0.80	0.42	-0.38	0.71	1.41	0.16	-0.16	0.87	-0.53	0.60	-0.87	0.39
	CO Min’	1.43	0.15	-0.51	0.61	0.14	0.89	1.86	0.06	-0.31	0.76	-0.52	0.60	0.68	0.50	-1.04	0.30
	NO Mean	1.79	0.07	-0.74	0.46	0.32	0.75	1.08	0.28	-0.25	0.80	0.03	0.97	-0.38	0.71	1.60	0.11
	NO_2 Mean	1.37	0.17	-1.19	0.24	0.21	0.83	2.11	0.04	-1.28	0.20	0.03	0.98	0.60	0.55	-0.21	0.83
	NOD Mean	1.77	0.08	-0.84	0.40	0.27	0.79	1.35	0.18	-0.49	0.63	-0.02	0.98	-0.19	0.85	1.25	0.21
	SO_2 Mean	0.30	0.76	2.28	0.02	-0.52	0.60	0.77	0.44	-1.76	0.08	2.64	0.01	-0.34	0.74	-0.02	0.98
	PM_{10} Mean	0.06	0.95	-0.22	0.82	-0.01	0.99	2.15	0.03	-1.29	0.20	0.03	0.98	-0.31	0.76	0.80	0.42
	O_3 Mean	-2.34	0.02	1.38	0.17	-0.54	0.59	-0.60	0.55	0.87	0.38	-0.95	0.34	0.47	0.64	-1.22	0.22
	CO Mean	2.20	0.03	-0.25	0.81	-0.70	0.49	2.16	0.03	-1.04	0.30	-0.60	0.55	0.64	0.53	0.51	0.61
	NO Max’	2.56	0.01	-0.69	0.49	0.58	0.56	0.58	0.56	-0.84	0.40	-0.68	0.49	0.68	0.50	1.89	0.06
	NO_2 Max’	1.22	0.22	-0.17	0.87	-0.49	0.62	2.13	0.03	-1.00	0.32	-0.26	0.79	0.25	0.80	-0.22	0.82
	NOD Max’	2.44	0.02	-0.71	0.48	0.55	0.58	0.68	0.50	-0.82	0.41	-0.76	0.45	0.65	0.52	1.73	0.08
	SO_2 Max’	-0.96	0.34	2.75	0.01	0.62	0.53	0.13	0.90	-1.70	0.09	2.63	0.01	-0.62	0.54	0.20	0.85
	PM_{10} Max’	0.48	0.63	0.04	0.97	-0.16	0.87	1.04	0.30	-0.26	0.79	0.40	0.69	-0.56	0.58	1.13	0.26
	O_3 Max’	-1.75	0.08	-0.36	0.72	-0.28	0.78	-0.15	0.88	0.61	0.54	-0.90	0.37	0.12	0.91	-0.98	0.33
	CO Max’	3.16	0.00	-0.15	0.88	-0.68	0.50	1.89	0.06	-1.52	0.13	-0.64	0.52	0.95	0.34	0.89	0.37
Weather	Temp Min’	-2.60	0.01	0.01	0.99	0.75	0.45	0.41	0.68	0.04	0.96	-1.17	0.24	0.62	0.54	-0.26	0.80
	Temp Max’	-0.96	0.34	-1.65	0.10	0.07	0.95	0.94	0.35	-0.78	0.44	1.06	0.29	0.26	0.80	-1.06	0.29
	Sun	0.63	0.53	-0.58	0.56	-0.46	0.64	-1.43	0.15	-0.15	0.88	2.12	0.04	-0.73	0.46	-0.86	0.39
	Rain	0.00	1.00	2.80	0.01	0.38	0.71	-0.01	0.99	0.53	0.60	-0.87	0.39	-1.91	0.06	-0.95	0.34
	Pressure	0.50	0.62	-1.43	0.15	0.68	0.50	0.43	0.67	-1.75	0.08	1.63	0.10	-0.63	0.53	0.75	0.45
	Wind speed	-0.52	0.60	0.56	0.57	-0.18	0.86	-1.55	0.12	1.15	0.25	1.39	0.17	-1.41	0.16	0.83	0.41
Pollen	Grass	0.97	0.33	-0.09	0.93	1.38	0.17	-1.26	0.21	0.43	0.67	1.16	0.25	-1.07	0.28	-1.18	0.24

Table G. 111: Trent Region Casualty Counts Asthmatics – Autoregressive Standardised percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	0.18	0.86	0.27	0.79	-0.36	0.72	-0.48	0.63	0.53	0.60	2.11	0.04	-0.92	0.36	1.27	0.20
	NO_2 Min’	0.60	0.55	0.66	0.51	1.35	0.18	-1.64	0.10	1.59	0.11	-0.75	0.45	-0.37	0.71	0.00	1.00
	NOD Min’	0.62	0.54	0.55	0.58	0.48	0.63	-1.28	0.20	1.28	0.20	0.75	0.45	-1.00	0.32	0.46	0.65
	SO_2 Min’	-0.20	0.84	-1.39	0.17	-0.20	0.84	0.08	0.94	0.70	0.49	-1.18	0.24	-0.89	0.38	0.04	0.97
	PM_{10} Min’	-0.14	0.89	1.36	0.17	-1.18	0.24	0.66	0.51	-1.32	0.19	-0.10	0.92	0.31	0.76	-0.64	0.52
	O_3 Min’	-0.19	0.85	-0.49	0.62	0.68	0.50	-0.44	0.66	-0.91	0.36	0.80	0.42	-0.59	0.56	1.14	0.25
	CO Min’	-0.82	0.41	1.81	0.07	-0.40	0.69	-0.32	0.75	0.54	0.59	-0.19	0.85	-1.18	0.24	0.77	0.44
	NO Mean	-1.43	0.15	1.56	0.12	-1.35	0.18	-0.76	0.45	-0.20	0.84	0.37	0.71	-0.73	0.47	-1.50	0.13
	NO_2 Mean	-1.82	0.07	2.61	0.01	-0.50	0.62	-1.07	0.29	1.81	0.07	-1.41	0.16	0.36	0.72	-1.41	0.16
	NOD Mean	-1.55	0.12	1.90	0.06	-1.13	0.26	-0.82	0.41	0.32	0.75	-0.06	0.95	-0.42	0.67	-1.56	0.12
	SO_2 Mean	-2.19	0.03	-0.51	0.61	-0.78	0.44	0.14	0.89	0.50	0.62	-2.63	0.01	-0.86	0.39	-1.46	0.14
	PM_{10} Mean	-1.15	0.25	2.84	0.01	-0.73	0.46	-1.45	0.15	-0.41	0.68	0.86	0.39	-0.48	0.63	0.38	0.70
	O_3 Mean	1.51	0.13	-1.63	0.10	0.90	0.37	0.45	0.66	-1.33	0.19	1.67	0.10	-1.11	0.27	2.80	0.01
	CO Mean	-1.78	0.08	1.66	0.10	-0.90	0.37	-1.51	0.13	-0.16	0.88	0.11	0.91	-1.74	0.08	-1.59	0.11
	NO Max’	-0.93	0.35	1.26	0.21	-1.04	0.30	-1.40	0.16	-0.25	0.80	0.41	0.68	-1.12	0.26	-1.69	0.09
	NO_2 Max’	-1.28	0.20	1.93	0.05	-0.61	0.54	-0.64	0.52	0.93	0.35	-0.94	0.35	-0.46	0.65	-0.94	0.35
	NOD Max’	-0.92	0.36	1.53	0.13	-1.06	0.29	-1.17	0.24	-0.24	0.81	0.34	0.74	-1.01	0.31	-1.67	0.10
	SO_2 Max’	-2.22	0.03	-0.25	0.80	-0.50	0.61	-0.27	0.79	-0.01	1.00	-2.92	0.00	-0.71	0.48	-2.11	0.04
	PM_{10} Max’	-0.90	0.37	3.95	0.00	-0.36	0.72	-2.80	0.01	0.27	0.79	1.17	0.24	-0.94	0.35	0.82	0.41
	O_3 Max’	1.49	0.14	-0.55	0.58	-0.41	0.68	0.45	0.66	0.31	0.76	0.51	0.61	-0.98	0.33	2.50	0.01
	CO Max’	-1.60	0.11	0.97	0.33	-1.33	0.19	-1.68	0.09	-0.19	0.85	-0.44	0.66	-1.75	0.08	-2.13	0.03
Weather	Temp Min’	1.07	0.29	-0.92	0.36	0.95	0.34	-0.45	0.65	0.30	0.77	0.84	0.40	0.53	0.60	0.03	0.98
	Temp Max’	0.93	0.35	-1.12	0.26	1.18	0.24	-0.39	0.70	-1.17	0.24	0.95	0.34	0.49	0.63	1.29	0.20
	Sun	0.95	0.34	-0.38	0.71	-2.46	0.01	1.51	0.13	-1.21	0.23	0.96	0.34	0.86	0.39	0.95	0.34
	Rain	0.49	0.62	-0.03	0.98	0.18	0.86	-0.54	0.59	2.62	0.01	-1.69	0.09	-0.60	0.55	-0.02	0.98
	Pressure	1.39	0.16	0.13	0.89	-0.84	0.40	0.23	0.82	-1.52	0.13	1.93	0.05	-0.78	0.43	0.78	0.44
	Wind speed	0.91	0.37	-1.48	0.14	1.29	0.20	-0.65	0.52	0.04	0.97	-1.07	0.28	0.56	0.57	0.15	0.88
Pollen	Grass	1.00	0.32	-0.47	0.64	0.28	0.78	0.29	0.77	-0.82	0.41	1.70	0.09	-0.48	0.63	0.78	0.44

Table G. 112: Trent Region Casualty Counts Non-asthmatics – Autoregressive Standardised percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	0.43	0.67	1.19	0.23	-0.12	0.90	-0.91	0.36	2.23	0.03	-0.90	0.37	1.05	0.29	1.93	0.05
	NO_2 Min’	0.37	0.71	0.87	0.39	0.32	0.75	0.31	0.76	0.84	0.40	-0.24	0.81	0.75	0.45	-0.50	0.62
	NOD Min’	0.05	0.96	1.40	0.16	0.10	0.92	-0.38	0.71	1.82	0.07	-0.87	0.39	0.75	0.45	0.56	0.58
	SO_2 Min’	-0.57	0.57	1.00	0.32	-0.93	0.35	-0.25	0.80	-0.11	0.91	-0.89	0.37	0.52	0.60	0.71	0.48
	PM_{10} Min’	-0.61	0.55	0.32	0.75	-0.64	0.52	1.33	0.19	0.61	0.54	-1.66	0.10	0.46	0.65	0.98	0.33
	O_3 Min’	-1.44	0.15	-0.35	0.72	0.41	0.69	-0.71	0.48	0.01	0.99	-0.98	0.33	-0.05	0.96	0.57	0.57
	CO Min’	0.62	0.54	-0.06	0.95	-0.32	0.75	0.98	0.33	0.83	0.41	-1.40	0.16	1.13	0.26	-0.20	0.84
	NO Mean	-0.76	0.45	1.60	0.11	-0.77	0.44	0.14	0.89	-1.26	0.21	0.71	0.48	-0.74	0.46	0.35	0.73
	NO_2 Mean	-0.02	0.98	0.88	0.38	-0.45	0.65	1.08	0.28	-0.88	0.38	-0.08	0.94	0.07	0.94	-0.41	0.68
	NOD Mean	-0.63	0.53	1.52	0.13	-0.76	0.45	0.43	0.67	-1.21	0.23	0.51	0.61	-0.53	0.60	0.17	0.87
	SO_2 Mean	-0.95	0.34	-0.61	0.54	-0.43	0.67	-1.29	0.20	0.41	0.68	-1.84	0.07	1.96	0.05	-1.92	0.06
	PM_{10} Mean	-1.07	0.29	1.54	0.12	-0.84	0.40	1.16	0.25	0.20	0.84	-0.75	0.46	0.82	0.42	0.69	0.49
	O_3 Mean	-0.11	0.91	-1.42	0.16	1.55	0.12	-1.29	0.20	-0.08	0.94	-0.27	0.79	0.48	0.63	0.44	0.66
	CO Mean	-1.23	0.22	0.08	0.93	-0.32	0.75	0.34	0.74	-1.00	0.32	-0.04	0.97	-1.15	0.25	-0.59	0.55
	NO Max’	-0.60	0.55	1.36	0.17	-0.71	0.48	-0.69	0.49	-1.77	0.08	0.54	0.59	-0.60	0.55	-0.08	0.94
	NO_2 Max’	-0.71	0.48	0.62	0.53	-0.85	0.40	0.33	0.74	-1.73	0.08	0.59	0.56	-0.58	0.56	-0.29	0.77
	NOD Max’	-0.66	0.51	1.31	0.19	-0.74	0.46	-0.47	0.64	-2.04	0.04	0.78	0.44	-0.72	0.47	0.06	0.95
	SO_2 Max’	-0.98	0.33	-1.00	0.32	-1.71	0.09	-0.07	0.94	-0.64	0.52	-0.53	0.59	0.43	0.67	-1.89	0.06
	PM_{10} Max’	-0.86	0.39	0.60	0.55	-0.24	0.81	0.97	0.33	0.59	0.55	-0.49	0.62	1.65	0.10	-0.02	0.98
	O_3 Max’	-0.28	0.78	-0.55	0.58	0.32	0.75	-0.96	0.34	0.63	0.53	-0.65	0.52	0.25	0.80	0.31	0.76
	CO Max’	-1.59	0.11	0.73	0.47	-1.07	0.28	0.24	0.81	-1.66	0.10	-0.71	0.48	-0.41	0.68	-0.85	0.40
Weather	Temp Min’	-1.07	0.28	1.51	0.13	1.31	0.19	-0.46	0.65	-0.45	0.65	2.86	0.00	-0.09	0.93	-0.65	0.52
	Temp Max’	0.54	0.59	-1.03	0.30	0.59	0.55	0.75	0.45	-0.40	0.69	-0.08	0.94	2.16	0.03	0.51	0.61
	Sun	1.45	0.15	-1.95	0.05	-0.72	0.47	1.43	0.15	-1.39	0.17	-0.84	0.40	2.39	0.02	1.75	0.08
	Rain	-0.58	0.56	1.18	0.24	0.24	0.81	0.11	0.91	0.06	0.96	0.34	0.73	-2.01	0.05	-0.96	0.34
	Pressure	1.75	0.08	0.04	0.97	-1.87	0.06	1.76	0.08	-1.13	0.26	1.03	0.30	-0.22	0.83	1.06	0.29
	Wind speed	0.84	0.40	-3.03	0.00	1.70	0.09	-1.12	0.26	-0.13	0.90	0.30	0.76	-1.34	0.18	0.31	0.76
Pollen	Grass	0.65	0.51	-0.71	0.48	0.79	0.43	-1.23	0.22	-0.27	0.79	1.96	0.05	-1.23	0.22	1.41	0.16

Table G. 113: Trent Region Emergency Consultations Asthmatics – Autoregressive Standardised percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min'	2.02	0.04	0.17	0.87	-1.49	0.14	1.92	0.06	1.19	0.24	-0.21	0.84	0.40	0.69	-0.04	0.97
	NO_2 Min'	-0.39	0.70	0.39	0.70	-0.53	0.60	1.19	0.23	-1.14	0.25	1.65	0.10	-0.22	0.82	-1.34	0.18
	NOD Min'	0.81	0.42	0.11	0.91	-1.15	0.25	1.54	0.12	-0.29	0.77	1.00	0.32	-0.09	0.93	-1.00	0.32
	SO_2 Min'	-2.31	0.02	1.67	0.10	-0.72	0.47	0.66	0.51	1.14	0.26	-0.71	0.48	0.16	0.87	-0.10	0.92
	PM_{10} Min'	0.27	0.79	-0.57	0.57	1.63	0.10	-0.95	0.34	-0.78	0.44	0.59	0.56	0.07	0.95	-1.95	0.05
	O_3 Min'	0.54	0.59	1.02	0.31	-2.17	0.03	0.52	0.60	-0.11	0.91	1.09	0.28	0.80	0.42	1.73	0.08
	CO Min'	1.23	0.22	-0.52	0.61	0.80	0.42	-0.35	0.72	-1.43	0.15	1.12	0.27	-1.05	0.30	-1.26	0.21
	NO Mean	-0.42	0.67	-0.36	0.72	-0.37	0.71	0.59	0.56	-0.59	0.56	-1.49	0.14	1.03	0.31	-1.91	0.06
	NO_2 Mean	0.22	0.83	-0.69	0.49	0.93	0.35	-0.58	0.57	0.32	0.75	-0.79	0.43	0.29	0.77	-1.18	0.24
	NOD Mean	-0.23	0.82	-0.52	0.60	0.02	0.99	0.34	0.73	-0.35	0.73	-1.35	0.18	0.83	0.41	-1.79	0.07
	SO_2 Mean	-0.82	0.41	-1.16	0.25	-0.48	0.63	0.29	0.77	-0.65	0.51	-1.69	0.09	1.77	0.08	-2.97	0.00
	PM_{10} Mean	0.56	0.58	0.50	0.62	0.36	0.72	-0.22	0.82	-0.54	0.59	-1.43	0.15	2.00	0.05	-2.08	0.04
	O_3 Mean	-0.43	0.67	0.47	0.64	-0.49	0.62	0.50	0.62	0.80	0.42	1.01	0.31	-0.87	0.39	1.36	0.17
	CO Mean	-0.86	0.39	-1.58	0.12	1.48	0.14	0.29	0.78	-1.45	0.15	-1.47	0.14	-0.47	0.64	-2.37	0.02
	NO Max'	-0.73	0.47	-1.22	0.22	1.70	0.09	-0.77	0.44	-0.19	0.85	-1.68	0.09	0.47	0.64	-1.74	0.08
	NO_2 Max'	-0.26	0.79	-1.84	0.07	2.03	0.04	-0.63	0.53	1.34	0.18	-1.72	0.09	-0.21	0.83	-1.79	0.07
	NOD Max'	-0.75	0.45	-1.40	0.16	1.94	0.05	-0.68	0.49	0.08	0.94	-1.95	0.05	0.51	0.61	-1.80	0.07
	SO_2 Max'	-0.66	0.51	-1.58	0.11	0.05	0.96	-1.35	0.18	-0.64	0.53	-1.60	0.11	0.35	0.73	-2.42	0.02
	PM_{10} Max'	1.91	0.06	0.12	0.91	0.94	0.35	-0.47	0.64	-0.25	0.80	-1.28	0.20	0.67	0.50	-1.97	0.05
	O_3 Max'	-0.03	0.98	-0.52	0.61	0.21	0.83	1.50	0.13	1.18	0.24	-0.17	0.87	-0.20	0.84	1.26	0.21
	CO Max'	-1.45	0.15	-1.98	0.05	2.04	0.04	-0.60	0.55	-1.74	0.08	-2.08	0.04	0.12	0.90	-2.34	0.02
Weather	Temp Min'	-0.44	0.66	-0.10	0.92	-0.72	0.47	-0.24	0.81	0.38	0.70	0.22	0.83	0.82	0.41	0.54	0.59
	Temp Max'	1.54	0.13	-1.31	0.19	0.66	0.51	0.34	0.73	0.01	0.99	-2.22	0.03	2.40	0.02	0.67	0.50
	Sun	0.90	0.37	-0.53	0.60	1.42	0.16	0.80	0.42	-0.63	0.53	-1.15	0.25	-0.08	0.94	0.49	0.63
	Rain	0.45	0.65	-0.96	0.34	3.64	0.00	-0.35	0.72	-1.09	0.28	-0.02	0.98	0.51	0.61	0.33	0.74
	Pressure	2.14	0.03	-2.15	0.03	2.20	0.03	-0.84	0.40	-0.39	0.70	0.06	0.95	0.89	0.37	-0.96	0.34
	Wind speed	1.57	0.12	0.61	0.54	-1.39	0.16	0.18	0.86	1.01	0.31	0.38	0.71	-1.81	0.07	0.90	0.37
Pollen	Grass	-0.21	0.84	1.46	0.14	1.19	0.24	-0.69	0.49	0.90	0.37	-0.51	0.61	0.91	0.36	0.21	0.84

Table G. 114: Trent Region Emergency Consultations Non-asthmatics – Autoregressive Standardised percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min'	2.27	0.02	0.20	0.84	-0.52	0.60	0.64	0.52	-0.23	0.82	0.19	0.85	0.29	0.77	1.52	0.13
	NO_2 Min'	1.95	0.05	0.55	0.58	-0.38	0.71	-1.19	0.23	0.43	0.67	-0.14	0.89	-0.24	0.81	1.18	0.24
	NOD Min'	2.25	0.03	0.35	0.73	-0.43	0.67	-0.45	0.66	-0.05	0.96	-0.16	0.87	0.06	0.95	1.39	0.16
	SO_2 Min'	-0.84	0.40	1.42	0.16	-2.46	0.01	0.51	0.61	-0.39	0.70	-2.30	0.02	0.35	0.73	-0.29	0.77
	PM_{10} Min'	1.42	0.16	0.79	0.43	-0.83	0.41	-0.57	0.57	-0.14	0.89	-0.12	0.91	-0.19	0.85	1.78	0.08
	O_3 Min'	-1.17	0.24	-0.81	0.42	-1.12	0.26	0.87	0.39	-0.44	0.66	3.33	0.00	-0.90	0.37	-0.47	0.64
	CO Min'	2.27	0.02	-1.32	0.19	-1.49	0.14	0.24	0.81	-1.80	0.07	0.71	0.48	-0.86	0.39	-0.89	0.37
	NO Mean	2.58	0.01	-1.71	0.09	0.63	0.53	-0.42	0.68	-1.25	0.21	-0.09	0.93	-0.06	0.95	-1.74	0.08
	NO_2 Mean	0.98	0.33	0.94	0.35	1.68	0.09	-2.16	0.03	0.72	0.47	-2.15	0.03	1.58	0.11	-0.75	0.45
	NOD Mean	2.31	0.02	-1.12	0.27	0.94	0.35	-0.79	0.43	-0.79	0.43	-0.68	0.50	0.41	0.68	-1.49	0.14
	SO_2 Mean	-0.31	0.76	-0.50	0.62	-1.48	0.14	-0.10	0.92	-1.41	0.16	-1.96	0.05	-0.21	0.84	-1.39	0.17
	PM_{10} Mean	1.92	0.05	0.36	0.72	0.52	0.60	-1.39	0.17	-0.66	0.51	0.70	0.48	0.35	0.73	0.05	0.96
	O_3 Mean	-1.89	0.06	-0.11	0.91	-0.43	0.67	1.30	0.20	-0.11	0.91	1.71	0.09	-0.22	0.83	0.40	0.69
	CO Mean	0.70	0.48	-1.22	0.22	-0.30	0.76	0.01	0.99	-1.81	0.07	-0.51	0.61	-0.41	0.68	-2.74	0.01
	NO Max'	1.30	0.20	-1.81	0.07	2.51	0.01	-1.14	0.25	-1.11	0.27	-0.33	0.74	-0.68	0.50	-2.13	0.03
	NO_2 Max'	-0.20	0.84	1.14	0.26	3.24	0.00	-2.51	0.01	0.36	0.72	-1.84	0.07	0.43	0.67	-0.97	0.33
	NOD Max'	1.26	0.21	-1.50	0.13	2.71	0.01	-1.27	0.20	-0.96	0.34	-0.56	0.57	-0.48	0.63	-2.25	0.03
	SO_2 Max'	-1.23	0.22	0.13	0.90	-0.73	0.47	-0.91	0.36	-1.71	0.09	-1.22	0.22	-0.65	0.52	-1.68	0.09
	PM_{10} Max'	0.19	0.85	3.06	0.00	1.28	0.20	-0.75	0.45	-1.45	0.15	1.61	0.11	0.60	0.55	-1.39	0.16
	O_3 Max'	-1.73	0.08	-0.52	0.60	2.13	0.03	1.24	0.21	-0.63	0.53	0.02	0.98	2.03	0.04	-0.23	0.82
	CO Max'	0.08	0.94	-1.83	0.07	2.07	0.04	-0.99	0.32	-1.77	0.08	0.00	1.00	-2.42	0.02	-2.51	0.01
Weather	Temp Min'	1.33	0.19	0.10	0.92	-1.42	0.16	1.70	0.09	-1.09	0.28	0.87	0.39	1.33	0.18	-1.06	0.29
	Temp Max'	-0.06	0.96	1.56	0.12	-0.87	0.38	-0.73	0.47	1.79	0.07	0.10	0.92	-1.40	0.16	1.81	0.07
	Sun	-0.31	0.76	0.02	0.99	0.15	0.88	0.05	0.96	0.80	0.43	-0.28	0.78	0.51	0.61	-1.93	0.05
	Rain	0.15	0.88	0.14	0.89	0.08	0.94	-0.74	0.46	-1.07	0.29	-1.07	0.28	-1.16	0.25	1.58	0.12
	Pressure	-0.64	0.52	1.06	0.29	1.50	0.13	-2.61	0.01	1.85	0.06	-1.91	0.06	1.53	0.13	-0.05	0.96
	Wind speed	-0.14	0.89	-2.51	0.01	-1.06	0.29	1.30	0.19	-0.34	0.73	0.34	0.74	-1.03	0.30	1.03	0.30
Pollen	Grass	0.60	0.55	2.36	0.02	0.25	0.80	-1.76	0.08	1.23	0.22	-0.98	0.33	1.48	0.14	-0.64	0.52

Table G. 115: Trent Region Emergency Counts Asthmatics – Autoregressive Standardised percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	0.71	0.48	0.26	0.79	-1.14	0.26	1.32	0.19	0.10	0.92	1.29	0.20	0.46	0.65	-0.17	0.86
	NO_2 Min’	1.65	0.10	-1.19	0.24	0.79	0.43	0.33	0.74	0.88	0.38	-0.44	0.66	0.53	0.60	-1.63	0.10
	NOD Min’	1.45	0.15	-0.31	0.76	-0.47	0.64	0.80	0.43	0.51	0.61	0.42	0.67	0.48	0.63	-1.37	0.17
	SO_2 Min’	-0.98	0.33	-1.37	0.17	0.42	0.68	1.07	0.29	0.14	0.89	-1.26	0.21	0.46	0.64	-0.92	0.36
	PM_{10} Min’	0.71	0.48	0.39	0.70	-1.06	0.29	0.45	0.65	-0.32	0.75	-0.97	0.33	0.94	0.35	-1.28	0.20
	O_3 Min’	-1.12	0.26	0.47	0.64	-0.70	0.48	-0.04	0.97	-1.92	0.05	1.73	0.08	-0.47	0.64	2.14	0.03
	CO Min’	0.72	0.47	0.45	0.65	-0.85	0.40	0.63	0.53	0.13	0.90	-0.30	0.76	-0.48	0.63	-0.69	0.49
	NO Mean	-0.49	0.62	0.15	0.88	-1.25	0.21	0.55	0.58	0.55	0.58	0.35	0.73	0.37	0.71	-2.47	0.01
	NO_2 Mean	-0.21	0.83	0.49	0.63	0.10	0.92	-0.36	0.72	1.88	0.06	-1.62	0.11	0.56	0.58	-1.27	0.21
	NOD Mean	-0.38	0.71	0.23	0.82	-0.97	0.33	0.42	0.67	0.85	0.39	-0.10	0.92	0.48	0.63	-2.29	0.02
	SO_2 Mean	-2.19	0.03	-1.12	0.26	0.34	0.74	0.17	0.87	0.83	0.41	-2.59	0.01	0.29	0.77	-2.04	0.04
	PM_{10} Mean	0.04	0.97	1.36	0.18	-1.34	0.18	0.38	0.70	0.47	0.64	-1.46	0.14	1.14	0.26	-0.58	0.56
	O_3 Mean	0.13	0.90	0.80	0.42	-0.49	0.62	0.36	0.72	-1.73	0.08	2.01	0.05	-1.99	0.05	3.02	0.00
	CO Mean	-0.74	0.46	-0.27	0.79	-0.51	0.61	0.16	0.87	-0.06	0.96	-0.06	0.95	-0.70	0.49	-1.75	0.08
	NO Max’	-0.12	0.90	-0.49	0.62	0.13	0.90	-0.11	0.91	1.25	0.21	-0.02	0.98	0.48	0.63	-2.57	0.01
	NO_2 Max’	-0.04	0.97	0.07	0.94	0.65	0.52	-0.18	0.86	1.66	0.10	-1.56	0.12	-0.11	0.91	-0.91	0.36
	NOD Max’	-0.13	0.90	-0.43	0.67	0.32	0.75	-0.04	0.97	1.22	0.22	-0.28	0.78	0.50	0.61	-2.46	0.01
	SO_2 Max’	-1.62	0.11	-1.13	0.26	0.62	0.54	-0.38	0.70	0.85	0.40	-2.40	0.02	-0.90	0.37	-1.48	0.14
	PM_{10} Max’	-0.31	0.76	1.57	0.12	0.89	0.37	-0.88	0.38	1.08	0.28	-1.14	0.26	0.71	0.48	-0.12	0.91
	O_3 Max’	-0.52	0.60	1.60	0.11	-0.50	0.62	0.80	0.43	-0.63	0.53	0.37	0.71	-1.57	0.12	2.69	0.01
	CO Max’	-0.70	0.48	-0.50	0.62	-0.01	0.99	0.01	0.99	0.27	0.79	-0.25	0.80	-0.34	0.74	-2.26	0.02
Weather	Temp Min’	1.25	0.21	-0.20	0.85	-0.09	0.92	-0.63	0.53	0.19	0.85	1.13	0.26	-0.67	0.50	-0.13	0.90
	Temp Max’	1.32	0.19	-1.73	0.08	2.17	0.03	-1.13	0.26	-0.51	0.61	-0.73	0.47	1.09	0.28	0.54	0.59
	Sun	0.52	0.61	-1.41	0.16	-1.18	0.24	1.95	0.05	-1.64	0.10	-0.07	0.94	0.97	0.33	1.55	0.12
	Rain	1.04	0.30	-0.28	0.78	0.84	0.40	-0.72	0.47	1.17	0.24	-1.11	0.27	-0.01	0.99	-0.56	0.58
	Pressure	0.48	0.63	-0.28	0.78	0.74	0.46	-0.75	0.45	-0.50	0.62	1.42	0.15	-0.15	0.88	-0.20	0.84
	Wind speed	0.71	0.48	0.55	0.58	-0.79	0.43	0.45	0.66	-0.71	0.48	0.79	0.43	-1.21	0.23	0.85	0.39
Pollen	Grass	0.96	0.34	0.30	0.76	1.70	0.09	-0.61	0.54	0.74	0.46	0.74	0.46	-0.92	0.36	0.58	0.56

Table G. 116: Trent Region Emergency Counts Non-asthmatics – Autoregressive Standardised percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	-0.12	0.91	1.28	0.20	-0.53	0.59	0.26	0.80	0.63	0.53	0.27	0.79	-0.46	0.64	2.18	0.03
	NO_2 Min’	1.26	0.21	0.67	0.50	0.01	1.00	0.06	0.95	1.02	0.31	0.05	0.96	0.18	0.86	0.37	0.71
	NOD Min’	0.17	0.86	1.59	0.11	-0.22	0.82	-0.04	0.97	0.89	0.37	0.21	0.83	-0.35	0.73	1.33	0.18
	SO_2 Min’	-0.23	0.82	1.67	0.10	-0.91	0.36	0.05	0.96	0.25	0.80	-0.71	0.48	-0.11	0.92	0.22	0.82
	PM_{10} Min’	0.28	0.78	-0.21	0.83	0.30	0.77	0.08	0.93	0.56	0.58	-0.94	0.35	-0.11	0.91	2.13	0.03
	O_3 Min’	-2.13	0.03	-0.08	0.94	0.19	0.85	-0.59	0.55	-0.18	0.86	1.71	0.09	-1.41	0.16	0.15	0.88
	CO Min’	1.02	0.31	0.48	0.63	-1.52	0.13	1.11	0.27	-0.06	0.95	-1.12	0.26	-0.07	0.94	-1.05	0.29
	NO Mean	0.32	0.75	0.72	0.47	-1.03	0.30	1.01	0.31	-0.71	0.48	0.58	0.56	-0.80	0.42	0.76	0.45
	NO_2 Mean	1.12	0.26	0.62	0.54	-0.35	0.73	0.99	0.32	0.06	0.95	-1.03	0.30	1.24	0.22	-0.97	0.33
	NOD Mean	0.52	0.61	0.75	0.45	-0.91	0.36	1.07	0.28	-0.58	0.56	0.19	0.85	-0.32	0.75	0.38	0.71
	SO_2 Mean	-0.40	0.69	0.84	0.40	-1.43	0.15	-0.42	0.67	-0.95	0.34	-0.34	0.74	0.59	0.55	-0.74	0.46
	PM_{10} Mean	0.39	0.70	0.76	0.45	-0.16	0.87	0.61	0.54	-0.46	0.64	0.71	0.48	-0.33	0.74	1.30	0.19
	O_3 Mean	-1.30	0.19	-0.76	0.45	1.84	0.07	-1.75	0.08	0.06	0.95	0.38	0.71	0.18	0.86	-0.13	0.90
	CO Mean	-0.16	0.88	0.13	0.90	-1.35	0.18	1.46	0.14	-1.23	0.22	-0.03	0.98	-1.19	0.24	-0.84	0.40
	NO Max’	0.03	0.98	0.67	0.50	-0.58	0.57	0.02	0.98	-1.02	0.31	0.57	0.57	-0.51	0.61	0.30	0.76
	NO_2 Max’	0.24	0.81	0.86	0.39	-0.21	0.84	0.28	0.78	-0.63	0.53	-0.27	0.79	0.50	0.62	-1.17	0.24
	NOD Max’	0.10	0.92	0.74	0.46	-0.57	0.57	0.13	0.89	-1.09	0.28	0.53	0.60	-0.48	0.63	0.20	0.84
	SO_2 Max’	-0.80	0.42	0.20	0.85	-2.01	0.04	-0.34	0.74	-0.74	0.46	0.59	0.56	-0.33	0.74	-0.58	0.56
	PM_{10} Max’	-0.32	0.75	1.52	0.13	1.25	0.21	0.84	0.40	-0.87	0.38	0.79	0.43	1.05	0.29	0.28	0.78
	O_3 Max’	-0.36	0.72	-0.33	0.74	1.35	0.18	-1.12	0.26	0.22	0.83	-0.87	0.39	0.93	0.35	-0.60	0.55
	CO Max’	-0.58	0.56	0.06	0.95	-0.59	0.56	0.98	0.33	-1.61	0.11	-0.48	0.63	-0.85	0.40	-0.67	0.50
Weather	Temp Min’	-0.18	0.86	1.34	0.18	-0.08	0.93	0.83	0.41	-0.76	0.45	1.69	0.09	0.39	0.70	-0.30	0.77
	Temp Max’	-0.14	0.89	0.02	0.99	-0.30	0.77	0.52	0.61	1.49	0.14	-0.46	0.64	0.73	0.46	0.80	0.42
	Sun	1.65	0.10	-1.84	0.07	0.08	0.94	0.77	0.44	0.07	0.94	-0.81	0.42	1.90	0.06	0.69	0.49
	Rain	-0.79	0.43	2.50	0.01	-0.16	0.88	-0.72	0.47	-0.40	0.69	0.38	0.70	-3.06	0.00	-0.46	0.65
	Pressure	1.56	0.12	0.12	0.91	-1.99	0.05	1.86	0.06	-0.43	0.67	-0.30	0.76	-0.12	0.90	1.61	0.11
	Wind speed	0.85	0.40	-1.88	0.06	0.48	0.63	-0.40	0.69	-0.68	0.50	1.73	0.08	-0.90	0.37	0.05	0.96
Pollen	Grass	0.65	0.52	1.08	0.28	0.69	0.49	-2.11	0.04	1.27	0.20	0.79	0.43	-0.63	0.53	0.77	0.44

Table G. 117: Trent Region Out of Hours Counts Asthmatics – Autoregressive Standardised percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min'	0.43	0.67	0.33	0.74	-0.56	0.57	1.35	0.18	-0.67	0.50	0.82	0.41	1.21	0.23	-1.37	0.17
	NO_2 Min'	2.28	0.02	-2.17	0.03	-0.01	1.00	1.54	0.12	0.38	0.70	-0.29	0.77	0.77	0.44	-1.93	0.05
	NOD Min'	1.50	0.13	-0.77	0.44	-0.55	0.58	1.61	0.11	-0.25	0.80	0.29	0.77	1.28	0.20	-2.10	0.04
	SO_2 Min'	0.74	0.46	-1.56	0.12	1.38	0.17	0.37	0.72	-0.72	0.47	-0.04	0.97	1.08	0.28	-1.62	0.11
	PM_{10} Min'	0.90	0.37	0.18	0.85	-1.78	0.08	1.06	0.29	0.77	0.44	-0.61	0.54	0.45	0.65	-1.21	0.23
	O_3 Min'	-1.54	0.12	1.05	0.29	-0.90	0.37	-0.34	0.73	-1.44	0.15	1.39	0.16	0.09	0.93	0.77	0.44
	CO Min'	1.23	0.22	-0.28	0.78	-1.31	0.19	1.51	0.13	-0.02	0.99	-0.10	0.92	0.28	0.78	-1.32	0.19
	NO Mean	0.58	0.56	-0.67	0.50	-0.35	0.73	1.46	0.14	0.45	0.65	1.50	0.13	-0.19	0.85	-1.32	0.19
	NO_2 Mean	1.05	0.30	-0.93	0.35	-0.18	0.86	1.29	0.20	0.86	0.39	-0.44	0.66	-0.43	0.67	0.00	1.00
	NOD Mean	0.77	0.44	-0.76	0.45	-0.40	0.69	1.56	0.12	0.46	0.65	1.16	0.25	-0.27	0.79	-1.07	0.29
	SO_2 Mean	-0.02	0.99	-0.84	0.40	1.25	0.21	0.31	0.76	0.58	0.56	-0.33	0.74	0.14	0.89	-0.83	0.41
	PM_{10} Mean	0.55	0.58	-0.14	0.89	-1.59	0.11	2.39	0.02	0.31	0.76	-1.04	0.30	0.44	0.66	-0.54	0.59
	O_3 Mean	-0.88	0.38	2.03	0.04	-1.16	0.25	-0.33	0.74	-1.45	0.15	0.80	0.43	-0.80	0.43	1.08	0.28
	CO Mean	0.83	0.41	-0.37	0.71	-0.89	0.38	1.99	0.05	-0.28	0.78	1.24	0.21	-0.34	0.74	-0.05	0.96
	NO Max'	0.48	0.63	-0.80	0.43	0.41	0.69	1.11	0.27	1.72	0.09	0.61	0.54	0.39	0.70	-1.09	0.28
	NO_2 Max'	1.08	0.28	-1.01	0.31	0.57	0.57	0.90	0.37	1.25	0.21	-0.82	0.41	-0.62	0.53	0.65	0.52
	NOD Max'	0.52	0.60	-0.91	0.37	0.56	0.57	1.10	0.27	1.60	0.11	0.39	0.70	0.27	0.79	-0.92	0.36
	SO_2 Max'	0.76	0.45	-1.35	0.18	1.55	0.12	0.37	0.71	1.14	0.26	-0.31	0.76	-0.75	0.45	0.42	0.68
	PM_{10} Max'	0.01	0.99	-0.66	0.51	1.33	0.18	0.98	0.33	1.31	0.19	-1.36	0.17	0.33	0.74	0.32	0.75
	O_3 Max'	-2.18	0.03	3.09	0.00	-0.74	0.46	-0.02	0.99	-1.13	0.26	-0.42	0.68	-1.33	0.19	1.94	0.05
	CO Max'	0.51	0.61	0.00	1.00	0.32	0.75	1.64	0.10	0.51	0.61	1.20	0.23	-0.09	0.93	0.18	0.86
Weather	Temp Min'	0.86	0.39	0.53	0.60	-0.30	0.76	-0.93	0.35	-0.03	0.97	0.89	0.37	-1.64	0.10	-0.04	0.97
	Temp Max'	0.14	0.89	-0.37	0.71	2.28	0.02	-1.52	0.13	-0.32	0.75	-0.62	0.53	0.20	0.84	-0.43	0.67
	Sun	-0.22	0.83	-1.12	0.27	0.27	0.79	1.37	0.17	-0.31	0.75	-0.29	0.77	0.03	0.97	1.47	0.14
	Rain	1.51	0.13	-0.54	0.59	-2.13	0.03	-0.91	0.36	-0.26	0.79	0.23	0.81	0.67	0.50	-1.05	0.29
	Pressure	-1.29	0.20	0.07	0.95	0.74	0.46	-0.61	0.54	0.08	0.94	1.66	0.10	-0.85	0.40	-0.48	0.63
	Wind speed	-0.93	0.35	1.34	0.18	-1.60	0.11	0.59	0.56	-0.97	0.34	1.47	0.14	-1.10	0.27	0.78	0.44
Pollen	Grass	0.78	0.43	0.19	0.85	1.50	0.13	-0.56	0.57	1.20	0.23	-0.02	0.99	-0.96	0.34	0.06	0.96

Table G. 118: Trent Region Out of Hours Counts Non-asthmatics – Autoregressive Standardised percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min'	-1.02	0.31	1.07	0.29	-0.43	0.67	-0.66	0.51	0.26	0.80	0.39	0.70	-1.38	0.17	1.03	0.30
	NO_2 Min'	0.20	0.84	0.50	0.62	-0.92	0.36	0.10	0.92	0.92	0.36	0.40	0.69	-0.44	0.66	0.31	0.76
	NOD Min'	-0.76	0.45	1.37	0.17	-0.66	0.51	-0.43	0.67	0.57	0.57	0.73	0.47	-1.00	0.32	0.79	0.43
	SO_2 Min'	0.26	0.80	0.49	0.63	0.94	0.35	-0.66	0.51	0.37	0.72	0.73	0.47	-0.64	0.53	0.07	0.95
	PM_{10} Min'	0.38	0.70	-0.66	0.51	0.99	0.32	-1.58	0.11	0.38	0.71	0.34	0.74	-0.75	0.45	1.37	0.17
	O_3 Min'	-0.81	0.42	0.25	0.80	1.09	0.27	-0.60	0.55	-0.51	0.61	2.03	0.04	-1.62	0.11	0.23	0.82
	CO Min'	-0.49	0.62	1.64	0.10	-1.48	0.14	-0.28	0.78	0.22	0.83	-0.45	0.65	-1.13	0.26	-0.39	0.70
	NO Mean	-0.64	0.53	0.82	0.41	-1.01	0.31	0.89	0.37	0.28	0.78	0.56	0.58	-0.13	0.89	0.64	0.52
	NO_2 Mean	0.60	0.55	0.27	0.79	-0.91	0.36	0.43	0.67	1.06	0.29	-0.42	0.68	0.92	0.36	-0.83	0.41
	NOD Mean	-0.41	0.68	0.72	0.47	-1.03	0.30	0.81	0.42	0.43	0.67	0.37	0.71	0.10	0.92	0.29	0.77
	SO_2 Mean	0.24	0.81	0.75	0.45	-0.74	0.46	0.03	0.97	-0.27	0.79	0.41	0.68	-0.12	0.91	1.04	0.30
	PM_{10} Mean	0.75	0.46	-0.19	0.85	0.27	0.79	-0.64	0.52	-0.09	0.93	1.57	0.12	-1.16	0.25	0.84	0.40
	O_3 Mean	0.11	0.91	-0.43	0.67	1.97	0.05	-1.80	0.07	-0.11	0.91	0.51	0.61	-0.36	0.72	-0.16	0.87
	CO Mean	-0.36	0.72	0.84	0.40	-1.31	0.19	0.87	0.39	-0.07	0.95	0.62	0.53	-0.60	0.55	0.06	0.96
	NO Max'	-1.04	0.30	0.77	0.44	-1.19	0.23	0.54	0.59	0.44	0.66	1.00	0.32	-0.16	0.87	0.49	0.62
	NO_2 Max'	0.44	0.66	0.30	0.77	-0.74	0.46	0.18	0.86	0.68	0.50	0.29	0.77	1.10	0.27	-1.13	0.26
	NOD Max'	-0.86	0.39	0.81	0.42	-1.27	0.21	0.53	0.60	0.49	0.63	0.92	0.36	-0.06	0.95	0.33	0.74
	SO_2 Max'	0.69	0.49	-0.18	0.86	-1.47	0.14	-0.13	0.90	0.82	0.41	0.58	0.56	0.10	0.92	1.46	0.14
	PM_{10} Max'	0.22	0.83	0.41	0.68	1.66	0.10	0.17	0.87	-1.11	0.27	1.03	0.30	0.18	0.86	0.62	0.54
	O_3 Max'	1.32	0.19	0.35	0.73	1.03	0.30	-1.17	0.24	-0.32	0.75	-0.52	0.61	0.33	0.74	-0.48	0.63
	CO Max'	-0.79	0.43	0.40	0.69	-0.12	0.91	0.80	0.43	0.10	0.92	0.31	0.76	-0.28	0.78	0.46	0.64
Weather	Temp Min'	1.39	0.17	0.65	0.51	-1.33	0.19	0.94	0.35	0.03	0.97	0.11	0.91	-0.14	0.89	0.68	0.50
	Temp Max'	-0.36	0.72	1.19	0.24	-0.84	0.40	-0.10	0.92	2.43	0.02	-0.87	0.38	-0.48	0.63	0.47	0.64
	Sun	0.99	0.32	-0.68	0.50	1.02	0.31	0.45	0.65	1.36	0.17	-0.89	0.38	0.84	0.40	0.63	0.53
	Rain	-0.67	0.50	1.52	0.13	-0.60	0.55	-0.78	0.43	-0.31	0.76	0.97	0.33	-1.41	0.16	-0.09	0.93
	Pressure	0.71	0.48	0.11	0.91	-2.14	0.03	2.06	0.04	0.52	0.60	-1.40	0.16	-0.39	0.70	1.29	0.20
	Wind speed	0.56	0.58	0.46	0.64	-0.19	0.85	0.59	0.56	-1.61	0.11	1.49	0.14	0.96	0.34	-1.04	0.30
Pollen	Grass	-0.06	0.96	1.01	0.31	-0.60	0.55	-0.51	0.61	1.55	0.12	-0.85	0.40	0.44	0.66	-0.01	0.99

Table G. 119: Trent Region All Counts Excess – Autoregressive Standardised percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	0.87	0.39	0.28	0.78	-1.19	0.23	-0.09	0.93	3.41	0.00	1.57	0.12	-0.82	0.41	0.70	0.49
	NO_2 Min’	0.38	0.70	0.68	0.50	0.28	0.78	-0.43	0.67	2.53	0.01	-0.84	0.40	0.46	0.65	-0.61	0.55
	NOD Min’	0.62	0.53	0.45	0.66	-0.76	0.45	-0.40	0.69	3.58	0.00	0.12	0.91	-0.51	0.61	0.18	0.86
	SO_2 Min’	0.45	0.65	0.01	0.99	-0.06	0.96	1.44	0.15	-1.61	0.11	-0.55	0.58	0.14	0.89	-0.11	0.91
	PM_{10} Min’	1.32	0.19	0.88	0.38	-0.92	0.36	-0.27	0.79	1.74	0.08	0.64	0.52	-0.57	0.57	-2.36	0.02
	O_3 Min’	0.29	0.77	-0.12	0.91	0.09	0.93	-0.43	0.67	0.19	0.85	-1.09	0.28	-0.90	0.37	0.89	0.38
	CO Min’	0.65	0.52	-0.53	0.60	0.88	0.38	0.30	0.76	2.39	0.02	-0.93	0.35	0.33	0.74	0.12	0.90
	NO Mean	0.67	0.50	-0.77	0.44	-0.66	0.51	1.30	0.19	0.42	0.67	2.22	0.03	-0.95	0.34	0.72	0.47
	NO_2 Mean	-0.44	0.66	0.76	0.45	-0.37	0.71	-0.06	0.96	1.20	0.23	-0.02	0.98	-0.57	0.57	-0.03	0.98
	NOD Mean	0.49	0.62	-0.45	0.65	-0.57	0.57	1.01	0.31	0.45	0.65	1.85	0.06	-1.01	0.31	0.57	0.57
	SO_2 Mean	-0.72	0.47	0.49	0.62	-0.81	0.42	2.32	0.02	-0.32	0.75	-1.33	0.18	0.74	0.46	-1.53	0.13
	PM_{10} Mean	1.11	0.27	-0.10	0.92	-0.32	0.75	-0.28	0.78	1.24	0.21	0.77	0.44	-1.18	0.24	-0.46	0.64
	O_3 Mean	0.26	0.80	0.20	0.84	-0.79	0.43	-0.07	0.95	-0.37	0.71	0.01	1.00	-2.11	0.04	0.57	0.57
	CO Mean	0.42	0.68	-0.67	0.50	-0.11	0.91	0.53	0.60	1.28	0.20	-0.35	0.73	0.33	0.74	-0.42	0.67
	NO Max’	0.01	0.99	-0.68	0.50	0.30	0.77	1.23	0.22	0.36	0.72	1.20	0.23	-0.66	0.51	0.62	0.54
	NO_2 Max’	-0.08	0.93	-0.81	0.42	0.00	1.00	-0.25	0.80	0.17	0.86	-0.36	0.72	-0.64	0.52	-0.01	0.99
	NOD Max’	0.01	0.99	-0.78	0.44	0.21	0.83	1.06	0.29	0.26	0.79	1.03	0.30	-0.61	0.54	0.60	0.55
	SO_2 Max’	-1.13	0.26	0.79	0.43	-0.33	0.74	2.66	0.01	-0.35	0.72	-1.54	0.13	-0.40	0.69	-0.78	0.43
	PM_{10} Max’	1.30	0.19	-0.50	0.62	-0.20	0.84	-0.69	0.49	1.21	0.23	1.45	0.15	-1.86	0.06	0.24	0.81
	O_3 Max’	-1.59	0.11	0.48	0.63	-0.80	0.43	0.19	0.85	0.36	0.72	-1.23	0.22	-1.59	0.11	-1.24	0.22
	CO Max’	0.94	0.35	-1.08	0.28	-0.39	0.70	1.30	0.20	-0.05	0.96	0.21	0.83	0.15	0.88	-0.64	0.52
Weather	Temp Min’	1.02	0.31	-0.34	0.74	-0.30	0.77	-0.05	0.96	0.75	0.45	-0.42	0.68	0.97	0.33	-1.61	0.11
	Temp Max’	2.16	0.03	-0.94	0.35	1.53	0.13	-1.42	0.16	-1.37	0.17	0.43	0.67	-0.16	0.87	0.23	0.82
	Sun	1.09	0.28	-0.58	0.56	1.48	0.14	-1.53	0.13	-2.14	0.03	-0.04	0.97	-0.62	0.53	1.47	0.14
	Rain	-1.76	0.08	0.26	0.80	-1.53	0.13	-0.19	0.85	0.80	0.43	0.21	0.84	-0.93	0.35	-0.62	0.54
	Pressure	-0.49	0.63	0.33	0.74	2.32	0.02	-0.65	0.52	-0.76	0.45	0.33	0.74	-0.77	0.44	2.03	0.04
	Wind speed	1.28	0.20	-0.10	0.92	-0.38	0.70	-0.12	0.91	-0.32	0.75	-0.26	0.79	0.01	0.99	0.15	0.88
Pollen	Grass	0.07	0.95	0.47	0.64	1.62	0.11	-0.67	0.50	3.12	0.00	-0.32	0.75	-1.11	0.27	1.45	0.15

Table G. 120: Trent Region Acute Visits Excess – Autoregressive Standardised percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	0.24	0.81	-0.49	0.63	-0.29	0.78	-1.95	0.05	1.48	0.14	-2.01	0.04	1.28	0.20	0.18	0.86
	NO_2 Min’	-1.35	0.18	0.01	0.99	-0.60	0.55	-1.01	0.31	0.55	0.58	-0.63	0.53	0.13	0.90	-0.01	0.99
	NOD Min’	-0.40	0.69	-0.31	0.76	-0.63	0.53	-1.59	0.11	1.31	0.19	-1.87	0.06	0.94	0.35	0.02	0.99
	SO_2 Min’	-2.19	0.03	-0.75	0.45	0.05	0.96	0.72	0.47	-0.56	0.58	-0.93	0.35	0.83	0.41	0.76	0.45
	PM_{10} Min’	0.36	0.72	-0.78	0.43	0.78	0.44	-2.27	0.02	0.52	0.61	-1.82	0.07	0.95	0.34	0.82	0.41
	O_3 Min’	0.57	0.57	-1.15	0.25	1.14	0.26	1.29	0.20	-2.10	0.04	0.35	0.73	-0.94	0.35	1.95	0.05
	CO Min’	-1.78	0.08	-0.24	0.81	-0.16	0.88	-2.35	0.02	1.51	0.13	-0.71	0.48	0.07	0.94	0.96	0.34
	NO Mean	-0.50	0.62	-0.26	0.79	-0.18	0.86	-1.72	0.09	0.89	0.38	-0.80	0.42	2.28	0.02	-1.73	0.09
	NO_2 Mean	-0.98	0.33	0.44	0.66	0.69	0.49	-3.02	0.00	1.23	0.22	-0.56	0.57	0.97	0.33	-0.54	0.59
	NOD Mean	-0.63	0.53	-0.12	0.90	0.08	0.94	-2.14	0.03	1.03	0.30	-0.81	0.42	2.13	0.03	-1.57	0.12
	SO_2 Mean	-1.56	0.12	-1.18	0.24	0.87	0.38	-1.14	0.26	2.30	0.02	-3.22	0.00	1.16	0.25	0.60	0.55
	PM_{10} Mean	0.32	0.75	-0.30	0.76	0.10	0.92	-2.83	0.01	2.38	0.02	-2.15	0.03	1.73	0.08	-0.16	0.87
	O_3 Mean	1.88	0.06	-0.26	0.79	0.03	0.98	1.43	0.15	-1.33	0.18	0.82	0.41	-1.34	0.18	1.63	0.10
	CO Mean	-0.79	0.43	-1.34	0.18	1.53	0.13	-3.22	0.00	2.00	0.05	-0.74	0.46	1.63	0.10	-0.95	0.34
	NO Max’	-0.49	0.62	-0.79	0.43	-0.18	0.86	-0.83	0.41	0.63	0.53	0.18	0.86	1.79	0.07	-2.37	0.02
	NO_2 Max’	-0.50	0.62	0.62	0.53	0.51	0.61	-2.24	0.03	-0.09	0.93	0.41	0.69	1.69	0.09	-0.94	0.35
	NOD Max’	-0.54	0.59	-0.61	0.54	-0.14	0.89	-0.94	0.35	0.49	0.62	0.33	0.75	1.86	0.06	-2.34	0.02
	SO_2 Max’	-0.88	0.38	-0.39	0.69	-0.35	0.72	-0.42	0.68	1.92	0.06	-2.59	0.01	0.66	0.51	0.49	0.63
	PM_{10} Max’	-0.55	0.58	-0.68	0.50	-0.29	0.77	-0.60	0.55	0.58	0.56	-1.67	0.09	2.36	0.02	-0.85	0.40
	O_3 Max’	2.02	0.04	0.24	0.81	0.50	0.62	0.74	0.46	-1.38	0.17	1.00	0.32	0.12	0.91	-0.18	0.86
	CO Max’	-0.66	0.51	-0.87	0.39	0.58	0.56	-1.50	0.13	1.31	0.19	-0.10	0.92	1.66	0.10	-1.63	0.10
Weather	Temp Min’	2.19	0.03	-0.17	0.87	-1.35	0.18	1.13	0.26	0.18	0.86	0.38	0.71	-0.46	0.64	-0.60	0.55
	Temp Max’	1.36	0.18	-0.28	0.78	-0.41	0.68	-1.02	0.31	1.72	0.09	-0.69	0.49	-0.25	0.81	0.12	0.90
	Sun	-0.69	0.49	0.01	0.99	-0.66	0.51	0.64	0.52	-1.25	0.21	-1.12	0.26	1.52	0.13	-0.02	0.99
	Rain	-1.08	0.28	-0.66	0.51	1.99	0.05	1.41	0.16	0.54	0.59	-0.34	0.74	0.14	0.89	0.92	0.36
	Pressure	-0.57	0.57	1.36	0.17	-0.11	0.91	-1.32	0.19	2.41	0.02	-3.44	0.00	2.08	0.04	-0.74	0.46
	Wind speed	0.96	0.34	0.64	0.52	0.01	0.99	2.20	0.03	-1.88	0.06	-0.27	0.78	0.83	0.41	-0.55	0.59
Pollen	Grass	-1.19	0.23	0.45	0.65	-0.80	0.43	1.11	0.27	-0.35	0.73	-0.95	0.34	0.12	0.91	0.85	0.39

Table G. 121: Trent Region Casualty Counts Excess – Autoregressive Standardised percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	0.30	0.77	-0.28	0.78	0.00	1.00	0.15	0.88	-0.96	0.34	2.43	0.02	-1.58	0.12	-0.16	0.88
	NO_2 Min’	0.19	0.85	0.25	0.80	1.09	0.28	-1.57	0.12	1.00	0.32	-0.52	0.60	-0.81	0.42	0.31	0.76
	NOD Min’	0.60	0.55	-0.17	0.87	0.54	0.59	-0.79	0.43	-0.08	0.93	1.18	0.24	-1.40	0.16	0.09	0.93
	SO_2 Min’	-0.06	0.95	-1.65	0.10	0.24	0.81	0.22	0.83	0.67	0.50	-0.41	0.68	-1.12	0.26	-0.43	0.67
	PM_{10} Min’	0.15	0.88	0.84	0.40	-0.49	0.62	-0.28	0.78	-1.52	0.13	0.92	0.36	-0.03	0.97	-0.99	0.32
	O_3 Min’	0.69	0.49	-0.24	0.81	0.21	0.84	0.06	0.95	-0.83	0.40	1.19	0.24	-0.41	0.69	0.52	0.60
	CO Min’	-0.85	0.40	1.77	0.08	-0.16	0.87	-0.78	0.43	-0.07	0.94	0.71	0.48	-1.76	0.08	0.95	0.35
	NO Mean	-0.80	0.43	0.36	0.72	-0.45	0.65	-0.69	0.49	0.74	0.46	-0.21	0.83	-0.21	0.83	-1.38	0.17
	NO_2 Mean	-1.45	0.15	1.55	0.12	-0.08	0.93	-1.50	0.13	2.04	0.04	-1.03	0.30	0.11	0.91	-0.71	0.48
	NOD Mean	-0.95	0.34	0.66	0.51	-0.31	0.75	-0.93	0.35	1.10	0.27	-0.40	0.69	-0.10	0.92	-1.27	0.20
	SO_2 Mean	-1.30	0.20	-0.07	0.94	-0.42	0.68	0.72	0.47	0.36	0.72	-0.82	0.41	-1.91	0.06	0.11	0.91
	PM_{10} Mean	-0.25	0.81	1.16	0.25	0.00	1.00	-1.82	0.07	-0.44	0.66	1.14	0.25	-0.96	0.34	0.01	0.99
	O_3 Mean	1.22	0.22	-0.65	0.52	-0.29	0.77	1.20	0.23	-1.16	0.25	1.52	0.13	-1.14	0.25	1.91	0.06
	CO Mean	-0.78	0.44	1.29	0.20	-0.39	0.69	-1.41	0.16	0.53	0.60	0.03	0.97	-0.68	0.50	-0.79	0.43
	NO Max’	-0.55	0.59	0.16	0.88	-0.23	0.82	-0.66	0.51	0.94	0.35	-0.10	0.92	-0.62	0.54	-1.26	0.21
	NO_2 Max’	-0.79	0.43	1.16	0.25	0.03	0.98	-0.73	0.46	1.78	0.07	-1.13	0.26	-0.08	0.94	-0.38	0.70
	NOD Max’	-0.53	0.60	0.39	0.70	-0.25	0.81	-0.64	0.52	1.11	0.27	-0.30	0.76	-0.43	0.67	-1.31	0.19
	SO_2 Max’	-1.40	0.16	0.37	0.71	0.47	0.64	-0.25	0.81	0.45	0.65	-1.79	0.07	-0.90	0.37	-0.46	0.64
	PM_{10} Max’	-0.23	0.82	2.60	0.01	-0.21	0.84	-2.69	0.01	-0.31	0.76	1.27	0.20	-1.79	0.07	0.69	0.49
	O_3 Max’	1.10	0.27	-0.42	0.68	-0.56	0.58	1.05	0.30	-0.19	0.85	0.81	0.42	-0.97	0.33	1.85	0.07
	CO Max’	-0.44	0.66	0.26	0.80	-0.30	0.77	-1.42	0.16	0.88	0.38	0.01	1.00	-1.07	0.29	-1.14	0.26
Weather	Temp Min’	1.63	0.10	-1.58	0.11	-0.13	0.90	-0.12	0.91	0.53	0.60	-1.08	0.28	0.36	0.72	0.45	0.65
	Temp Max’	0.46	0.64	-0.14	0.89	0.55	0.58	-0.85	0.39	-0.62	0.54	0.84	0.40	-0.99	0.32	0.77	0.44
	Sun	-0.20	0.84	1.04	0.30	-1.54	0.12	0.26	0.80	0.08	0.93	1.47	0.14	-0.78	0.44	-0.19	0.85
	Rain	0.54	0.59	-1.07	0.29	-0.20	0.84	-0.70	0.49	1.99	0.05	-1.85	0.07	1.10	0.27	0.62	0.54
	Pressure	0.03	0.97	0.18	0.86	0.53	0.60	-0.93	0.35	-0.32	0.75	0.94	0.35	-0.56	0.57	-0.03	0.98
	Wind speed	0.43	0.67	0.67	0.50	-0.23	0.82	0.41	0.68	-0.18	0.86	-1.17	0.24	1.27	0.21	-0.02	0.99
Pollen	Grass	0.97	0.34	-0.03	0.98	-0.55	0.58	1.31	0.19	-0.54	0.59	-0.12	0.91	0.84	0.40	-0.83	0.41

Table G. 122: Trent Region Emergency Consultations Excess – Autoregressive Standardised percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	0.24	0.81	-0.01	0.99	-0.60	0.55	0.92	0.36	0.92	0.36	-0.44	0.66	0.24	0.81	-0.86	0.39
	NO_2 Min’	-1.28	0.20	-0.13	0.90	-0.07	0.94	1.61	0.11	-1.15	0.25	1.04	0.30	0.29	0.77	-1.77	0.08
	NOD Min’	-0.58	0.57	-0.12	0.90	-0.44	0.66	1.28	0.20	-0.16	0.87	0.56	0.57	0.03	0.98	-1.50	0.13
	SO_2 Min’	-1.20	0.23	0.39	0.70	0.81	0.42	0.17	0.87	1.13	0.26	0.63	0.53	0.00	1.00	0.07	0.95
	PM_{10} Min’	-0.36	0.72	-0.74	0.46	1.63	0.10	-0.36	0.72	-0.42	0.67	0.32	0.75	0.05	0.96	-2.35	0.02
	O_3 Min’	0.93	0.36	1.04	0.30	-1.07	0.29	-0.33	0.75	0.53	0.60	-1.30	0.19	1.21	0.23	1.48	0.14
	CO Min’	0.20	0.84	-0.07	0.95	1.44	0.15	-0.10	0.92	-0.23	0.82	0.27	0.79	-0.07	0.94	-0.46	0.64
	NO Mean	-1.67	0.09	0.78	0.43	-0.63	0.53	0.69	0.49	0.37	0.71	-1.20	0.23	1.01	0.31	-0.52	0.60
	NO_2 Mean	-0.31	0.76	-1.02	0.31	-0.20	0.84	0.95	0.34	-0.19	0.85	0.33	0.74	-0.28	0.78	-0.57	0.57
	NOD Mean	-1.43	0.15	0.34	0.74	-0.54	0.59	0.78	0.44	0.28	0.78	-0.85	0.40	0.69	0.49	-0.57	0.57
	SO_2 Mean	-0.77	0.44	-0.41	0.69	0.19	0.85	0.29	0.78	0.18	0.86	-0.21	0.83	1.29	0.20	-1.39	0.17
	PM_{10} Mean	-0.42	0.67	0.14	0.89	0.04	0.97	0.74	0.46	-0.01	1.00	-1.71	0.09	1.47	0.14	-1.63	0.10
	O_3 Mean	0.58	0.56	0.51	0.61	-0.02	0.98	-0.72	0.47	1.04	0.30	-0.07	0.95	-0.89	0.37	0.89	0.38
	CO Mean	-1.31	0.19	-0.49	0.63	1.02	0.31	0.29	0.77	-0.01	0.99	-0.87	0.38	0.08	0.93	-0.32	0.75
	NO Max’	-1.25	0.21	0.13	0.90	0.16	0.87	0.11	0.91	0.40	0.69	-1.01	0.31	0.74	0.46	-0.17	0.86
	NO_2 Max’	-0.18	0.86	-1.95	0.05	-0.10	0.92	1.05	0.29	0.73	0.46	-0.13	0.90	-0.34	0.73	-0.87	0.38
	NOD Max’	-1.26	0.21	-0.15	0.88	0.21	0.84	0.21	0.83	0.53	0.59	-1.08	0.28	0.67	0.50	-0.17	0.87
	SO_2 Max’	-0.02	0.98	-1.17	0.24	0.18	0.86	-0.51	0.61	0.52	0.60	-0.48	0.63	0.63	0.53	-0.98	0.33
	PM_{10} Max’	1.32	0.19	-1.64	0.10	0.27	0.79	0.36	0.72	0.46	0.65	-1.76	0.08	0.49	0.62	-0.80	0.43
	O_3 Max’	0.62	0.53	0.11	0.91	-0.88	0.38	0.29	0.77	1.35	0.18	0.14	0.89	-1.49	0.14	1.07	0.28
	CO Max’	-1.18	0.24	-0.66	0.51	0.68	0.50	-0.14	0.89	0.29	0.77	-1.60	0.11	1.19	0.24	-0.65	0.52
Weather	Temp Min’	-1.03	0.30	-0.04	0.97	0.35	0.73	-1.11	0.27	0.82	0.41	-0.08	0.94	-0.21	0.83	0.84	0.40
	Temp Max’	1.31	0.19	-2.03	0.04	1.14	0.26	1.07	0.29	-1.09	0.28	-1.85	0.06	2.73	0.01	-0.62	0.54
	Sun	1.09	0.27	-0.54	0.59	1.07	0.29	0.76	0.45	-1.04	0.30	-0.74	0.46	-0.08	0.93	1.31	0.19
	Rain	0.17	0.87	-1.16	0.25	3.38	0.00	-0.01	1.00	-0.20	0.84	0.55	0.58	0.83	0.40	-0.73	0.47
	Pressure	2.15	0.03	-2.31	0.02	0.90	0.37	0.83	0.41	-1.55	0.12	1.29	0.20	-0.08	0.94	-0.81	0.42
	Wind speed	1.45	0.15	1.80	0.07	-0.44	0.66	-0.89	0.37	1.40	0.16	-0.03	0.98	-1.04	0.30	0.11	0.91
Pollen	Grass	-0.73	0.47	-0.32	0.75	1.32	0.19	0.05	0.96	0.39	0.70	0.63	0.53	-0.72	0.47	0.53	0.59

Table G. 123: Trent Region Emergency Counts Excess – Autoregressive Standardised percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
	Exposure	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min'	0.95	0.34	-0.54	0.59	-0.43	0.67	0.96	0.34	-0.32	0.75	0.96	0.34	0.72	0.47	-1.49	0.14
	NO_2 Min'	0.65	0.52	-1.40	0.16	0.81	0.42	0.20	0.84	0.13	0.89	-0.46	0.65	0.30	0.76	-1.64	0.10
	NOD Min'	1.29	0.20	-1.28	0.20	-0.08	0.94	0.68	0.50	-0.10	0.92	0.16	0.88	0.63	0.53	-1.97	0.05
	SO_2 Min'	-0.69	0.49	-2.13	0.03	0.88	0.38	0.87	0.39	0.03	0.98	-0.59	0.55	0.47	0.64	-0.97	0.33
	PM_{10} Min'	0.50	0.61	0.43	0.67	-0.99	0.32	0.30	0.77	-0.58	0.56	-0.31	0.76	0.83	0.41	-2.31	0.02
	O_3 Min'	0.21	0.83	0.37	0.71	-0.80	0.42	0.36	0.72	-1.48	0.14	0.36	0.72	0.55	0.58	1.69	0.09
	CO Min'	0.09	0.93	0.06	0.95	0.18	0.86	-0.19	0.85	0.18	0.86	0.41	0.68	-0.38	0.70	0.08	0.94
	NO Mean	-0.51	0.61	-0.32	0.75	-0.33	0.74	-0.16	0.87	0.96	0.34	-0.12	0.90	0.83	0.40	-2.48	0.01
	NO_2 Mean	-0.77	0.44	0.01	0.99	0.32	0.75	-0.85	0.39	1.49	0.14	-0.74	0.46	-0.33	0.74	-0.43	0.67
	NOD Mean	-0.52	0.60	-0.28	0.78	-0.17	0.86	-0.30	0.76	1.10	0.27	-0.24	0.81	0.61	0.54	-2.10	0.04
	SO_2 Mean	-1.50	0.14	-1.25	0.21	1.10	0.27	0.36	0.72	1.35	0.18	-1.84	0.07	-0.17	0.87	-1.14	0.26
	PM_{10} Mean	-0.09	0.93	0.60	0.55	-0.99	0.32	0.00	1.00	0.64	0.53	-1.70	0.09	1.13	0.26	-1.24	0.21
	O_3 Mean	0.73	0.47	1.10	0.27	-1.62	0.11	1.37	0.17	-1.41	0.16	1.35	0.18	-1.69	0.09	2.56	0.01
	CO Mean	-0.42	0.68	-0.37	0.71	0.49	0.63	-0.79	0.43	0.72	0.47	-0.04	0.97	0.20	0.84	-0.90	0.37
	NO Max'	-0.11	0.91	-0.83	0.41	0.51	0.61	-0.13	0.89	1.69	0.09	-0.41	0.69	0.73	0.47	-2.29	0.02
	NO_2 Max'	-0.15	0.88	-0.51	0.61	0.68	0.50	-0.31	0.76	1.70	0.09	-1.16	0.25	-0.44	0.66	0.04	0.97
	NOD Max'	-0.16	0.87	-0.82	0.41	0.65	0.51	-0.14	0.89	1.69	0.09	-0.60	0.55	0.72	0.47	-2.14	0.03
	SO_2 Max'	-0.85	0.40	-0.95	0.34	1.71	0.09	-0.16	0.87	1.26	0.21	-2.32	0.02	-0.55	0.58	-0.81	0.42
	PM_{10} Max'	0.07	0.95	0.24	0.81	-0.09	0.93	-1.12	0.26	1.36	0.17	-1.46	0.14	-0.08	0.94	-0.23	0.82
	O_3 Max'	-0.36	0.72	1.44	0.15	-1.29	0.20	1.32	0.19	-0.58	0.57	0.80	0.42	-1.86	0.06	2.60	0.01
	CO Max'	-0.19	0.85	-0.49	0.62	0.37	0.71	-0.63	0.53	1.24	0.22	0.04	0.97	0.33	0.74	-1.44	0.15
Weather	Temp Min'	1.20	0.23	-0.93	0.35	-0.01	0.99	-1.01	0.32	0.58	0.56	-0.09	0.93	-0.88	0.38	0.06	0.95
	Temp Max'	1.26	0.21	-1.42	0.16	2.14	0.03	-1.22	0.22	-1.37	0.17	-0.32	0.75	0.50	0.62	-0.12	0.91
	Sun	-0.51	0.61	0.10	0.92	-0.93	0.36	1.16	0.25	-1.34	0.18	0.48	0.63	-0.31	0.76	0.87	0.39
	Rain	1.16	0.24	-2.04	0.04	0.59	0.56	-0.24	0.81	1.15	0.25	-1.20	0.23	1.82	0.07	-0.11	0.91
	Pressure	-0.42	0.67	-0.29	0.77	1.86	0.06	-1.80	0.07	-0.15	0.88	1.41	0.16	-0.05	0.96	-1.23	0.22
	Wind speed	0.30	0.76	1.71	0.09	-1.04	0.30	0.67	0.50	-0.11	0.91	-0.47	0.64	-0.47	0.64	0.76	0.45
Pollen	Grass	0.50	0.62	-0.32	0.75	1.16	0.25	0.79	0.43	-0.11	0.92	0.18	0.86	-0.49	0.63	-0.05	0.96

Table G. 124: Trent Region Out of Hours Counts Excess – Autoregressive Standardised percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
	Exposure	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min'	0.92	0.36	-0.31	0.75	-0.23	0.82	1.69	0.09	-0.75	0.45	0.43	0.67	1.79	0.07	-1.73	0.08
	NO_2 Min'	1.78	0.08	-2.12	0.03	0.56	0.58	1.25	0.21	-0.26	0.79	-0.54	0.59	0.96	0.34	-1.83	0.07
	NOD Min'	1.71	0.09	-1.47	0.14	-0.09	0.93	1.72	0.09	-0.54	0.59	-0.30	0.77	1.72	0.09	-2.26	0.02
	SO_2 Min'	0.41	0.68	-1.59	0.11	0.62	0.54	0.71	0.48	-0.80	0.42	-0.48	0.63	1.30	0.19	-1.39	0.17
	PM_{10} Min'	0.47	0.64	0.65	0.52	-2.11	0.04	1.81	0.07	0.40	0.69	-0.68	0.50	0.83	0.41	-1.80	0.07
	O_3 Min'	-0.90	0.37	0.76	0.45	-1.37	0.17	0.11	0.91	-0.86	0.39	-0.05	0.96	1.01	0.31	0.53	0.59
	CO Min'	1.29	0.20	-1.13	0.26	-0.20	0.84	1.45	0.15	-0.10	0.92	0.14	0.89	0.91	0.36	-0.87	0.39
	NO Mean	0.81	0.42	-0.93	0.35	0.28	0.78	0.73	0.46	0.28	0.78	0.89	0.37	-0.05	0.96	-1.50	0.13
	NO_2 Mean	0.48	0.63	-0.89	0.37	0.35	0.72	0.84	0.40	0.08	0.94	-0.15	0.88	-0.87	0.39	0.48	0.63
	NOD Mean	0.84	0.40	-0.97	0.33	0.24	0.81	0.86	0.39	0.17	0.87	0.70	0.48	-0.25	0.80	-1.07	0.28
	SO_2 Mean	-0.19	0.85	-1.10	0.27	1.45	0.15	0.24	0.81	0.68	0.50	-0.57	0.57	0.28	0.78	-1.33	0.18
	PM_{10} Mean	-0.03	0.97	0.02	0.98	-1.48	0.14	2.35	0.02	0.33	0.74	-1.82	0.07	1.08	0.28	-0.99	0.32
	O_3 Mean	-0.91	0.36	1.97	0.05	-2.14	0.03	0.79	0.43	-1.09	0.28	0.36	0.72	-0.53	0.60	1.04	0.30
	CO Mean	0.87	0.38	-0.73	0.47	0.01	1.00	1.19	0.23	-0.16	0.87	0.62	0.53	0.11	0.91	-0.10	0.92
	NO Max'	0.98	0.33	-1.00	0.32	0.99	0.32	0.67	0.51	1.29	0.20	-0.12	0.90	0.48	0.63	-1.23	0.22
	NO_2 Max'	0.62	0.54	-1.01	0.32	0.84	0.40	0.67	0.51	0.67	0.51	-0.89	0.37	-1.16	0.25	1.21	0.23
	NOD Max'	0.90	0.37	-1.13	0.26	1.17	0.24	0.64	0.52	1.15	0.25	-0.27	0.79	0.31	0.76	-0.98	0.32
	SO_2 Max'	0.22	0.82	-1.03	0.30	2.14	0.03	0.38	0.70	0.43	0.67	-0.59	0.55	-0.63	0.53	-0.53	0.60
	PM_{10} Max'	-0.20	0.84	-0.75	0.45	0.06	0.95	0.70	0.49	1.82	0.07	-1.73	0.08	0.18	0.86	-0.17	0.86
	O_3 Max'	-2.64	0.01	2.29	0.02	-1.15	0.25	0.64	0.52	-0.77	0.44	-0.02	0.98	-1.28	0.20	1.84	0.07
	CO Max'	0.83	0.41	-0.17	0.87	0.29	0.78	0.94	0.35	0.46	0.65	0.82	0.41	0.11	0.91	-0.16	0.87
Weather	Temp Min'	-0.08	0.93	0.03	0.98	0.51	0.61	-1.32	0.19	-0.05	0.96	0.62	0.54	-1.31	0.19	-0.43	0.67
	Temp Max'	0.30	0.77	-0.91	0.36	2.30	0.02	-1.13	0.26	-1.70	0.09	-0.03	0.98	0.40	0.69	-0.60	0.55
	Sun	-0.77	0.44	-0.50	0.61	-0.33	0.74	0.87	0.38	-1.08	0.28	0.29	0.77	-0.40	0.69	0.83	0.41
	Rain	1.56	0.12	-1.24	0.22	-1.33	0.18	-0.28	0.78	-0.11	0.91	-0.36	0.72	1.29	0.20	-0.73	0.47
	Pressure	-1.45	0.15	-0.09	0.93	1.88	0.06	-1.71	0.09	-0.19	0.85	2.14	0.03	-0.45	0.65	-1.11	0.27
	Wind speed	-1.08	0.28	0.92	0.36	-1.20	0.23	0.15	0.88	0.13	0.90	0.38	0.71	-1.56	0.12	1.30	0.19
Pollen	Grass	0.84	0.40	-0.56	0.58	1.86	0.06	-0.42	0.68	0.18	0.86	0.52	0.61	-1.15	0.25	0.03	0.98

G4.3. Sheffield autoregressive point-estimates and P-values

Table G. 125: Sheffield All Counts Asthmatics – Autoregressive Standardised percentage change and P-values by lag day per exposure.

Exposure		Lag0 Est	Lag0 P	Lag1 Est	Lag1 P	Lag2 Est	Lag2 P	Lag3 Est	Lag3 P	Lag4 Est	Lag4 P	Lag5 Est	Lag5 P	Lag6 Est	Lag6 P	Lag7 Est	Lag7 P
Outdoor air pollutants	NO Min’	0.69	0.49	-0.27	0.79	0.54	0.59	-0.51	0.61	0.93	0.35	1.81	0.07	0.52	0.60	1.60	0.11
	NO_2 Min’	0.23	0.82	-0.83	0.41	0.10	0.92	1.01	0.32	-0.40	0.69	-0.11	0.91	1.04	0.30	0.76	0.45
	NOD Min’	0.58	0.56	-0.74	0.46	0.53	0.60	0.00	1.00	0.10	0.92	1.14	0.25	0.78	0.43	1.08	0.28
	SO_2 Min’	1.48	0.14	0.56	0.58	-0.56	0.57	-0.72	0.47	1.47	0.14	1.14	0.26	-1.79	0.07	3.11	0.00
	PM_{10} Min’	-0.49	0.62	-1.14	0.25	-0.68	0.50	1.42	0.16	0.01	1.00	-0.44	0.66	0.33	0.74	-0.44	0.66
	O_3 Min’	-0.85	0.39	2.12	0.03	-1.41	0.16	-2.17	0.03	1.40	0.16	0.80	0.43	0.22	0.83	-0.88	0.38
	CO Min’	1.60	0.11	0.56	0.58	0.04	0.97	-0.81	0.42	-0.33	0.74	1.35	0.18	0.91	0.36	0.98	0.33
	NO Mean	-1.13	0.26	1.36	0.17	-0.12	0.91	-1.92	0.06	1.21	0.23	0.73	0.46	-0.04	0.97	0.89	0.38
	NO_2 Mean	-0.58	0.57	-0.63	0.53	0.85	0.40	-0.08	0.94	0.42	0.68	-0.41	0.68	-0.17	0.87	-0.16	0.87
	NOD Mean	-1.07	0.29	0.90	0.37	0.13	0.90	-1.54	0.12	1.10	0.27	0.44	0.66	-0.05	0.96	0.64	0.52
	SO_2 Mean	-1.69	0.09	-0.08	0.94	0.16	0.88	0.03	0.98	0.63	0.53	-0.59	0.56	0.02	0.98	0.04	0.97
	PM_{10} Mean	-1.66	0.10	-0.46	0.64	0.40	0.69	0.19	0.85	1.08	0.28	-0.44	0.66	0.24	0.81	-0.74	0.46
	O_3 Mean	-0.55	0.59	1.16	0.25	-1.23	0.22	-0.53	0.59	0.64	0.52	-0.17	0.86	0.35	0.72	-1.73	0.09
	CO Mean	-0.10	0.92	0.83	0.41	-0.90	0.37	-1.80	0.07	0.98	0.33	0.83	0.41	0.66	0.51	0.15	0.88
	NO Max’	-0.36	0.72	0.48	0.63	-0.41	0.68	-2.02	0.04	1.33	0.19	0.47	0.64	0.05	0.96	0.84	0.40
	NO_2 Max’	-0.59	0.55	-0.83	0.41	0.45	0.65	-0.99	0.32	0.81	0.42	-0.56	0.58	-0.35	0.72	-0.31	0.76
	NOD Max’	-0.46	0.64	0.44	0.66	-0.31	0.76	-2.06	0.04	1.31	0.19	0.44	0.66	-0.27	0.78	0.87	0.38
	SO_2 Max’	-1.55	0.12	-0.98	0.33	-0.12	0.91	-0.71	0.48	-0.48	0.64	0.34	0.74	-0.34	0.73	-0.19	0.85
	PM_{10} Max’	-1.41	0.16	0.00	1.00	0.14	0.89	-0.55	0.58	1.12	0.26	-0.12	0.91	0.73	0.47	-0.66	0.51
	O_3 Max’	-0.08	0.94	0.30	0.77	-0.71	0.48	0.11	0.91	0.14	0.89	-0.09	0.93	-0.05	0.96	-3.57	0.00
	CO Max’	0.17	0.87	1.00	0.32	-1.32	0.19	-1.95	0.05	1.13	0.26	0.95	0.34	-0.48	0.63	0.34	0.73
Weather	Temp Min’	1.21	0.23	0.53	0.59	0.67	0.50	-1.52	0.13	0.14	0.89	-0.82	0.41	-1.17	0.24	-0.12	0.91
	Temp Max’	0.13	0.89	0.04	0.97	1.40	0.16	-1.31	0.19	-0.55	0.58	0.75	0.45	-0.58	0.56	-1.86	0.06
	Sun	-1.96	0.05	-0.13	0.90	0.01	1.00	-0.62	0.53	0.18	0.85	-1.44	0.15	1.43	0.15	-1.32	0.19
	Rain	0.70	0.49	-1.10	0.27	-1.51	0.13	-0.31	0.76	0.15	0.88	0.26	0.80	1.10	0.27	0.34	0.74
	Pressure	-1.44	0.15	1.30	0.19	0.39	0.70	0.90	0.37	0.09	0.93	0.37	0.71	-0.83	0.41	0.53	0.60
	Wind speed	0.83	0.41	0.46	0.65	-0.36	0.72	0.27	0.79	-1.01	0.31	-0.61	0.54	0.25	0.80	0.60	0.55
Pollen	Grass	0.79	0.43	-0.88	0.38	1.82	0.07	0.69	0.49	1.84	0.07	0.45	0.65	0.82	0.41	0.54	0.59

Table G. 126: Sheffield All Counts Non-asthmatics – Autoregressive Standardised percentage change and P-values by lag day per exposure.

Exposure		Lag0 Est	Lag0 P	Lag1 Est	Lag1 P	Lag2 Est	Lag2 P	Lag3 Est	Lag3 P	Lag4 Est	Lag4 P	Lag5 Est	Lag5 P	Lag6 Est	Lag6 P	Lag7 Est	Lag7 P
Outdoor air pollutants	NO Min’	-0.81	0.42	0.56	0.58	0.95	0.34	-0.48	0.63	0.34	0.73	-0.61	0.54	0.02	0.99	1.50	0.14
	NO_2 Min’	-0.10	0.92	-1.08	0.28	1.48	0.14	-0.65	0.52	-0.88	0.38	0.35	0.73	-0.60	0.55	1.69	0.09
	NOD Min’	-0.50	0.62	-0.58	0.56	1.68	0.09	-0.85	0.39	-0.29	0.78	-0.20	0.84	-0.35	0.73	1.73	0.08
	SO_2 Min’	-0.03	0.98	0.01	0.99	0.74	0.46	-0.44	0.66	-0.71	0.48	0.41	0.68	-1.55	0.12	2.42	0.02
	PM_{10} Min’	0.94	0.35	-1.21	0.23	0.03	0.98	1.29	0.20	-1.21	0.23	-0.42	0.67	-0.23	0.82	1.64	0.10
	O_3 Min’	-1.17	0.24	0.56	0.57	-0.77	0.44	-0.30	0.77	2.13	0.03	0.53	0.60	-1.54	0.12	-0.02	0.99
	CO Min’	-0.48	0.63	-0.16	0.87	0.10	0.92	0.16	0.87	0.40	0.69	-1.40	0.16	0.91	0.37	1.59	0.11
	NO Mean	-2.50	0.01	-0.35	0.73	0.73	0.47	-0.02	0.98	-0.65	0.52	-0.29	0.77	-1.21	0.23	1.39	0.17
	NO_2 Mean	-0.39	0.70	-1.06	0.29	1.85	0.06	-0.64	0.52	-1.11	0.27	-0.84	0.40	-0.02	0.98	1.29	0.20
	NOD Mean	-2.02	0.04	-0.50	0.61	1.07	0.28	-0.20	0.84	-0.81	0.42	-0.51	0.61	-0.94	0.35	1.47	0.14
	SO_2 Mean	-0.93	0.35	-0.24	0.81	0.86	0.39	-0.84	0.40	-0.63	0.53	-0.43	0.67	0.36	0.72	0.38	0.70
	PM_{10} Mean	0.40	0.69	-1.16	0.25	1.46	0.14	-0.81	0.42	-0.42	0.67	-0.20	0.85	-0.77	0.44	1.46	0.15
	O_3 Mean	0.27	0.78	0.74	0.46	-1.30	0.19	0.36	0.72	1.73	0.08	0.51	0.61	-0.44	0.66	-1.27	0.21
	CO Mean	-1.81	0.07	-0.64	0.52	-0.01	0.99	1.08	0.28	-0.99	0.32	-1.54	0.12	-0.10	0.92	0.80	0.43
	NO Max’	-1.62	0.11	-0.26	0.80	-0.08	0.93	0.13	0.90	-0.96	0.34	-0.56	0.58	-0.53	0.60	1.00	0.32
	NO_2 Max’	-0.27	0.79	-0.86	0.39	0.90	0.37	-0.29	0.77	-1.74	0.08	-0.57	0.57	-0.35	0.73	1.04	0.30
	NOD Max’	-1.55	0.12	-0.31	0.76	-0.03	0.98	0.21	0.83	-1.21	0.23	-0.48	0.63	-0.51	0.61	1.05	0.30
	SO_2 Max’	-1.03	0.31	0.80	0.42	-0.42	0.68	-0.79	0.43	-0.48	0.63	-0.92	0.36	0.38	0.71	0.21	0.83
	PM_{10} Max’	0.68	0.49	-0.95	0.34	1.11	0.27	-0.66	0.51	-1.09	0.28	-0.15	0.88	-0.85	0.39	1.46	0.15
	O_3 Max’	0.56	0.57	0.41	0.68	-0.55	0.58	-0.08	0.94	2.13	0.03	-0.02	0.98	0.53	0.59	-1.99	0.05
	CO Max’	-2.11	0.04	-0.26	0.79	-0.79	0.43	0.70	0.48	-0.99	0.33	-1.07	0.29	0.26	0.80	-0.14	0.89
Weather	Temp Min’	-0.33	0.74	0.08	0.94	0.97	0.33	0.48	0.63	-1.09	0.28	-0.03	0.98	0.50	0.62	0.57	0.57
	Temp Max’	-0.48	0.63	-0.01	0.99	1.36	0.17	1.10	0.27	-1.13	0.26	0.57	0.57	-1.40	0.16	1.30	0.19
	Sun	0.06	0.95	0.81	0.42	-0.19	0.85	1.80	0.07	-0.12	0.91	0.04	0.97	-1.71	0.09	1.16	0.25
	Rain	-0.25	0.80	-1.61	0.11	0.13	0.90	-0.19	0.85	-0.81	0.42	-0.04	0.97	0.14	0.89	0.23	0.82
	Pressure	-0.20	0.84	0.79	0.43	0.01	0.99	-0.32	0.75	-0.40	0.69	1.49	0.14	-1.05	0.29	-0.20	0.84
	Wind speed	1.24	0.22	0.60	0.55	1.37	0.17	-2.10	0.04	2.09	0.04	0.55	0.58	-0.35	0.73	-1.16	0.25
Pollen	Grass	-0.21	0.84	3.14	0.00	-0.95	0.34	0.11	0.91	1.25	0.21	0.67	0.51	-0.52	0.61	-0.43	0.67

Table G. 127: Sheffield Admissions Asthmatics – Autoregressive Standardised percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	1.20	0.23	-0.35	0.73	0.71	0.48	0.52	0.61	-0.75	0.45	0.43	0.67	-0.70	0.49	1.89	0.06
	NO_2 Min’	0.30	0.77	0.45	0.65	-1.57	0.12	0.50	0.62	0.49	0.62	-1.00	0.32	1.16	0.25	-0.25	0.80
	NOD Min’	0.80	0.42	0.11	0.91	-0.55	0.58	0.51	0.61	-0.39	0.70	0.00	1.00	-0.04	0.97	0.99	0.32
	SO_2 Min’	1.64	0.10	0.56	0.57	-0.79	0.43	0.00	1.00	0.98	0.33	1.83	0.07	-1.33	0.18	2.11	0.04
	PM_{10} Min’	-0.18	0.86	0.79	0.43	-1.20	0.23	0.38	0.70	0.71	0.48	-0.59	0.56	1.02	0.31	-0.64	0.52
	O_3 Min’	-0.24	0.81	1.33	0.18	-0.72	0.47	-0.09	0.93	0.73	0.46	0.88	0.38	-0.22	0.83	1.04	0.30
	CO Min’	2.25	0.03	1.08	0.28	-1.72	0.09	-0.24	0.81	-0.29	0.77	0.70	0.48	0.25	0.80	0.27	0.79
	NO Mean	0.82	0.41	0.13	0.89	-0.06	0.96	-1.05	0.30	1.58	0.12	-0.44	0.66	-0.21	0.84	0.33	0.74
	NO_2 Mean	-0.62	0.54	-0.22	0.83	0.40	0.69	-0.48	0.63	1.27	0.20	-1.05	0.29	0.58	0.56	-1.09	0.28
	NOD Mean	0.46	0.64	-0.03	0.97	0.12	0.91	-0.95	0.34	1.57	0.12	-0.69	0.49	0.04	0.97	-0.05	0.96
	SO_2 Mean	-1.34	0.18	1.53	0.13	-1.03	0.30	-0.05	0.96	1.44	0.15	0.11	0.91	1.01	0.31	-0.02	0.98
	PM_{10} Mean	-0.60	0.55	-0.34	0.73	-0.77	0.44	0.56	0.58	1.44	0.15	-0.59	0.56	0.37	0.71	-0.87	0.38
	O_3 Mean	-1.53	0.13	0.70	0.48	0.07	0.95	0.15	0.88	-0.54	0.59	0.66	0.51	-0.20	0.84	0.07	0.94
	CO Mean	1.18	0.24	0.37	0.72	-0.46	0.64	-0.99	0.32	0.87	0.39	0.56	0.58	0.12	0.91	-0.04	0.97
	NO Max’	0.17	0.87	0.36	0.72	0.27	0.79	-1.81	0.07	1.45	0.15	-0.30	0.77	-0.36	0.72	0.33	0.74
	NO_2 Max’	-1.36	0.17	-0.92	0.36	2.12	0.03	-2.79	0.01	1.60	0.11	-0.52	0.60	-0.26	0.79	-0.06	0.95
	NOD Max’	-0.10	0.92	0.33	0.74	0.48	0.63	-2.19	0.03	1.64	0.10	-0.42	0.68	-0.42	0.67	0.29	0.77
	SO_2 Max’	-1.20	0.23	0.91	0.36	-0.60	0.55	-1.04	0.30	0.50	0.62	1.25	0.21	-0.14	0.89	1.29	0.20
	PM_{10} Max’	-0.90	0.37	0.08	0.94	-0.40	0.69	-0.09	0.93	1.19	0.24	0.28	0.78	-0.09	0.93	-0.24	0.81
	O_3 Max’	-1.23	0.22	-1.49	0.14	1.56	0.12	0.54	0.59	-0.73	0.47	0.21	0.83	-0.25	0.81	-1.16	0.25
	CO Max’	1.03	0.31	0.93	0.35	-0.29	0.77	-1.74	0.08	1.42	0.16	0.33	0.74	-0.68	0.50	0.38	0.70
Weather	Temp Min’	0.75	0.45	1.62	0.11	-0.71	0.48	-0.64	0.52	0.89	0.37	-1.16	0.25	0.10	0.92	0.33	0.74
	Temp Max’	-1.90	0.06	1.72	0.09	0.22	0.83	-1.05	0.29	-0.80	0.42	1.06	0.29	1.72	0.09	-1.96	0.05
	Sun	-0.75	0.45	-0.26	0.79	-0.42	0.68	-0.45	0.65	-0.12	0.91	0.45	0.65	1.57	0.12	-1.06	0.29
	Rain	0.71	0.48	-0.36	0.72	-0.66	0.51	0.22	0.82	-0.57	0.57	1.16	0.25	0.91	0.36	-1.70	0.09
	Pressure	-1.70	0.09	1.64	0.10	-0.74	0.46	0.99	0.32	-0.56	0.58	0.60	0.55	-0.51	0.61	0.53	0.60
	Wind speed	-0.24	0.81	0.92	0.36	-1.75	0.08	1.53	0.13	-1.45	0.15	0.48	0.63	0.16	0.87	1.14	0.25
Pollen	Grass	-0.06	0.95	0.73	0.47	0.14	0.89	0.57	0.57	1.11	0.27	0.16	0.87	0.35	0.73	1.11	0.27

Table G. 128: Sheffield Admissions Non-asthmatics – Autoregressive Standardised percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	-1.53	0.13	0.26	0.80	1.51	0.13	-1.46	0.15	0.59	0.56	-1.11	0.27	-0.40	0.69	0.76	0.45
	NO_2 Min’	-0.57	0.57	-1.13	0.26	2.89	0.00	-1.28	0.20	-0.52	0.60	0.32	0.75	-1.29	0.20	1.03	0.30
	NOD Min’	-1.20	0.23	-0.56	0.58	2.62	0.01	-1.64	0.10	0.40	0.69	-0.66	0.51	-0.74	0.46	1.01	0.31
	SO_2 Min’	-1.48	0.14	0.20	0.84	0.68	0.49	0.05	0.96	-0.56	0.58	-0.47	0.64	0.46	0.65	0.09	0.93
	PM_{10} Min’	1.57	0.12	-2.09	0.04	1.89	0.06	1.30	0.19	-1.77	0.08	0.38	0.71	-0.30	0.76	0.81	0.42
	O_3 Min’	-1.16	0.25	1.65	0.10	-1.96	0.05	0.94	0.35	2.05	0.04	0.57	0.57	-0.72	0.47	-0.11	0.91
	CO Min’	-0.84	0.40	0.48	0.63	0.30	0.76	-1.08	0.28	1.19	0.24	-1.83	0.07	0.56	0.58	0.85	0.39
	NO Mean	-1.12	0.26	-0.62	0.54	2.03	0.04	-1.67	0.10	-0.24	0.81	0.41	0.68	-0.86	0.39	0.15	0.88
	NO_2 Mean	0.36	0.72	-1.71	0.09	3.21	0.00	-1.32	0.19	-1.32	0.19	0.54	0.59	-0.77	0.44	0.82	0.41
	NOD Mean	-0.67	0.50	-1.01	0.31	2.51	0.01	-1.69	0.09	-0.51	0.61	0.40	0.69	-0.84	0.40	0.35	0.73
	SO_2 Mean	0.05	0.96	-1.45	0.15	2.18	0.03	-1.24	0.21	0.54	0.59	-0.77	0.44	0.95	0.34	-0.44	0.66
	PM_{10} Mean	0.06	0.95	-0.75	0.45	3.06	0.00	-1.84	0.07	-0.43	0.67	0.68	0.50	-1.03	0.30	0.48	0.63
	O_3 Mean	-0.24	0.81	1.11	0.27	-2.56	0.01	1.38	0.17	0.90	0.37	0.37	0.71	0.43	0.67	-0.48	0.63
	CO Mean	-0.41	0.69	-0.51	0.61	1.27	0.21	-0.66	0.51	-0.32	0.75	-0.28	0.78	-0.05	0.96	0.01	0.99
	NO Max’	-0.73	0.46	-0.18	0.86	1.45	0.15	-1.94	0.05	-0.42	0.68	0.58	0.56	-0.25	0.80	-0.39	0.69
	NO_2 Max’	0.06	0.95	-0.88	0.38	1.98	0.05	-0.85	0.40	-2.28	0.02	1.23	0.22	-0.93	0.35	1.08	0.28
	NOD Max’	-0.73	0.46	-0.21	0.83	1.52	0.13	-1.85	0.06	-0.69	0.49	0.75	0.46	-0.45	0.66	-0.11	0.91
	SO_2 Max’	-0.71	0.48	-0.03	0.97	1.24	0.22	-0.35	0.73	0.65	0.52	-1.16	0.25	0.35	0.73	0.12	0.90
	PM_{10} Max’	0.40	0.69	-0.59	0.55	3.21	0.00	-2.13	0.03	-0.67	0.50	1.05	0.29	-1.57	0.12	0.46	0.65
	O_3 Max’	-0.70	0.49	1.19	0.24	-1.52	0.13	0.48	0.63	1.05	0.30	0.29	0.77	1.25	0.21	-1.04	0.30
	CO Max’	-0.83	0.41	0.20	0.84	0.76	0.45	-1.17	0.24	-0.51	0.61	0.66	0.51	0.04	0.97	-0.57	0.57
Weather	Temp Min’	-0.58	0.56	0.15	0.88	0.51	0.61	0.67	0.50	0.40	0.69	-0.96	0.34	1.18	0.24	1.79	0.07
	Temp Max’	-0.09	0.93	-0.42	0.68	0.55	0.59	1.93	0.05	-0.79	0.43	-0.02	0.99	-0.59	0.56	1.48	0.14
	Sun	-0.20	0.84	0.74	0.46	-0.37	0.71	2.25	0.03	-0.95	0.34	1.06	0.29	-1.57	0.12	0.12	0.91
	Rain	-0.81	0.42	-1.80	0.07	-0.08	0.94	0.01	0.99	0.48	0.64	-0.47	0.64	0.17	0.87	0.40	0.69
	Pressure	0.89	0.38	-0.79	0.43	0.99	0.32	-0.13	0.90	-0.66	0.51	1.77	0.08	-2.28	0.02	1.12	0.26
	Wind speed	1.02	0.31	0.29	0.77	-0.32	0.75	-0.78	0.44	1.92	0.06	-0.66	0.51	2.00	0.05	-1.91	0.06
Pollen	Grass	-1.52	0.13	3.48	0.00	-1.92	0.06	1.53	0.13	0.76	0.45	0.49	0.63	-1.00	0.32	0.85	0.40

Table G. 129: Sheffield A&E Counts Asthmatics – Autoregressive Standardised percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	0.92	0.36	-0.68	0.50	0.82	0.41	-1.13	0.26	1.20	0.23	1.89	0.06	0.50	0.62	1.00	0.32
	NO_2 Min’	0.02	0.98	-1.63	0.10	1.31	0.19	0.56	0.57	-0.42	0.67	0.40	0.69	0.18	0.86	0.57	0.57
	NOD Min’	0.53	0.59	-1.43	0.15	1.32	0.19	-0.60	0.55	0.31	0.75	1.25	0.21	0.43	0.67	0.62	0.53
	SO_2 Min’	0.95	0.34	0.24	0.81	-0.35	0.72	-0.78	0.44	1.60	0.11	0.09	0.93	-1.59	0.11	2.34	0.02
	PM_{10} Min’	-0.92	0.36	-2.02	0.04	-0.24	0.81	2.02	0.04	-0.44	0.66	-0.50	0.62	-0.11	0.91	-0.84	0.40
	O_3 Min’	-0.35	0.72	1.56	0.12	-1.46	0.14	-1.87	0.06	1.75	0.08	-0.67	0.50	1.51	0.13	-1.32	0.19
	CO Min’	0.95	0.34	-0.04	0.97	1.12	0.26	-0.62	0.54	-0.16	0.87	1.41	0.16	0.76	0.45	0.20	0.84
	NO Mean	-1.32	0.19	1.12	0.26	0.39	0.70	-1.94	0.05	0.40	0.69	1.36	0.17	-0.53	0.59	0.40	0.69
	NO_2 Mean	-0.76	0.45	-0.71	0.48	1.29	0.20	-0.26	0.80	-0.17	0.87	0.53	0.60	-1.27	0.20	0.03	0.98
	NOD Mean	-1.22	0.22	0.69	0.49	0.65	0.52	-1.62	0.11	0.31	0.76	1.24	0.22	-0.77	0.44	0.32	0.75
	SO_2 Mean	-1.18	0.24	-0.89	0.37	0.46	0.64	-0.19	0.85	0.33	0.74	-0.36	0.72	-1.59	0.11	-0.22	0.83
	PM_{10} Mean	-1.55	0.12	-0.84	0.40	1.24	0.22	-0.12	0.91	0.50	0.61	-0.03	0.98	-0.09	0.93	-1.25	0.21
	O_3 Mean	0.54	0.59	0.82	0.41	-1.99	0.05	-0.29	0.77	1.67	0.10	-1.84	0.07	1.95	0.05	-2.13	0.03
	CO Mean	-0.50	0.62	0.57	0.57	-0.41	0.68	-1.69	0.09	0.40	0.69	1.10	0.27	0.21	0.84	-0.41	0.68
	NO Max’	-0.33	0.74	0.38	0.70	-0.19	0.85	-1.76	0.08	0.60	0.55	1.09	0.27	-0.58	0.56	0.29	0.77
	NO_2 Max’	-0.46	0.65	-0.29	0.77	-0.16	0.88	-0.27	0.79	-0.29	0.77	0.30	0.77	-0.95	0.34	-0.56	0.57
	NOD Max’	-0.42	0.67	0.41	0.68	-0.22	0.83	-1.58	0.11	0.33	0.74	1.22	0.22	-0.92	0.36	0.35	0.72
	SO_2 Max’	-1.24	0.21	-1.42	0.16	0.05	0.96	-0.42	0.67	-0.72	0.47	-0.05	0.96	-1.41	0.16	-1.40	0.16
	PM_{10} Max’	-1.39	0.17	-0.31	0.76	0.97	0.33	-0.65	0.52	0.54	0.59	-0.09	0.92	0.58	0.56	-1.59	0.11
	O_3 Max’	0.93	0.35	0.59	0.55	-1.85	0.07	0.46	0.65	0.71	0.48	-1.08	0.28	0.78	0.44	-3.06	0.00
	CO Max’	0.13	0.89	0.63	0.53	-1.19	0.23	-1.40	0.16	0.31	0.76	1.18	0.24	-0.71	0.48	-0.52	0.60
Weather	Temp Min’	0.77	0.44	0.05	0.96	0.98	0.33	-1.69	0.09	-0.34	0.73	-0.37	0.71	-1.33	0.18	-0.27	0.79
	Temp Max’	0.82	0.41	-0.29	0.78	1.21	0.23	-0.51	0.61	-0.82	0.41	0.10	0.92	-1.39	0.17	-1.01	0.31
	Sun	-2.66	0.01	0.66	0.51	0.20	0.85	-0.76	0.45	1.08	0.28	-2.51	0.01	0.75	0.45	-1.08	0.28
	Rain	0.32	0.75	-1.20	0.23	-1.50	0.14	0.08	0.94	-0.14	0.89	-0.04	0.97	1.35	0.18	1.21	0.23
	Pressure	-1.01	0.31	0.15	0.88	1.33	0.19	1.12	0.26	-0.69	0.49	1.48	0.14	-1.62	0.11	0.15	0.88
	Wind speed	0.79	0.43	0.37	0.71	0.20	0.84	-0.50	0.62	-0.01	1.00	-1.43	0.15	0.58	0.56	0.52	0.61
Pollen	Grass	1.09	0.27	-1.22	0.22	1.75	0.08	0.89	0.37	1.53	0.13	0.40	0.69	0.75	0.45	0.42	0.68

Table G. 130: Sheffield A&E Counts Non-asthmatics – Autoregressive Standardised percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	-0.40	0.69	-1.08	0.28	1.79	0.07	1.92	0.06	-2.10	0.04	-0.03	0.98	2.14	0.03	2.07	0.04
	NO_2 Min’	0.62	0.54	-0.33	0.74	-0.08	0.94	0.72	0.47	-1.14	0.25	-1.21	0.23	1.79	0.07	0.18	0.86
	NOD Min’	0.08	0.94	-1.00	0.32	1.17	0.24	1.37	0.17	-2.55	0.01	-0.25	0.80	1.98	0.05	1.08	0.28
	SO_2 Min’	-0.33	0.74	0.46	0.64	-1.81	0.07	1.12	0.26	-1.57	0.12	0.33	0.74	-0.03	0.97	1.07	0.28
	PM_{10} Min’	1.52	0.13	-0.91	0.36	0.05	0.96	0.23	0.82	-0.98	0.33	-0.42	0.67	0.53	0.60	-1.63	0.10
	O_3 Min’	-0.41	0.68	0.28	0.78	1.08	0.28	-0.45	0.65	0.15	0.88	-0.14	0.89	-0.45	0.66	-0.82	0.41
	CO Min’	0.50	0.62	-0.88	0.38	0.36	0.72	1.22	0.22	-1.83	0.07	0.38	0.70	1.47	0.14	0.91	0.36
	NO Mean	0.32	0.75	-1.20	0.23	-1.16	0.25	0.55	0.58	-1.74	0.08	-0.44	0.66	-0.01	1.00	1.10	0.27
	NO_2 Mean	0.16	0.88	0.52	0.60	-1.68	0.09	-0.08	0.94	-0.18	0.86	-0.74	0.46	-0.61	0.54	0.40	0.69
	NOD Mean	0.22	0.83	-0.70	0.48	-1.38	0.17	0.48	0.63	-1.42	0.16	-0.57	0.57	-0.16	0.87	0.98	0.33
	SO_2 Mean	-0.03	0.97	-0.34	0.74	-0.14	0.89	-0.46	0.65	-2.33	0.02	1.42	0.16	-0.83	0.41	-0.65	0.52
	PM_{10} Mean	1.39	0.16	-0.47	0.64	-0.83	0.41	-0.32	0.75	-0.32	0.75	-0.07	0.95	0.41	0.69	-0.57	0.57
	O_3 Mean	-1.13	0.26	0.15	0.88	0.94	0.35	0.18	0.85	-0.53	0.60	1.04	0.30	0.10	0.92	-0.96	0.34
	CO Mean	-0.35	0.73	-0.07	0.94	-1.12	0.26	0.18	0.86	-2.06	0.04	-0.56	0.58	0.40	0.69	0.63	0.53
	NO Max’	0.18	0.86	-1.24	0.22	-1.93	0.05	-0.22	0.83	-1.03	0.30	-0.45	0.65	0.50	0.62	0.08	0.94
	NO_2 Max’	0.32	0.75	-0.35	0.73	-1.89	0.06	-0.52	0.60	-0.51	0.61	-0.65	0.52	-0.49	0.62	-0.19	0.85
	NOD Max’	0.19	0.85	-1.10	0.27	-2.02	0.04	-0.17	0.87	-1.06	0.29	-0.42	0.67	0.45	0.65	0.09	0.93
	SO_2 Max’	-0.35	0.73	-0.25	0.81	0.68	0.49	-1.31	0.19	-1.60	0.11	-0.35	0.73	-0.50	0.62	-1.22	0.22
	PM_{10} Max’	1.47	0.14	-0.10	0.92	-1.31	0.19	-0.56	0.57	-0.45	0.65	-0.46	0.64	1.49	0.14	-0.91	0.37
	O_3 Max’	-1.64	0.10	1.44	0.15	-0.18	0.86	0.23	0.82	0.46	0.65	-0.02	0.98	0.17	0.86	-0.84	0.40
	CO Max’	-0.68	0.49	-0.73	0.47	-1.55	0.12	-0.74	0.46	-1.66	0.10	-1.53	0.13	1.57	0.12	0.51	0.61
Weather	Temp Min’	1.21	0.23	-0.57	0.57	0.50	0.62	-0.39	0.70	-0.56	0.57	-1.66	0.10	-0.42	0.67	1.04	0.30
	Temp Max’	-0.53	0.59	0.26	0.80	0.62	0.54	-0.25	0.80	-0.31	0.76	-0.21	0.84	-0.93	0.36	-0.28	0.78
	Sun	0.43	0.66	-0.38	0.70	0.19	0.85	0.85	0.40	0.64	0.52	0.45	0.66	-0.62	0.53	1.59	0.11
	Rain	0.73	0.46	-2.43	0.02	-0.29	0.78	-0.80	0.43	1.45	0.15	-0.32	0.75	-0.71	0.48	0.93	0.35
	Pressure	-0.51	0.61	0.28	0.78	0.05	0.96	0.35	0.72	0.43	0.67	0.03	0.98	0.40	0.69	-0.23	0.82
	Wind speed	-0.11	0.92	-1.08	0.28	1.63	0.10	-1.54	0.12	-0.13	0.90	0.49	0.63	-1.09	0.28	-1.10	0.27
Pollen	Grass	0.12	0.91	0.83	0.41	-0.04	0.97	1.61	0.11	-0.03	0.98	0.03	0.98	-1.55	0.12	1.79	0.07

Table G. 131: Sheffield All Counts Excess – Autoregressive Standardised percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	0.98	0.33	-0.42	0.67	-0.19	0.85	-0.01	0.99	0.38	0.71	1.80	0.07	0.46	0.65	-0.05	0.96
	NO_2 Min’	0.18	0.86	0.15	0.88	-1.00	0.32	1.20	0.23	0.26	0.80	-0.23	0.82	1.26	0.21	-0.73	0.46
	NOD Min’	0.69	0.49	-0.08	0.94	-0.77	0.44	0.60	0.55	0.21	0.83	1.05	0.29	0.89	0.38	-0.59	0.55
	SO_2 Min’	0.97	0.33	0.48	0.63	-1.06	0.29	-0.08	0.94	1.51	0.13	0.59	0.55	-0.14	0.89	0.44	0.66
	PM_{10} Min’	-1.08	0.28	-0.01	1.00	-0.48	0.63	0.08	0.94	0.82	0.41	0.02	0.99	0.45	0.65	-1.42	0.16
	O_3 Min’	0.25	0.80	1.13	0.26	-0.35	0.73	-1.27	0.20	-0.60	0.55	0.20	0.84	1.24	0.22	-0.63	0.53
	CO Min’	1.36	0.18	0.58	0.56	-0.12	0.91	-0.68	0.50	-0.54	0.59	1.95	0.05	0.01	0.99	-0.49	0.62
	NO Mean	0.77	0.44	1.16	0.25	-0.56	0.58	-1.34	0.18	1.30	0.19	0.84	0.40	0.83	0.41	-0.30	0.77
	NO_2 Mean	-0.29	0.77	0.34	0.74	-0.80	0.42	0.46	0.65	1.06	0.29	0.38	0.70	-0.04	0.97	-1.05	0.29
	NOD Mean	0.49	0.62	0.95	0.34	-0.64	0.52	-0.92	0.36	1.32	0.19	0.78	0.44	0.62	0.53	-0.55	0.58
	SO_2 Mean	-0.60	0.55	0.18	0.85	-0.60	0.55	0.63	0.53	0.93	0.35	-0.10	0.92	-0.23	0.82	-0.26	0.79
	PM_{10} Mean	-1.53	0.13	0.53	0.59	-0.77	0.44	0.68	0.50	1.02	0.31	-0.07	0.95	0.75	0.45	-1.53	0.13
	O_3 Mean	-0.59	0.56	0.33	0.74	0.16	0.88	-0.66	0.51	-0.76	0.45	-0.54	0.59	0.60	0.55	-0.40	0.69
	CO Mean	0.96	0.34	1.05	0.30	-0.73	0.47	-1.97	0.05	1.38	0.17	1.70	0.09	0.62	0.53	-0.35	0.73
	NO Max’	0.81	0.42	0.48	0.63	-0.21	0.84	-1.62	0.11	1.66	0.10	0.84	0.40	0.42	0.67	-0.10	0.92
	NO_2 Max’	-0.44	0.66	0.10	0.92	-0.44	0.66	-0.43	0.67	1.78	0.07	0.09	0.93	0.03	0.97	-0.95	0.34
	NOD Max’	0.66	0.51	0.50	0.62	-0.17	0.86	-1.71	0.09	1.82	0.07	0.77	0.44	0.16	0.87	-0.10	0.92
	SO_2 Max’	-0.35	0.73	-1.19	0.24	0.13	0.89	0.10	0.92	0.08	0.94	0.89	0.37	-0.53	0.59	-0.26	0.79
	PM_{10} Max’	-1.61	0.11	0.72	0.47	-0.75	0.46	0.06	0.95	1.55	0.12	0.11	0.92	1.18	0.24	-1.45	0.15
	O_3 Max’	-0.39	0.70	-0.04	0.97	-0.10	0.92	0.19	0.85	-1.34	0.18	-0.09	0.93	-0.42	0.67	-1.19	0.24
	CO Max’	1.33	0.19	0.94	0.35	-0.44	0.66	-1.89	0.06	1.56	0.12	1.54	0.13	-0.50	0.62	0.50	0.62
Weather	Temp Min’	1.14	0.26	0.36	0.72	-0.19	0.85	-1.49	0.14	0.85	0.40	-0.55	0.59	-1.11	0.27	-0.46	0.65
	Temp Max’	0.40	0.69	-0.09	0.93	0.00	1.00	-1.64	0.10	0.34	0.73	0.08	0.94	0.64	0.52	-2.21	0.03
	Sun	-1.49	0.14	-0.83	0.41	0.09	0.93	-1.74	0.08	0.19	0.85	-1.11	0.27	2.24	0.03	-1.77	0.08
	Rain	0.83	0.41	0.41	0.68	-1.08	0.28	-0.08	0.93	0.79	0.43	0.28	0.78	0.80	0.43	0.03	0.98
	Pressure	-0.92	0.36	0.39	0.70	0.27	0.79	0.84	0.40	0.39	0.70	-0.82	0.41	0.17	0.87	0.51	0.61
	Wind speed	-0.30	0.76	-0.10	0.92	-1.20	0.23	1.74	0.08	-2.26	0.02	-0.81	0.42	0.48	0.64	1.22	0.22
Pollen	Grass	0.80	0.42	-3.20	0.00	2.04	0.04	0.42	0.67	0.58	0.56	-0.19	0.85	0.85	0.40	0.81	0.42

Table G. 132: Sheffield Admissions Excess – Autoregressive Standardised percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	1.86	0.06	-0.39	0.70	-0.44	0.66	1.44	0.15	-0.96	0.34	0.98	0.33	-0.13	0.90	0.69	0.49
	NO_2 Min’	0.71	0.48	1.04	0.30	-3.08	0.00	1.24	0.22	0.64	0.52	-0.93	0.35	1.73	0.08	-0.80	0.42
	NOD Min’	1.46	0.14	0.42	0.68	-2.15	0.03	1.54	0.12	-0.60	0.55	0.43	0.67	0.54	0.59	0.01	0.99
	SO_2 Min’	2.06	0.04	0.18	0.86	-1.08	0.28	-0.08	0.94	1.12	0.26	1.61	0.11	-1.27	0.20	1.48	0.14
	PM_{10} Min’	-1.29	0.20	2.02	0.04	-2.12	0.03	-0.73	0.47	1.70	0.09	-0.72	0.47	0.87	0.39	-0.96	0.34
	O_3 Min’	0.65	0.52	-0.25	0.80	0.95	0.34	-0.72	0.47	-1.01	0.31	0.16	0.87	0.32	0.75	0.74	0.46
	CO Min’	2.11	0.04	0.31	0.76	-1.35	0.18	0.54	0.59	-1.12	0.26	1.73	0.08	-0.22	0.83	-0.37	0.71
	NO Mean	1.26	0.21	0.49	0.62	-1.39	0.16	0.40	0.69	1.28	0.20	-0.67	0.50	0.55	0.58	0.16	0.88
	NO_2 Mean	-0.74	0.46	1.08	0.28	-2.04	0.04	0.64	0.52	1.78	0.08	-1.13	0.26	0.95	0.34	-1.25	0.21
	NOD Mean	0.72	0.48	0.67	0.50	-1.63	0.10	0.52	0.60	1.44	0.15	-0.82	0.41	0.69	0.49	-0.23	0.82
	SO_2 Mean	-1.03	0.30	1.95	0.05	-2.21	0.03	0.86	0.39	0.56	0.58	0.64	0.52	0.07	0.94	0.28	0.78
	PM_{10} Mean	-0.58	0.56	0.41	0.68	-2.67	0.01	1.63	0.10	1.23	0.22	-0.91	0.37	0.96	0.34	-0.84	0.40
	O_3 Mean	-0.86	0.39	-0.38	0.71	1.97	0.05	-0.88	0.38	-1.01	0.31	0.26	0.80	-0.49	0.62	0.35	0.73
	CO Mean	1.01	0.31	0.56	0.58	-1.18	0.24	-0.23	0.82	0.76	0.45	0.59	0.56	0.09	0.93	0.03	0.97
	NO Max’	0.58	0.56	0.40	0.69	-0.80	0.42	0.03	0.98	1.35	0.18	-0.61	0.54	0.00	1.00	0.52	0.60
	NO_2 Max’	-1.01	0.31	0.04	0.97	-0.06	0.95	-1.27	0.21	2.66	0.01	-1.23	0.22	0.47	0.64	-0.79	0.43
	NOD Max’	0.39	0.70	0.40	0.69	-0.68	0.50	-0.31	0.75	1.70	0.09	-0.81	0.42	0.08	0.94	0.29	0.77
	SO_2 Max’	-0.29	0.77	0.49	0.63	-1.24	0.22	-0.50	0.62	-0.18	0.86	1.68	0.09	-0.30	0.76	0.79	0.43
	PM_{10} Max’	-1.05	0.30	0.67	0.51	-2.55	0.01	1.36	0.17	1.36	0.17	-0.57	0.57	1.03	0.30	-0.41	0.68
	O_3 Max’	-0.41	0.68	-1.89	0.06	2.20	0.03	0.06	0.95	-1.19	0.23	0.08	0.94	-1.09	0.28	-0.09	0.93
	CO Max’	1.20	0.23	0.49	0.62	-0.72	0.47	-0.43	0.67	1.30	0.19	-0.12	0.91	-0.57	0.57	0.74	0.46
Weather	Temp Min’	0.91	0.36	1.10	0.27	-0.82	0.41	-0.93	0.35	0.43	0.67	-0.17	0.87	-0.76	0.45	-1.03	0.30
	Temp Max’	-1.33	0.18	1.55	0.12	-0.23	0.82	-1.94	0.05	0.02	0.98	0.60	0.55	1.67	0.09	-2.47	0.01
	Sun	-0.39	0.69	-0.73	0.47	-0.06	0.95	-1.88	0.06	0.61	0.54	-0.50	0.62	2.23	0.03	-0.84	0.40
	Rain	1.09	0.27	0.97	0.33	-0.36	0.72	0.07	0.95	-0.83	0.41	1.24	0.21	0.50	0.62	-1.50	0.13
	Pressure	-1.82	0.07	1.70	0.09	-1.17	0.24	0.68	0.50	0.07	0.94	-0.80	0.42	1.23	0.22	-0.43	0.66
	Wind speed	-0.95	0.34	0.47	0.64	-0.99	0.32	1.55	0.12	-2.25	0.02	0.67	0.50	-1.20	0.23	2.15	0.03
Pollen	Grass	1.24	0.22	-2.12	0.03	1.46	0.15	-0.97	0.33	0.59	0.55	-0.67	0.50	1.11	0.27	0.40	0.69

Table G. 133: Sheffield A&E Counts Excess – Autoregressive Standardised percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min'	0.82	0.41	0.47	0.64	-0.60	0.55	-2.02	0.04	2.51	0.01	1.51	0.13	-1.06	0.29	-0.85	0.40
	NO_2 Min'	-0.32	0.75	-0.94	0.35	1.01	0.31	-0.17	0.87	0.46	0.64	1.22	0.22	-1.07	0.28	0.27	0.79
	NOD Min'	0.30	0.77	-0.28	0.78	0.17	0.87	-1.34	0.18	2.06	0.04	1.17	0.24	-1.00	0.32	-0.33	0.74
	SO_2 Min'	1.05	0.30	-0.08	0.93	0.78	0.43	-1.13	0.26	2.10	0.04	-0.16	0.88	-1.04	0.30	0.89	0.37
	PM_{10} Min'	-1.52	0.13	-0.77	0.44	-0.12	0.91	1.15	0.25	0.33	0.74	0.00	1.00	-0.32	0.75	0.58	0.56
	O_3 Min'	0.11	0.91	0.98	0.33	-1.63	0.10	-0.84	0.40	1.02	0.31	-0.30	0.76	1.35	0.18	-0.47	0.64
	CO Min'	0.34	0.73	0.47	0.64	0.50	0.62	-1.25	0.21	1.16	0.24	0.75	0.45	-0.56	0.58	-0.41	0.68
	NO Mean	-1.22	0.22	1.48	0.14	1.21	0.23	-1.88	0.06	1.58	0.12	1.31	0.19	-0.37	0.71	-0.46	0.64
	NO_2 Mean	-0.59	0.55	-0.91	0.37	2.04	0.04	-0.19	0.85	0.08	0.94	0.88	0.38	-0.48	0.63	-0.23	0.82
	NOD Mean	-1.05	0.29	0.83	0.40	1.52	0.13	-1.59	0.11	1.29	0.20	1.29	0.20	-0.47	0.64	-0.42	0.67
	SO_2 Mean	-0.49	0.63	-0.34	0.73	0.37	0.71	0.14	0.89	1.84	0.07	-1.21	0.23	-0.46	0.65	0.38	0.71
	PM_{10} Mean	-1.85	0.06	-0.23	0.82	1.41	0.16	0.00	1.00	0.59	0.56	0.09	0.93	-0.35	0.73	-0.42	0.67
	O_3 Mean	1.28	0.20	0.44	0.66	-2.00	0.05	-0.23	0.82	1.43	0.15	-1.96	0.05	1.31	0.19	-0.90	0.37
	CO Mean	-0.13	0.90	0.34	0.74	0.56	0.58	-1.44	0.15	1.75	0.08	1.15	0.25	-0.06	0.95	-0.60	0.55
	NO Max'	-0.41	0.68	0.96	0.34	1.20	0.23	-1.28	0.20	1.20	0.23	1.13	0.26	-0.74	0.46	0.12	0.90
	NO_2 Max'	-0.47	0.64	-0.01	0.99	1.17	0.24	0.14	0.89	0.21	0.83	0.65	0.52	-0.34	0.73	-0.21	0.83
	NOD Max'	-0.49	0.63	0.90	0.37	1.25	0.21	-1.17	0.24	1.05	0.29	1.19	0.23	-0.95	0.34	0.18	0.86
	SO_2 Max'	-0.34	0.73	-0.68	0.50	-0.39	0.70	0.57	0.57	0.65	0.51	0.15	0.88	-0.57	0.57	-0.02	0.98
	PM_{10} Max'	-1.87	0.06	-0.15	0.88	1.47	0.14	-0.19	0.85	0.65	0.52	0.26	0.80	-0.57	0.57	-0.38	0.71
	O_3 Max'	1.91	0.06	-0.64	0.53	-1.20	0.23	0.24	0.81	0.21	0.84	-0.85	0.40	0.52	0.61	-1.62	0.11
	CO Max'	0.46	0.65	0.81	0.42	0.22	0.82	-0.65	0.51	1.41	0.16	1.95	0.05	-1.52	0.13	-0.61	0.54
Weather	Temp Min'	-0.34	0.74	0.48	0.63	0.40	0.69	-0.86	0.39	0.21	0.84	0.85	0.40	-0.46	0.64	-0.90	0.37
	Temp Max'	0.81	0.42	-0.45	0.66	0.26	0.79	-0.07	0.95	-0.38	0.70	0.33	0.74	-0.36	0.72	-0.42	0.67
	Sun	-2.34	0.02	0.67	0.50	-0.22	0.82	-1.16	0.24	0.30	0.76	-2.07	0.04	1.00	0.32	-1.82	0.07
	Rain	-0.12	0.90	1.10	0.27	-0.62	0.54	0.68	0.50	-1.00	0.32	0.27	0.79	1.71	0.09	0.22	0.83
	Pressure	-0.12	0.91	-0.22	0.82	0.97	0.33	0.46	0.65	-0.70	0.48	0.99	0.32	-1.48	0.14	0.33	0.74
	Wind speed	0.77	0.44	1.01	0.31	-0.95	0.34	0.74	0.46	-0.01	1.00	-1.34	0.18	1.31	0.19	0.96	0.34
Pollen	Grass	0.87	0.39	-1.92	0.06	1.35	0.18	-0.39	0.69	1.02	0.31	0.24	0.81	1.79	0.07	-1.25	0.21

G4.4. Scotland Autoregressive Point-estimates and P-values

Table G. 134: Scotland All Counts Asthmatics – Autoregressive Standardised percentage change and P-values by lag day per exposure.

Exposure		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	-0.27	0.78	0.87	0.39	-0.29	0.77	-0.34	0.74	0.67	0.51	-1.16	0.25	-0.27	0.79	-0.38	0.70
	NO_2 Min’	0.09	0.93	-0.08	0.94	0.58	0.56	-0.29	0.77	0.32	0.75	-2.44	0.02	-0.78	0.44	-0.75	0.45
	NOD Min’	-0.06	0.95	0.40	0.69	-1.37	0.17	0.25	0.80	1.12	0.26	-1.37	0.17	-1.21	0.23	-1.26	0.21
	SO_2 Min’	-0.62	0.54	-0.17	0.87	-1.00	0.32	-0.55	0.58	-0.02	0.99	-1.50	0.13	0.82	0.41	0.55	0.58
	PM_{10} Min’	-0.70	0.49	0.42	0.67	0.04	0.97	-0.14	0.89	0.12	0.90	-1.08	0.28	0.17	0.87	-2.19	0.03
	O_3 Min’	1.11	0.27	-0.09	0.93	1.03	0.30	0.64	0.52	-0.66	0.51	0.26	0.79	-0.33	0.74	0.42	0.67
	CO Min’	0.51	0.61	1.08	0.28	-0.49	0.62	-0.62	0.53	0.17	0.87	1.00	0.32	-1.45	0.15	-0.43	0.67
	NO Mean	-1.34	0.18	1.12	0.26	0.22	0.82	-0.01	0.99	0.23	0.82	-1.52	0.13	0.48	0.63	-0.36	0.72
	NO_2 Mean	-0.27	0.79	-0.55	0.59	0.78	0.44	-0.75	0.46	-0.77	0.44	-1.53	0.13	-0.63	0.53	0.04	0.97
	NOD Mean	-1.32	0.19	0.79	0.43	-0.79	0.43	0.37	0.72	0.06	0.95	-1.11	0.27	-0.14	0.89	-0.89	0.37
	SO_2 Mean	0.42	0.67	0.89	0.37	-1.62	0.11	-1.53	0.13	-0.27	0.79	-1.35	0.18	0.27	0.78	0.19	0.85
	PM_{10} Mean	-0.46	0.65	0.45	0.66	0.79	0.43	-0.54	0.59	1.45	0.15	-2.70	0.01	1.22	0.22	-1.27	0.21
	O_3 Mean	0.75	0.46	-0.18	0.85	1.34	0.18	0.11	0.91	-1.26	0.21	0.26	0.80	-0.64	0.52	0.37	0.71
	CO Mean	-0.54	0.59	1.05	0.29	0.23	0.82	-0.31	0.76	-0.05	0.96	-0.11	0.92	0.02	0.98	-0.54	0.59
	NO Max’	-0.92	0.36	0.77	0.44	0.75	0.45	-0.42	0.67	0.78	0.44	-1.36	0.18	0.35	0.73	0.35	0.73
	NO_2 Max’	-1.06	0.29	-0.56	0.58	1.05	0.29	-1.05	0.29	-0.57	0.57	-1.13	0.26	-0.30	0.76	0.26	0.79
	NOD Max’	-1.20	0.23	0.55	0.58	-0.24	0.81	0.11	0.92	0.75	0.45	-0.70	0.48	0.13	0.89	-0.56	0.58
	SO_2 Max’	0.87	0.39	0.49	0.62	-1.67	0.10	-1.58	0.11	-0.88	0.38	-1.26	0.21	0.75	0.45	-0.28	0.78
	PM_{10} Max’	-0.84	0.40	0.16	0.87	1.28	0.20	-0.35	0.73	0.12	0.91	-0.29	0.77	0.47	0.64	-0.38	0.71
	O_3 Max’	0.54	0.59	-0.14	0.89	1.21	0.23	-0.59	0.56	-0.65	0.52	1.13	0.26	-0.59	0.56	0.12	0.91
	CO Max’	-0.73	0.47	1.15	0.25	0.18	0.86	0.03	0.98	0.84	0.40	-0.06	0.95	0.75	0.46	-0.02	0.98
Weather	Temp Min’	0.44	0.66	0.18	0.86	0.74	0.46	-0.59	0.55	-1.32	0.19	0.62	0.53	-2.61	0.01	1.87	0.06
	Temp Max’	-0.29	0.77	1.91	0.06	0.25	0.80	0.12	0.91	-0.26	0.79	-1.23	0.22	-1.34	0.18	0.78	0.44
	Sun	1.42	0.16	1.38	0.17	-0.04	0.97	0.29	0.78	0.49	0.63	0.46	0.64	0.58	0.56	-0.03	0.97
	Rain	0.84	0.40	-0.11	0.91	-0.44	0.66	-1.30	0.20	-1.80	0.07	1.62	0.11	-0.71	0.48	-1.04	0.30
	Pressure	-0.45	0.66	0.36	0.72	0.78	0.44	0.95	0.34	-0.92	0.36	0.20	0.84	0.30	0.76	-1.07	0.29
	Wind speed	0.71	0.48	-0.38	0.70	0.38	0.70	-0.09	0.93	-0.90	0.37	0.37	0.71	-0.14	0.89	-0.10	0.92
Pollen	Grass	0.34	0.73	0.80	0.42	2.00	0.05	-0.62	0.54	0.89	0.37	-0.92	0.36	-0.99	0.32	-1.95	0.05
	Birch	-0.79	0.43	-1.21	0.23	0.95	0.34	-0.85	0.40	0.50	0.62	0.52	0.60	-0.97	0.33	1.19	0.23
	Oak	0.54	0.59	1.25	0.21	-1.08	0.28	0.46	0.65	-0.45	0.66	0.25	0.80	0.59	0.55	-0.85	0.40
	Nettle	0.70	0.48	0.49	0.62	0.99	0.32	-0.40	0.69	-0.02	0.98	-1.52	0.13	-1.07	0.28	-1.47	0.14

Table G. 135: Scotland All Counts Non-asthmatics – Autoregressive Standardised percentage change estimates and P-values by lag day per exposure.

Exposure		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	-0.65	0.52	0.17	0.87	-0.29	0.77	0.42	0.68	0.69	0.49	-0.78	0.44	-0.85	0.40	-1.37	0.17
	NO_2 Min’	0.98	0.33	0.42	0.67	-0.85	0.40	-0.11	0.91	0.46	0.65	-0.09	0.93	-0.35	0.73	-1.52	0.13
	NOD Min’	0.74	0.46	0.09	0.93	-1.25	0.21	0.21	0.83	1.67	0.10	1.15	0.25	-1.77	0.08	-1.47	0.14
	SO_2 Min’	-0.32	0.75	0.96	0.34	-0.68	0.50	-0.68	0.50	-1.01	0.31	-2.53	0.01	2.37	0.02	0.37	0.71
	PM_{10} Min’	2.25	0.02	-1.15	0.25	0.26	0.80	0.27	0.79	0.60	0.55	-1.10	0.27	-0.24	0.81	-2.38	0.02
	O_3 Min’	1.09	0.28	0.75	0.45	-0.51	0.61	1.72	0.09	-1.34	0.18	0.77	0.44	0.35	0.72	-0.19	0.85
	CO Min’	0.55	0.58	-0.64	0.52	0.04	0.97	0.49	0.63	-0.17	0.86	0.39	0.70	-1.09	0.28	-1.42	0.16
	NO Mean	0.16	0.87	0.89	0.37	-0.02	0.98	0.13	0.90	1.11	0.27	-1.19	0.24	0.64	0.52	0.15	0.88
	NO_2 Mean	0.90	0.37	0.50	0.62	-0.49	0.62	-0.83	0.40	1.02	0.31	-1.62	0.10	0.79	0.43	-0.87	0.38
	NOD Mean	0.42	0.68	0.63	0.53	-0.51	0.61	0.02	0.98	1.90	0.06	-0.57	0.57	-0.02	0.98	-0.25	0.80
	SO_2 Mean	0.94	0.35	1.27	0.20	-2.01	0.04	-1.33	0.19	-1.07	0.29	-1.73	0.08	2.18	0.03	0.84	0.40
	PM_{10} Mean	2.50	0.01	-1.07	0.29	1.17	0.24	0.05	0.96	-0.15	0.88	-0.80	0.43	0.18	0.86	-1.02	0.31
	O_3 Mean	0.62	0.53	0.28	0.78	-0.63	0.53	1.18	0.24	-1.61	0.11	0.83	0.41	0.32	0.75	0.55	0.58
	CO Mean	-0.25	0.80	0.57	0.57	-0.30	0.76	0.39	0.70	0.32	0.75	-0.63	0.53	0.33	0.74	-0.18	0.86
	NO Max’	0.67	0.50	0.94	0.35	0.81	0.42	-0.57	0.57	1.92	0.06	-0.84	0.40	0.48	0.63	1.67	0.10
	NO_2 Max’	0.57	0.57	0.41	0.68	0.24	0.81	-2.17	0.03	1.14	0.25	-0.88	0.38	-0.30	0.76	0.65	0.51
	NOD Max’	0.76	0.45	0.70	0.48	0.81	0.42	-0.81	0.42	2.47	0.01	0.03	0.97	-0.36	0.72	1.32	0.19
	SO_2 Max’	1.69	0.09	1.67	0.10	-2.10	0.04	-1.44	0.15	-0.97	0.33	-1.33	0.18	2.54	0.01	0.70	0.49
	PM_{10} Max’	1.22	0.22	0.38	0.70	0.54	0.59	-0.91	0.36	1.82	0.07	1.10	0.27	-1.39	0.16	0.91	0.36
	O_3 Max’	0.62	0.53	0.25	0.80	0.40	0.69	0.32	0.75	-0.39	0.69	0.45	0.65	0.40	0.69	0.17	0.87
	CO Max’	0.43	0.67	1.00	0.32	0.18	0.86	-0.49	0.63	2.16	0.03	-0.78	0.44	1.45	0.15	1.38	0.17
Weather	Temp Min’	-0.39	0.69	-0.62	0.54	1.41	0.16	0.19	0.85	-0.79	0.43	-0.18	0.86	-1.13	0.26	-0.55	0.58
	Temp Max’	-0.05	0.96	1.33	0.18	-0.13	0.90	1.40	0.16	-0.92	0.36	0.10	0.92	-1.07	0.29	0.01	1.00
	Sun	0.49	0.63	2.20	0.03	-1.37	0.17	-0.28	0.78	-0.38	0.70	2.48	0.01	-0.35	0.73	1.99	0.05
	Rain	1.37	0.17	-0.77	0.44	0.28	0.78	0.28	0.78	-1.58	0.11	-0.91	0.37	-1.08	0.28	0.25	0.80
	Pressure	-0.27	0.79	0.33	0.74	1.81	0.07	-2.73	0.01	1.01	0.31	0.69	0.49	-0.05	0.96	-0.84	0.40
	Wind speed	0.10	0.92	-0.34	0.74	-0.21	0.84	2.02	0.04	-1.69	0.09	0.36	0.72	0.37	0.71	-0.48	0.63
Pollen	Grass	0.14	0.89	1.26	0.21	-0.61	0.54	-0.03	0.98	-1.03	0.30	-0.08	0.93	-1.87	0.06	-1.96	0.05
	Birch	-0.89	0.37	0.14	0.89	-0.01	0.99	-0.25	0.80	0.52	0.61	0.71	0.48	1.05	0.29	-1.06	0.29
	Oak	0.43	0.66	0.94	0.35	0.71	0.48	-0.40	0.69	-1.03	0.30	-0.06	0.95	2.73	0.01	-0.31	0.76
	Nettle	0.44	0.66	1.27	0.20	-0.64	0.52	-0.39	0.70	-0.81	0.42	-0.95	0.34	-1.04	0.30	-1.28	0.20

Table G. 136: Scotland Acute Visits Asthmatics – Autoregressive Standardised percentage change and P-values by lag day per exposure.

Exposure		Lag0 Est	P	Lag1 Est	P	Lag2 Est	P	Lag3 Est	P	Lag4 Est	P	Lag5 Est	P	Lag6 Est	P	Lag7 Est	P
Outdoor air pollutants	NO Min’	-0.37	0.71	-0.97	0.33	0.30	0.77	-1.60	0.11	0.99	0.32	-0.68	0.50	-0.15	0.88	0.54	0.59
	NO_2 Min’	0.28	0.78	-0.58	0.56	-0.26	0.79	-1.46	0.14	0.67	0.50	-0.27	0.78	0.10	0.92	-0.36	0.72
	NOD Min’	-0.12	0.90	-0.53	0.59	0.31	0.76	-0.46	0.64	-0.38	0.71	-0.57	0.57	-0.09	0.93	0.01	0.99
	SO_2 Min’	-0.66	0.51	0.86	0.39	1.09	0.28	0.80	0.42	0.35	0.72	-1.13	0.26	-1.42	0.16	-1.47	0.14
	PM_{10} Min’	0.95	0.34	-1.18	0.24	-0.32	0.75	-0.10	0.92	-0.42	0.68	-1.38	0.17	-1.12	0.26	-0.25	0.81
	O_3 Min’	0.20	0.84	-2.18	0.03	-0.07	0.95	0.22	0.83	-1.58	0.11	-0.80	0.42	-0.85	0.39	-0.81	0.42
	CO Min’	0.35	0.73	-0.46	0.65	-0.25	0.81	-0.73	0.47	-1.39	0.16	-0.40	0.69	0.11	0.91	-0.73	0.47
	NO Mean	-0.57	0.57	-0.59	0.56	0.14	0.89	-0.82	0.41	0.68	0.50	-0.93	0.35	1.37	0.17	0.43	0.67
	NO_2 Mean	-0.29	0.78	0.18	0.86	-0.27	0.78	-0.40	0.69	-0.26	0.80	-0.46	0.65	0.05	0.96	0.49	0.62
	NOD Mean	-0.78	0.44	-0.12	0.90	0.15	0.88	-0.03	0.98	-0.41	0.68	-0.93	0.35	1.13	0.26	0.36	0.72
	SO_2 Mean	-0.67	0.50	0.79	0.43	1.44	0.15	1.42	0.15	-0.31	0.76	-0.86	0.39	-1.46	0.15	-1.71	0.09
	PM_{10} Mean	0.69	0.49	-0.74	0.46	-0.78	0.44	0.63	0.53	-2.19	0.03	-2.08	0.04	-0.53	0.60	0.89	0.37
	O_3 Mean	0.47	0.64	-1.87	0.06	0.62	0.54	0.28	0.78	-1.38	0.17	-0.48	0.63	-1.33	0.18	-0.76	0.45
	CO Mean	0.87	0.38	-0.52	0.61	1.00	0.32	0.98	0.33	-0.71	0.48	-0.68	0.50	1.85	0.07	-0.16	0.87
	NO Max’	-0.62	0.54	-0.56	0.58	0.50	0.61	-0.99	0.32	0.82	0.41	-0.67	0.50	1.61	0.11	0.55	0.59
	NO_2 Max’	-0.83	0.41	0.41	0.68	0.22	0.83	0.06	0.95	-0.28	0.78	-0.79	0.43	0.85	0.40	1.12	0.26
	NOD Max’	-0.98	0.33	0.15	0.88	0.52	0.61	-0.21	0.84	-0.07	0.95	-0.94	0.35	1.76	0.08	0.43	0.67
	SO_2 Max’	-0.88	0.38	1.10	0.27	1.19	0.23	1.33	0.18	-0.42	0.67	-0.59	0.55	-1.05	0.29	-2.27	0.02
	PM_{10} Max’	-0.06	0.95	-0.02	0.99	1.45	0.15	-0.14	0.89	-1.09	0.28	-2.50	0.01	-1.20	0.23	1.20	0.23
	O_3 Max’	0.90	0.37	-1.88	0.06	0.86	0.39	0.56	0.58	-1.16	0.25	-1.13	0.26	-1.68	0.09	-0.45	0.66
	CO Max’	0.68	0.50	-0.88	0.38	0.94	0.35	1.25	0.21	0.01	1.00	-0.39	0.70	2.11	0.04	0.45	0.65
Weather	Temp Min’	-1.34	0.18	0.97	0.33	-1.04	0.30	-0.80	0.42	-1.54	0.13	-1.78	0.08	-0.30	0.77	0.90	0.37
	Temp Max’	-0.92	0.36	-0.40	0.69	0.75	0.45	0.91	0.36	-2.14	0.03	-0.89	0.37	-0.19	0.85	0.18	0.86
	Sun	-0.85	0.40	-0.14	0.89	0.55	0.59	0.78	0.44	0.02	0.99	-0.68	0.50	1.33	0.18	-0.83	0.41
	Rain	0.47	0.64	0.04	0.97	0.91	0.36	-0.78	0.44	1.32	0.19	0.38	0.71	-2.35	0.02	2.18	0.03
	Pressure	-1.01	0.31	0.03	0.98	-1.23	0.22	1.89	0.06	-1.92	0.06	1.13	0.26	0.69	0.49	-1.96	0.05
	Wind speed	-1.10	0.27	-0.13	0.90	0.00	1.00	-1.15	0.25	2.00	0.05	-0.87	0.39	0.27	0.79	-1.05	0.30
Pollen	Grass	0.60	0.55	-1.16	0.25	-0.12	0.90	0.46	0.65	-0.52	0.61	0.43	0.67	0.56	0.57	-0.66	0.51
	Birch	-0.22	0.83	0.84	0.40	-0.79	0.43	-0.57	0.57	0.23	0.82	-0.40	0.69	0.57	0.57	0.17	0.86
	Oak	-0.41	0.68	0.83	0.41	0.14	0.89	1.42	0.16	-1.04	0.30	-0.14	0.89	0.25	0.80	0.29	0.77
	Nettle	1.21	0.23	-1.03	0.30	0.64	0.53	-1.02	0.31	0.88	0.38	1.75	0.08	0.16	0.87	-1.10	0.27

Table G. 137: Scotland Acute Visits Non-asthmatics – Autoregressive Standardised percentage change and P-values by lag day per exposure.

Exposure		Lag0 Est	P	Lag1 Est	P	Lag2 Est	P	Lag3 Est	P	Lag4 Est	P	Lag5 Est	P	Lag6 Est	P	Lag7 Est	P
Outdoor air pollutants	NO Min’	0.30	0.77	-1.39	0.17	0.32	0.75	-0.74	0.46	0.15	0.88	-0.08	0.94	0.36	0.72	-0.65	0.52
	NO_2 Min’	1.16	0.25	-0.68	0.50	-0.53	0.60	-0.09	0.93	0.54	0.59	-0.91	0.37	1.67	0.10	-0.95	0.34
	NOD Min’	-0.08	0.94	-1.30	0.19	-0.67	0.51	2.13	0.03	-1.07	0.29	0.39	0.70	0.89	0.38	-1.61	0.11
	SO_2 Min’	0.05	0.96	0.49	0.63	-0.84	0.40	-0.46	0.65	-0.18	0.86	0.19	0.85	1.36	0.17	-1.32	0.19
	PM_{10} Min’	0.16	0.87	0.82	0.42	-0.25	0.80	0.94	0.35	-2.34	0.02	1.32	0.19	-1.98	0.05	-2.24	0.03
	O_3 Min’	1.11	0.27	-0.89	0.37	-0.17	0.86	-1.86	0.06	-1.45	0.15	-0.84	0.40	-1.78	0.08	-0.22	0.83
	CO Min’	0.31	0.76	-0.39	0.70	0.00	1.00	-0.54	0.59	-1.12	0.26	-1.08	0.28	0.43	0.67	-3.23	0.00
	NO Mean	0.16	0.87	0.39	0.70	-0.67	0.50	0.57	0.57	-0.40	0.69	-1.33	0.18	4.18	0.00	-0.15	0.88
	NO_2 Mean	0.81	0.42	-0.20	0.84	-1.05	0.30	-0.13	0.90	0.49	0.63	-2.06	0.04	3.02	0.00	0.02	0.98
	NOD Mean	-0.49	0.63	0.26	0.80	-0.96	0.34	1.65	0.10	-1.02	0.31	-1.24	0.22	3.49	0.00	-0.55	0.58
	SO_2 Mean	-0.15	0.88	0.14	0.89	-0.33	0.74	-1.58	0.12	0.69	0.49	0.63	0.53	1.62	0.11	-1.69	0.09
	PM_{10} Mean	0.56	0.57	1.67	0.10	-1.47	0.14	1.05	0.29	-2.72	0.01	-0.44	0.66	0.93	0.35	-2.25	0.03
	O_3 Mean	0.86	0.39	0.00	1.00	0.17	0.87	-1.49	0.14	-0.95	0.34	-0.60	0.55	-2.68	0.01	0.04	0.97
	CO Mean	0.69	0.49	-0.18	0.86	0.78	0.44	0.61	0.54	-1.28	0.20	-0.94	0.35	4.37	0.00	-0.85	0.39
	NO Max’	0.45	0.65	1.03	0.30	-1.22	0.22	0.61	0.55	-0.30	0.77	-0.43	0.67	3.04	0.00	0.73	0.46
	NO_2 Max’	0.42	0.68	0.12	0.91	-1.34	0.18	0.18	0.86	-0.42	0.68	-1.34	0.18	2.25	0.03	1.31	0.19
	NOD Max’	-0.34	0.73	0.57	0.57	-1.08	0.28	1.66	0.10	-1.14	0.26	-0.33	0.75	2.35	0.02	0.30	0.76
	SO_2 Max’	-0.46	0.65	-0.27	0.79	-0.16	0.87	-1.21	0.23	0.63	0.53	1.21	0.23	1.65	0.10	-1.94	0.05
	PM_{10} Max’	0.59	0.55	-0.98	0.33	0.81	0.42	0.69	0.49	-1.46	0.15	-0.86	0.39	1.33	0.18	-0.22	0.83
	O_3 Max’	0.88	0.38	-0.51	0.61	1.09	0.27	-1.09	0.28	-0.60	0.55	-1.10	0.27	-2.58	0.01	0.47	0.64
	CO Max’	0.16	0.88	0.94	0.35	0.30	0.76	0.97	0.33	-0.40	0.69	-0.64	0.52	4.39	0.00	0.60	0.55
Weather	Temp Min’	0.80	0.42	0.20	0.84	0.49	0.62	-1.14	0.26	-0.78	0.44	-1.19	0.24	-1.81	0.07	0.62	0.53
	Temp Max’	0.86	0.39	-1.33	0.18	1.42	0.16	-1.01	0.31	-0.60	0.55	-1.62	0.11	-0.65	0.52	1.16	0.25
	Sun	-2.48	0.01	-0.90	0.37	0.14	0.89	-1.03	0.31	0.24	0.81	-0.86	0.39	-1.07	0.29	0.79	0.43
	Rain	-0.25	0.80	-0.14	0.89	0.50	0.62	1.38	0.17	0.06	0.95	1.52	0.13	-1.12	0.26	0.02	0.98
	Pressure	0.74	0.46	0.22	0.83	-1.68	0.09	2.14	0.03	-0.62	0.53	-1.27	0.20	1.39	0.17	-1.87	0.06
	Wind speed	-0.70	0.49	0.14	0.89	1.54	0.12	-0.77	0.44	-0.51	0.61	0.56	0.58	-0.78	0.44	-0.32	0.75
Pollen	Grass	-0.29	0.77	0.47	0.64	1.97	0.05	-0.70	0.48	1.34	0.18	-0.37	0.71	0.60	0.55	1.17	0.24
	Birch	1.80	0.07	-0.27	0.79	0.34	0.73	-0.72	0.47	0.69	0.49	-0.13	0.90	0.02	0.99	0.14	0.89
	Oak	-0.23	0.82	1.74	0.08	0.00	1.00	-0.47	0.64	0.07	0.95	-0.33	0.74	0.53	0.60	-1.53	0.13
	Nettle	-0.33	0.75	-0.32	0.75	1.75	0.08	-1.53	0.13	2.15	0.03	0.14	0.89	0.20	0.84	2.51	0.01

Table G. 138: Scotland Casualty Counts Asthmatics – Autoregressive Standardised percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	-1.86	0.06	0.78	0.44	-0.33	0.75	0.00	1.00	1.18	0.24	-0.74	0.46	-1.38	0.17	-0.89	0.37
	NO_2 Min’	-0.63	0.53	0.54	0.59	-0.42	0.67	1.62	0.11	1.25	0.21	1.51	0.13	1.67	0.10	2.28	0.02
	NOD Min’	-1.35	0.18	2.51	0.01	-0.12	0.91	1.19	0.23	2.16	0.03	1.08	0.28	1.88	0.06	1.87	0.06
	SO_2 Min’	-1.11	0.27	-2.76	0.01	-1.26	0.21	-0.59	0.55	1.19	0.24	0.00	1.00	0.08	0.94	-0.49	0.63
	PM_{10} Min’	0.18	0.86	1.70	0.09	0.13	0.90	1.91	0.06	-0.43	0.67	-0.71	0.48	2.74	0.01	2.54	0.01
	O_3 Min’	1.08	0.28	2.16	0.03	1.55	0.12	3.52	0.00	-0.58	0.56	2.25	0.03	3.20	0.00	3.82	0.00
	CO Min’	-1.11	0.27	1.36	0.17	-0.68	0.50	1.49	0.14	-0.24	0.81	1.24	0.22	0.00	1.00	3.25	0.00
	NO Mean	-0.87	0.39	0.40	0.69	-0.12	0.90	0.94	0.35	0.52	0.61	1.08	0.28	-1.72	0.09	1.16	0.25
	NO_2 Mean	-0.93	0.35	-0.57	0.57	-0.03	0.98	1.12	0.26	0.76	0.45	1.69	0.09	-0.09	0.93	2.58	0.01
	NOD Mean	-1.05	0.30	1.17	0.24	0.26	0.79	1.05	0.29	1.53	0.13	1.64	0.10	-0.43	0.67	2.32	0.02
	SO_2 Mean	-1.62	0.10	-3.46	0.00	-0.02	0.98	-0.39	0.70	-0.05	0.96	-0.51	0.61	-0.18	0.85	-0.20	0.85
	PM_{10} Mean	1.29	0.20	0.52	0.61	0.95	0.34	1.52	0.13	-0.69	0.49	-0.38	0.71	2.39	0.02	0.96	0.34
	O_3 Mean	2.31	0.02	1.68	0.09	0.84	0.40	3.47	0.00	-0.84	0.40	1.93	0.05	2.65	0.01	4.25	0.00
	CO Mean	-1.51	0.13	-0.05	0.96	-1.71	0.09	0.30	0.76	-1.43	0.15	-0.01	0.99	-2.23	0.03	-0.61	0.55
	NO Max’	-1.24	0.22	0.29	0.77	-1.26	0.21	1.16	0.25	0.70	0.49	-0.01	0.99	-1.06	0.29	0.99	0.32
	NO_2 Max’	-1.01	0.31	-0.28	0.78	-0.95	0.34	1.39	0.16	1.34	0.18	0.10	0.92	-0.23	0.82	1.74	0.08
	NOD Max’	-1.43	0.15	1.32	0.19	-0.91	0.37	1.60	0.11	1.86	0.06	0.56	0.58	-0.09	0.93	1.61	0.11
	SO_2 Max’	-1.18	0.24	-2.44	0.02	0.15	0.88	-0.43	0.67	-0.56	0.57	-1.00	0.32	-0.39	0.70	-0.08	0.94
	PM_{10} Max’	-0.08	0.94	-0.57	0.57	1.86	0.06	0.28	0.78	0.96	0.34	0.33	0.74	-0.14	0.89	0.17	0.86
	O_3 Max’	1.35	0.18	2.00	0.05	2.09	0.04	3.69	0.00	0.17	0.87	2.62	0.01	2.71	0.01	4.78	0.00
	CO Max’	-1.40	0.16	-0.93	0.35	-1.68	0.09	0.22	0.83	-1.22	0.22	-0.45	0.65	-2.92	0.00	-1.20	0.23
Weather	Temp Min’	0.17	0.86	-0.60	0.55	1.87	0.06	0.52	0.60	-0.04	0.97	0.95	0.34	0.06	0.95	1.90	0.06
	Temp Max’	1.22	0.22	1.11	0.27	-0.41	0.69	0.54	0.59	0.20	0.84	1.44	0.15	-0.05	0.96	2.82	0.01
	Sun	1.47	0.14	1.51	0.13	0.35	0.73	-0.40	0.69	-0.66	0.51	0.27	0.79	1.56	0.12	1.55	0.12
	Rain	0.03	0.98	0.46	0.64	0.38	0.71	-0.22	0.82	0.01	0.99	-0.77	0.44	0.46	0.65	-1.97	0.05
	Pressure	2.87	0.00	0.08	0.94	-1.54	0.12	-0.09	0.93	-0.16	0.87	1.56	0.12	-0.16	0.87	0.43	0.67
	Wind speed	-0.92	0.36	1.48	0.14	-0.42	0.68	0.86	0.39	-1.01	0.31	-1.15	0.25	0.47	0.64	-1.32	0.19
Pollen	Grass	1.13	0.26	0.32	0.75	-0.11	0.91	0.16	0.87	-1.97	0.05	-0.87	0.39	-0.87	0.38	0.06	0.95
	Birch	0.47	0.64	-0.34	0.74	-0.72	0.47	-0.28	0.78	0.88	0.38	-0.24	0.81	-0.23	0.82	1.95	0.05
	Oak	0.97	0.33	1.09	0.27	0.53	0.60	0.56	0.58	-2.10	0.04	-0.07	0.94	1.58	0.11	0.21	0.83
	Nettle	0.26	0.80	0.00	1.00	0.11	0.91	-0.35	0.73	-1.25	0.21	0.99	0.32	-0.79	0.43	0.32	0.75

Table G. 139: Scotland Casualty Counts Non-asthmatics – Autoregressive Standardised percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	-0.08	0.94	0.56	0.58	0.91	0.36	-2.30	0.02	0.76	0.45	-1.18	0.24	0.44	0.66	-1.25	0.21
	NO_2 Min’	0.16	0.88	1.81	0.07	1.83	0.07	-1.23	0.22	3.01	0.00	0.71	0.48	1.49	0.14	2.05	0.04
	NOD Min’	1.26	0.21	0.85	0.40	1.54	0.12	-0.40	0.69	1.90	0.06	0.90	0.37	1.96	0.05	1.39	0.16
	SO_2 Min’	-1.01	0.31	-0.44	0.66	-0.71	0.48	-0.76	0.45	0.43	0.67	-1.27	0.20	-1.21	0.23	-0.69	0.49
	PM_{10} Min’	0.23	0.82	1.92	0.06	1.71	0.09	-0.81	0.42	1.66	0.10	0.73	0.47	0.12	0.90	2.26	0.02
	O_3 Min’	0.00	1.00	2.50	0.01	1.26	0.21	1.53	0.13	1.05	0.30	2.56	0.01	2.16	0.03	3.59	0.00
	CO Min’	-0.18	0.85	-0.47	0.64	0.18	0.86	-0.25	0.80	1.55	0.12	-1.39	0.17	1.13	0.26	1.80	0.07
	NO Mean	0.83	0.41	0.83	0.41	-1.50	0.13	0.62	0.53	2.76	0.01	-0.52	0.60	-0.26	0.79	1.14	0.26
	NO_2 Mean	-0.44	0.66	1.79	0.07	0.07	0.95	-0.17	0.87	3.22	0.00	0.55	0.58	0.64	0.52	1.59	0.11
	NOD Mean	1.33	0.18	0.99	0.32	-1.12	0.26	1.60	0.11	2.66	0.01	0.46	0.65	0.55	0.58	1.48	0.14
	SO_2 Mean	-0.26	0.80	-1.18	0.24	-1.09	0.28	-1.48	0.14	0.60	0.55	-1.94	0.05	-0.38	0.70	0.11	0.91
	PM_{10} Mean	0.61	0.54	1.49	0.14	0.75	0.45	-0.73	0.46	2.09	0.04	0.21	0.83	0.14	0.89	1.72	0.09
	O_3 Mean	0.28	0.78	1.45	0.15	1.54	0.12	1.57	0.12	1.41	0.16	1.94	0.05	1.74	0.08	3.52	0.00
	CO Mean	0.53	0.60	-0.36	0.72	-2.95	0.00	-0.87	0.39	1.47	0.14	-1.28	0.20	-1.58	0.11	-0.28	0.78
	NO Max’	1.17	0.24	0.61	0.54	-1.40	0.16	1.11	0.27	2.89	0.00	-0.14	0.89	-0.78	0.44	1.65	0.10
	NO_2 Max’	0.37	0.71	1.11	0.27	-0.30	0.76	0.64	0.52	2.69	0.01	0.61	0.54	-0.19	0.85	1.08	0.28
	NOD Max’	1.86	0.06	0.72	0.47	-1.08	0.28	2.07	0.04	3.08	0.00	0.67	0.50	-0.20	0.84	1.90	0.06
	SO_2 Max’	-0.47	0.64	-1.05	0.29	-0.47	0.64	-1.15	0.25	0.72	0.47	-1.68	0.09	0.67	0.50	0.83	0.41
	PM_{10} Max’	1.54	0.12	-1.00	0.32	0.19	0.85	1.29	0.20	1.07	0.29	2.16	0.03	-0.74	0.46	0.80	0.43
	O_3 Max’	0.11	0.92	1.66	0.10	2.58	0.01	2.00	0.05	2.68	0.01	1.93	0.05	2.03	0.04	3.88	0.00
	CO Max’	0.93	0.35	-0.20	0.84	-3.34	0.00	-0.75	0.46	2.28	0.02	-1.42	0.16	-1.69	0.09	-0.87	0.38
Weather	Temp Min’	-0.35	0.73	0.08	0.94	1.69	0.09	1.09	0.28	1.00	0.32	-0.07	0.94	1.50	0.13	-1.67	0.10
	Temp Max’	2.07	0.04	1.07	0.29	-0.96	0.34	0.41	0.68	1.09	0.27	1.68	0.09	0.12	0.91	2.13	0.03
	Sun	1.75	0.08	1.41	0.16	-0.77	0.44	-1.85	0.07	1.14	0.26	1.50	0.13	-0.22	0.82	3.16	0.00
	Rain	-1.51	0.13	-1.48	0.14	0.08	0.94	-0.11	0.92	1.34	0.18	-0.48	0.63	-1.03	0.30	-0.29	0.78
	Pressure	2.36	0.02	-0.66	0.51	-0.12	0.91	-0.21	0.83	0.71	0.48	0.28	0.78	-0.61	0.54	1.41	0.16
	Wind speed	0.84	0.40	-0.84	0.40	0.01	0.99	-0.11	0.91	-0.96	0.34	0.31	0.75	-0.77	0.44	-1.79	0.07
Pollen	Grass	0.87	0.38	-0.14	0.89	-0.85	0.39	-1.06	0.29	-1.32	0.19	0.49	0.62	-0.76	0.45	-1.18	0.24
	Birch	0.43	0.67	0.81	0.42	1.35	0.18	1.66	0.10	1.13	0.26	0.28	0.78	0.25	0.81	-0.49	0.62
	Oak	1.49	0.14	-0.80	0.42	1.44	0.15	0.76	0.45	-0.49	0.62	-0.95	0.34	0.30	0.76	0.69	0.49
	Nettle	-0.63	0.53	1.08	0.28	-0.49	0.62	-1.42	0.16	-0.65	0.51	-0.06	0.96	-0.24	0.81	-0.35	0.72

Table G. 140: Scotland Emergency Consultations Asthmatics – Autoregressive Standardised percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	-0.26	0.79	-0.25	0.80	0.69	0.49	0.78	0.44	0.09	0.93	-0.77	0.44	-1.32	0.19	0.13	0.90
	NO_2 Min’	0.63	0.53	2.21	0.03	1.42	0.16	2.16	0.03	1.36	0.18	-0.13	0.90	1.66	0.10	2.38	0.02
	NOD Min’	0.70	0.48	1.77	0.08	2.03	0.04	1.69	0.09	1.57	0.12	0.18	0.86	0.52	0.61	3.24	0.00
	SO_2 Min’	-2.40	0.02	-0.50	0.62	0.78	0.43	-0.22	0.83	-1.94	0.05	0.29	0.77	-2.85	0.00	-2.75	0.01
	PM_{10} Min’	2.41	0.02	1.28	0.20	-0.08	0.93	-1.14	0.25	0.97	0.33	1.04	0.30	1.46	0.14	3.18	0.00
	O_3 Min’	0.91	0.36	2.03	0.04	1.55	0.12	2.65	0.01	3.27	0.00	4.31	0.00	5.13	0.00	4.50	0.00
	CO Min’	0.03	0.98	1.20	0.23	-0.06	0.95	0.23	0.82	-0.19	0.85	-0.23	0.82	0.88	0.38	1.77	0.08
	NO Mean	-0.43	0.67	0.38	0.71	0.23	0.82	1.77	0.08	0.86	0.39	-0.96	0.34	1.45	0.15	-0.66	0.51
	NO_2 Mean	-0.61	0.54	1.24	0.22	0.79	0.43	2.11	0.04	0.87	0.39	0.28	0.78	2.29	0.02	0.27	0.79
	NOD Mean	-0.05	0.96	0.77	0.44	1.11	0.27	1.85	0.06	1.41	0.16	-0.04	0.97	1.94	0.05	0.77	0.44
	SO_2 Mean	-1.01	0.31	-0.68	0.50	-0.45	0.65	-0.06	0.96	-1.14	0.26	-2.22	0.03	-2.37	0.02	-2.41	0.02
	PM_{10} Mean	1.97	0.05	1.25	0.21	-0.90	0.37	-1.38	0.17	0.44	0.66	-0.35	0.73	1.28	0.20	3.09	0.00
	O_3 Mean	1.95	0.05	1.27	0.21	1.37	0.17	2.13	0.03	2.75	0.01	3.79	0.00	5.01	0.00	4.01	0.00
	CO Mean	-0.67	0.50	0.04	0.97	-0.30	0.76	-0.42	0.68	0.20	0.84	-2.72	0.01	-0.01	1.00	-3.91	0.00
	NO Max’	-1.13	0.26	0.75	0.45	0.30	0.77	2.86	0.00	0.40	0.69	-0.03	0.98	1.42	0.16	-0.84	0.40
	NO_2 Max’	-1.15	0.25	0.36	0.72	0.87	0.39	2.67	0.01	0.39	0.70	0.26	0.80	1.85	0.07	-0.99	0.32
	NOD Max’	-0.70	0.49	0.69	0.49	1.06	0.29	2.73	0.01	1.09	0.28	0.89	0.38	1.86	0.06	0.62	0.54
	SO_2 Max’	0.56	0.57	-0.04	0.97	-1.36	0.18	-0.08	0.94	-0.47	0.64	-2.30	0.02	-2.13	0.03	-1.51	0.13
	PM_{10} Max’	0.78	0.43	0.74	0.46	-1.44	0.15	-1.14	0.26	0.77	0.44	-1.42	0.16	1.58	0.11	1.56	0.12
	O_3 Max’	2.16	0.03	0.53	0.60	1.36	0.17	3.01	0.00	3.59	0.00	4.68	0.00	6.19	0.00	4.13	0.00
	CO Max’	-1.27	0.20	-0.09	0.93	-0.17	0.86	0.05	0.96	-0.10	0.92	-2.09	0.04	-0.72	0.47	-4.01	0.00
Weather	Temp Min’	1.83	0.07	0.30	0.77	-1.25	0.21	1.84	0.07	-2.16	0.03	1.44	0.15	-0.59	0.56	0.92	0.36
	Temp Max’	1.16	0.25	-0.21	0.83	-0.99	0.32	2.67	0.01	-0.41	0.68	1.11	0.27	-0.37	0.71	1.17	0.24
	Sun	-0.53	0.60	-0.75	0.45	-0.36	0.72	1.17	0.24	1.39	0.17	-0.39	0.69	-0.82	0.41	1.15	0.25
	Rain	-1.46	0.14	0.52	0.61	-0.03	0.97	-0.77	0.44	-0.58	0.56	-1.67	0.10	1.29	0.20	1.03	0.31
	Pressure	-2.34	0.02	0.79	0.43	0.60	0.55	0.01	0.99	2.42	0.02	-2.12	0.03	1.23	0.22	0.54	0.59
Pollen	Wind speed	0.58	0.56	-0.06	0.95	-0.43	0.66	0.52	0.60	-0.07	0.94	-0.43	0.67	-0.71	0.48	-0.41	0.69
	Grass	1.36	0.17	-0.97	0.33	0.72	0.47	0.01	0.99	0.79	0.43	-1.72	0.09	0.79	0.43	-0.70	0.48
	Birch	-0.04	0.97	0.33	0.74	1.99	0.05	0.08	0.93	1.89	0.06	1.62	0.11	-0.75	0.46	-0.43	0.67
	Oak	3.36	0.00	-1.39	0.17	0.89	0.37	-0.22	0.83	-1.22	0.22	0.69	0.49	1.55	0.12	-0.28	0.78
	Nettle	1.50	0.13	-0.60	0.55	-0.74	0.46	0.01	1.00	0.26	0.79	-0.42	0.68	0.38	0.71	-1.13	0.26

Table G. 141: Scotland Emergency Consultations Non-asthmatics – Autoregressive Standardised percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	1.71	0.09	0.21	0.83	1.35	0.18	1.02	0.31	1.16	0.25	-2.86	0.00	-0.84	0.40	-0.61	0.54
	NO_2 Min’	2.46	0.01	2.64	0.01	1.51	0.13	1.25	0.21	0.30	0.77	-1.42	0.16	0.99	0.32	1.43	0.15
	NOD Min’	2.68	0.01	2.53	0.01	1.36	0.17	1.10	0.27	0.60	0.55	-1.34	0.18	0.64	0.52	1.87	0.06
	SO_2 Min’	-0.78	0.44	-0.79	0.43	-1.05	0.29	-1.34	0.18	0.55	0.58	-0.96	0.34	-1.62	0.10	-1.89	0.06
	PM_{10} Min’	1.32	0.19	-0.18	0.86	1.30	0.20	-1.37	0.17	1.62	0.11	0.49	0.62	0.87	0.38	2.47	0.01
	O_3 Min’	1.25	0.21	1.38	0.17	1.70	0.09	1.66	0.10	2.13	0.03	3.81	0.00	4.13	0.00	3.19	0.00
	CO Min’	2.12	0.03	-0.41	0.68	-0.12	0.90	1.66	0.10	0.77	0.44	-0.65	0.52	2.00	0.05	0.07	0.95
	NO Mean	1.07	0.28	0.34	0.73	1.24	0.22	0.97	0.33	0.56	0.57	-0.39	0.69	-0.94	0.35	0.97	0.33
	NO_2 Mean	1.88	0.06	0.97	0.33	2.01	0.04	-0.06	0.95	1.43	0.15	-0.49	0.62	1.45	0.15	-0.21	0.83
	NOD Mean	1.64	0.10	1.02	0.31	1.66	0.10	0.73	0.46	1.08	0.28	0.20	0.84	-0.20	0.84	1.78	0.08
	SO_2 Mean	0.38	0.70	-1.67	0.10	0.40	0.69	-1.58	0.11	0.15	0.88	-1.61	0.11	-1.25	0.21	-1.92	0.05
	PM_{10} Mean	1.28	0.20	-0.48	0.63	1.70	0.09	-1.58	0.11	0.17	0.87	0.28	0.78	0.49	0.62	1.65	0.10
	O_3 Mean	1.71	0.09	0.21	0.83	1.78	0.08	1.64	0.10	1.59	0.11	3.55	0.00	3.56	0.00	2.76	0.01
	CO Mean	0.34	0.73	-0.26	0.79	0.87	0.39	-0.13	0.90	-0.61	0.54	-0.96	0.34	-0.74	0.46	-2.04	0.04
	NO Max’	1.45	0.15	0.48	0.63	1.18	0.24	0.73	0.47	0.00	1.00	-0.79	0.43	-0.66	0.51	1.55	0.12
	NO_2 Max’	1.35	0.18	0.92	0.36	1.11	0.27	0.50	0.62	1.36	0.17	-0.07	0.94	0.41	0.68	0.48	0.64
	NOD Max’	1.50	0.13	0.71	0.48	1.40	0.16	1.41	0.16	0.71	0.48	-0.52	0.60	-0.21	0.84	2.13	0.03
	SO_2 Max’	1.62	0.11	-1.15	0.25	0.26	0.80	-1.74	0.08	-0.26	0.80	-1.25	0.21	-1.01	0.31	-1.20	0.23
	PM_{10} Max’	-0.48	0.63	0.50	0.62	0.57	0.57	-0.21	0.83	0.81	0.42	-1.63	0.10	-0.99	0.32	1.78	0.08
	O_3 Max’	2.41	0.02	0.58	0.56	2.69	0.01	1.46	0.15	2.86	0.00	3.52	0.00	4.74	0.00	2.18	0.03
	CO Max’	0.80	0.43	-0.78	0.44	0.92	0.36	-0.06	0.95	-1.58	0.11	-0.97	0.33	-2.04	0.04	-1.68	0.09
Weather	Temp Min’	0.50	0.62	-0.54	0.59	0.42	0.67	0.96	0.34	-1.43	0.15	1.85	0.06	0.05	0.96	-0.99	0.32
	Temp Max’	1.06	0.29	0.65	0.52	1.80	0.07	-0.48	0.63	-0.82	0.41	0.61	0.54	1.07	0.28	0.29	0.77
	Sun	-0.73	0.46	0.54	0.59	1.01	0.31	-1.04	0.30	0.07	0.94	0.11	0.91	-0.18	0.86	-0.22	0.82
	Rain	-0.44	0.66	-0.49	0.62	-1.83	0.07	0.81	0.42	-0.88	0.38	-0.44	0.66	0.65	0.52	1.61	0.11
	Pressure	0.89	0.37	1.43	0.15	-0.58	0.56	-1.41	0.16	1.19	0.23	-0.46	0.64	0.19	0.85	1.01	0.31
	Wind speed	-1.41	0.16	0.28	0.78	-1.27	0.21	1.10	0.27	-1.02	0.31	-0.24	0.81	0.00	1.00	-0.06	0.95
Pollen	Grass	-0.96	0.34	0.73	0.47	-0.06	0.95	-0.56	0.58	-1.16	0.25	-0.42	0.67	0.63	0.53	-0.60	0.55
	Birch	0.88	0.38	0.83	0.41	0.37	0.71	0.78	0.44	0.65	0.52	1.84	0.07	0.46	0.64	-0.55	0.58
	Oak	-2.06	0.04	-0.96	0.34	2.89	0.00	-1.04	0.30	0.10	0.92	0.25	0.80	0.08	0.93	0.76	0.45
	Nettle	-0.97	0.33	0.44	0.66	-0.14	0.89	-0.76	0.45	-0.97	0.33	0.11	0.92	1.06	0.29	-0.68	0.49

Table G. 142: Scotland Emergency Counts Asthmatics – Autoregressive Standardised percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min'	-0.59	0.56	0.68	0.50	0.30	0.76	-0.77	0.44	1.55	0.12	-0.61	0.54	-1.67	0.09	-0.60	0.55
	NO_2 Min'	0.28	0.78	1.52	0.13	1.42	0.16	0.77	0.44	1.39	0.16	0.51	0.61	0.98	0.33	2.91	0.00
	NOD Min'	-0.36	0.72	2.76	0.01	1.25	0.21	0.73	0.46	1.50	0.13	1.12	0.26	0.57	0.57	3.16	0.00
	SO_2 Min'	-1.26	0.21	-1.74	0.08	-0.28	0.78	-0.91	0.37	0.00	1.00	0.34	0.73	-0.66	0.51	-0.68	0.50
	PM_{10} Min'	1.96	0.05	1.94	0.05	0.64	0.53	-0.72	0.47	0.45	0.66	-0.59	0.56	2.53	0.01	2.65	0.01
	O_3 Min'	0.57	0.57	1.71	0.09	1.26	0.21	2.32	0.02	1.04	0.30	2.17	0.03	3.97	0.00	3.44	0.00
	CO Min'	0.49	0.63	1.27	0.20	-0.97	0.33	0.41	0.68	-0.41	0.68	1.03	0.30	0.97	0.33	1.83	0.07
	NO Mean	0.11	0.91	0.24	0.81	0.55	0.59	0.48	0.63	1.98	0.05	-0.21	0.83	0.77	0.44	0.79	0.43
	NO_2 Mean	0.88	0.38	-0.30	0.76	1.75	0.08	0.71	0.48	0.49	0.63	0.41	0.69	1.39	0.16	2.01	0.04
	NOD Mean	0.39	0.70	0.73	0.47	1.19	0.23	0.95	0.34	1.60	0.11	0.61	0.54	1.75	0.08	2.11	0.04
	SO_2 Mean	-0.95	0.34	-2.30	0.02	0.40	0.69	-0.35	0.73	-0.05	0.96	-1.29	0.20	-0.63	0.53	-0.21	0.83
	PM_{10} Mean	2.51	0.01	1.65	0.10	0.84	0.40	-1.46	0.14	0.30	0.76	-1.19	0.23	2.11	0.04	2.68	0.01
	O_3 Mean	1.84	0.07	0.87	0.39	1.45	0.15	1.39	0.17	0.58	0.56	1.67	0.10	4.10	0.00	3.28	0.00
	CO Mean	0.58	0.56	-1.04	0.30	-0.13	0.90	0.06	0.95	-0.24	0.81	-0.28	0.78	0.26	0.80	-2.03	0.04
	NO Max'	-0.08	0.94	-0.03	0.98	0.24	0.81	1.00	0.32	2.08	0.04	-0.53	0.60	1.37	0.17	0.54	0.59
	NO_2 Max'	0.32	0.75	-0.62	0.54	1.02	0.31	1.83	0.07	0.60	0.55	-0.53	0.60	1.73	0.08	0.79	0.43
	NOD Max'	0.21	0.83	0.52	0.60	0.39	0.70	1.73	0.08	2.14	0.03	0.32	0.75	2.46	0.01	1.54	0.13
	SO_2 Max'	-0.54	0.59	-1.96	0.05	-0.60	0.55	0.61	0.54	-0.40	0.69	-1.60	0.11	-0.28	0.78	0.06	0.95
	PM_{10} Max'	0.40	0.69	0.96	0.34	1.17	0.24	-1.80	0.07	1.03	0.30	-0.46	0.64	1.36	0.18	1.68	0.09
	O_3 Max'	1.09	0.28	0.70	0.49	1.84	0.07	1.94	0.05	0.78	0.44	1.79	0.07	4.48	0.00	3.53	0.00
	CO Max'	-0.35	0.73	-1.14	0.25	-0.48	0.63	0.07	0.94	0.75	0.45	-0.44	0.66	-0.52	0.60	-1.91	0.06
Weather	Temp Min'	0.29	0.77	0.63	0.53	0.35	0.72	0.91	0.36	-1.78	0.07	-0.08	0.94	1.04	0.30	0.93	0.35
	Temp Max'	2.61	0.01	-1.02	0.31	0.44	0.66	1.64	0.10	-0.79	0.43	-0.11	0.91	1.47	0.14	1.52	0.13
	Sun	0.88	0.38	0.09	0.93	0.56	0.58	0.55	0.59	-0.10	0.92	0.44	0.66	1.66	0.10	0.37	0.71
	Rain	-0.43	0.67	1.80	0.07	0.30	0.76	-0.74	0.46	-0.82	0.41	-0.57	0.57	1.72	0.09	-0.58	0.56
	Pressure	-0.67	0.51	0.01	0.99	0.19	0.85	1.17	0.24	0.96	0.34	-1.02	0.31	0.73	0.47	1.05	0.29
	Wind	-1.31	0.19	1.04	0.30	0.23	0.82	-0.39	0.70	-0.47	0.64	-0.98	0.33	-0.19	0.85	-1.62	0.11
Pollen	Grass	3.82	0.00	-1.95	0.05	1.60	0.11	0.24	0.81	-0.92	0.36	-1.84	0.07	0.25	0.80	-0.43	0.67
	Birch	0.09	0.93	0.50	0.62	-0.10	0.92	-0.93	0.35	1.05	0.29	0.59	0.56	-1.91	0.06	0.72	0.47
	Oak	1.62	0.11	0.45	0.65	1.18	0.24	0.59	0.55	-2.86	0.00	0.74	0.46	1.20	0.23	1.00	0.32
	Nettle	2.29	0.02	-1.25	0.21	-0.52	0.60	0.30	0.76	-0.51	0.61	-0.09	0.93	0.04	0.97	-0.19	0.85

Table G. 143: Scotland Emergency Counts Non-asthmatics – Autoregressive Standardised percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min'	0.08	0.94	-0.57	0.57	2.20	0.03	-1.22	0.22	1.11	0.27	-1.35	0.18	-0.74	0.46	-0.49	0.63
	NO_2 Min'	0.78	0.43	1.14	0.25	2.11	0.04	0.47	0.64	1.70	0.09	-0.07	0.94	1.92	0.05	1.07	0.28
	NOD Min'	1.69	0.09	0.26	0.80	2.36	0.02	0.38	0.70	0.75	0.46	0.12	0.91	1.82	0.07	1.25	0.21
	SO_2 Min'	-2.04	0.04	-1.01	0.31	-0.21	0.84	-0.16	0.88	0.10	0.92	-0.47	0.64	-0.29	0.78	-1.60	0.11
	PM_{10} Min'	0.45	0.65	1.92	0.06	2.01	0.05	-0.48	0.63	0.96	0.34	0.81	0.42	-0.31	0.76	2.62	0.01
	O_3 Min'	-0.11	0.92	1.93	0.05	1.54	0.12	1.66	0.10	0.82	0.41	2.19	0.03	3.02	0.00	3.12	0.00
	CO Min'	1.14	0.26	-1.08	0.28	-0.27	0.79	0.63	0.53	1.28	0.20	-0.67	0.51	-0.02	0.98	-0.74	0.46
	NO Mean	0.24	0.81	0.67	0.50	-0.25	0.80	0.13	0.90	2.07	0.04	-0.69	0.49	0.63	0.53	1.02	0.31
	NO_2 Mean	0.19	0.85	0.70	0.48	1.03	0.30	0.13	0.90	2.13	0.03	-0.30	0.76	1.95	0.05	0.88	0.38
	NOD Mean	0.97	0.33	0.73	0.46	0.21	0.84	0.51	0.61	1.87	0.06	-0.30	0.76	1.81	0.07	1.35	0.18
	SO_2 Mean	-1.18	0.24	-1.56	0.12	0.37	0.71	-1.14	0.26	0.62	0.54	-1.15	0.25	0.38	0.70	-1.32	0.19
	PM_{10} Mean	0.88	0.38	1.62	0.11	0.75	0.45	-0.16	0.87	0.83	0.40	0.44	0.66	-0.03	0.98	1.10	0.27
	O_3 Mean	0.01	0.99	1.35	0.18	2.02	0.04	1.52	0.13	0.98	0.33	1.48	0.14	2.41	0.02	2.73	0.01
	CO Mean	0.38	0.70	-0.15	0.88	-1.90	0.06	-1.28	0.20	1.38	0.17	-0.97	0.33	-0.68	0.50	-1.29	0.20
	NO Max'	1.10	0.27	0.54	0.59	-0.29	0.77	0.69	0.49	2.25	0.02	-0.51	0.61	0.69	0.49	1.46	0.14
	NO_2 Max'	0.57	0.57	0.59	0.56	0.62	0.54	0.64	0.52	1.78	0.08	-0.18	0.86	1.12	0.26	1.40	0.16
	NOD Max'	2.01	0.04	0.60	0.55	0.17	0.87	0.64	0.53	2.03	0.04	-0.16	0.88	1.27	0.20	2.20	0.03
	SO_2 Max'	-0.88	0.38	-1.39	0.17	0.51	0.61	-0.74	0.46	0.67	0.50	-0.58	0.56	0.99	0.33	-1.02	0.31
	PM_{10} Max'	0.68	0.50	-0.33	0.74	0.27	0.79	1.08	0.28	0.80	0.43	1.64	0.10	-0.79	0.43	0.85	0.39
	O_3 Max'	-0.01	0.99	1.76	0.08	2.70	0.01	1.49	0.14	2.19	0.03	1.25	0.21	2.88	0.00	1.80	0.07
	CO Max'	0.36	0.72	0.22	0.83	-1.69	0.09	-1.71	0.09	1.99	0.05	-1.53	0.13	-0.30	0.77	-1.03	0.30
Weather	Temp Min'	-0.18	0.86	0.45	0.66	1.52	0.13	1.72	0.09	-0.66	0.51	0.06	0.95	0.08	0.93	-1.32	0.19
	Temp Max'	2.06	0.04	-0.05	0.96	0.95	0.34	-0.69	0.49	0.71	0.48	0.06	0.95	0.18	0.86	1.70	0.09
	Sun	-0.97	0.33	0.42	0.68	0.41	0.68	-2.88	0.00	-0.07	0.94	0.84	0.40	-0.39	0.69	2.18	0.03
	Rain	-0.56	0.58	-0.03	0.98	0.06	0.95	1.85	0.07	0.49	0.62	-0.47	0.64	-1.26	0.21	-0.53	0.60
	Pressure	0.96	0.34	1.33	0.18	-1.67	0.10	-0.17	0.86	1.38	0.17	-0.92	0.36	1.23	0.22	-0.01	0.99
	Wind speed	-0.63	0.53	0.12	0.90	0.49	0.62	0.42	0.67	-1.41	0.16	0.57	0.57	-1.55	0.12	-1.15	0.25
Pollen	Grass	-0.34	0.73	-0.74	0.46	1.34	0.18	-1.37	0.17	-1.15	0.25	-0.16	0.87	0.35	0.73	-0.46	0.64
	Birch	1.05	0.29	1.39	0.17	0.68	0.50	0.99	0.32	0.51	0.61	0.98	0.33	0.48	0.63	-0.77	0.44
	Oak	0.66	0.51	-0.31	0.76	2.32	0.02	0.34	0.74	-0.38	0.70	-1.44	0.15	0.37	0.71	1.09	0.28
	Nettle	-0.92	0.36	-0.55	0.59	1.36	0.18	-1.56	0.12	-0.17	0.86	-0.66	0.51	0.55	0.58	0.00	1.00

Table G. 144: Scotland Out of Hours Counts Asthmatics – Autoregressive Standardised percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	0.55	0.58	1.24	0.22	0.34	0.73	-0.74	0.46	0.62	0.54	0.65	0.52	-0.61	0.54	-1.00	0.32
	NO_2 Min’	0.30	0.76	0.53	0.59	1.96	0.05	-0.54	0.59	0.04	0.97	0.66	0.51	-0.15	0.88	0.09	0.93
	NOD Min’	0.41	0.68	1.47	0.14	0.88	0.38	-0.38	0.70	-0.17	0.87	1.47	0.14	-0.09	0.93	0.28	0.78
	SO_2 Min’	0.21	0.84	0.09	0.93	0.11	0.91	-1.02	0.31	-0.29	0.77	0.88	0.38	0.67	0.51	1.62	0.10
	PM_{10} Min’	0.34	0.73	1.29	0.20	0.83	0.40	-1.09	0.28	-0.36	0.72	0.10	0.92	1.03	0.30	-0.40	0.69
	O_3 Min’	-0.56	0.58	0.33	0.74	-0.31	0.75	-0.71	0.48	0.22	0.83	-1.78	0.08	0.25	0.80	-0.65	0.52
	CO Min’	1.18	0.24	0.06	0.95	-0.59	0.55	-0.47	0.64	0.45	0.65	1.56	0.12	0.18	0.86	-0.41	0.68
	NO Mean	1.72	0.09	-0.07	0.95	1.48	0.14	-0.49	0.62	1.26	0.21	1.20	0.23	0.60	0.55	0.31	0.76
	NO_2 Mean	2.09	0.04	-1.13	0.26	2.52	0.01	-1.20	0.23	-0.29	0.77	0.62	0.53	0.82	0.41	0.17	0.87
	NOD Mean	2.08	0.04	-0.38	0.71	1.48	0.14	-0.50	0.62	0.59	0.56	1.46	0.15	1.25	0.21	0.62	0.53
	SO_2 Mean	0.42	0.67	-0.66	0.51	0.70	0.49	-0.52	0.60	0.44	0.66	0.55	0.58	0.60	0.55	1.88	0.06
	PM_{10} Mean	1.25	0.21	0.71	0.48	1.17	0.24	-1.99	0.05	0.64	0.53	0.66	0.51	0.37	0.71	0.55	0.58
	O_3 Mean	-0.40	0.69	0.34	0.74	0.15	0.88	-1.24	0.22	0.13	0.89	-1.82	0.07	1.07	0.28	-0.50	0.62
	CO Mean	2.28	0.02	-1.70	0.09	1.03	0.30	-0.47	0.64	0.85	0.40	2.42	0.02	1.11	0.27	-0.28	0.78
	NO Max’	2.44	0.02	-0.66	0.51	1.54	0.12	-0.73	0.47	2.22	0.03	0.21	0.83	1.70	0.09	-0.32	0.75
	NO_2 Max’	2.08	0.04	-1.21	0.23	1.66	0.10	-0.63	0.53	-0.06	0.95	0.17	0.86	1.70	0.09	-0.61	0.54
	NOD Max’	2.82	0.01	-1.00	0.32	0.88	0.38	-0.53	0.60	1.86	0.06	0.70	0.48	2.57	0.01	-0.01	0.99
	SO_2 Max’	-0.23	0.82	-0.68	0.50	0.35	0.72	0.45	0.66	0.04	0.97	0.40	0.69	1.32	0.19	1.95	0.05
	PM_{10} Max’	0.73	0.47	0.67	0.50	1.26	0.21	-2.22	0.03	0.81	0.42	1.11	0.27	1.53	0.13	0.62	0.54
	O_3 Max’	-0.42	0.67	0.48	0.64	-0.29	0.77	-0.73	0.47	-0.49	0.62	-1.85	0.06	1.36	0.18	-0.11	0.91
	CO Max’	1.69	0.09	-1.06	0.29	0.64	0.52	-0.89	0.38	1.96	0.05	1.85	0.07	1.37	0.17	-0.09	0.93
Weather	Temp Min’	-0.25	0.80	0.80	0.42	0.15	0.88	0.30	0.76	-0.26	0.80	-1.05	0.30	1.55	0.12	-0.53	0.59
	Temp Max’	2.26	0.02	-1.99	0.05	0.73	0.47	0.29	0.77	-0.43	0.67	-1.29	0.20	3.08	0.00	-1.02	0.31
	Sun	1.01	0.31	-0.57	0.57	0.06	0.95	0.28	0.78	-0.28	0.78	0.39	0.70	1.67	0.10	-1.14	0.26
	Rain	0.16	0.88	2.52	0.01	0.14	0.89	-0.45	0.65	-0.28	0.78	0.09	0.93	1.14	0.26	0.19	0.85
	Pressure	-1.13	0.26	-0.50	0.62	1.36	0.17	1.44	0.15	0.60	0.55	-1.92	0.06	-0.12	0.90	1.89	0.06
	Wind speed	-0.98	0.33	1.35	0.18	0.12	0.91	-0.87	0.38	-0.17	0.86	-0.74	0.46	-0.76	0.45	-0.81	0.42
Pollen	Grass	4.28	0.00	-2.28	0.02	1.43	0.15	-0.16	0.88	-0.14	0.89	-0.55	0.58	0.88	0.38	-0.34	0.73
	Birch	0.42	0.68	0.69	0.49	-1.44	0.15	-0.64	0.52	-0.60	0.55	1.56	0.12	-1.97	0.05	-0.23	0.82
	Oak	0.73	0.47	0.63	0.53	0.21	0.84	0.76	0.45	-1.37	0.17	0.44	0.66	-0.86	0.39	1.62	0.11
	Nettle	2.74	0.01	-1.57	0.12	-0.76	0.45	0.76	0.45	-0.28	0.78	-0.48	0.63	0.49	0.63	0.09	0.93

Table G. 145: Scotland Out of Hours Counts Non-asthmatics – Autoregressive Standardised percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	-0.82	0.41	-1.76	0.08	2.15	0.03	-0.49	0.62	-0.28	0.78	0.56	0.57	-1.13	0.26	0.39	0.69
	NO_2 Min’	-0.55	0.58	-0.94	0.35	1.29	0.20	0.66	0.51	0.09	0.93	1.03	0.31	0.64	0.52	-0.98	0.33
	NOD Min’	0.36	0.72	-1.73	0.08	1.95	0.05	-0.73	0.47	-0.47	0.64	0.43	0.67	0.61	0.54	-0.35	0.72
	SO_2 Min’	-1.39	0.17	-0.45	0.65	1.42	0.16	1.62	0.11	-0.10	0.92	0.56	0.58	0.86	0.39	-0.36	0.72
	PM_{10} Min’	-0.49	0.62	1.48	0.14	1.19	0.23	0.36	0.72	0.06	0.95	-0.05	0.96	-0.95	0.34	0.91	0.36
	O_3 Min’	-1.59	0.11	0.23	0.82	0.30	0.77	1.02	0.31	-0.96	0.34	-1.79	0.07	0.83	0.41	-0.25	0.80
	CO Min’	0.66	0.51	-0.95	0.34	-0.43	0.67	0.50	0.61	1.26	0.21	0.42	0.68	-2.52	0.01	-1.04	0.30
	NO Mean	-0.54	0.59	0.10	0.92	0.39	0.70	-1.23	0.22	0.51	0.61	0.85	0.40	0.38	0.71	-0.25	0.80
	NO_2 Mean	-0.51	0.61	-0.86	0.39	0.91	0.37	-0.05	0.96	0.00	1.00	0.66	0.51	0.69	0.49	-0.27	0.79
	NOD Mean	0.14	0.89	-0.42	0.67	0.61	0.54	-1.75	0.08	0.33	0.74	0.03	0.97	1.26	0.21	-0.44	0.66
	SO_2 Mean	-1.26	0.21	-0.01	0.99	1.76	0.08	1.15	0.25	0.51	0.61	0.47	0.64	0.69	0.49	-0.41	0.68
	PM_{10} Mean	-0.14	0.89	0.84	0.40	0.44	0.66	0.88	0.38	0.57	0.57	0.88	0.38	-1.39	0.16	-0.05	0.96
	O_3 Mean	-1.64	0.10	0.73	0.46	0.78	0.44	0.94	0.35	-0.70	0.48	-2.05	0.04	0.85	0.40	-0.22	0.82
	CO Mean	0.19	0.85	0.37	0.71	-1.19	0.23	-1.36	0.18	1.94	0.05	0.60	0.55	-0.77	0.44	-0.15	0.88
	NO Max’	-0.05	0.96	-0.18	0.86	0.80	0.43	-0.81	0.42	1.58	0.11	0.29	0.77	1.47	0.14	-0.91	0.36
	NO_2 Max’	-0.29	0.77	-0.38	0.70	1.00	0.32	-0.34	0.74	0.25	0.81	0.22	0.83	0.98	0.33	0.12	0.90
	NOD Max’	0.73	0.47	-0.34	0.73	1.02	0.31	-1.99	0.05	0.93	0.35	-0.50	0.62	1.89	0.06	-0.67	0.50
	SO_2 Max’	-1.36	0.17	0.16	0.87	1.37	0.17	1.35	0.18	0.71	0.48	1.04	0.30	0.63	0.53	-1.01	0.31
	PM_{10} Max’	-0.24	0.81	0.75	0.46	0.23	0.82	0.62	0.54	0.43	0.67	2.16	0.03	-0.63	0.53	-0.76	0.45
	O_3 Max’	-1.55	0.12	1.25	0.21	0.62	0.53	1.08	0.28	-0.39	0.69	-1.90	0.06	1.04	0.30	-1.22	0.22
	CO Max’	-0.25	0.80	0.92	0.36	-0.44	0.66	-2.33	0.02	2.66	0.01	-0.29	0.77	0.61	0.54	-0.01	1.00
Weather	Temp Min’	-0.43	0.67	0.43	0.66	0.59	0.56	1.45	0.15	-0.25	0.81	-0.79	0.43	-0.61	0.54	0.06	0.95
	Temp Max’	0.84	0.40	-0.93	0.35	0.93	0.35	-1.03	0.31	1.11	0.27	-1.00	0.32	-0.11	0.92	0.13	0.89
	Sun	-0.86	0.39	-0.35	0.72	1.13	0.26	-2.16	0.03	-1.04	0.30	0.34	0.74	0.43	0.67	0.21	0.83
	Rain	0.81	0.42	1.47	0.14	0.78	0.43	2.39	0.02	0.22	0.83	-0.98	0.33	-1.26	0.21	-1.53	0.13
	Pressure	-1.80	0.07	2.31	0.02	-1.85	0.07	0.16	0.87	0.93	0.35	-0.81	0.42	1.77	0.08	-1.18	0.24
	Wind speed	-0.49	0.62	0.57	0.57	0.90	0.37	0.50	0.62	-0.86	0.39	0.68	0.50	-1.58	0.11	-0.02	0.99
Pollen	Grass	-0.30	0.76	-1.34	0.18	2.01	0.05	-1.08	0.28	-0.52	0.61	-0.06	0.95	1.15	0.25	-0.49	0.62
	Birch	-0.08	0.94	1.34	0.18	-0.17	0.87	-0.22	0.82	-1.30	0.20	0.62	0.54	0.18	0.85	-0.57	0.57
	Oak	1.20	0.23	-0.24	0.81	0.89	0.37	0.55	0.58	0.00	1.00	-1.24	0.21	0.02	0.99	1.04	0.30
	Nettle	0.08	0.94	-1.38	0.17	1.92	0.06	-0.76	0.45	-0.24	0.81	-0.58	0.56	0.52	0.60	-0.52	0.60

Table G. 146: Scotland All Counts Excess – Autoregressive Standardised percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	-0.02	0.98	1.07	0.28	-0.08	0.93	-0.56	0.58	0.29	0.77	-1.05	0.29	0.14	0.89	0.31	0.76
	NO_2 Min’	-0.43	0.67	-0.27	0.79	1.00	0.32	-0.24	0.81	0.15	0.88	-2.94	0.00	-0.73	0.46	-0.10	0.92
	NOD Min’	-0.36	0.72	0.52	0.61	-1.03	0.30	0.18	0.86	0.26	0.80	-2.35	0.02	-0.35	0.72	-0.79	0.43
	SO_2 Min’	-0.51	0.61	-0.63	0.53	-0.65	0.51	-0.29	0.77	0.31	0.76	-0.17	0.86	-0.45	0.65	0.44	0.66
	PM_{10} Min’	-2.43	0.02	1.15	0.25	0.04	0.97	-0.44	0.66	-0.19	0.85	-0.61	0.54	0.19	0.85	-1.12	0.26
	O_3 Min’	0.78	0.44	-0.65	0.52	1.43	0.15	-0.14	0.89	0.11	0.91	-0.31	0.76	-0.63	0.53	0.58	0.56
	CO Min’	0.11	0.91	1.74	0.08	-0.80	0.42	-1.02	0.31	0.34	0.74	0.93	0.35	-1.04	0.30	0.55	0.58
	NO Mean	-1.70	0.09	0.87	0.38	0.27	0.79	-0.15	0.88	-0.35	0.73	-1.25	0.21	0.17	0.86	-0.59	0.56
	NO_2 Mean	-0.76	0.45	-0.94	0.35	1.13	0.26	-0.44	0.66	-1.39	0.16	-0.97	0.33	-1.24	0.22	0.46	0.65
	NOD Mean	-1.68	0.09	0.55	0.58	-0.72	0.47	0.32	0.75	-1.01	0.31	-1.08	0.28	-0.14	0.89	-1.06	0.29
	SO_2 Mean	-0.03	0.98	0.43	0.67	-0.75	0.46	-1.03	0.30	0.20	0.84	-0.58	0.57	-0.96	0.34	-0.28	0.78
	PM_{10} Mean	-2.30	0.02	1.22	0.22	0.19	0.85	-0.66	0.51	1.95	0.05	-2.81	0.01	1.27	0.20	-0.93	0.35
	O_3 Mean	0.71	0.48	-0.54	0.59	1.83	0.07	-0.39	0.69	-0.49	0.62	-0.31	0.76	-1.02	0.31	0.11	0.91
	CO Mean	-0.57	0.57	1.09	0.28	0.35	0.73	-0.62	0.54	-0.24	0.81	-0.03	0.98	-0.09	0.93	-0.39	0.70
	NO Max’	-1.51	0.13	0.37	0.71	0.36	0.72	-0.26	0.80	-0.20	0.84	-1.28	0.20	0.02	0.98	-0.60	0.55
	NO_2 Max’	-1.46	0.14	-0.94	0.35	1.08	0.28	-0.08	0.94	-1.17	0.24	-0.96	0.34	-0.29	0.77	-0.17	0.86
	NOD Max’	-1.75	0.08	0.21	0.83	-0.89	0.38	0.44	0.66	-0.55	0.58	-0.93	0.35	0.27	0.78	-1.52	0.13
	SO_2 Max’	-0.02	0.98	-0.25	0.80	-0.77	0.44	-1.07	0.29	-0.54	0.59	-0.70	0.48	-0.65	0.51	-0.76	0.45
	PM_{10} Max’	-1.90	0.06	-0.05	0.96	1.20	0.23	0.08	0.94	-1.11	0.27	-0.99	0.32	1.34	0.18	-1.04	0.30
	O_3 Max’	0.47	0.64	-0.47	0.64	1.06	0.29	-0.78	0.43	-0.45	0.65	0.99	0.32	-1.04	0.30	0.03	0.98
	CO Max’	-1.36	0.17	1.01	0.31	0.01	0.99	0.16	0.87	-0.31	0.76	0.18	0.86	-0.02	0.99	-0.78	0.43
Weather	Temp Min’	0.84	0.40	0.37	0.71	0.03	0.98	-0.73	0.46	-0.92	0.36	0.97	0.33	-2.51	0.01	2.53	0.01
	Temp Max’	-0.06	0.95	1.39	0.16	0.28	0.78	-0.76	0.45	0.47	0.64	-1.41	0.16	-0.94	0.35	0.86	0.39
	Sun	1.35	0.18	0.21	0.83	0.87	0.38	0.45	0.65	0.78	0.44	-0.85	0.39	0.92	0.36	-1.05	0.29
	Rain	0.06	0.96	0.26	0.79	-0.58	0.56	-1.59	0.11	-1.13	0.26	2.29	0.02	-0.10	0.92	-1.32	0.19
	Pressure	-0.26	0.80	0.27	0.79	-0.33	0.74	2.76	0.01	-1.48	0.14	-0.27	0.79	0.30	0.76	-0.60	0.55
	Wind speed	0.80	0.42	-0.50	0.62	0.70	0.49	-1.19	0.24	-0.12	0.90	0.25	0.80	-0.24	0.81	0.07	0.94
Pollen	Grass	0.37	0.71	0.46	0.65	2.69	0.01	-0.63	0.53	1.66	0.10	-0.73	0.47	0.01	0.99	-1.20	0.23
	Birch	-0.36	0.72	-1.52	0.13	1.23	0.22	-0.81	0.42	0.28	0.78	0.25	0.80	-1.78	0.08	2.08	0.04
	Oak	0.39	0.70	1.00	0.32	-1.89	0.06	0.91	0.36	0.28	0.78	0.18	0.86	-1.07	0.29	-0.74	0.46
	Nettle	0.67	0.51	-0.09	0.93	1.32	0.19	-0.10	0.92	0.35	0.73	-1.01	0.31	-0.52	0.60	-0.98	0.33

Table G. 147: Scotland Acute Visits Excess – Autoregressive Standardised percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	-0.49	0.62	-0.34	0.73	0.26	0.79	-0.99	0.32	0.85	0.39	-0.81	0.42	-0.24	0.81	1.00	0.32
	NO_2 Min’	-0.33	0.75	-0.14	0.89	-0.01	0.99	-1.12	0.26	0.31	0.76	0.46	0.65	-0.99	0.32	0.34	0.74
	NOD Min’	-0.06	0.95	0.18	0.86	0.80	0.43	-1.58	0.11	0.37	0.71	-0.73	0.46	-0.53	0.60	1.12	0.26
	SO_2 Min’	-0.51	0.61	0.57	0.57	1.48	0.14	0.94	0.35	0.40	0.69	-1.05	0.29	-1.98	0.05	-0.47	0.64
	PM_{10} Min’	0.91	0.36	-1.40	0.16	0.10	0.92	-0.68	0.50	1.24	0.21	-2.12	0.03	0.22	0.83	1.00	0.32
	O_3 Min’	-0.47	0.64	-1.13	0.26	-0.05	0.96	1.20	0.23	-0.56	0.58	-0.09	0.93	0.43	0.67	-0.65	0.52
	CO Min’	0.16	0.87	-0.10	0.92	-0.15	0.88	-0.29	0.77	-0.63	0.53	0.48	0.63	-0.12	0.90	1.34	0.18
	NO Mean	-0.56	0.58	-0.91	0.36	0.17	0.86	-0.89	0.37	0.65	0.52	0.62	0.54	-1.73	0.08	0.72	0.47
	NO_2 Mean	-0.57	0.57	0.40	0.69	0.13	0.90	-0.11	0.91	-0.59	0.56	1.07	0.29	-1.87	0.06	0.61	0.54
	NOD Mean	-0.29	0.77	-0.30	0.76	0.69	0.49	-1.03	0.30	0.06	0.95	0.44	0.66	-1.42	0.16	0.90	0.37
	SO_2 Mean	-0.38	0.70	0.66	0.51	1.45	0.15	2.17	0.03	-0.56	0.58	-1.03	0.30	-2.21	0.03	-0.59	0.55
	PM_{10} Mean	0.34	0.74	-1.37	0.17	0.25	0.80	-0.01	0.99	-0.20	0.84	-1.61	0.11	-0.92	0.36	2.12	0.03
	O_3 Mean	-0.08	0.93	-1.46	0.15	0.44	0.66	1.00	0.32	-0.63	0.53	0.03	0.98	0.52	0.61	-0.75	0.45
	CO Mean	0.44	0.66	-0.19	0.85	0.51	0.61	0.57	0.57	0.01	0.99	0.30	0.77	-0.96	0.34	0.36	0.72
	NO Max’	-0.92	0.36	-1.21	0.23	0.92	0.36	-1.20	0.23	0.98	0.33	-0.02	0.98	-0.67	0.50	0.26	0.79
	NO_2 Max’	-0.87	0.38	0.41	0.68	0.85	0.40	-0.02	0.98	0.06	0.96	0.17	0.86	-0.63	0.53	0.42	0.68
	NOD Max’	-0.75	0.46	-0.21	0.83	1.09	0.28	-1.25	0.21	0.67	0.50	-0.38	0.70	0.03	0.97	0.37	0.71
	SO_2 Max’	-0.49	0.62	1.16	0.25	1.06	0.29	1.83	0.07	-0.59	0.56	-1.08	0.28	-1.92	0.06	-1.05	0.29
	PM_{10} Max’	-0.28	0.78	0.77	0.44	0.83	0.41	-0.50	0.62	-0.07	0.95	-1.56	0.12	-2.00	0.05	1.18	0.24
	O_3 Max’	0.37	0.72	-1.00	0.32	0.07	0.94	0.88	0.38	-0.70	0.49	-0.31	0.76	0.11	0.91	-0.66	0.51
	CO Max’	0.52	0.60	-1.41	0.16	0.68	0.49	0.63	0.53	0.16	0.88	0.35	0.73	-0.80	0.42	-0.08	0.94
Weather	Temp Min’	-1.61	0.11	0.62	0.53	-1.26	0.21	0.13	0.90	-0.91	0.36	-0.95	0.34	0.84	0.40	0.40	0.69
	Temp Max’	-1.23	0.22	0.41	0.68	-0.23	0.82	1.52	0.13	-1.48	0.14	0.09	0.93	0.37	0.71	-0.57	0.57
	Sun	0.66	0.51	0.57	0.57	0.44	0.66	1.27	0.20	-0.21	0.83	-0.14	0.89	1.80	0.07	-1.33	0.18
	Rain	0.75	0.45	0.14	0.89	0.73	0.47	-1.53	0.13	1.21	0.23	-0.58	0.56	-1.48	0.14	1.90	0.06
	Pressure	-1.50	0.13	0.05	0.96	-0.13	0.90	0.34	0.73	-1.43	0.15	1.94	0.05	-0.29	0.77	-0.57	0.57
	Wind speed	-0.64	0.52	-0.34	0.74	-0.74	0.46	-0.73	0.47	2.29	0.02	-1.29	0.20	0.69	0.49	-1.02	0.31
Pollen	Grass	0.69	0.49	-1.40	0.16	-1.33	0.18	0.99	0.32	-1.46	0.15	0.64	0.53	0.10	0.92	-1.37	0.17
	Birch	-1.05	0.29	0.80	0.42	-0.90	0.37	0.05	0.96	-0.05	0.96	-0.09	0.93	0.21	0.83	0.14	0.89
	Oak	-0.30	0.76	0.03	0.98	0.03	0.97	1.67	0.10	-1.12	0.26	0.24	0.81	-0.24	0.81	0.83	0.41
	Nettle	1.01	0.31	-0.70	0.48	-0.27	0.79	0.00	1.00	-0.57	0.57	1.54	0.13	-0.10	0.92	-2.59	0.01

Table G. 148: Scotland Casualty Counts Excess – Autoregressive Standardised percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	-1.27	0.20	0.16	0.87	-1.00	0.32	1.57	0.12	0.03	0.98	0.12	0.91	-1.49	0.14	0.05	0.96
	NO_2 Min’	0.18	0.86	-0.60	0.55	-1.33	0.18	2.07	0.04	-0.71	0.48	0.98	0.33	0.30	0.77	0.30	0.76
	NOD Min’	-1.16	0.25	1.30	0.20	-1.03	0.31	1.15	0.25	0.60	0.55	0.51	0.61	0.17	0.86	0.39	0.70
	SO_2 Min’	-0.14	0.89	-1.60	0.11	-0.56	0.57	-0.27	0.79	0.27	0.79	0.54	0.59	0.78	0.43	0.21	0.83
	PM_{10} Min’	0.78	0.44	0.00	1.00	-1.03	0.30	2.19	0.03	-1.65	0.10	-1.23	0.22	2.18	0.03	0.42	0.67
	O_3 Min’	1.44	0.15	0.48	0.63	0.64	0.52	2.15	0.03	-0.92	0.36	0.08	0.93	0.99	0.32	0.26	0.79
	CO Min’	-0.27	0.79	1.40	0.16	-0.53	0.60	1.25	0.21	-0.84	0.40	1.97	0.05	-0.65	0.52	1.16	0.25
	NO Mean	-0.96	0.34	-0.14	0.89	0.67	0.51	0.29	0.77	-1.37	0.17	1.24	0.22	-1.07	0.28	0.19	0.85
	NO_2 Mean	0.20	0.84	-1.35	0.18	0.04	0.97	0.89	0.37	-1.25	0.21	1.14	0.26	-0.38	0.71	0.81	0.42
	NOD Mean	-1.12	0.26	0.37	0.71	0.84	0.40	-0.23	0.82	-0.43	0.67	1.16	0.25	-0.64	0.52	0.73	0.46
	SO_2 Mean	-0.62	0.54	-1.45	0.15	0.57	0.57	0.43	0.67	-0.46	0.65	0.69	0.49	0.01	0.99	-0.36	0.72
	PM_{10} Mean	1.30	0.19	-0.59	0.55	0.24	0.81	1.66	0.10	-2.06	0.04	-0.43	0.66	1.70	0.09	-0.39	0.70
	O_3 Mean	2.19	0.03	0.75	0.45	-0.26	0.80	2.00	0.05	-1.53	0.13	0.06	0.95	0.77	0.44	0.55	0.59
	CO Mean	-1.48	0.14	0.09	0.93	0.36	0.72	0.55	0.58	-2.00	0.05	0.90	0.37	-0.47	0.64	-0.06	0.95
	NO Max’	-1.27	0.21	0.02	0.99	-0.10	0.92	0.10	0.92	-1.30	0.19	0.17	0.87	-0.12	0.90	-0.33	0.74
	NO_2 Max’	-0.56	0.58	-0.71	0.48	-0.42	0.68	0.49	0.63	-0.68	0.50	-0.11	0.91	0.03	0.97	0.52	0.60
	NOD Max’	-1.68	0.09	0.86	0.39	0.10	0.92	-0.08	0.93	-0.44	0.66	0.16	0.88	0.21	0.83	-0.07	0.94
	SO_2 Max’	-0.11	0.92	-0.90	0.37	0.29	0.77	0.29	0.77	-0.87	0.39	0.30	0.76	-0.79	0.43	-0.74	0.46
	PM_{10} Max’	-0.64	0.52	0.48	0.63	1.48	0.14	-0.62	0.54	0.04	0.97	-1.22	0.22	0.35	0.73	-0.43	0.67
	O_3 Max’	1.54	0.12	0.85	0.40	-0.05	0.96	1.61	0.11	-1.68	0.09	0.88	0.38	0.51	0.61	0.73	0.47
	CO Max’	-1.75	0.08	-0.56	0.58	0.53	0.60	0.40	0.69	-2.46	0.01	0.58	0.56	-0.95	0.34	-0.02	0.98
Weather	Temp Min’	0.19	0.85	-0.52	0.60	0.38	0.71	-0.38	0.71	-0.73	0.47	0.86	0.39	-0.91	0.36	2.66	0.01
	Temp Max’	-0.33	0.74	0.31	0.75	0.40	0.69	0.16	0.87	-0.26	0.79	0.08	0.94	-0.09	0.93	0.69	0.49
	Sun	0.27	0.79	0.56	0.58	1.07	0.29	1.25	0.21	-1.03	0.30	-0.66	0.51	1.46	0.15	-0.99	0.32
	Rain	0.79	0.43	1.09	0.28	0.09	0.93	-0.16	0.87	-1.14	0.26	-0.53	0.60	0.97	0.33	-1.34	0.18
	Pressure	1.20	0.23	0.48	0.63	-1.03	0.30	0.05	0.96	-0.64	0.52	1.19	0.24	0.26	0.79	-0.69	0.49
	Wind speed	-1.49	0.14	1.68	0.09	-0.28	0.78	0.76	0.45	-0.35	0.72	-1.34	0.18	0.87	0.38	0.29	0.77
Pollen	Grass	0.28	0.78	0.40	0.69	0.46	0.64	0.98	0.33	-0.61	0.54	-0.80	0.42	-0.22	0.82	0.85	0.40
	Birch	0.45	0.65	-0.59	0.55	-1.37	0.17	-1.29	0.20	0.36	0.72	-0.61	0.54	-0.53	0.60	1.81	0.07
	Oak	-0.10	0.92	1.44	0.15	-1.06	0.29	0.29	0.77	-1.31	0.19	0.36	0.72	1.01	0.31	-0.15	0.88
	Nettle	0.63	0.53	-0.82	0.41	0.46	0.64	0.44	0.66	-0.47	0.64	1.19	0.24	-0.54	0.59	0.42	0.68

Table G. 149: Scotland Emergency Consultations Excess – Autoregressive Standardised percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	-0.98	0.33	-0.85	0.39	-0.35	0.72	-0.19	0.85	-0.28	0.78	0.61	0.54	-0.63	0.53	0.34	0.73
	NO_2 Min’	0.79	0.43	0.86	0.39	0.10	0.92	1.08	0.28	1.02	0.31	0.28	0.78	0.76	0.45	1.13	0.26
	NOD Min’	-0.12	0.91	0.38	0.71	0.59	0.55	0.77	0.44	0.98	0.33	0.77	0.44	-0.03	0.97	1.51	0.13
	SO_2 Min’	-1.20	0.23	-0.83	0.41	0.61	0.54	0.39	0.69	-0.90	0.37	0.68	0.50	-0.93	0.35	-0.93	0.35
	PM_{10} Min’	2.57	0.01	1.68	0.09	-0.17	0.86	-0.57	0.57	0.34	0.73	0.18	0.86	0.66	0.51	1.08	0.28
	O_3 Min’	0.63	0.53	1.24	0.22	0.59	0.55	1.71	0.09	1.57	0.12	1.70	0.09	0.96	0.34	1.48	0.14
	CO Min’	-0.81	0.42	1.54	0.12	-0.14	0.89	-0.82	0.41	-0.12	0.90	-0.50	0.62	0.10	0.92	1.54	0.12
	NO Mean	-0.29	0.77	0.33	0.74	-1.40	0.16	0.75	0.45	0.60	0.55	-1.21	0.23	2.23	0.03	-1.08	0.28
	NO_2 Mean	0.32	0.75	0.60	0.55	-0.55	0.58	1.81	0.07	-0.21	0.84	0.13	0.90	1.04	0.30	0.49	0.62
	NOD Mean	-0.11	0.91	0.38	0.70	-0.63	0.53	1.13	0.26	0.38	0.71	-0.62	0.54	1.95	0.05	-0.32	0.75
	SO_2 Mean	-0.80	0.42	-0.34	0.74	-0.67	0.50	0.38	0.70	-0.17	0.87	-0.90	0.37	-0.61	0.54	-0.53	0.60
	PM_{10} Mean	1.84	0.07	2.09	0.04	-1.33	0.19	-0.74	0.46	0.48	0.63	-0.76	0.45	0.87	0.38	1.86	0.06
	O_3 Mean	1.23	0.22	0.89	0.37	0.49	0.63	0.94	0.35	1.06	0.29	1.22	0.22	1.45	0.15	1.25	0.21
	CO Mean	-1.09	0.28	0.13	0.89	-1.59	0.11	-0.44	0.66	0.61	0.54	-1.99	0.05	0.77	0.44	-1.77	0.08
	NO Max’	-1.12	0.26	0.70	0.48	-0.98	0.33	1.70	0.09	0.19	0.85	-0.04	0.97	1.60	0.11	-1.18	0.24
	NO_2 Max’	-0.05	0.96	0.08	0.93	0.10	0.92	1.94	0.05	-0.64	0.53	0.09	0.93	1.11	0.27	-0.67	0.50
	NOD Max’	-1.07	0.29	0.60	0.55	-0.30	0.77	1.89	0.06	0.06	0.96	0.28	0.78	1.75	0.08	-0.87	0.39
	SO_2 Max’	-0.02	0.98	-0.29	0.77	-1.57	0.12	0.88	0.38	0.21	0.84	-1.11	0.27	-0.76	0.45	-0.41	0.68
	PM_{10} Max’	1.19	0.23	0.91	0.36	-1.63	0.10	-0.89	0.37	0.31	0.76	-0.05	0.96	2.12	0.03	0.30	0.76
	O_3 Max’	1.08	0.28	0.29	0.77	-0.13	0.90	1.45	0.15	0.84	0.40	1.50	0.13	1.85	0.06	1.48	0.14
	CO Max’	-1.97	0.05	0.29	0.77	-1.62	0.11	-0.08	0.93	1.00	0.32	-1.65	0.10	0.50	0.62	-1.95	0.05
Weather	Temp Min’	0.81	0.42	0.79	0.43	-0.94	0.35	0.66	0.51	-1.20	0.23	0.03	0.98	-0.59	0.55	1.48	0.14
	Temp Max’	0.82	0.41	-0.21	0.83	-1.20	0.23	2.09	0.04	0.35	0.73	0.25	0.80	-1.01	0.31	0.91	0.36
	Sun	0.19	0.85	-0.63	0.53	-0.50	0.62	1.37	0.17	0.46	0.64	0.23	0.82	-0.73	0.47	0.98	0.33
	Rain	-0.99	0.32	0.37	0.71	0.94	0.35	-0.61	0.54	-0.20	0.84	-0.50	0.62	0.81	0.42	-0.48	0.63
	Pressure	-1.62	0.11	-0.67	0.50	1.26	0.21	0.59	0.55	1.31	0.19	-1.04	0.30	0.93	0.35	-0.25	0.80
	Wind speed	0.61	0.54	0.00	1.00	0.59	0.56	-0.08	0.94	-0.47	0.64	0.12	0.91	-0.30	0.77	0.01	0.99
Pollen	Grass	1.18	0.24	-0.76	0.45	1.55	0.12	0.55	0.58	1.07	0.29	-1.57	0.12	0.37	0.71	-0.56	0.58
	Birch	-0.59	0.56	-0.45	0.65	2.57	0.01	-1.35	0.18	0.98	0.33	-1.26	0.21	-0.57	0.57	-0.35	0.73
	Oak	2.74	0.01	-1.26	0.21	-0.48	0.63	-0.42	0.68	-0.86	0.39	0.67	0.51	1.70	0.09	-0.60	0.55
	Nettle	1.46	0.15	-0.10	0.92	-0.01	0.99	0.56	0.58	0.43	0.66	-0.85	0.40	0.27	0.78	-0.77	0.44

Table G. 150: Scotland Emergency Counts Excess – Autoregressive Standardised percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	-0.53	0.60	1.05	0.29	-1.16	0.25	-0.02	0.98	0.81	0.42	0.24	0.81	-1.05	0.30	-0.18	0.86
	NO_2 Min’	0.62	0.54	0.86	0.39	0.06	0.95	0.63	0.53	0.36	0.72	0.70	0.49	-0.39	0.70	1.55	0.12
	NOD Min’	-0.52	0.61	2.55	0.01	-0.22	0.83	0.56	0.57	1.14	0.26	1.17	0.24	-0.73	0.47	1.76	0.08
	SO_2 Min’	0.16	0.87	-0.80	0.42	-0.22	0.83	-0.83	0.41	-0.26	0.80	0.42	0.67	-0.33	0.74	0.56	0.57
	PM_{10} Min’	2.12	0.03	0.64	0.52	-0.68	0.50	-0.20	0.84	-0.24	0.81	-1.10	0.27	2.41	0.02	0.48	0.63
	O_3 Min’	1.14	0.26	0.63	0.53	0.38	0.71	1.23	0.22	0.67	0.50	0.31	0.76	1.17	0.24	0.65	0.51
	CO Min’	-0.17	0.87	1.90	0.06	-0.73	0.46	-0.08	0.94	-1.04	0.30	1.47	0.14	0.94	0.35	1.87	0.06
	NO Mean	0.16	0.87	-0.19	0.85	0.59	0.56	0.40	0.69	0.67	0.50	0.37	0.71	0.15	0.88	0.01	1.00
	NO_2 Mean	1.24	0.22	-0.58	0.56	0.93	0.35	0.67	0.50	-0.73	0.47	0.73	0.47	-0.06	0.96	1.02	0.31
	NOD Mean	0.23	0.82	0.33	0.74	1.00	0.32	0.64	0.52	0.54	0.59	1.03	0.30	0.30	0.76	0.90	0.37
	SO_2 Mean	-0.06	0.96	-0.86	0.39	-0.07	0.95	0.30	0.76	-0.44	0.66	-0.35	0.73	-0.65	0.52	0.57	0.57
	PM_{10} Mean	1.99	0.05	0.64	0.53	-0.09	0.93	-1.08	0.28	-0.31	0.76	-1.22	0.22	1.85	0.06	1.50	0.13
	O_3 Mean	2.13	0.03	0.12	0.91	0.18	0.85	0.38	0.70	-0.01	0.99	0.28	0.78	1.65	0.10	0.73	0.47
	CO Mean	-0.08	0.94	-1.03	0.31	0.63	0.53	0.79	0.43	-1.01	0.31	0.53	0.60	0.70	0.49	-0.99	0.32
	NO Max’	-0.46	0.64	-0.30	0.77	0.47	0.64	0.48	0.64	0.48	0.63	-0.08	0.94	0.65	0.52	-0.49	0.63
	NO_2 Max’	0.40	0.69	-0.78	0.43	0.63	0.53	1.16	0.25	-0.44	0.66	-0.23	0.82	0.76	0.45	-0.27	0.79
	NOD Max’	-0.64	0.52	0.28	0.78	0.43	0.67	1.22	0.22	0.85	0.39	0.56	0.57	1.33	0.19	-0.13	0.90
	SO_2 Max’	0.23	0.82	-0.61	0.54	-0.85	0.40	0.93	0.35	-0.75	0.46	-0.92	0.36	-0.77	0.44	0.56	0.58
	PM_{10} Max’	0.17	0.87	1.21	0.23	0.67	0.50	-2.23	0.03	0.58	0.56	-1.40	0.16	1.79	0.07	0.71	0.48
	O_3 Max’	1.74	0.08	-0.22	0.82	-0.07	0.94	0.71	0.48	-0.75	0.45	0.62	0.53	1.68	0.09	1.59	0.11
	CO Max’	-0.90	0.37	-1.45	0.15	0.23	0.82	1.03	0.30	-0.61	0.54	0.71	0.48	-0.23	0.82	-1.05	0.29
Weather	Temp Min’	0.18	0.85	0.42	0.67	-0.57	0.57	-0.34	0.73	-1.14	0.26	-0.14	0.89	0.75	0.45	1.75	0.08
	Temp Max’	0.94	0.35	-0.82	0.41	-0.12	0.91	1.90	0.06	-0.92	0.36	0.09	0.93	1.05	0.29	0.08	0.94
	Sun	1.55	0.12	-0.20	0.84	0.29	0.77	2.55	0.01	0.07	0.94	-0.05	0.96	1.59	0.11	-1.15	0.25
	Rain	0.10	0.92	1.38	0.17	0.37	0.71	-1.69	0.09	-0.92	0.36	-0.21	0.83	2.29	0.02	-0.10	0.92
	Pressure	-0.74	0.46	-0.95	0.34	1.21	0.23	1.24	0.22	-0.02	0.98	-0.40	0.69	-0.07	0.94	0.86	0.39
	Wind speed	-0.71	0.48	0.94	0.35	0.05	0.96	-0.73	0.47	0.32	0.75	-1.32	0.19	0.80	0.43	-0.55	0.58
Pollen	Grass	3.61	0.00	-1.22	0.22	0.38	0.70	1.18	0.24	-0.11	0.91	-1.29	0.20	0.07	0.95	-0.12	0.90
	Birch	-0.39	0.70	-0.58	0.56	-0.31	0.75	-1.64	0.10	0.74	0.46	-0.46	0.65	-1.82	0.07	1.00	0.32
	Oak	1.08	0.28	0.59	0.56	-1.14	0.25	0.42	0.67	-1.97	0.05	1.40	0.16	0.80	0.43	0.37	0.71
	Nettle	2.71	0.01	-0.82	0.41	-1.31	0.19	1.19	0.23	-0.39	0.70	0.61	0.54	-0.12	0.91	-0.29	0.77

Table G. 151: Scotland Out of Hours Counts Excess – Autoregressive Standardised percentage change and P-values by lag day per exposure.

		Lag0		Lag1		Lag2		Lag3		Lag4		Lag5		Lag6		Lag7	
Exposure		Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P	Est	P
Outdoor air pollutants	NO Min’	1.13	0.26	2.28	0.02	-1.08	0.28	-0.51	0.61	0.86	0.39	0.40	0.69	0.06	0.96	-1.10	0.27
	NO_2 Min’	0.61	0.54	1.15	0.25	1.02	0.31	-0.90	0.37	0.08	0.93	-0.03	0.97	-0.57	0.57	0.70	0.49
	NOD Min’	0.26	0.79	2.59	0.01	-0.36	0.72	0.19	0.85	0.25	0.81	1.21	0.23	-0.58	0.56	0.47	0.64
	SO_2 Min’	1.25	0.21	0.57	0.57	-0.74	0.46	-2.09	0.04	-0.12	0.91	0.39	0.69	0.08	0.93	1.68	0.09
	PM_{10} Min’	0.85	0.40	0.24	0.81	-0.12	0.90	-1.28	0.20	-0.32	0.75	0.14	0.89	1.45	0.15	-0.83	0.41
	O_3 Min’	0.44	0.66	0.15	0.88	-0.50	0.62	-1.47	0.14	0.79	0.43	-0.27	0.78	-0.25	0.80	-0.34	0.74
	CO Min’	0.65	0.52	0.71	0.48	-0.31	0.76	-0.78	0.43	-0.39	0.69	1.03	0.31	1.84	0.07	0.39	0.70
	NO Mean	2.05	0.04	-0.28	0.78	1.17	0.24	0.38	0.71	1.25	0.21	0.65	0.52	0.14	0.89	0.42	0.67
	NO_2 Mean	2.18	0.03	-0.60	0.55	1.73	0.08	-1.05	0.30	-0.08	0.93	0.18	0.86	0.25	0.80	0.28	0.78
	NOD Mean	1.91	0.06	-0.15	0.88	1.03	0.30	0.77	0.44	0.63	0.53	1.46	0.15	0.18	0.85	0.78	0.44
	SO_2 Mean	1.28	0.20	-0.37	0.71	-0.41	0.68	-1.29	0.20	0.14	0.89	0.15	0.88	0.16	0.87	1.84	0.07
	PM_{10} Mean	1.31	0.19	0.07	0.94	0.71	0.48	-2.40	0.02	0.27	0.79	0.02	0.99	1.17	0.24	0.55	0.58
	O_3 Mean	0.62	0.54	-0.18	0.85	-0.45	0.65	-1.84	0.07	0.53	0.60	-0.10	0.92	0.47	0.64	-0.25	0.80
	CO Mean	2.01	0.05	-1.75	0.08	1.77	0.08	0.63	0.53	-0.28	0.78	1.77	0.08	1.44	0.15	-0.22	0.83
	NO Max’	2.24	0.03	-0.62	0.53	0.92	0.36	-0.04	0.97	1.19	0.23	-0.01	0.99	0.45	0.65	0.23	0.82
	NO_2 Max’	2.00	0.05	-1.03	0.30	0.87	0.38	-0.28	0.78	-0.02	0.98	0.03	0.98	0.85	0.40	-0.67	0.50
	NOD Max’	2.13	0.03	-0.78	0.44	0.23	0.82	1.00	0.32	1.34	0.18	0.99	0.32	0.97	0.33	0.34	0.73
	SO_2 Max’	0.83	0.41	-0.51	0.61	-0.48	0.63	-0.46	0.64	-0.32	0.75	-0.35	0.72	0.81	0.42	2.23	0.03
	PM_{10} Max’	0.97	0.33	-0.01	0.99	1.01	0.31	-2.41	0.02	0.59	0.56	-0.47	0.64	1.70	0.09	0.94	0.35
	O_3 Max’	0.62	0.53	-0.48	0.63	-0.70	0.49	-1.43	0.15	-0.21	0.84	-0.28	0.78	0.63	0.53	0.81	0.42
	CO Max’	1.83	0.07	-1.70	0.09	0.93	0.35	0.95	0.34	0.38	0.70	1.92	0.06	0.75	0.45	-0.15	0.88
Weather	Temp Min’	-0.02	0.99	0.61	0.54	-0.24	0.81	-0.75	0.46	-0.12	0.91	-0.44	0.66	1.85	0.06	-0.47	0.64
	Temp Max’	1.38	0.17	-1.06	0.29	-0.05	0.96	0.93	0.35	-1.09	0.28	-0.38	0.70	2.75	0.01	-0.99	0.32
	Sun	1.51	0.13	-0.16	0.87	-0.74	0.46	1.74	0.08	0.51	0.61	0.29	0.77	1.16	0.25	-1.26	0.21
	Rain	-0.44	0.66	1.34	0.18	-0.34	0.73	-1.99	0.05	-0.28	0.78	0.85	0.40	1.88	0.06	1.12	0.26
	Pressure	0.31	0.76	-2.20	0.03	2.56	0.01	1.08	0.28	0.01	0.99	-1.21	0.23	-1.33	0.18	2.52	0.01
	Wind speed	-0.57	0.57	1.00	0.32	-0.45	0.66	-1.18	0.24	0.36	0.72	-0.96	0.34	0.41	0.68	-0.76	0.45
Pollen	Grass	4.28	0.00	-1.37	0.17	-0.06	0.95	0.26	0.80	0.32	0.75	-0.64	0.52	0.21	0.84	0.09	0.93
	Birch	0.14	0.89	-0.54	0.59	-0.96	0.34	-0.38	0.70	0.33	0.74	0.81	0.42	-2.06	0.04	0.14	0.89
	Oak	-0.15	0.88	0.75	0.45	-0.65	0.51	0.20	0.84	-1.12	0.26	1.36	0.18	-0.93	0.35	0.99	0.32
	Nettle	2.63	0.01	-0.68	0.50	-2.04	0.04	1.02	0.31	-0.16	0.87	-0.01	0.99	0.25	0.80	0.49	0.63

G5. Diagnostics - Autocorrelation plots

G5.1. England and Wales Autoregression Autocorrelation Plots

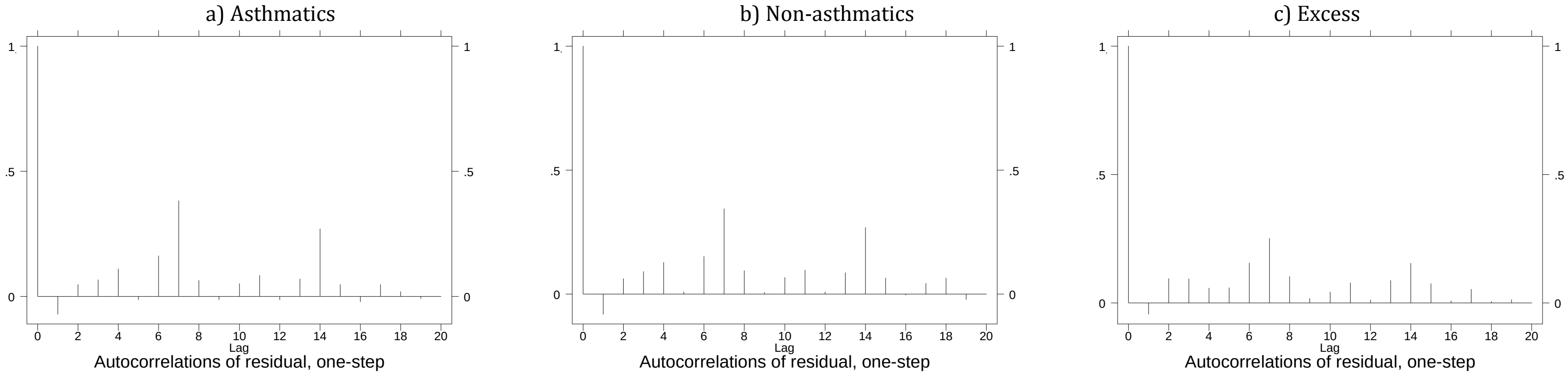


Figure G5. 1: England and Wales All Counts - ACF plot ARIMA null model (1,0,0), a) Asthmatics, b) Non-asthmatics, c) Excess.

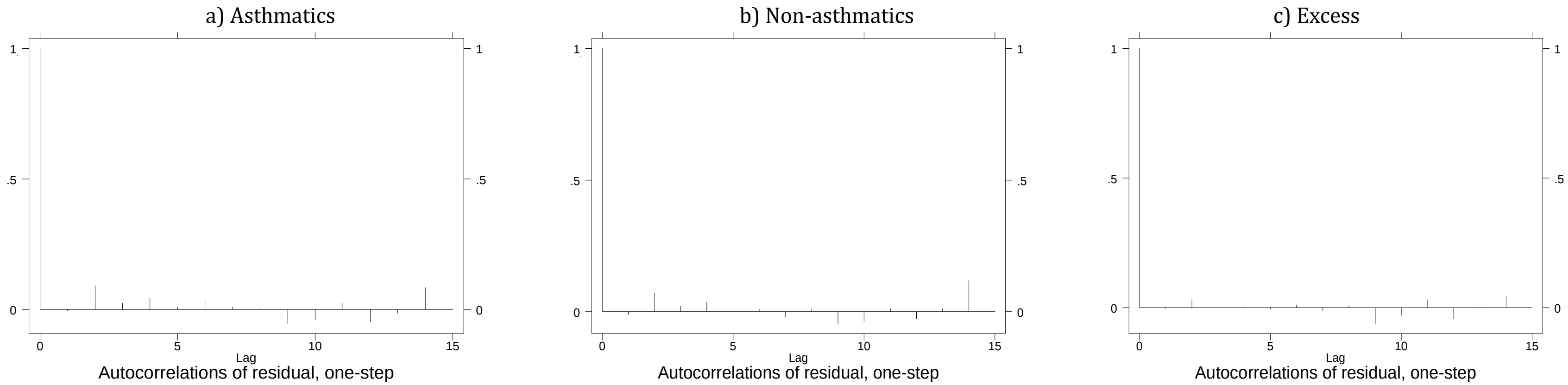


Figure G5. 2: England and Wales All Counts - ACF plot ARIMA (7,0,1) null model, a) Asthmatics, b) Non-asthmatics, c) Excess.

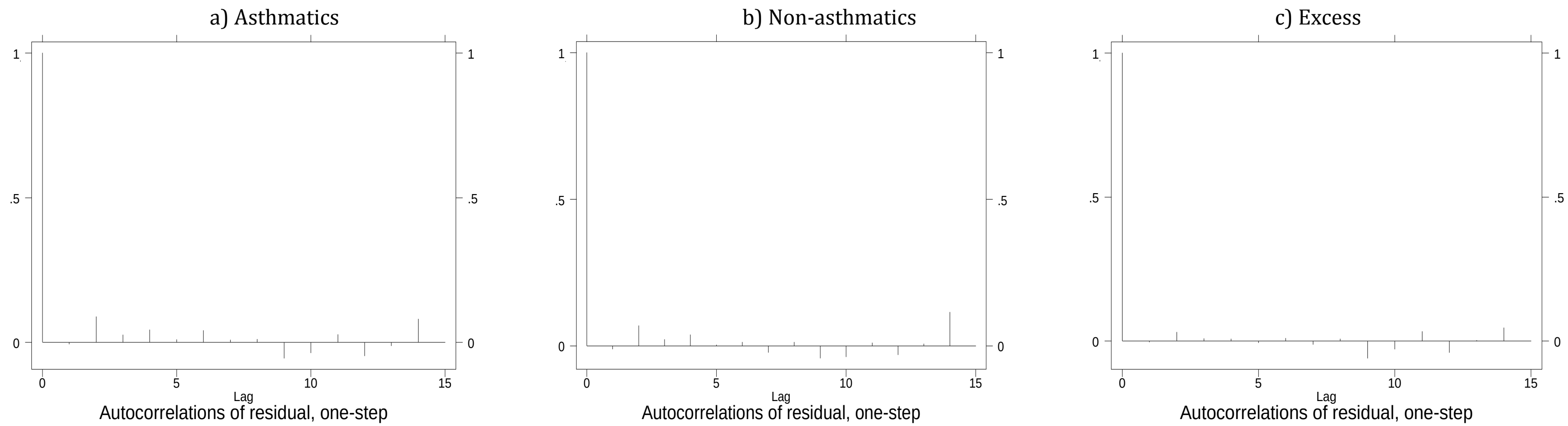


Figure G5. 3: England and Wales All Counts - ACF plot ARIMA (7,0,1) model with NOD Minimum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

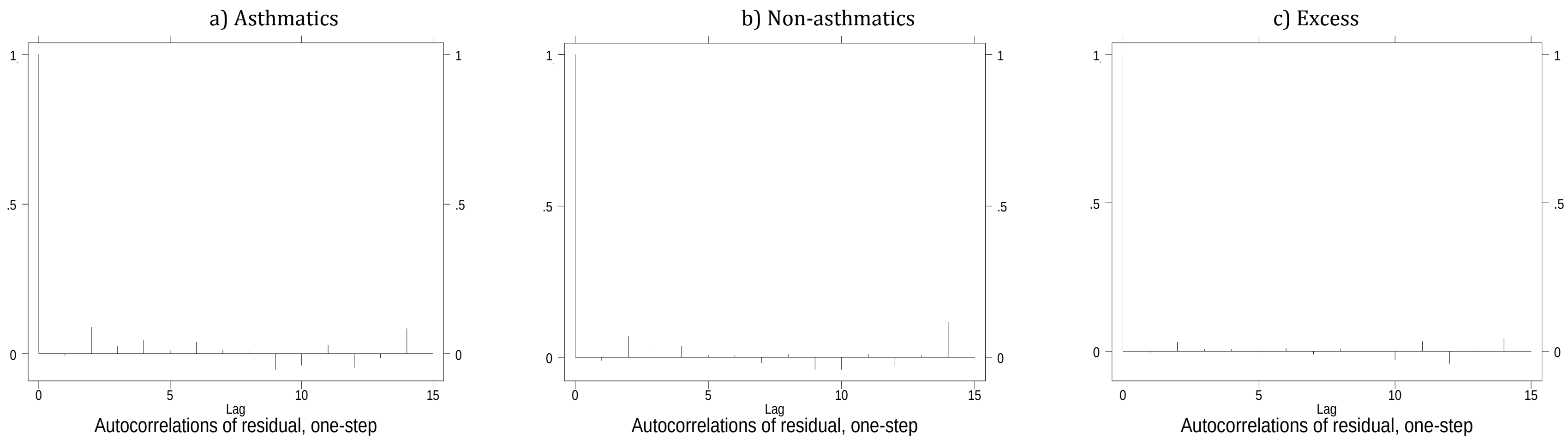


Figure G5. 4: England and Wales All Counts - ACF plot ARIMA (7,0,1) model with NOD mean measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

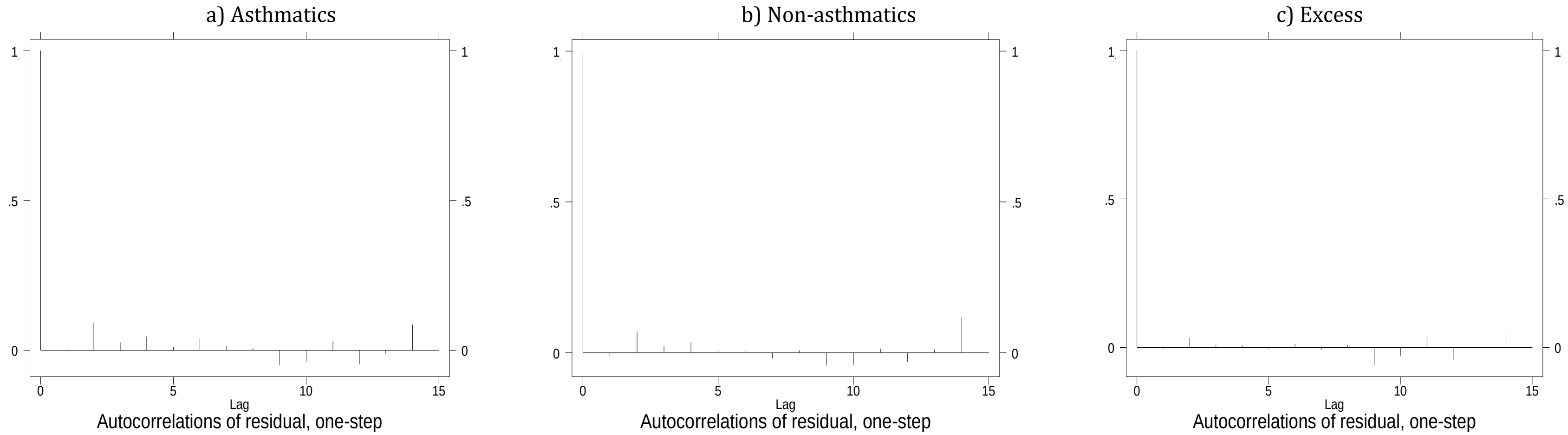


Figure G5. 5: England and Wales All Counts - ACF plot ARIMA (7,0,1) model with NOD maximum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

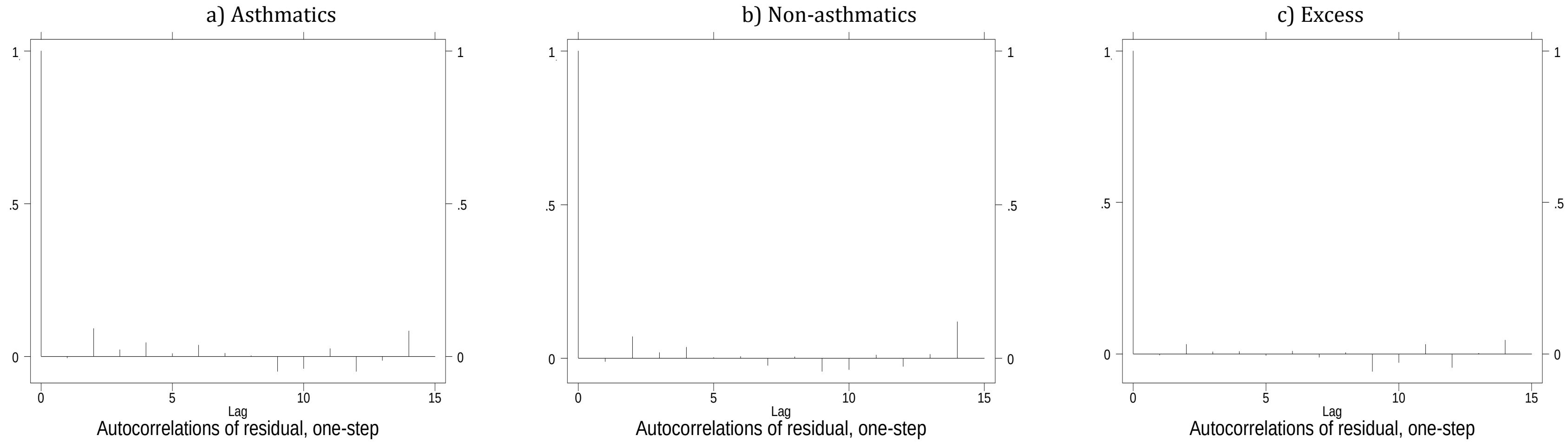


Figure G5. 6: England and Wales All Counts - ACF plot ARIMA (7,0,1) model with Temperature Minimum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

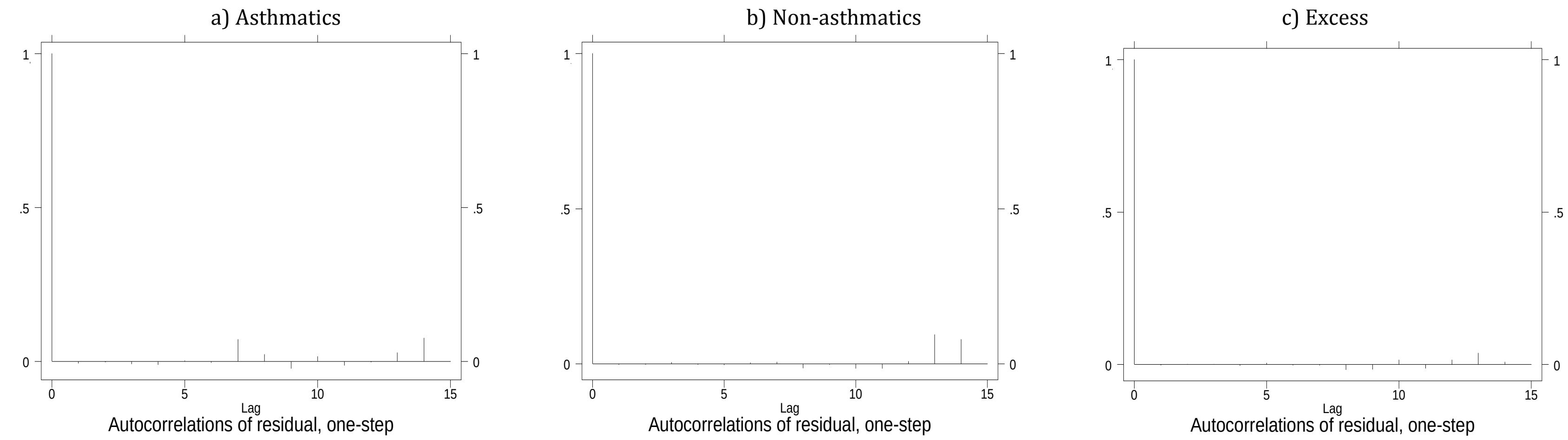


Figure G5. 7: England and Wales Acute Visits - ACF plot ARIMA (7,0,1) null model, a) Asthmatics, b) Non-asthmatics, c) Excess.

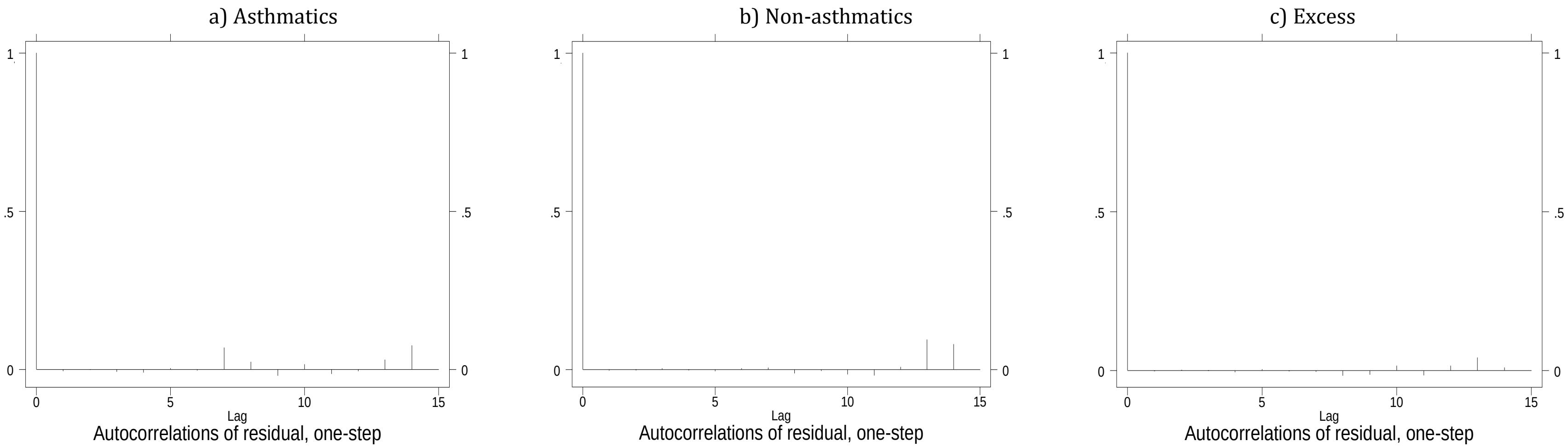


Figure G5. 8: England and Wales Acute Visits - ACF plot ARIMA (7,0,1) model with SO_2 Minimum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

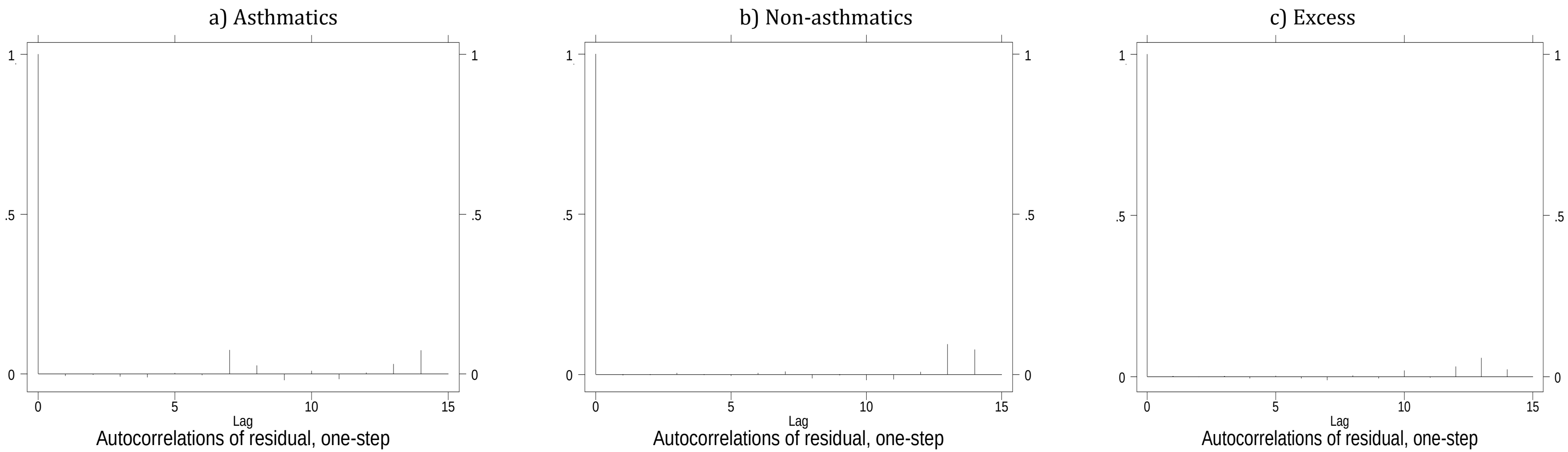


Figure G5. 9: England and Wales Acute Visits - ACF plot ARIMA (7,0,1) model with SO_2 mean measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

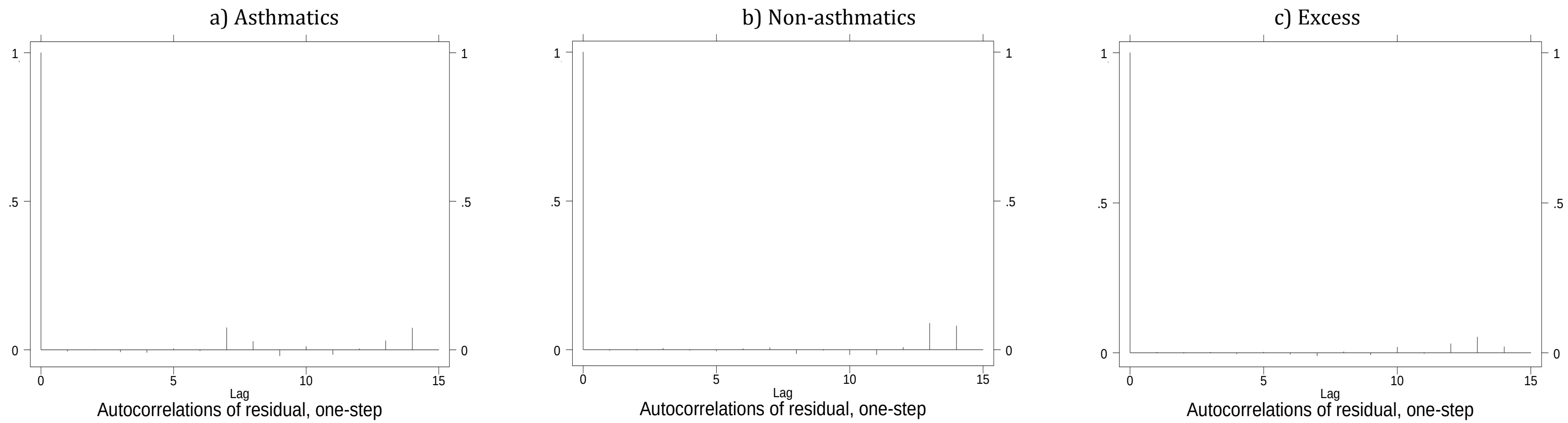


Figure G5. 10: England and Wales Acute Visits - ACF plot ARIMA (7,0,1) model with SO_2 maximum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

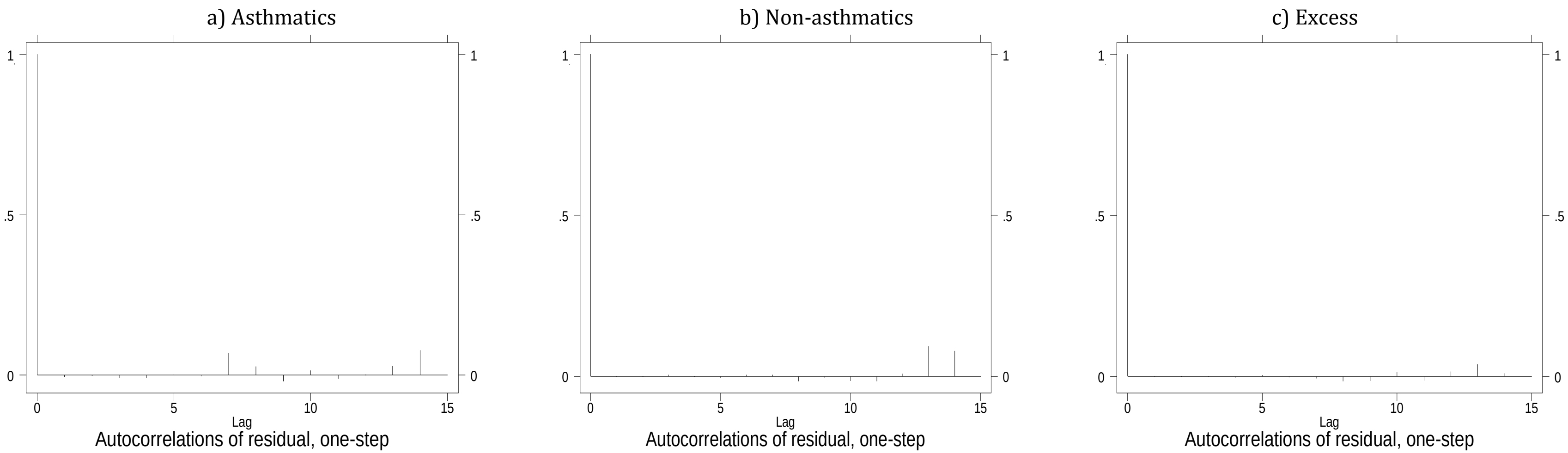


Figure G5. 11: England and Wales Acute Visits - ACF plot ARIMA (7,0,1) Temperature maximum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

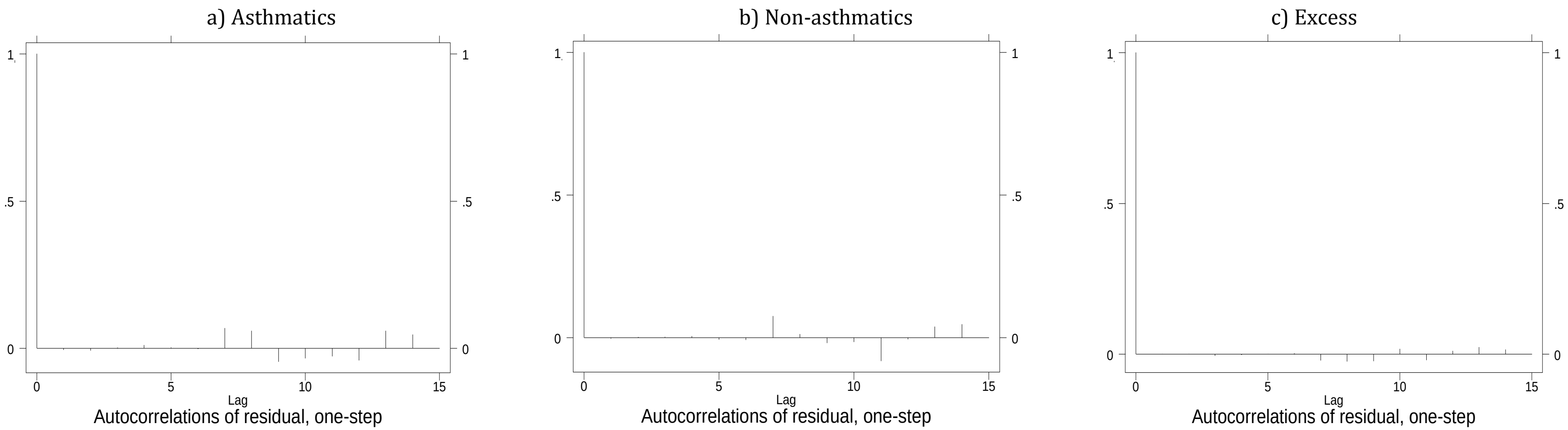


Figure G5. 12: England and Wales Casualty Counts - ACF plot ARIMA (7,0,1) null model, a) Asthmatics, b) Non-asthmatics, c) Excess.

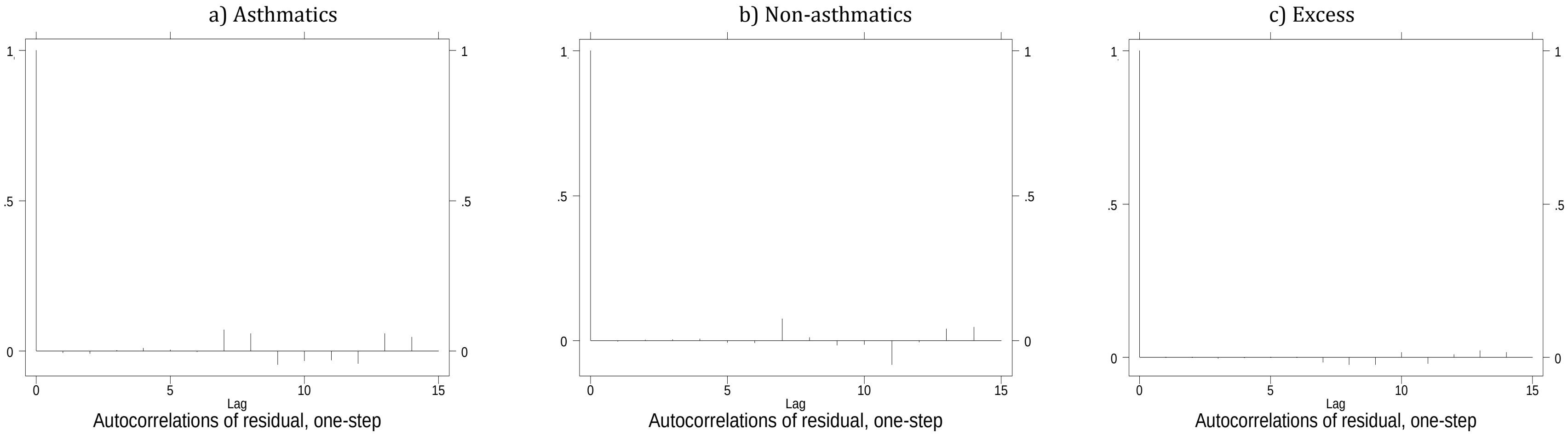


Figure G5. 13: England and Wales Casualty Counts - ACF plot ARIMA (7,0,1) model with O_3 Minimum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

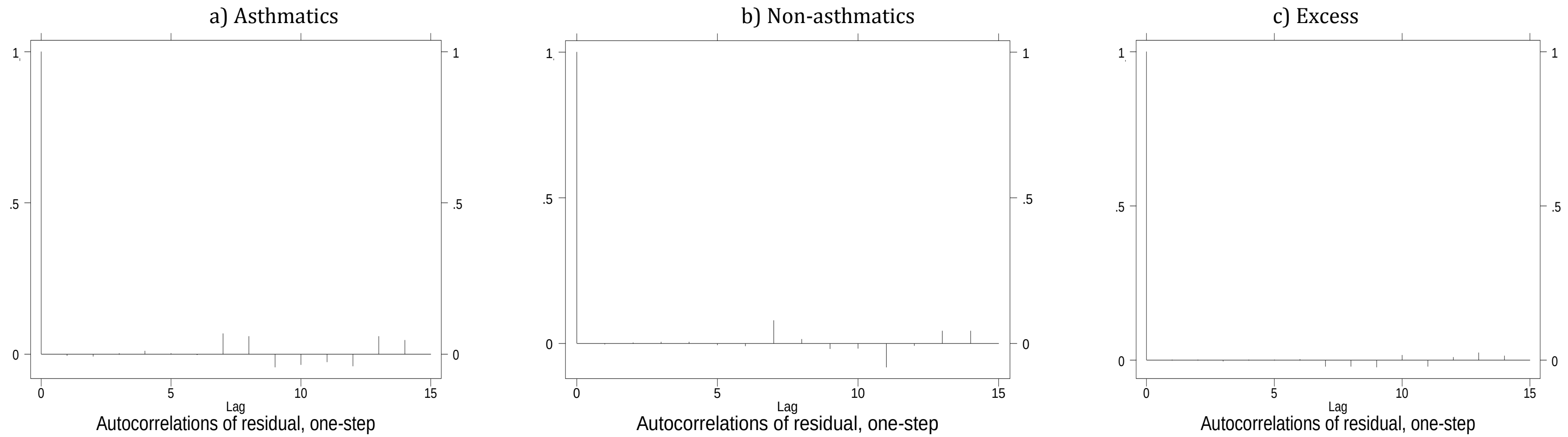


Figure G5. 14: England and Wales Casualty Counts - ACF plot ARIMA (7,0,1) model with O_2 mean measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

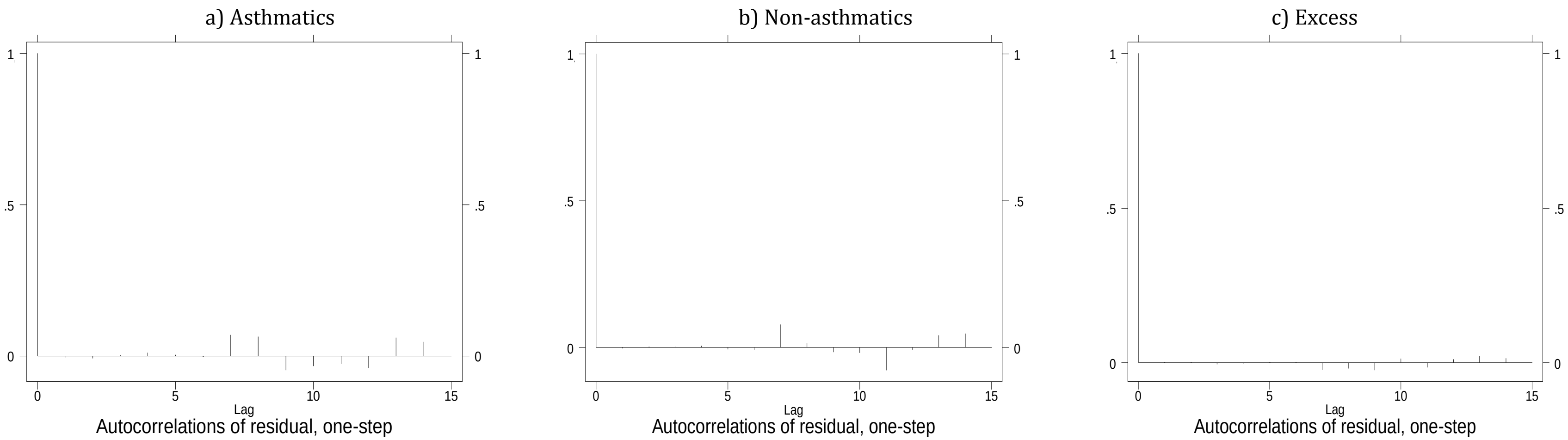


Figure G5. 15: England and Wales Casualty Counts - ACF plot ARIMA (7,0,1) model with O_3 maximum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

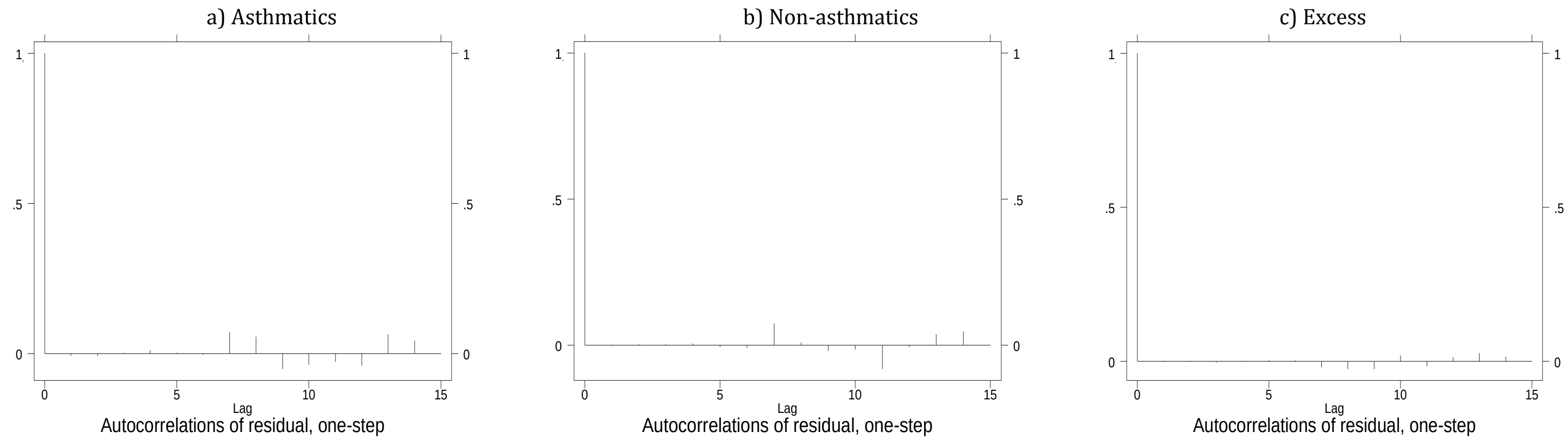


Figure G5. 16: England and Wales Casualty Counts - ACF plot ARIMA (7,0,1) Grass measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

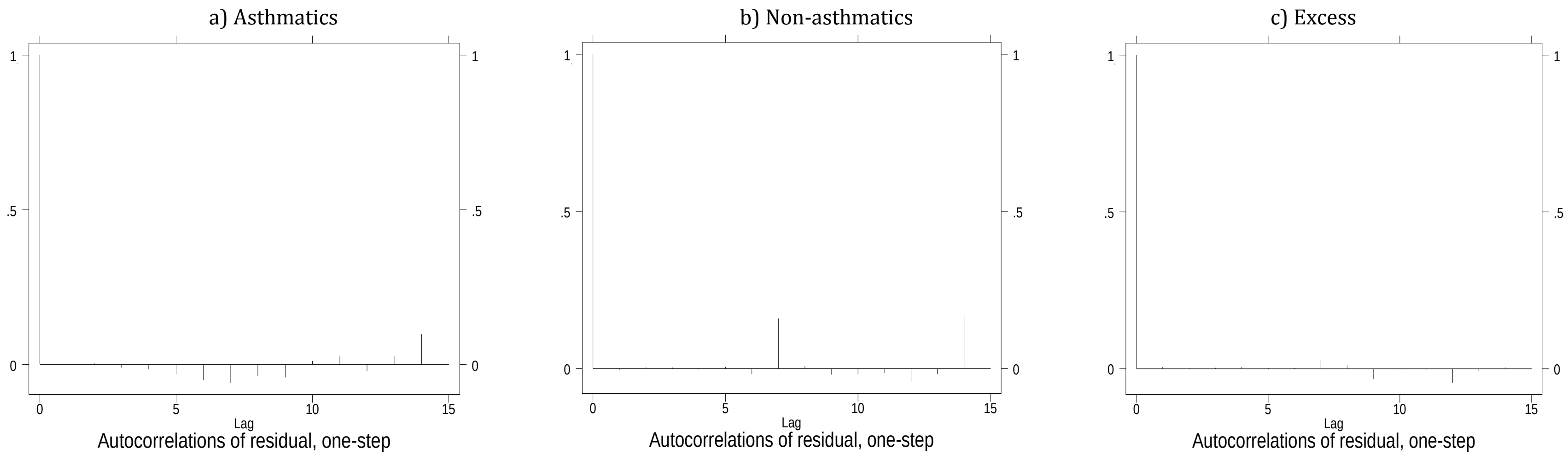


Figure G5. 17: England and Wales Emergency Consultations - ACF plot ARIMA (7,0,1) null model, a) Asthmatics, b) Non-asthmatics, c) Excess.

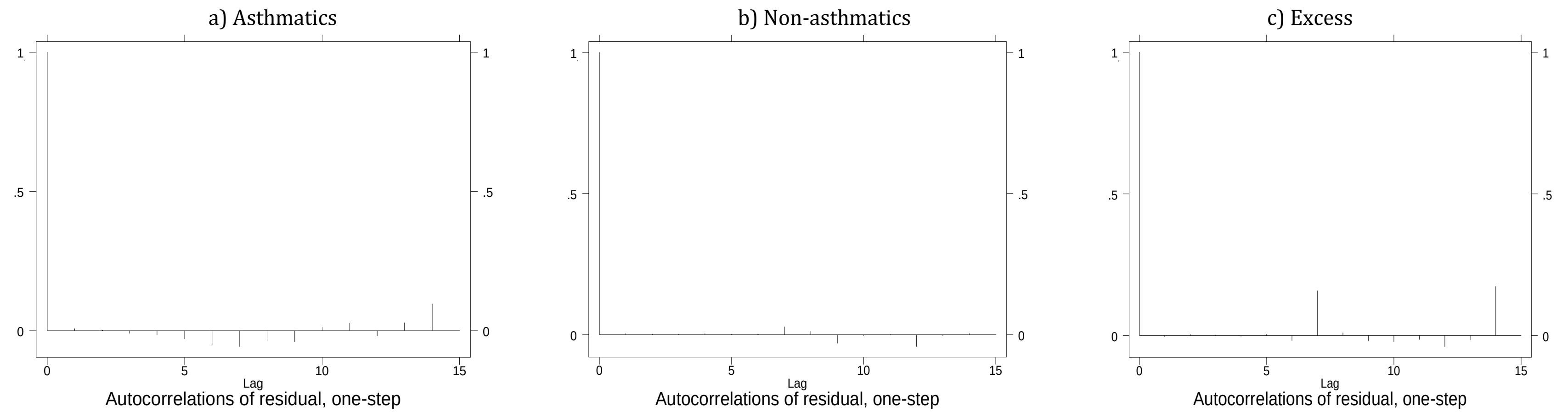


Figure G5. 18: England and Wales Emergency Consultations - ACF plot ARIMA (7,0,1) model with NO_2 Minimum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

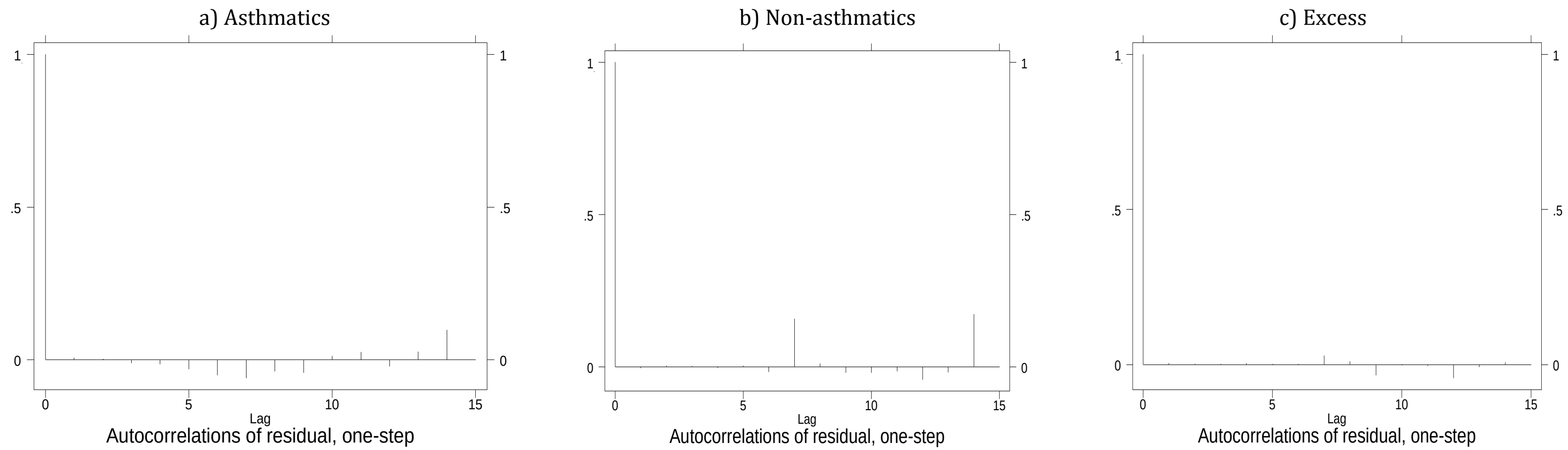


Figure G5. 19: England and Wales Emergency Consultations - ACF plot ARIMA (7,0,1) model with NO_2 mean measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

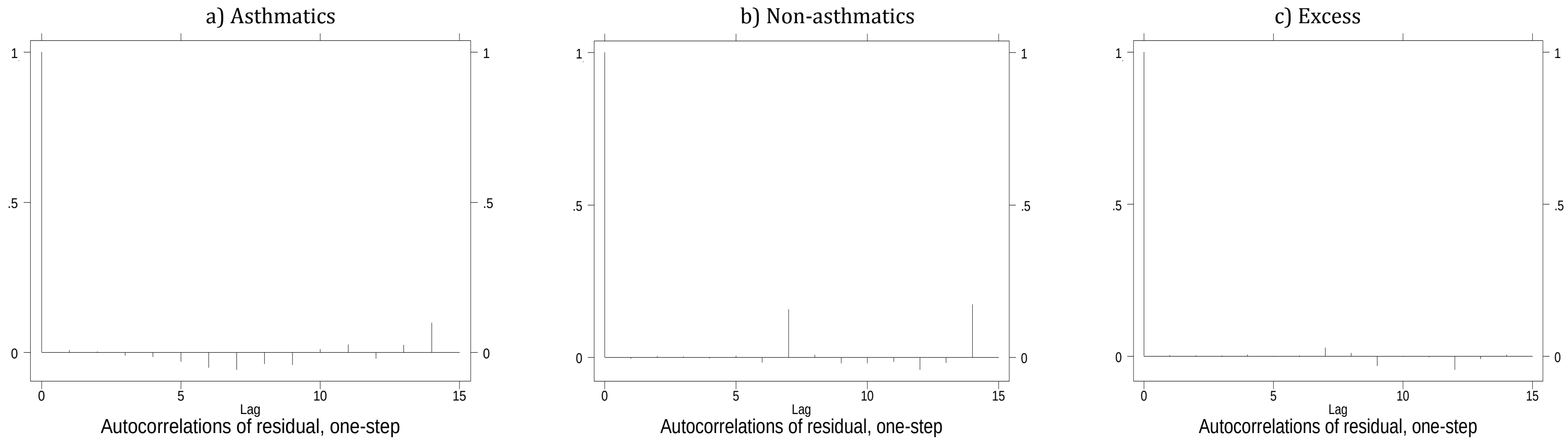


Figure G5. 20: England and Wales Emergency Consultations - ACF plot ARIMA (7,0,1) model with NO_2 maximum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

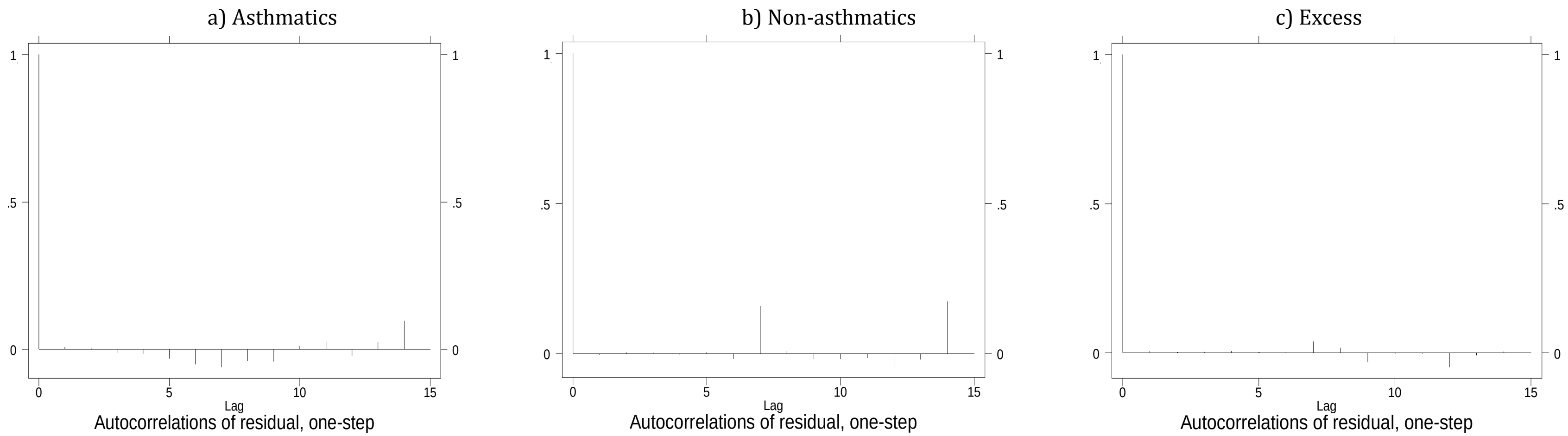


Figure G5. 21: England and Wales Emergency Consultations - ACF plot ARIMA (7,0,1) Rain measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

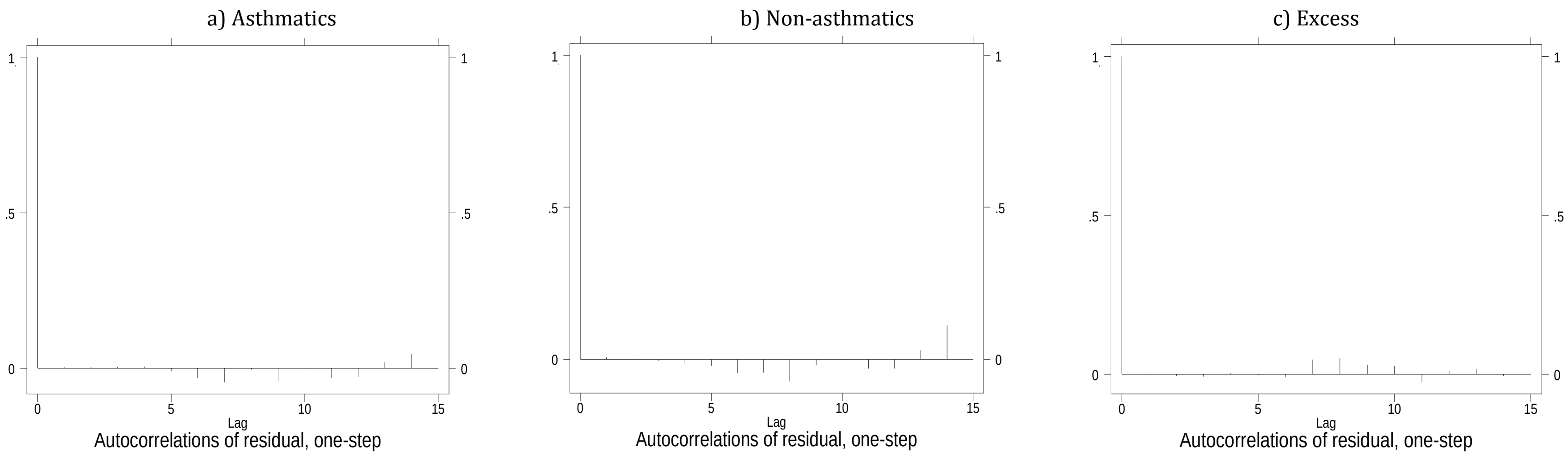


Figure G5. 22: England and Wales Emergency Counts - ACF plot ARIMA (7,0,1) null model, a) Asthmatics, b) Non-asthmatics, c) Excess.

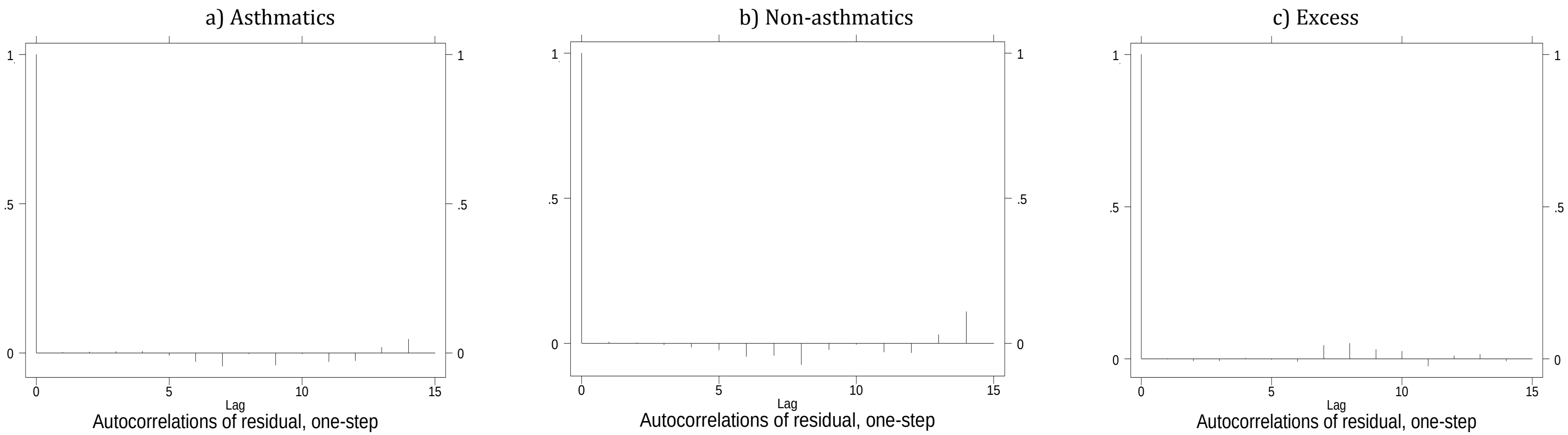


Figure G5. 23: England and Wales Emergency Counts - ACF plot ARIMA (7,0,1) model with PM_{10} Minimum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

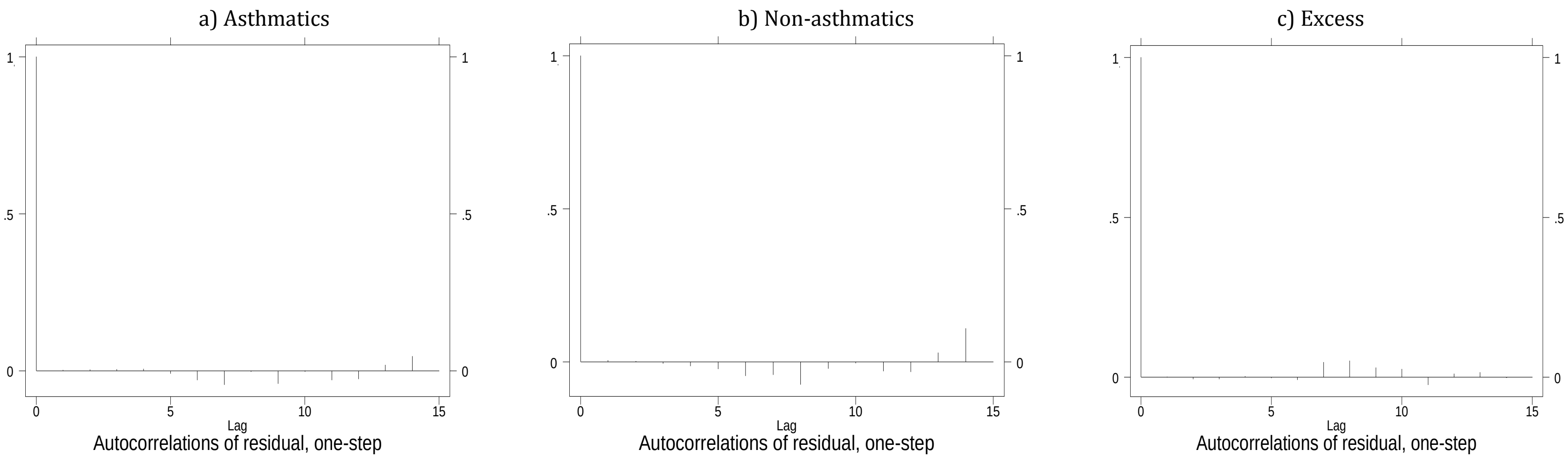


Figure G5. 24: England and Wales Emergency Counts - ACF plot ARIMA (7,0,1) model with PM_{10} mean measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

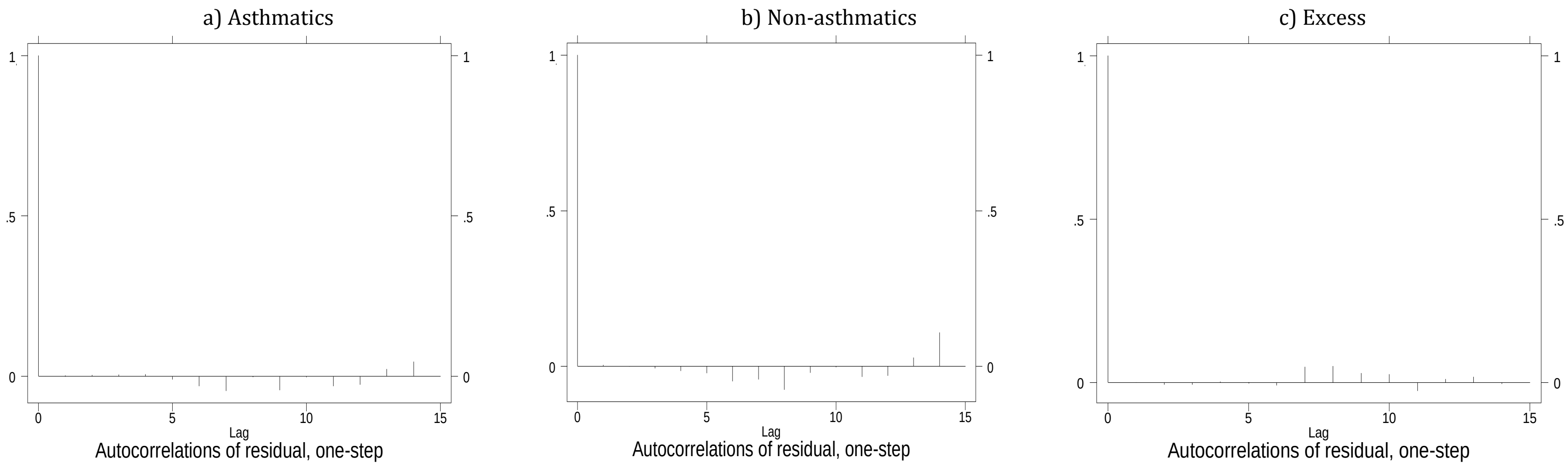


Figure G5. 25: England and Wales Emergency Counts - ACF plot ARIMA (7,0,1) model with PM_{10} maximum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

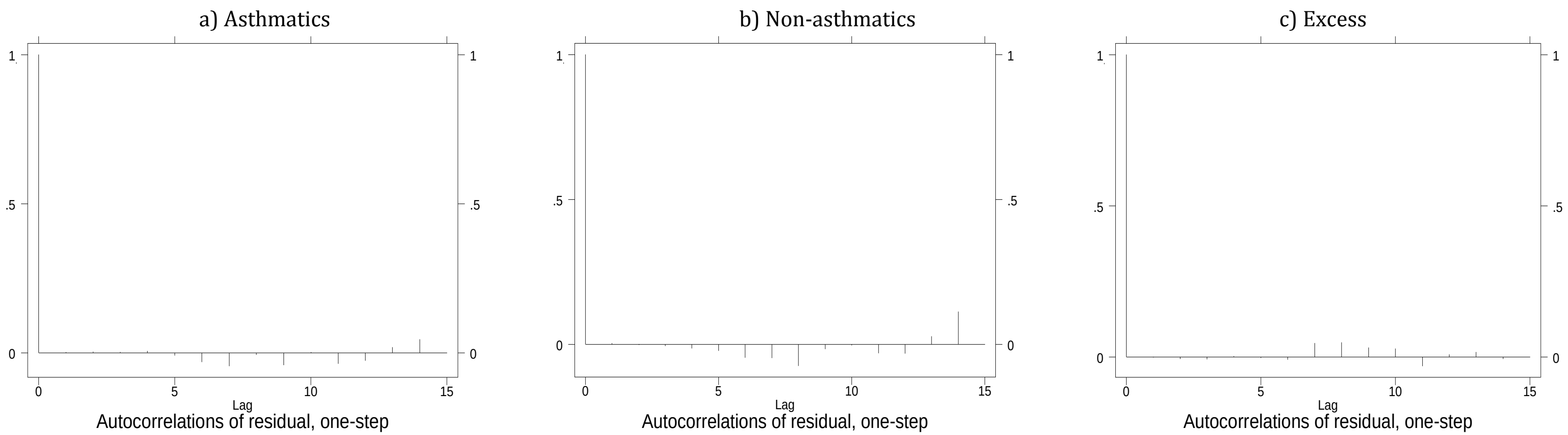


Figure G5. 26: England and Wales Emergency Counts - ACF plot ARIMA (7,0,1) Sun measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

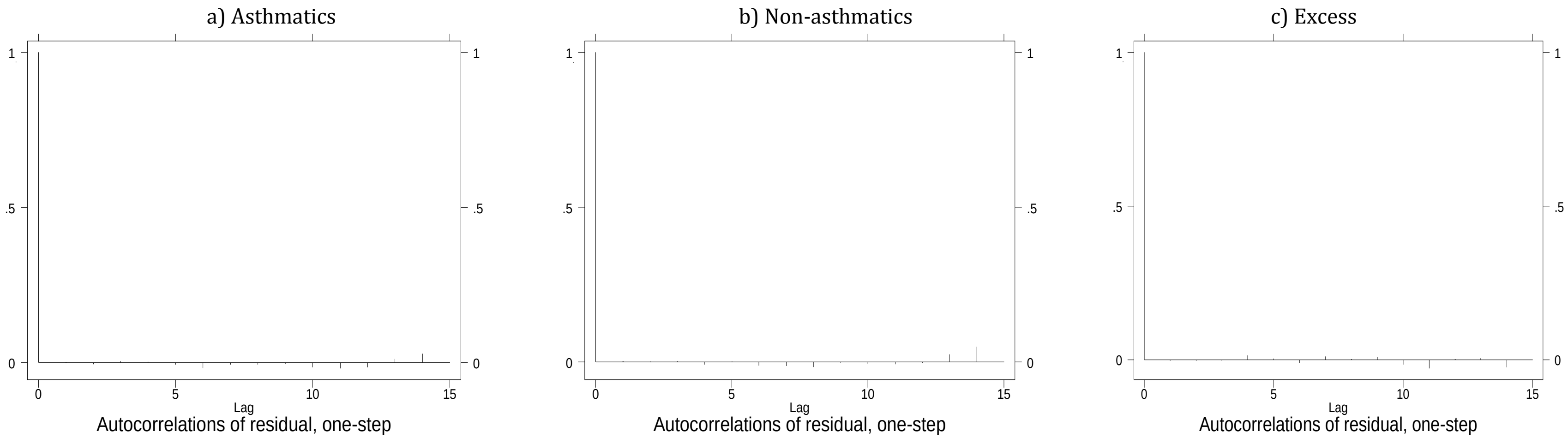


Figure G5. 27: England and Wales Out of Hours Counts - ACF plot ARIMA (7,0,1) null model, a) Asthmatics, b) Non-asthmatics, c) Excess.

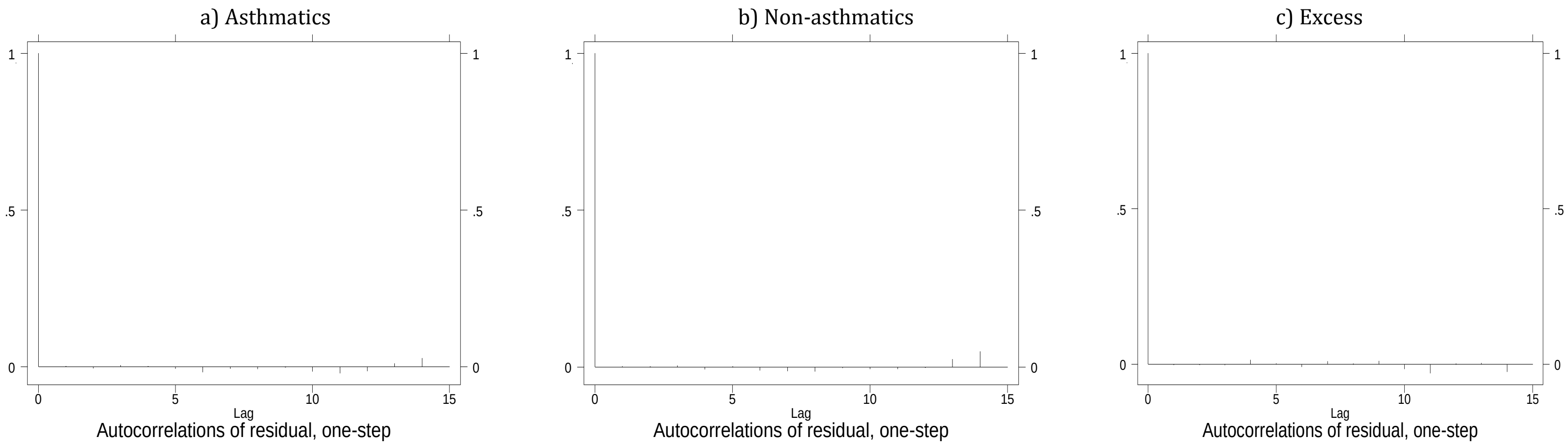


Figure G5. 28: England and Wales Out of Hours Counts - ACF plot ARIMA (7,0,1) model with CO Minimum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

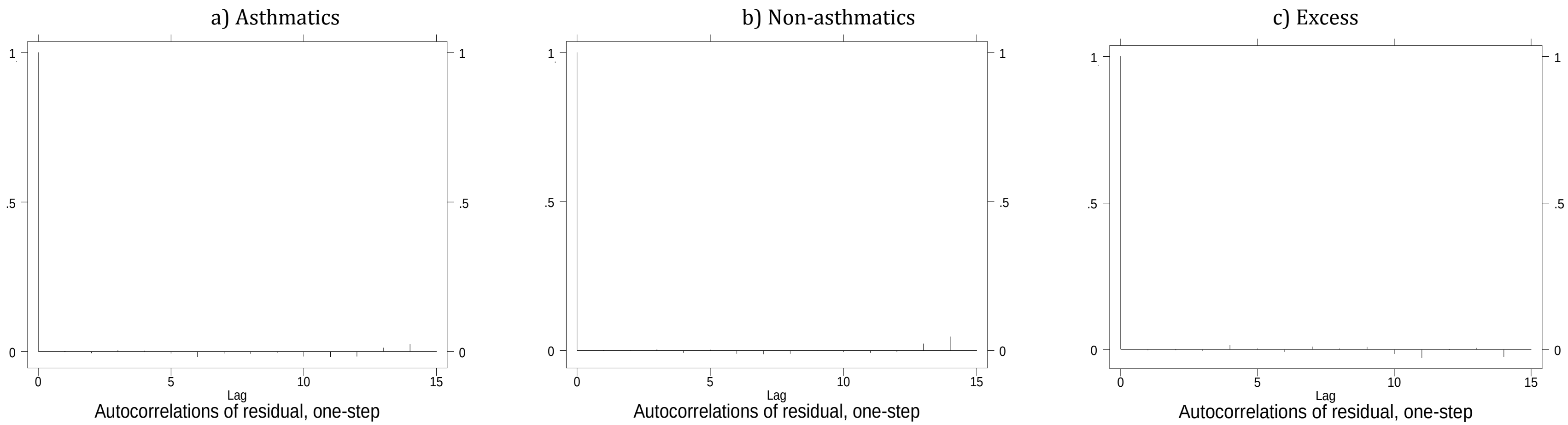


Figure G5. 29: England and Wales Out of Hours Counts - ACF plot ARIMA (7,0,1) model with CO mean measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

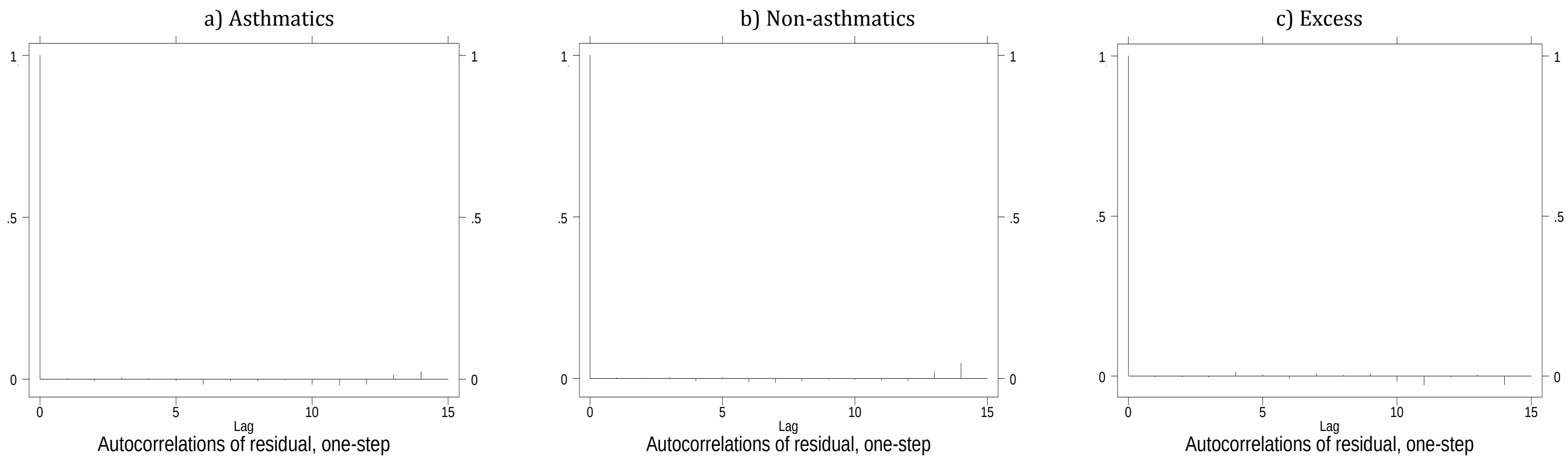


Figure G5. 30: England and Wales Out of Hours Counts - ACF plot ARIMA (7,0,1) model with CO maximum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

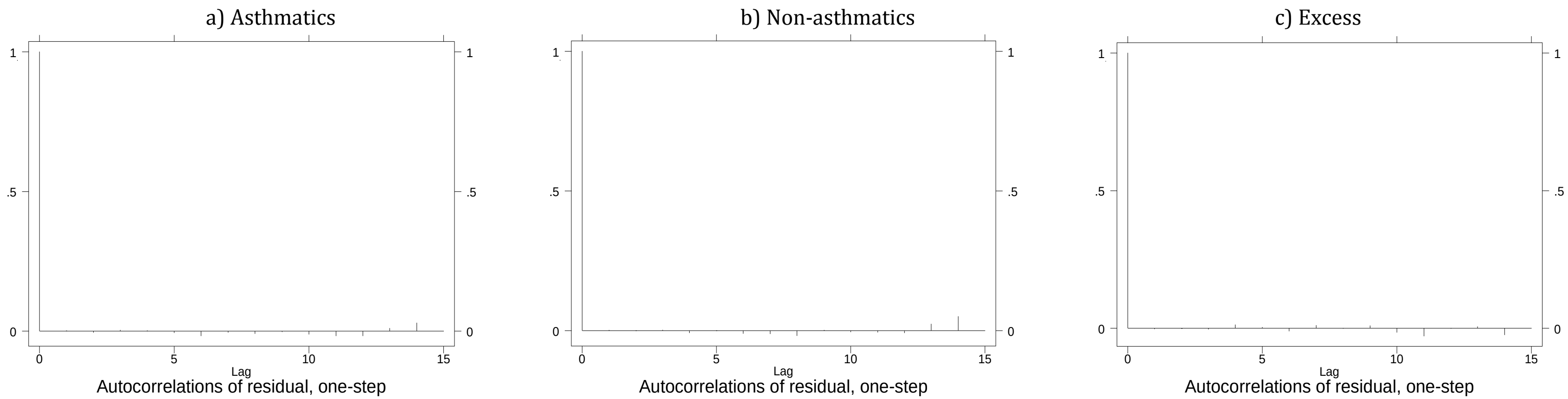


Figure G5. 31: England and Wales Out of Hours Counts - ACF plot ARIMA (7,0,1) Wind speed measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

G5.2. Trent Region Autoregression Autocorrelation Plots

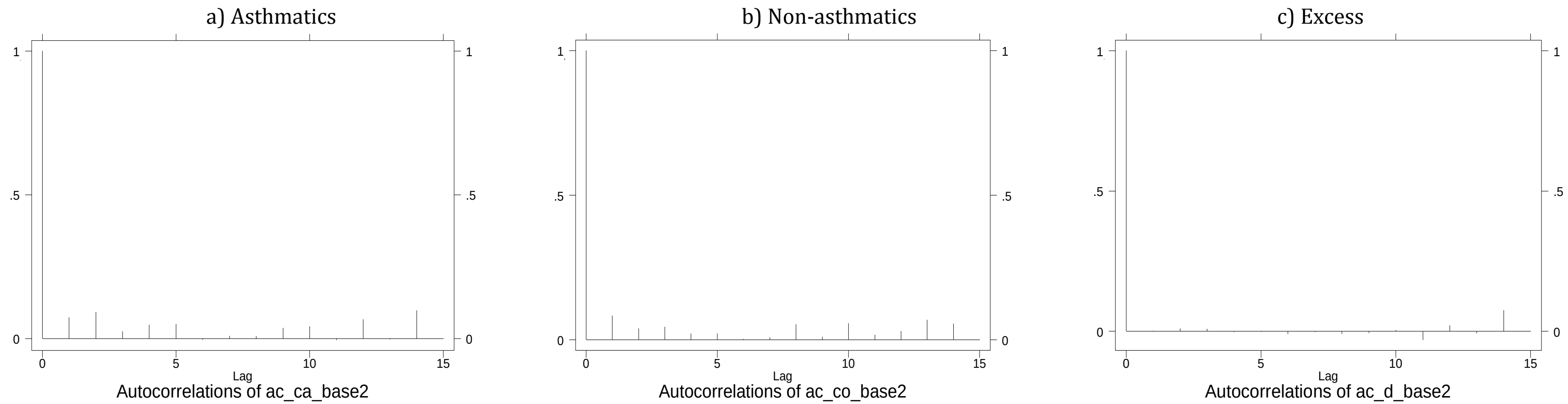


Figure G5. 32: Trent Region All Counts - ACF plot ARPOIS (7) null model, a) Asthmatics, b) Non-asthmatics, c) Excess.

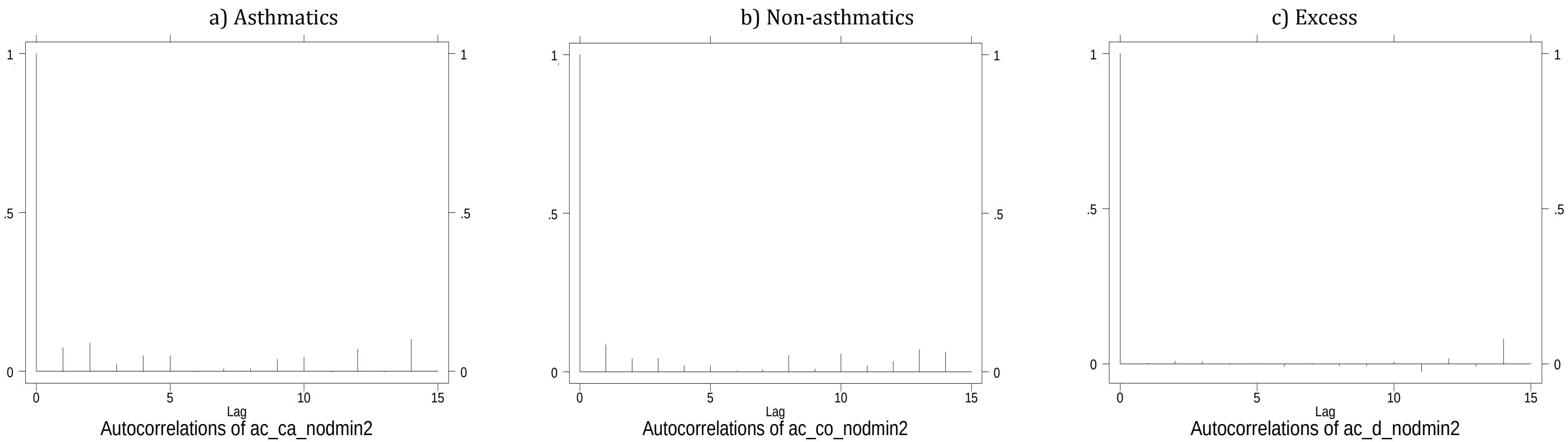


Figure G5. 33: Trent Region All Counts - ACF plot ARPOIS (7) model with NOD Minimum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

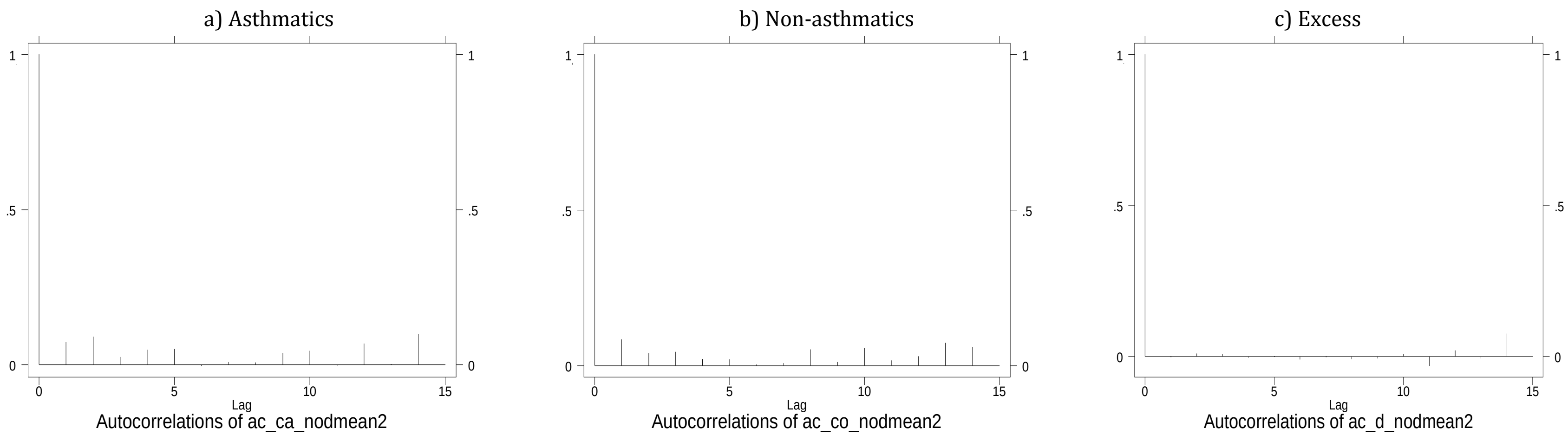


Figure G5. 34: Trent Region All Counts - ACF plot ARPOIS (7) model with NOD mean measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

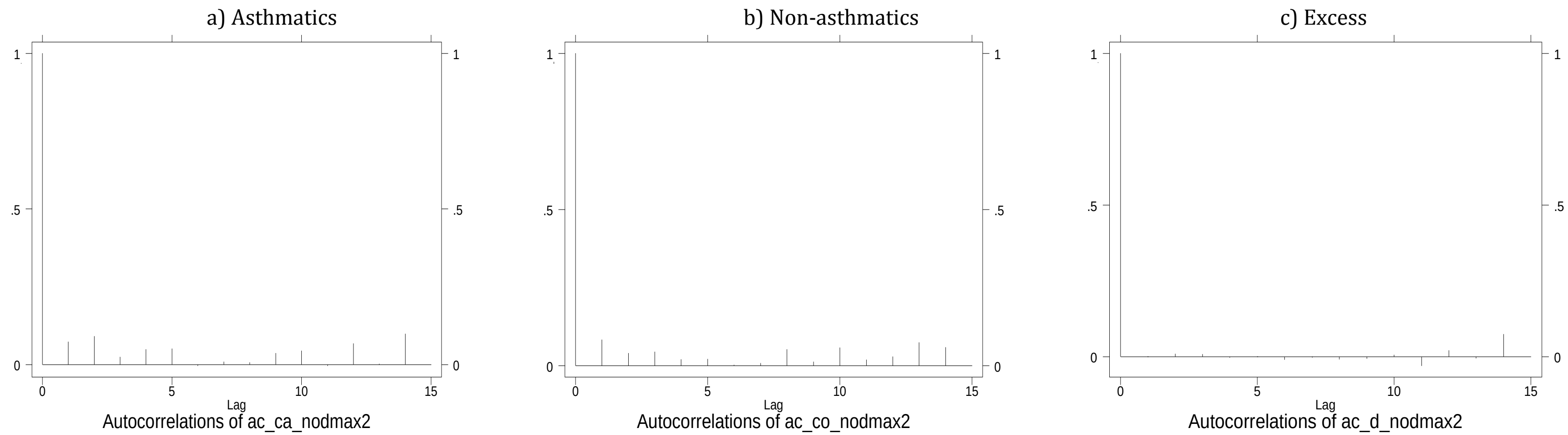


Figure G5. 35: Trent Region All Counts - ACF plot ARPOIS (7) model with NOD maximum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

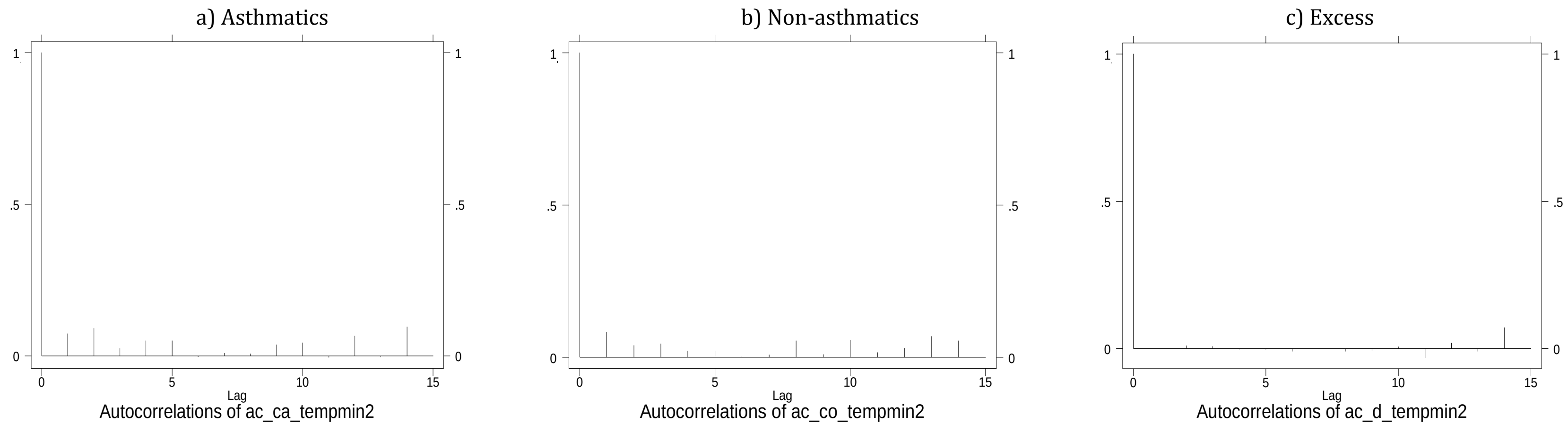


Figure G5. 36: Trent Region All Counts - ACF plot ARPOIS (7) model with Temperature Minimum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

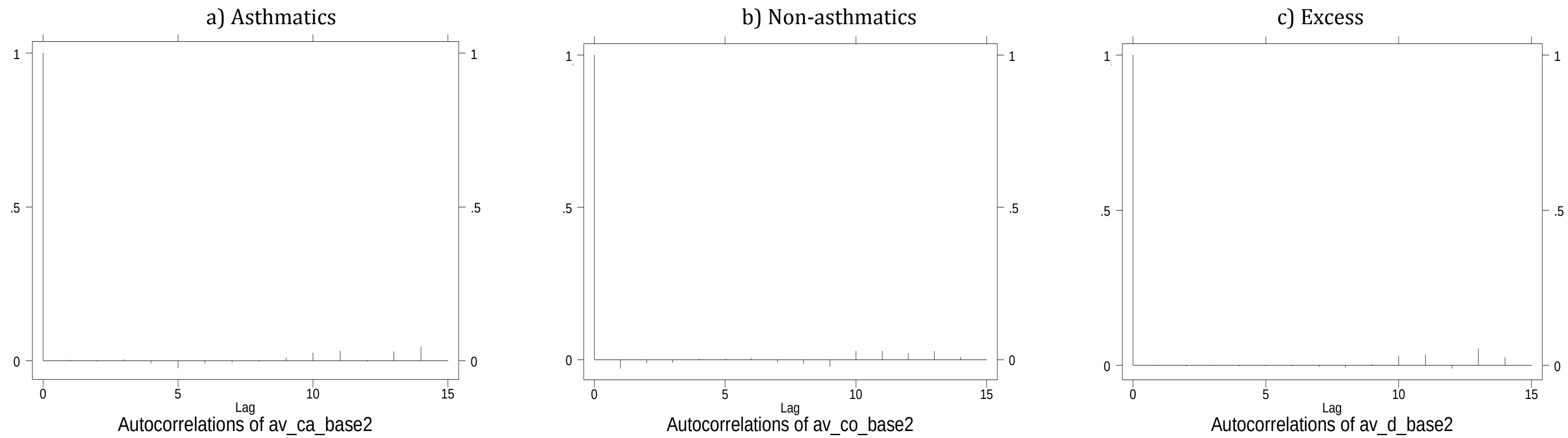


Figure G5. 37: Trent Region Acute Visits - ACF plot ARPOIS (7) null model, a) Asthmatics, b) Non-asthmatics, c) Excess.

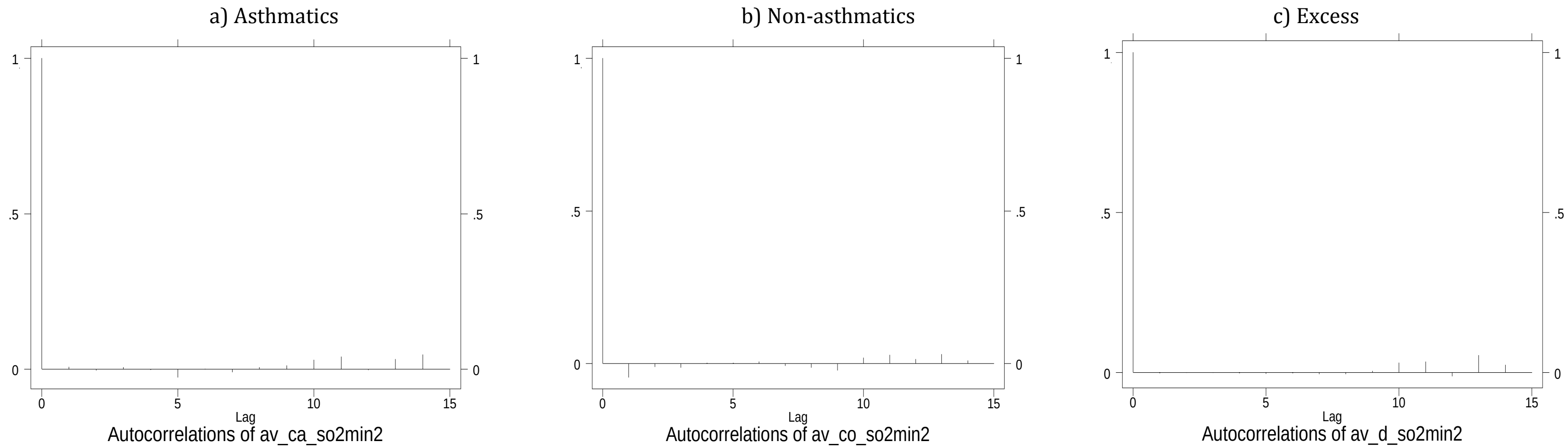


Figure G5. 38: Trent Region Acute Visits - ACF plot ARPOIS (7) model with SO_2 Minimum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

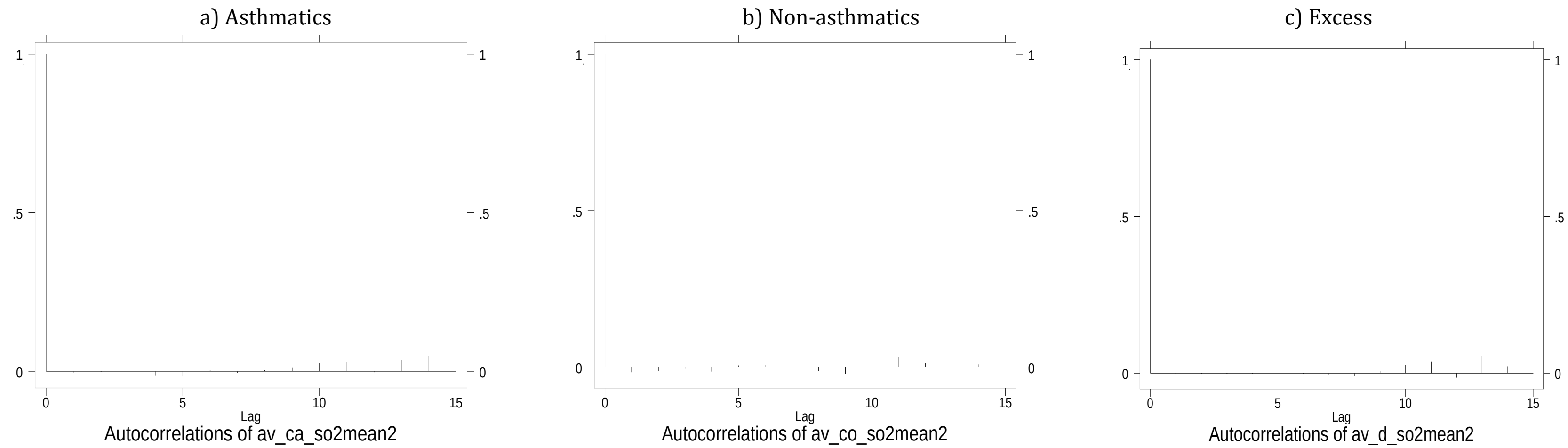


Figure G5. 39: Trent Region Acute Visits - ACF plot ARPOIS (7) model with SO_2 mean measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

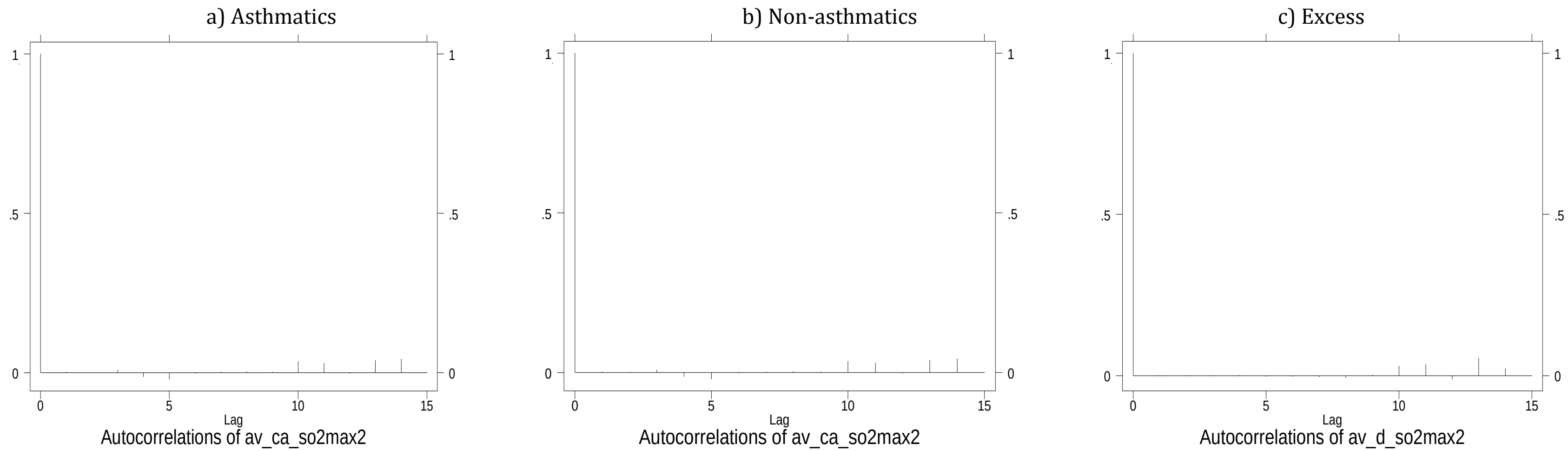


Figure G5. 40: Trent Region Acute Visits - ACF plot ARPOIS (7) model with SO_2 maximum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

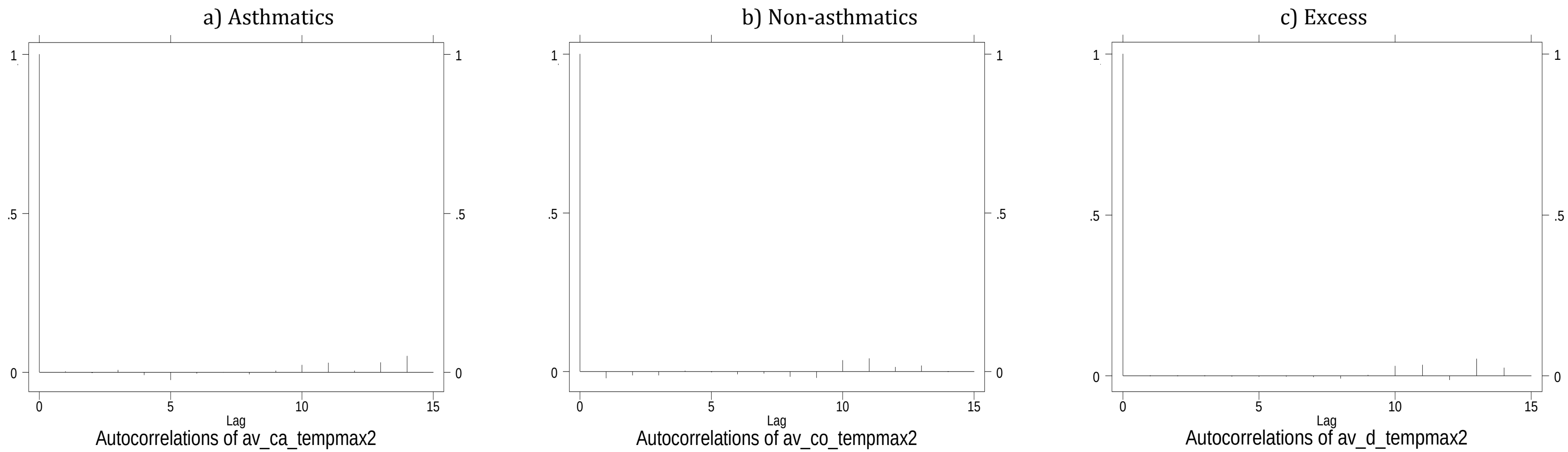


Figure G5. 41: Trent Region Acute Visits - ACF plot ARPOIS (7) Temperature maximum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

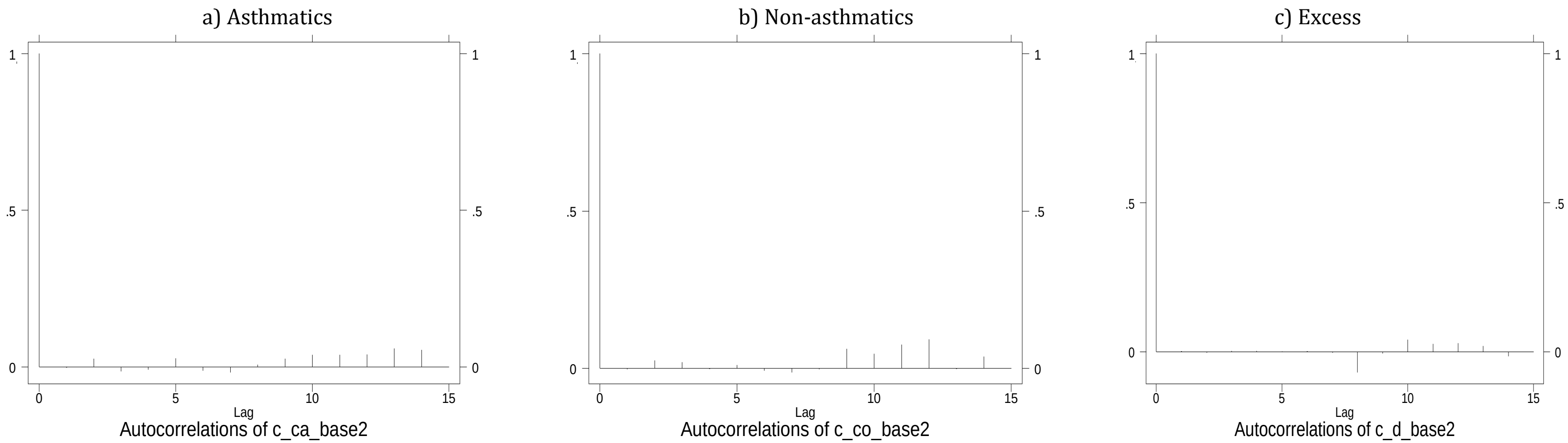


Figure G5. 42: Trent Region Casualty Counts - ACF plot ARPOIS (7) null model, a) Asthmatics, b) Non-asthmatics, c) Excess.

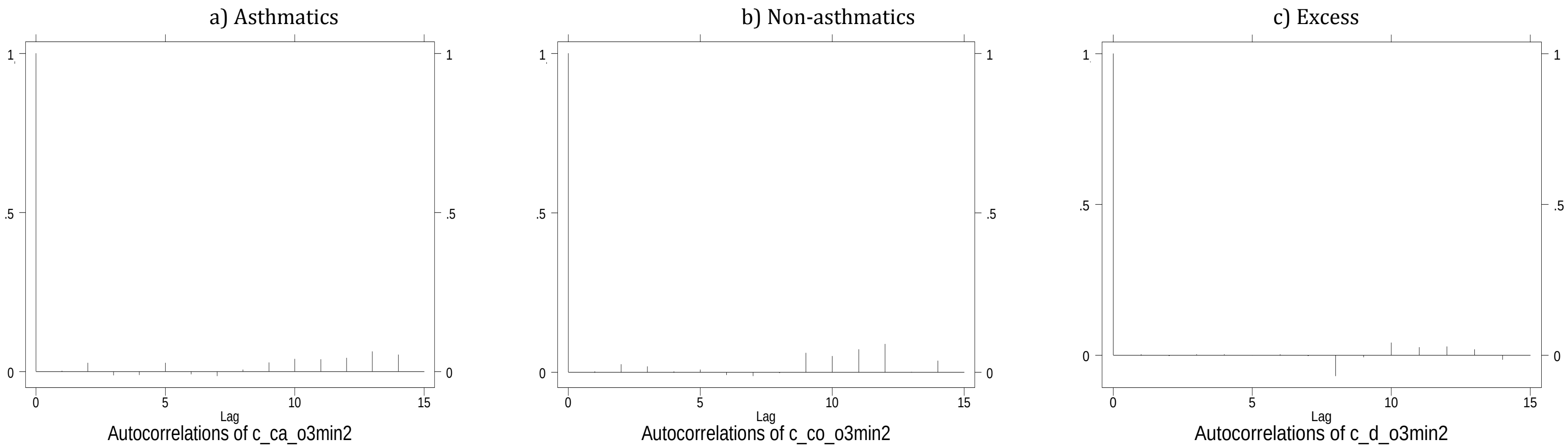


Figure G5. 43: Trent Region Casualty Counts - ACF plot ARPOIS (7) model with O_3 Minimum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

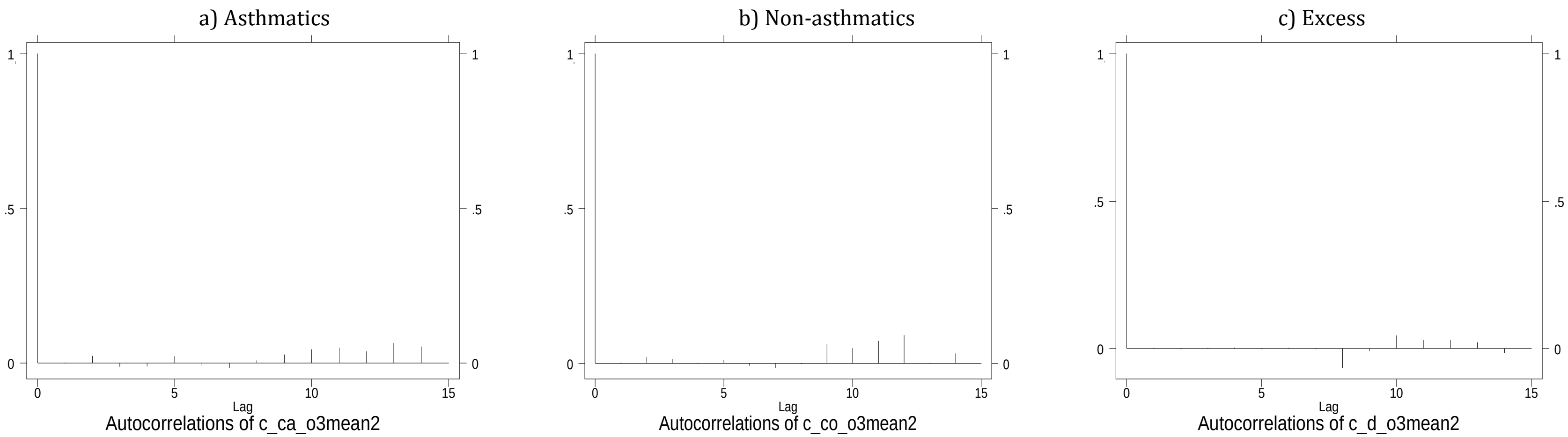


Figure G5. 44: Trent Region Casualty Counts - ACF plot ARPOIS (7) model with O_2 mean measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

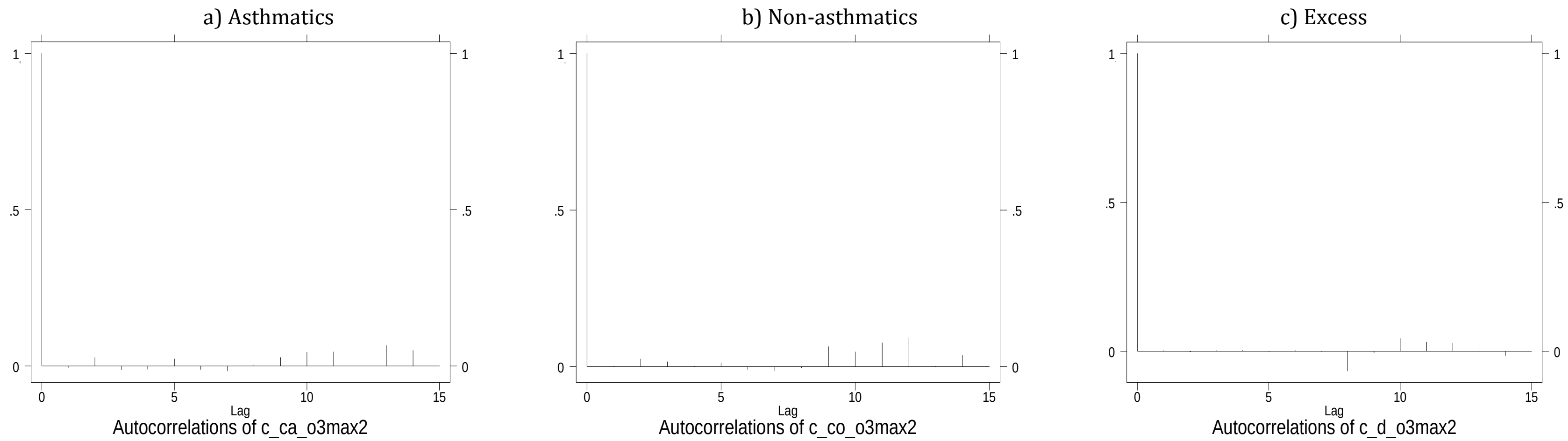


Figure G5. 45: Trent Region Casualty Counts - ACF plot ARPOIS (7) model with O_3 maximum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

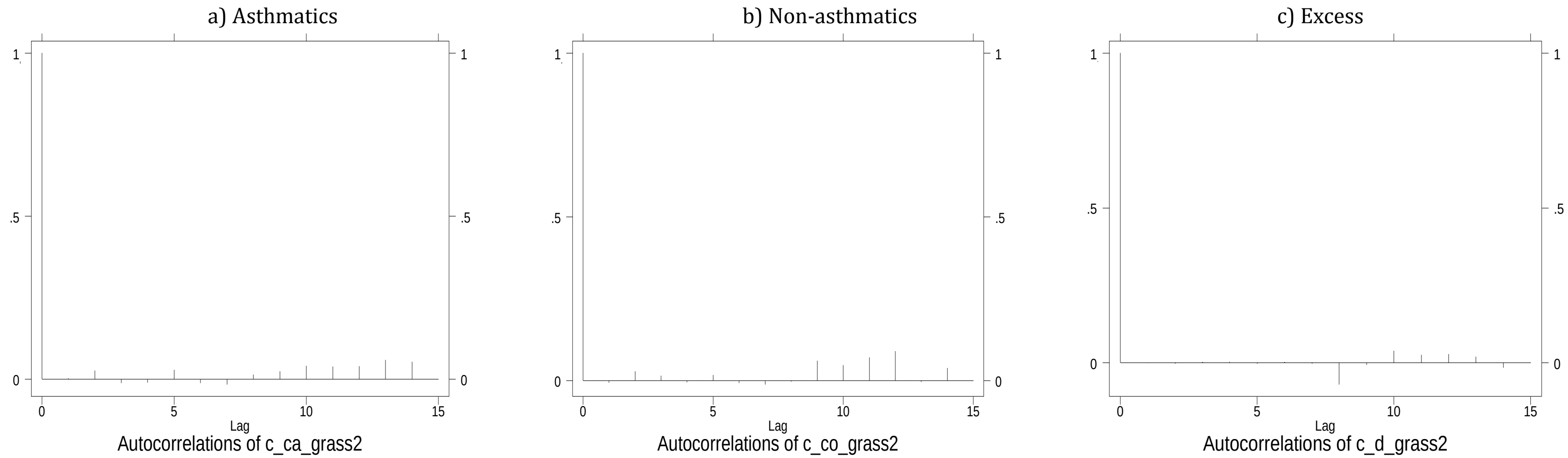


Figure G5. 46: Trent Region Casualty Counts - ACF plot ARPOIS (7) Grass measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

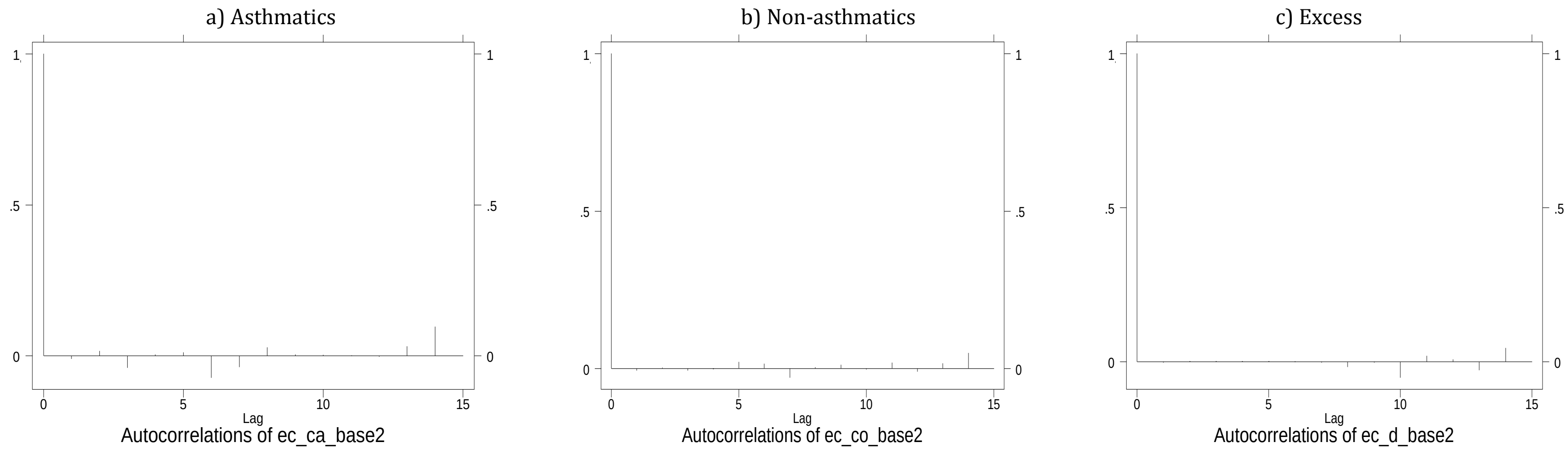


Figure G5. 47: Trent Region Emergency Consultations - ACF plot ARPOIS (7) null model, a) Asthmatics, b) Non-asthmatics, c) Excess.

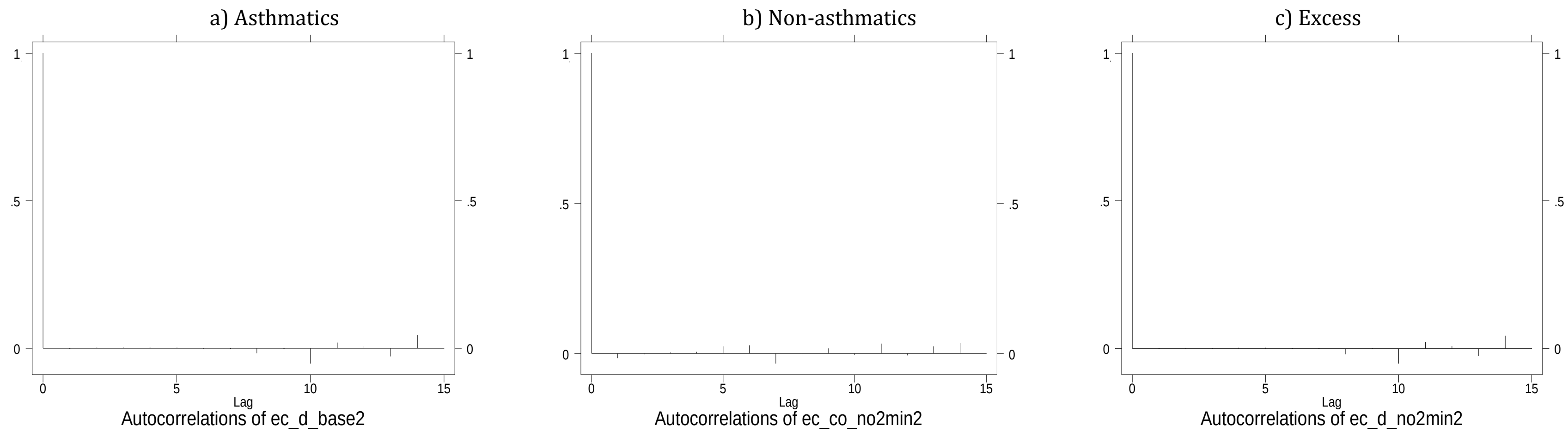


Figure G5. 48: Trent Region Emergency Consultations - ACF plot ARPOIS (7) model with NO_2 Minimum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

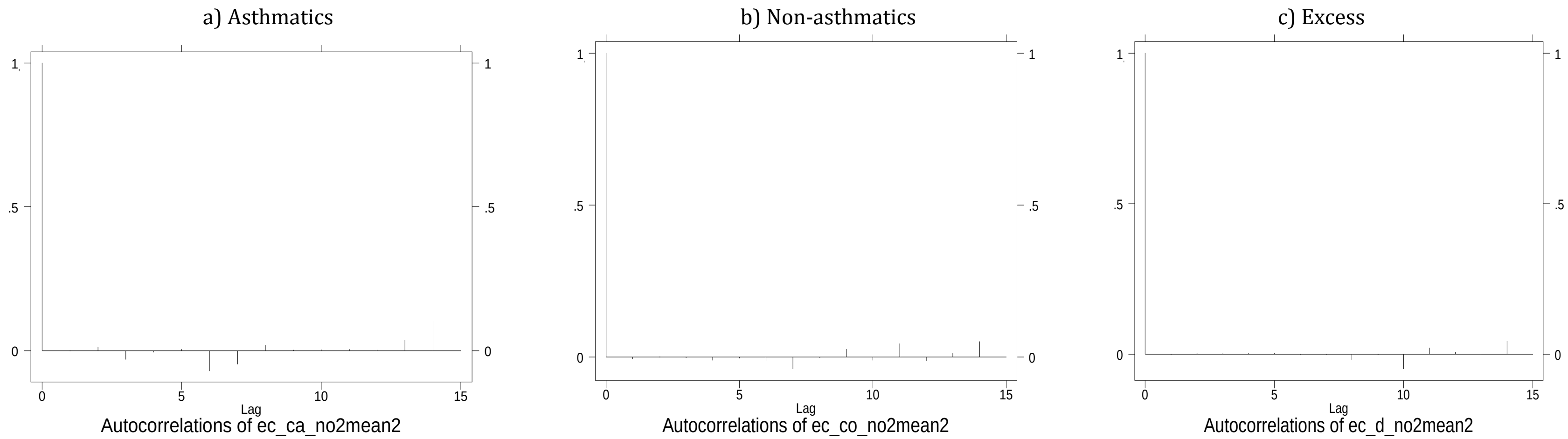


Figure G5. 49: Trent Region Emergency Consultations - ACF plot ARPOIS (7) model with NO_2 mean measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

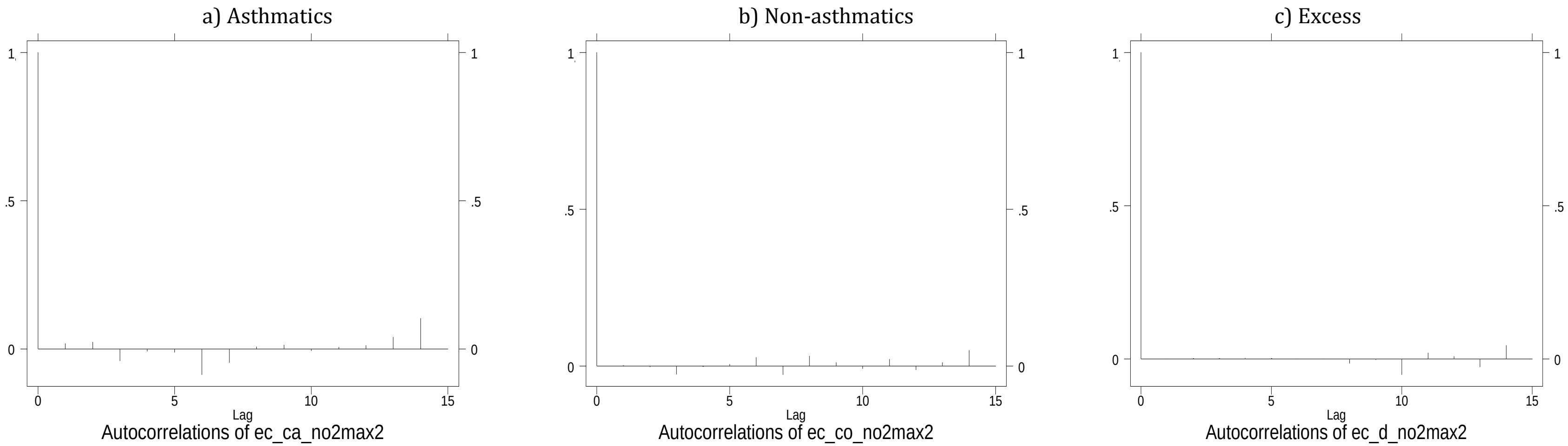


Figure G5. 50: Trent Region Emergency Consultations - ACF plot ARPOIS (7) model with NO_2 maximum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

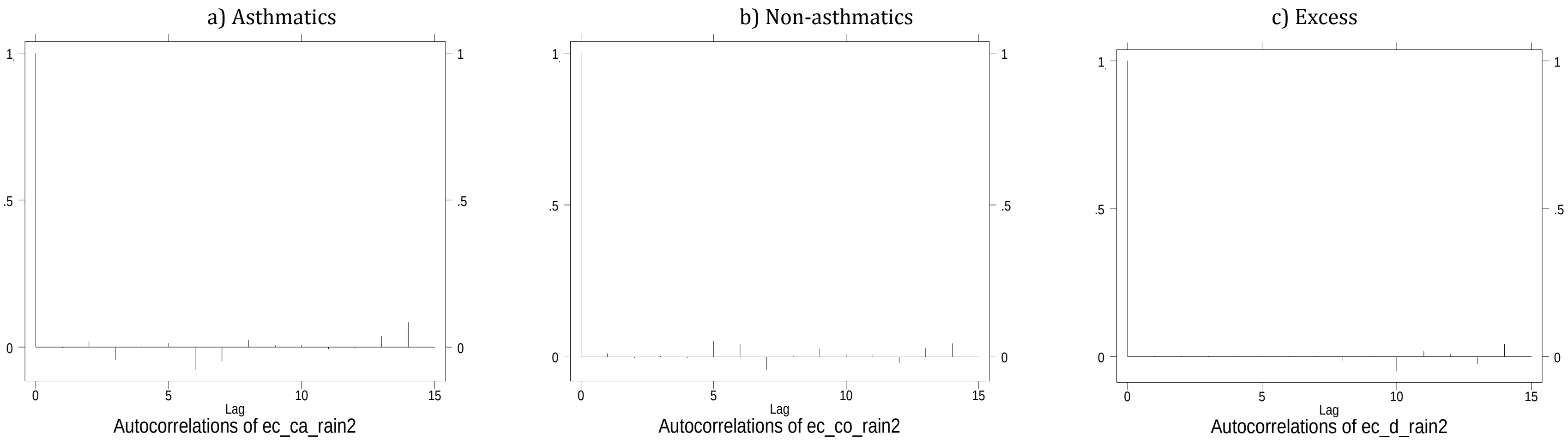


Figure G5. 51: Trent Region Emergency Consultations - ACF plot ARPOIS (7) Rain measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

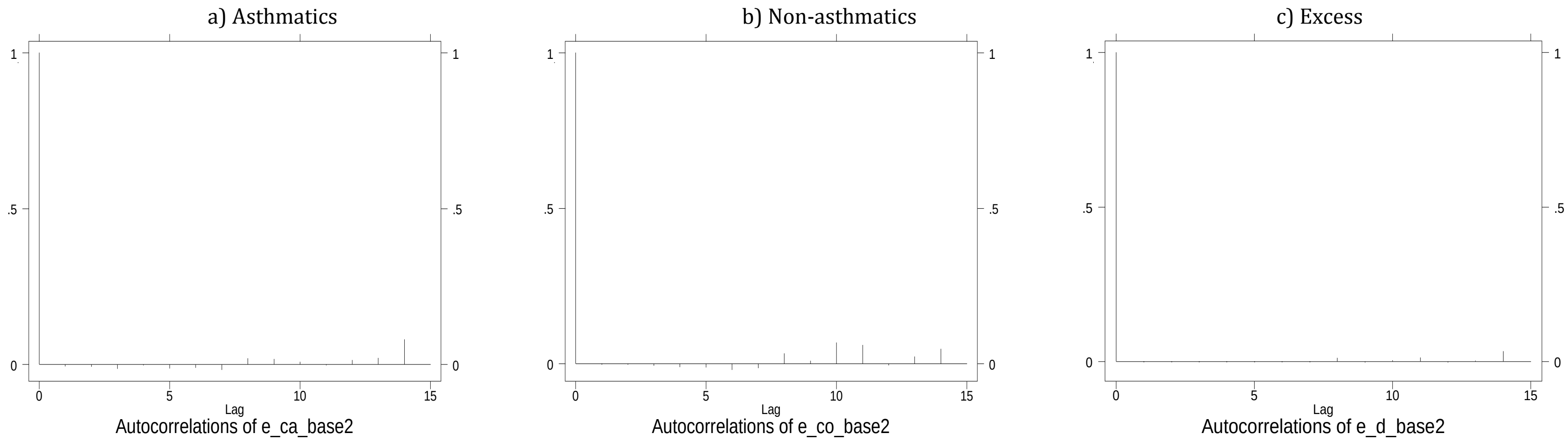


Figure G5. 52: Trent Region Emergency Counts - ACF plot ARPOIS (7) null model, a) Asthmatics, b) Non-asthmatics, c) Excess.

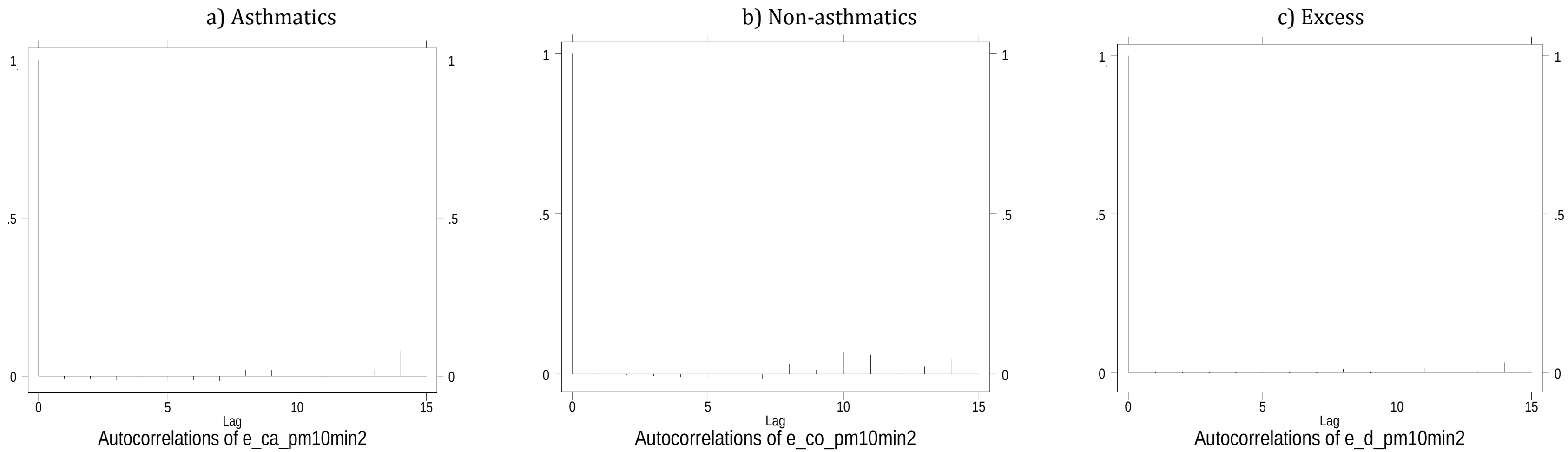


Figure G5. 53: Trent Region Emergency Counts - ACF plot ARPOIS (7) model with PM_{10} Minimum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

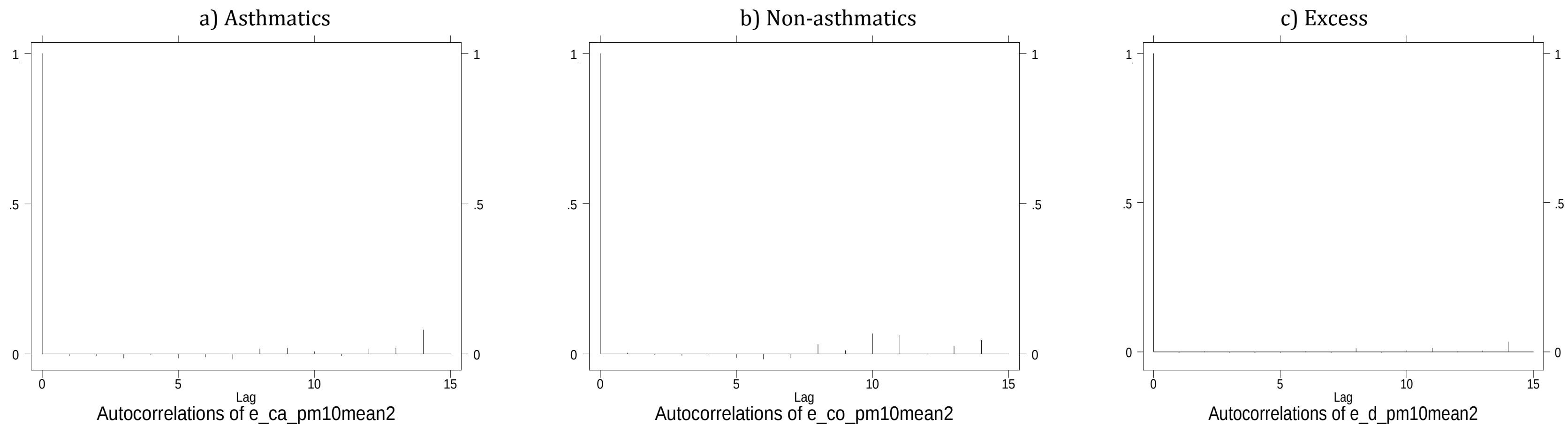


Figure G5. 54: Trent Region Emergency Counts - ACF plot ARPOIS (7) model with PM_{10} mean measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

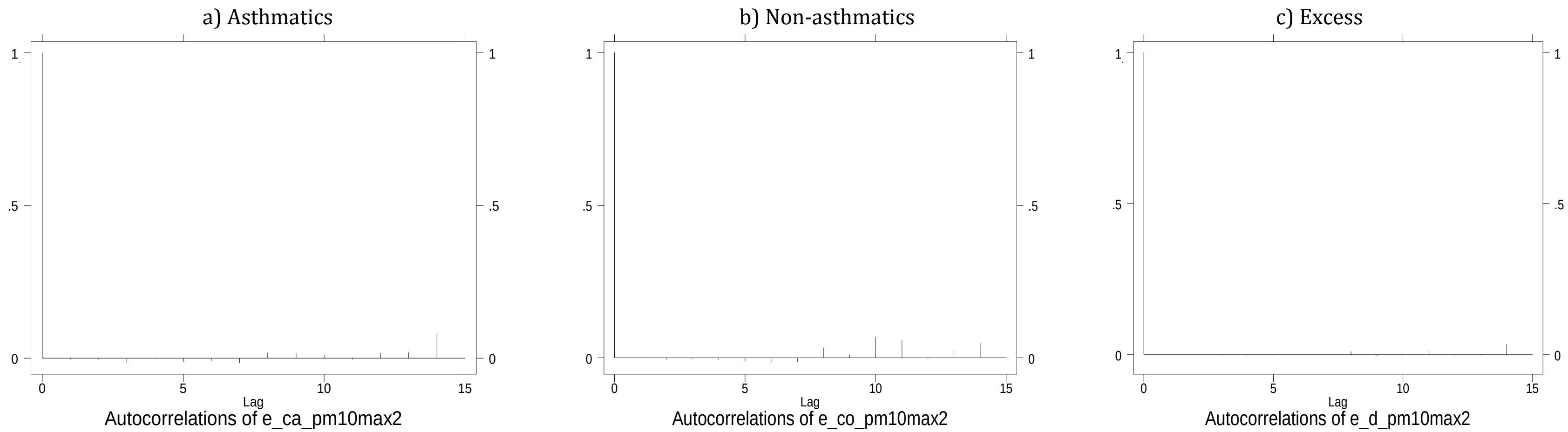


Figure G5. 55: Trent Region Emergency Counts - ACF plot ARPOIS (7) model with PM_{10} maximum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

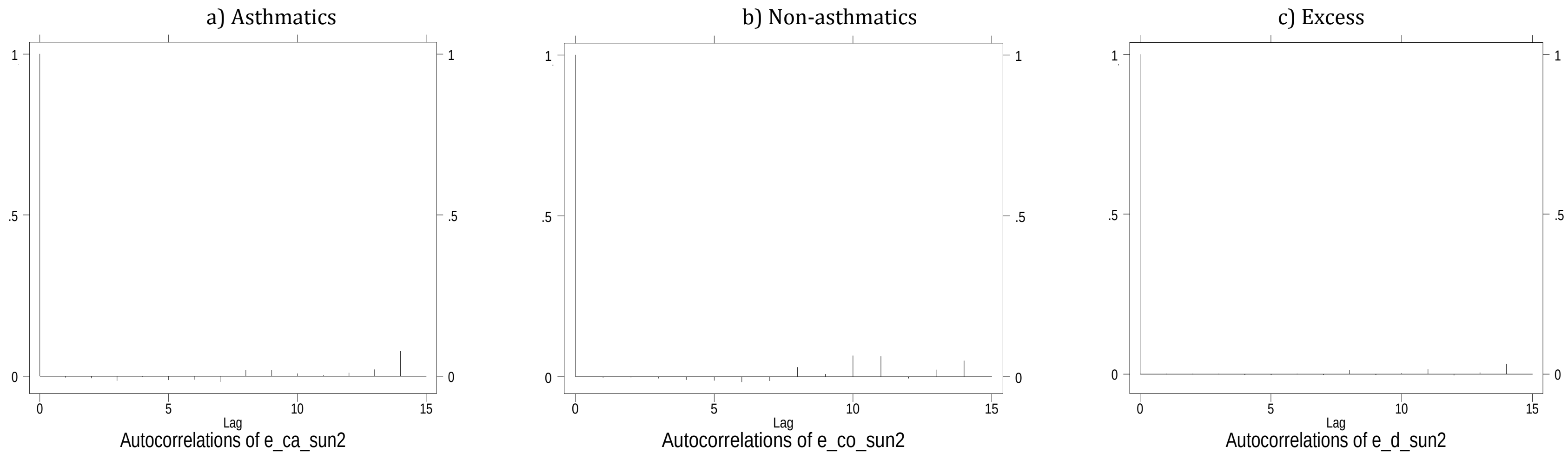


Figure G5. 56: Trent Region Emergency Counts - ACF plot ARPOIS (7) Sun measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

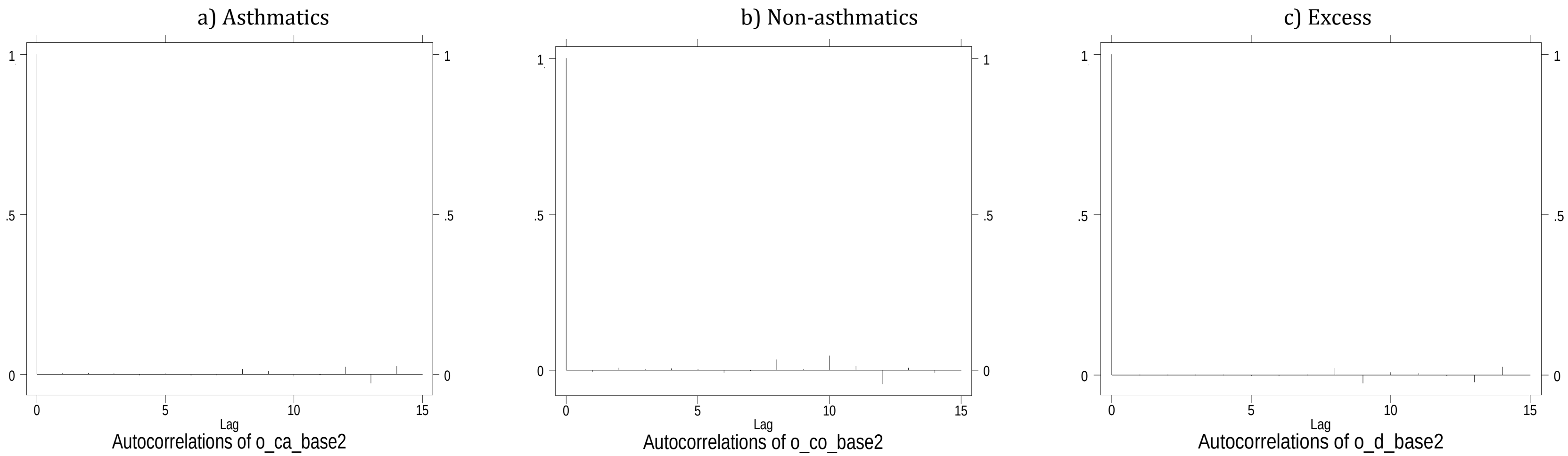


Figure G5. 57: Trent Region Out of Hours Counts - ACF plot ARPOIS (7) null model, a) Asthmatics, b) Non-asthmatics, c) Excess.

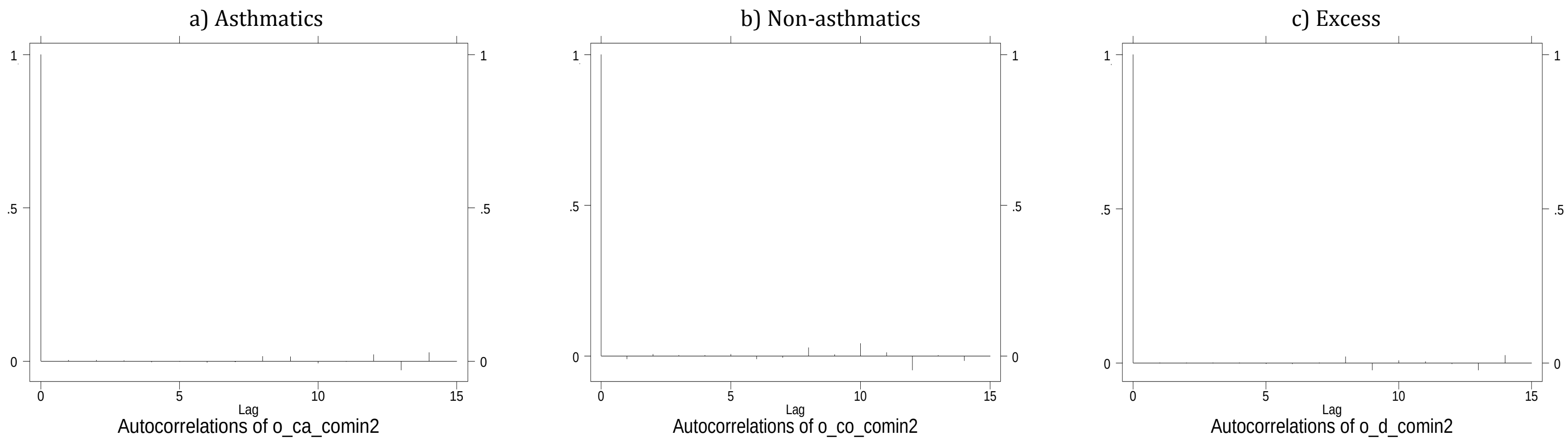


Figure G5. 58: Trent Region Out of Hours Counts - ACF plot ARPOIS (7) model with CO Minimum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

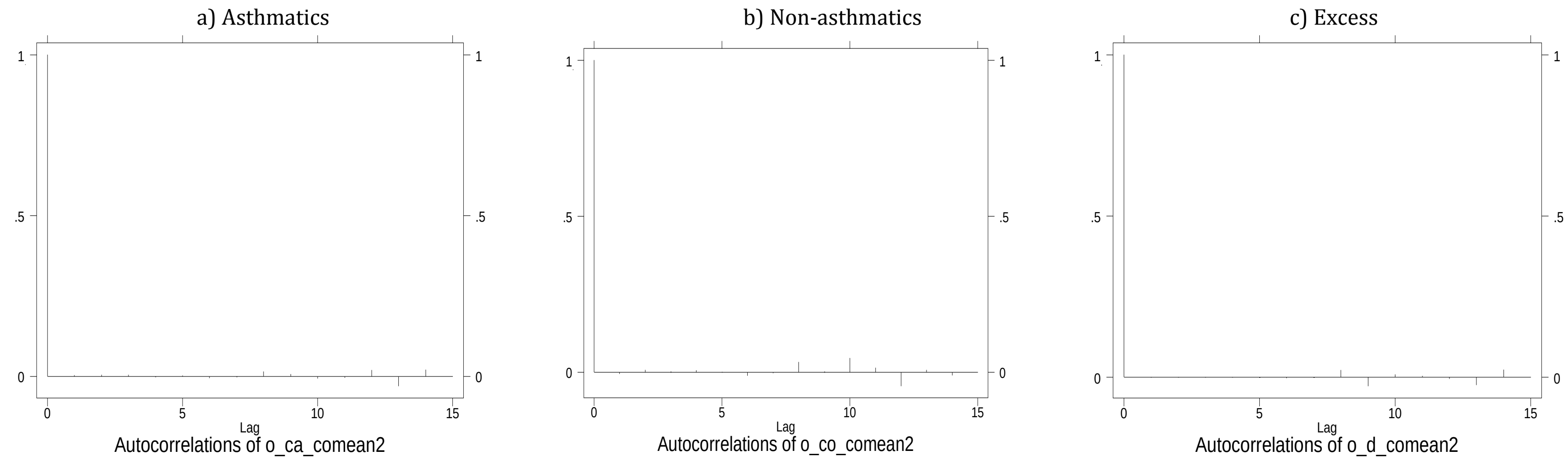


Figure G5. 59: Trent Region Out of Hours Counts - ACF plot ARPOIS (7) model with CO mean measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

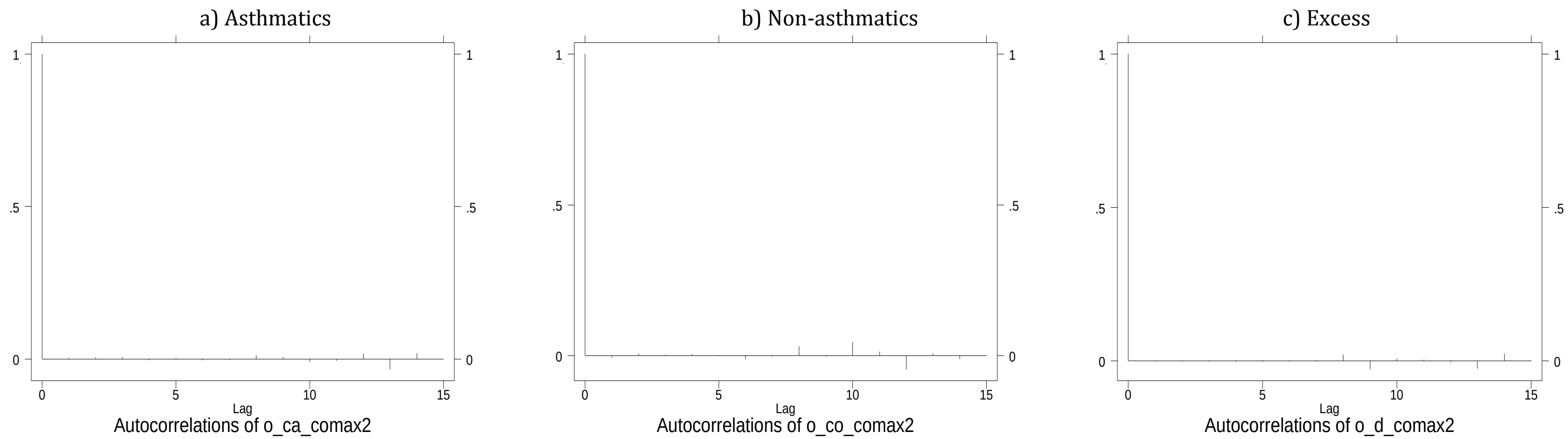


Figure G5. 60: Trent Region Out of Hours Counts - ACF plot ARPOIS (7) model with CO maximum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

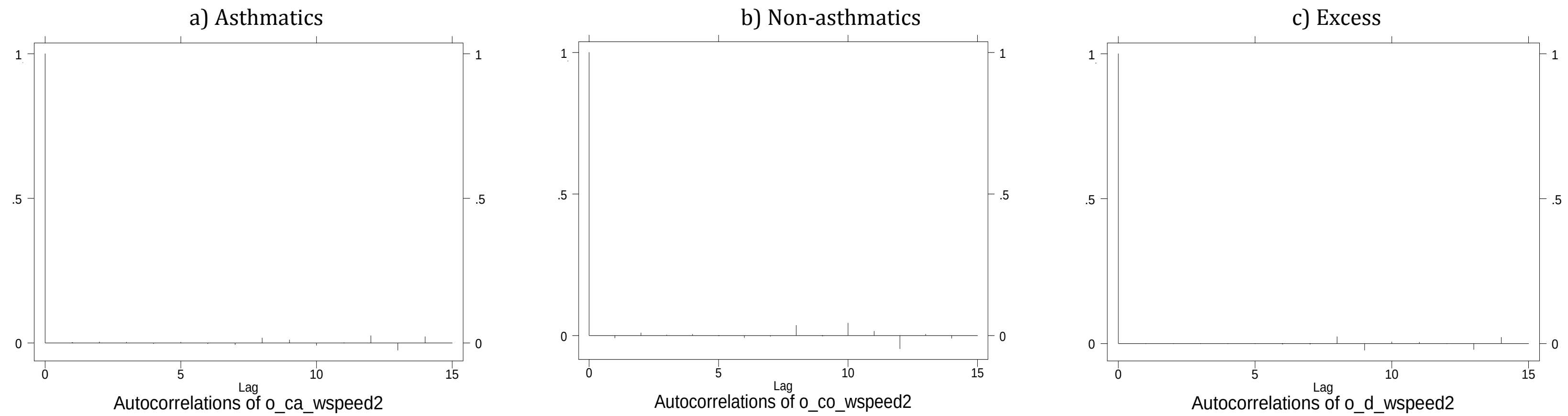


Figure G5. 61: Trent Region Out of Hours Counts - ACF plot ARPOIS (7) Wind speed measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

G5.3. Sheffield Autoregression Autocorrelation Plots

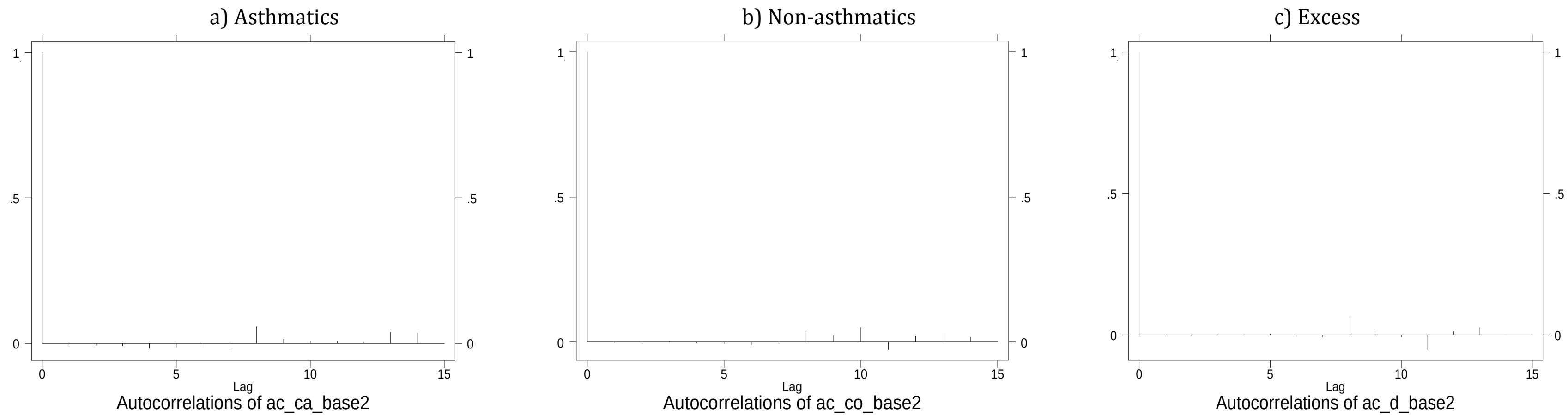


Figure G5. 62: Sheffield All Counts - ACF plot ARPOIS (7) null model, a) Asthmatics, b) Non-asthmatics, c) Excess.

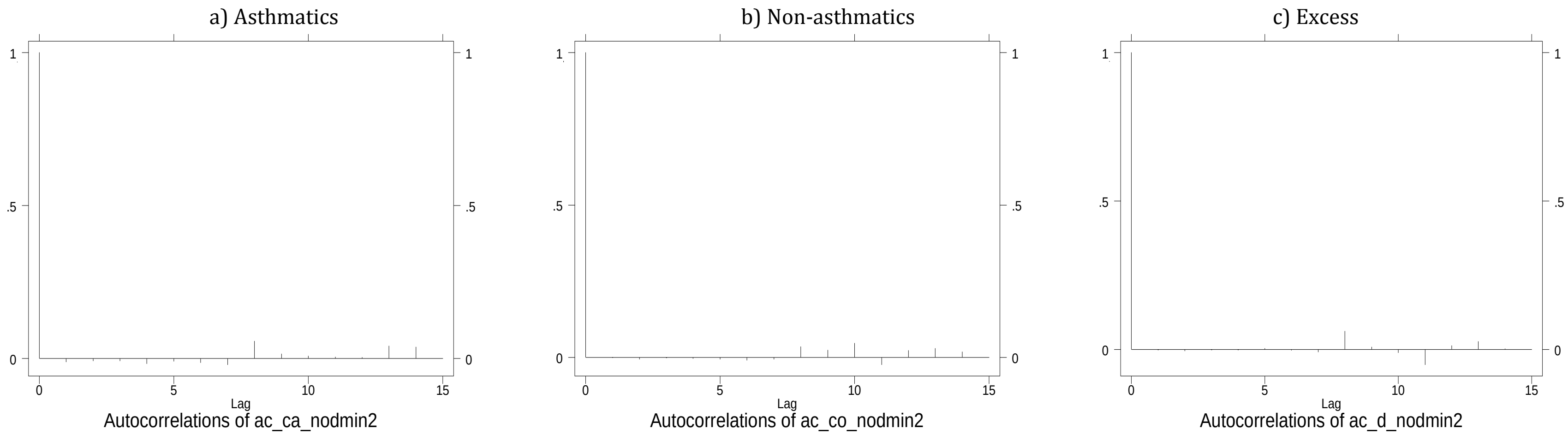


Figure G5. 63: Sheffield All Counts - ACF plot ARPOIS (7) model with NOD Minimum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

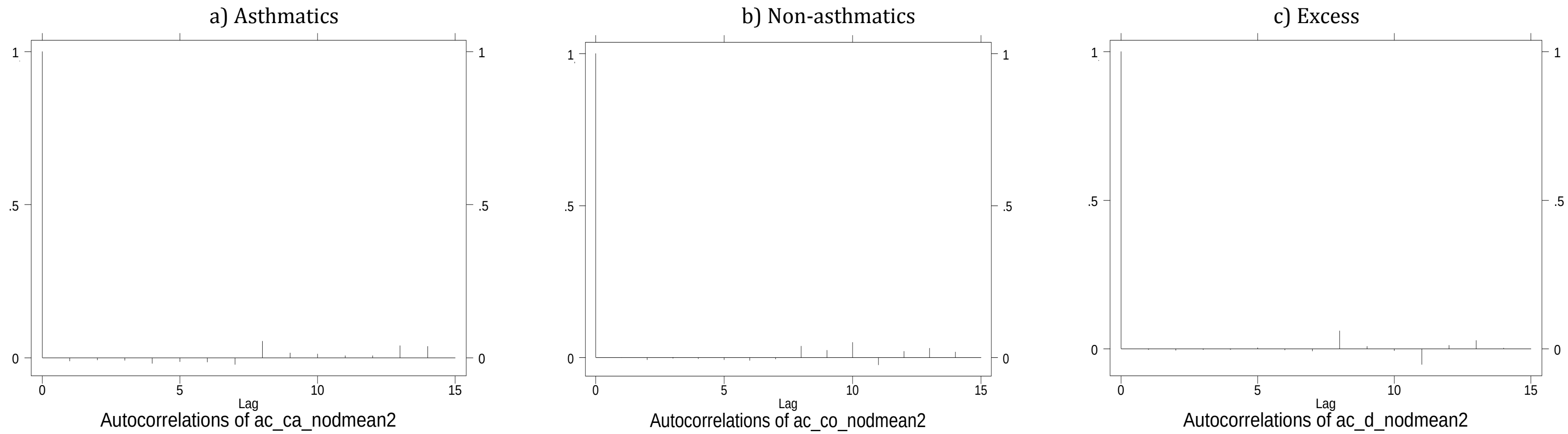


Figure G5. 64: Sheffield All Counts - ACF plot ARPOIS (7) model with NOD mean measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

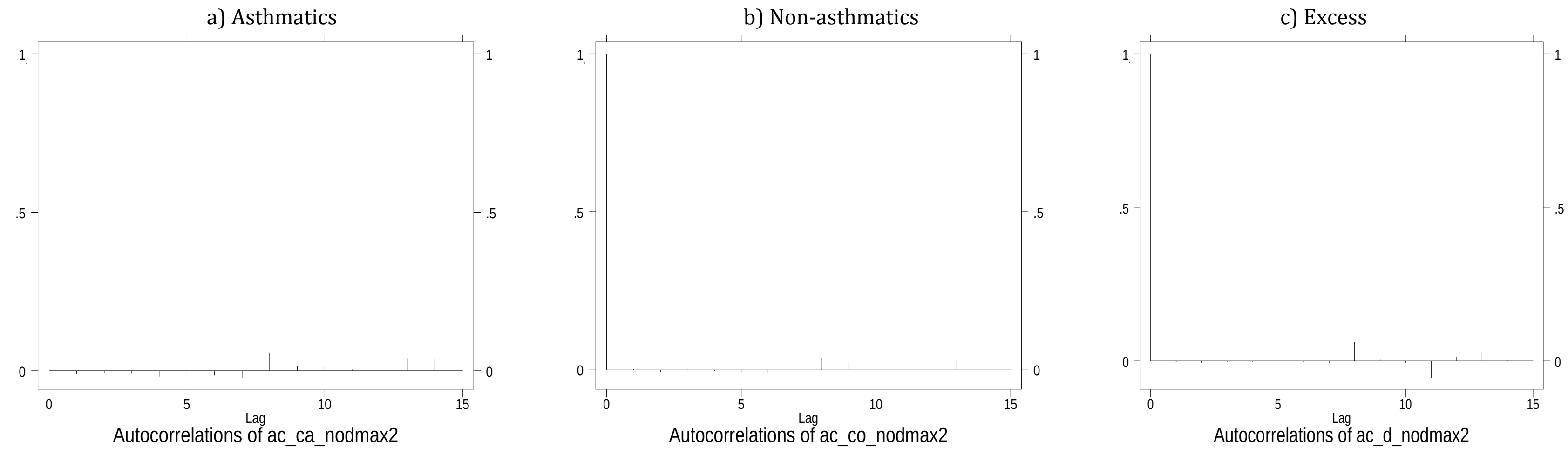


Figure G5. 65: Sheffield All Counts - ACF plot ARPOIS (7) model with NOD maximum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

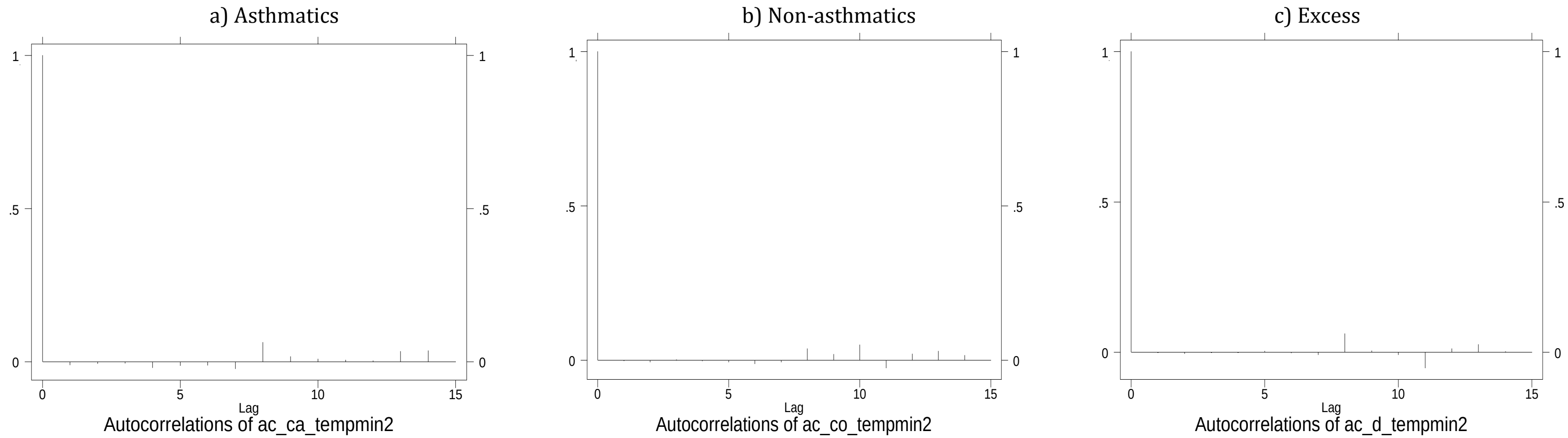


Figure G5. 66: Sheffield All Counts - ACF plot ARPOIS (7) model with Temperature Minimum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

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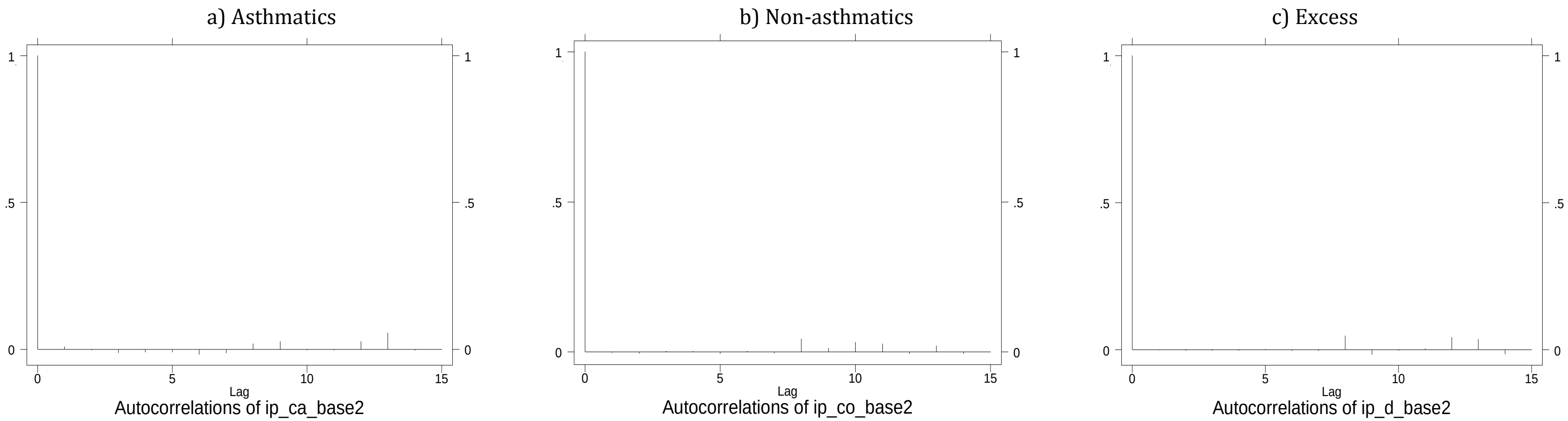

Figure G5. 67: Sheffield Admissions - ACF plot ARPOIS (7) null model, a) Asthmatics, b) Non-asthmatics, c) Excess

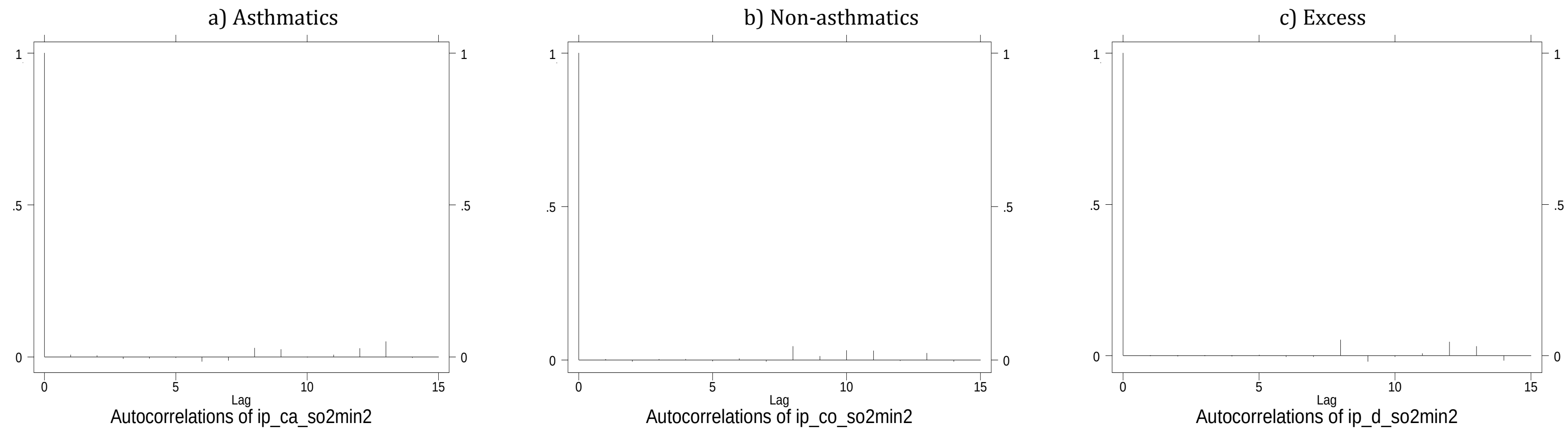

Figure G5. 68: Sheffield Admissions - ACF plot ARPOIS (7) model with SO_2 Minimum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

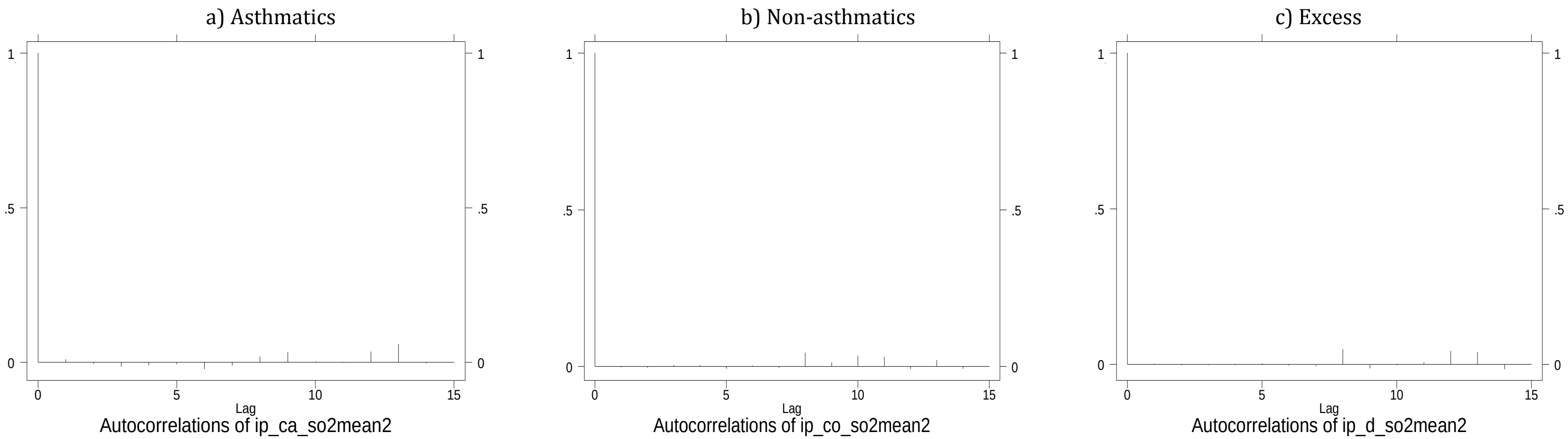

Figure G5. 69: Sheffield Admissions - ACF plot ARPOIS (7) model with SO_2 mean measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

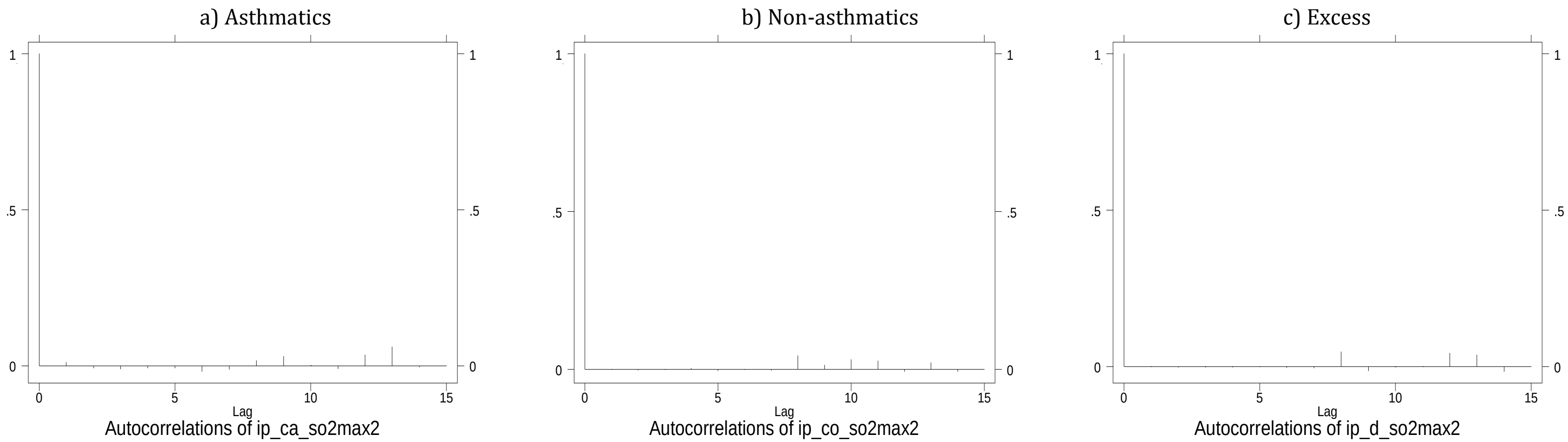

Figure G5. 70: Sheffield Admissions - ACF plot ARPOIS (7) model with SO_2 maximum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

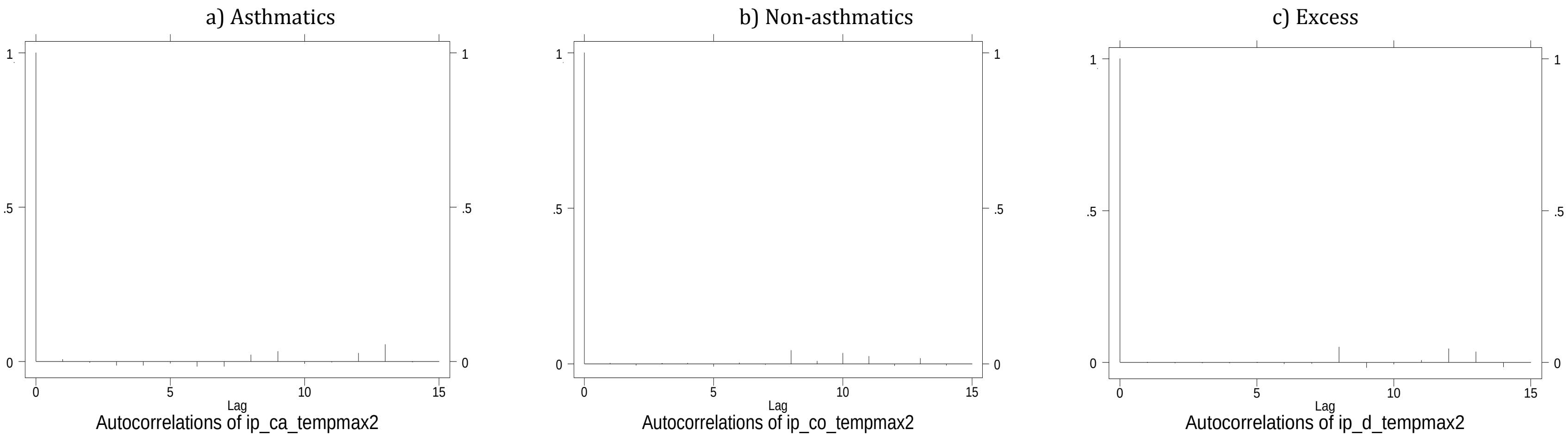

Figure G5. 71: Sheffield Admissions - ACF plot ARPOIS (7) Temperature maximum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

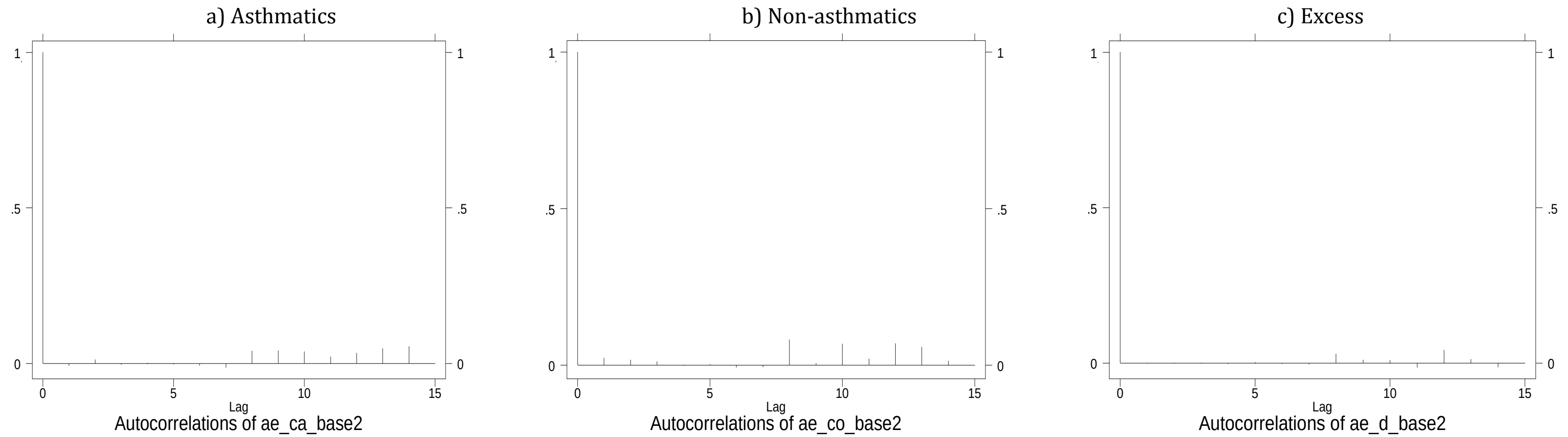

Figure G5. 72: Sheffield A&E Counts - ACF plot ARPOIS (7) null model, a) Asthmatics, b) Non-asthmatics, c) Excess.

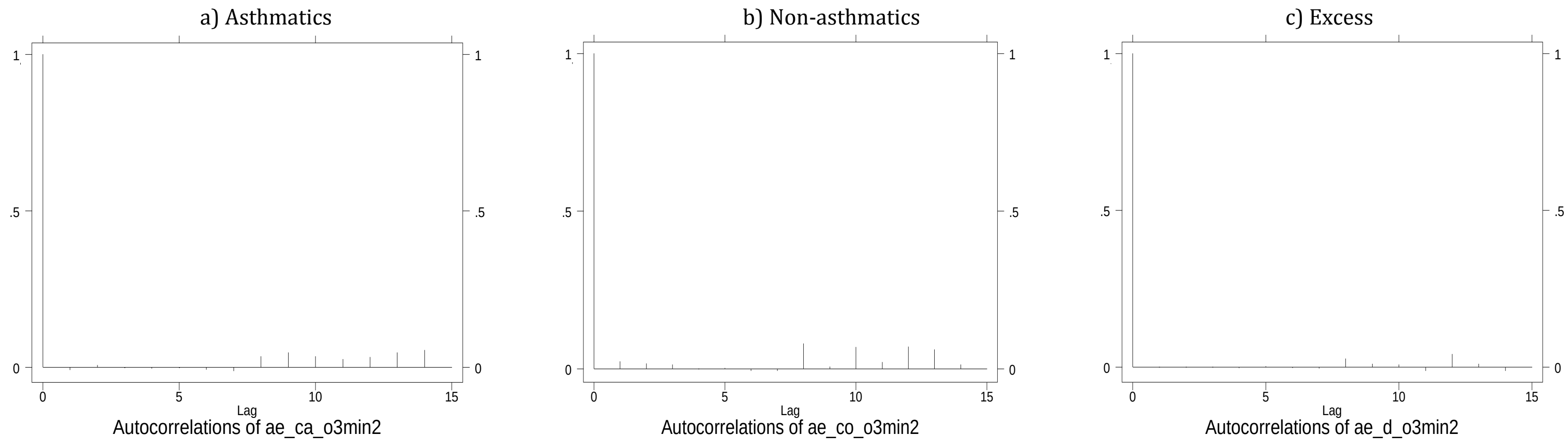

Figure G5. 73: Sheffield A&E Counts - ACF plot ARPOIS (7) model with O_3 Minimum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

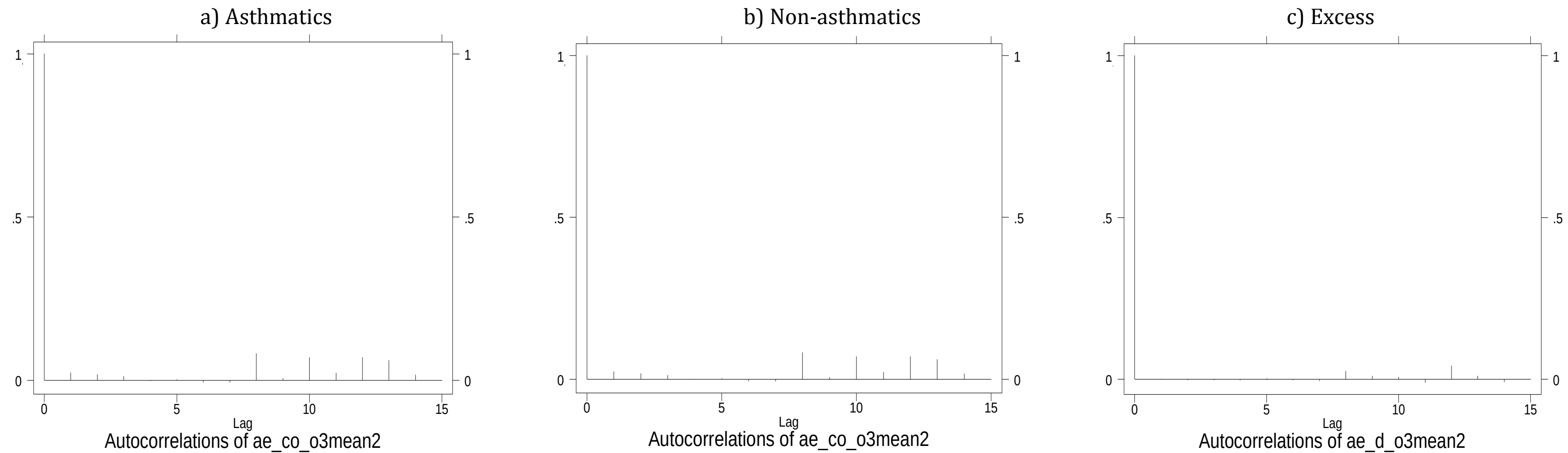

Figure G5. 74: Sheffield A&E Counts - ACF plot ARPOIS (7) model with O_2 mean measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

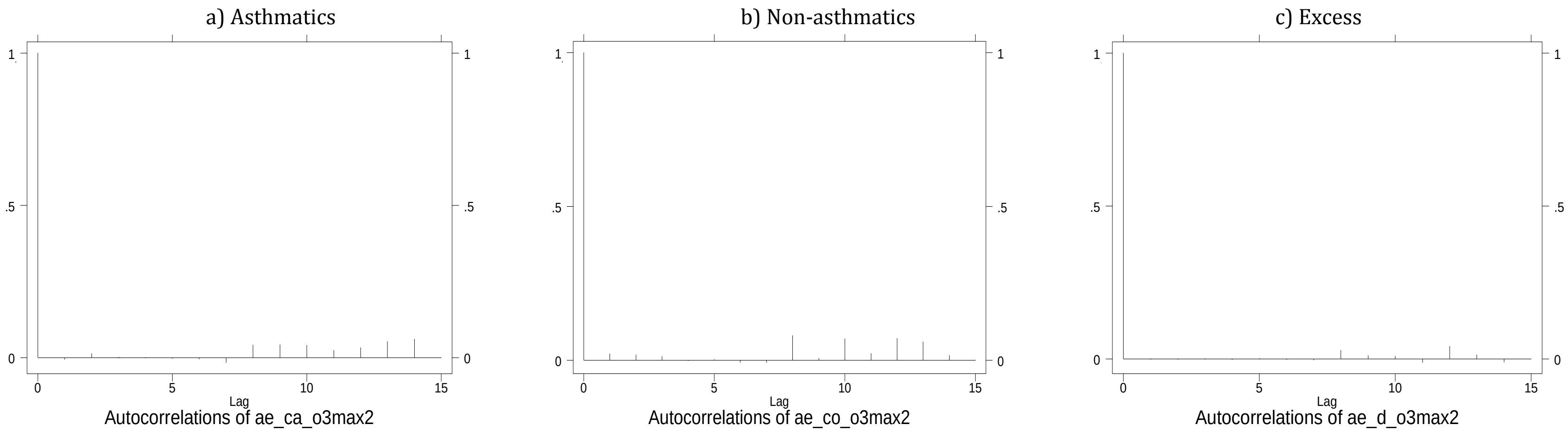

Figure G5. 75: Sheffield A&E Counts - ACF plot ARPOIS (7) model with O_3 maximum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

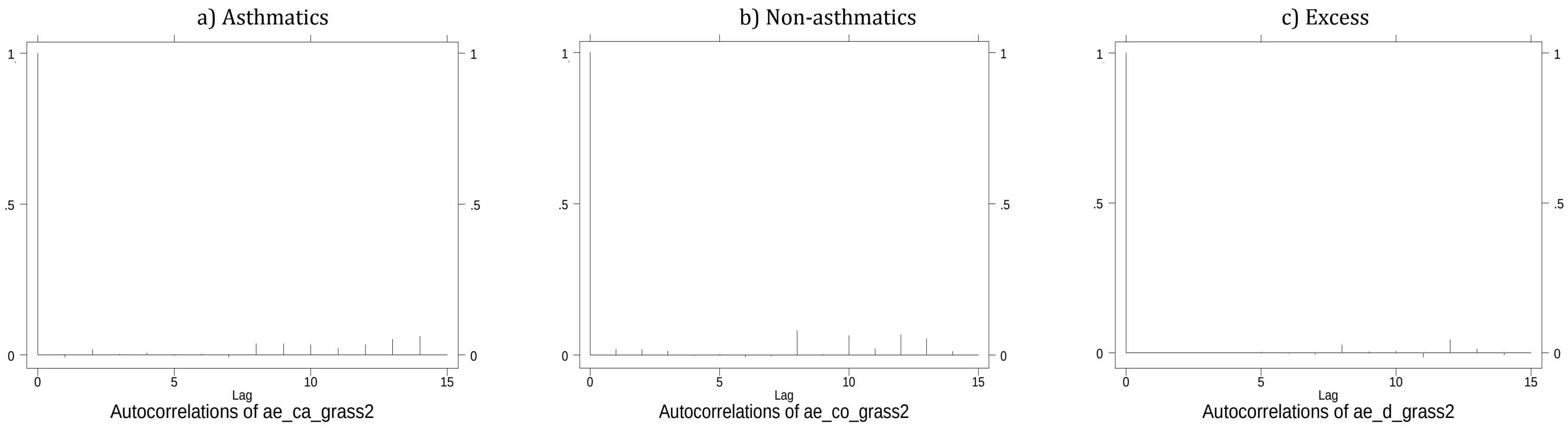

Figure G5. 76: Sheffield A&E Counts - ACF plot ARPOIS (7) Grass measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

G5.4. Scotland Autoregression Autocorrelation Plots

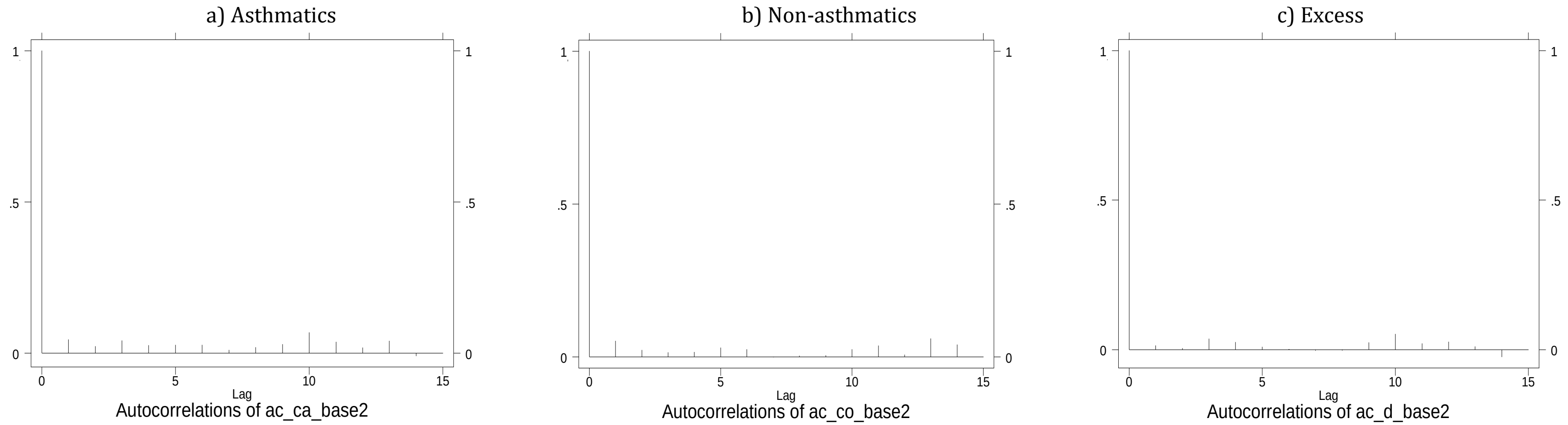

Figure G5. 77: Scotland All Counts - ACF plot ARPOIS (7) null model, a) Asthmatics, b) Non-asthmatics, c) Excess.

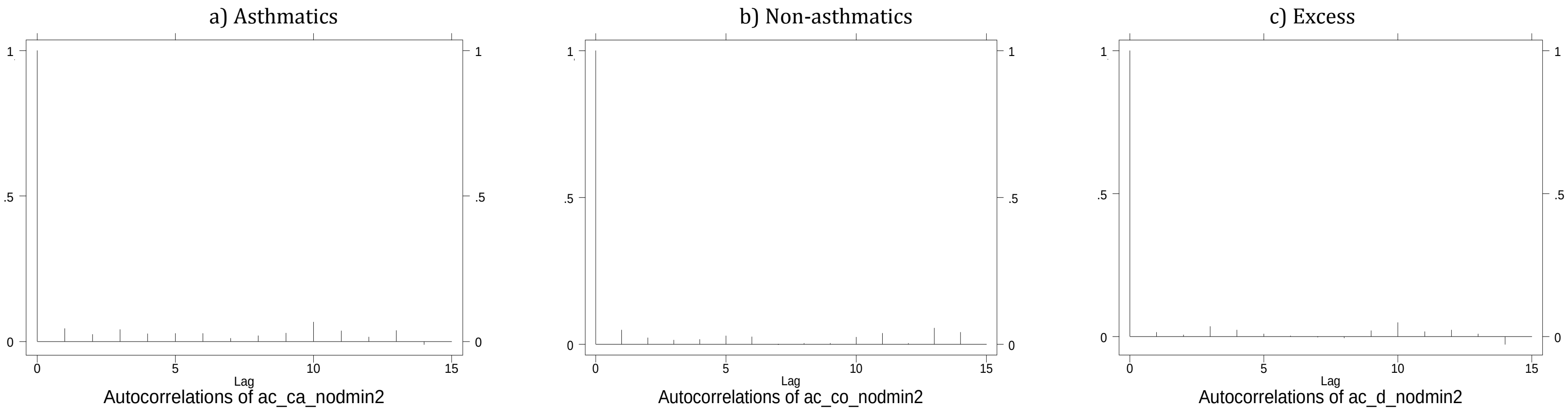

Figure G5. 78: Scotland All Counts - ACF plot ARPOIS (7) model with NOD Minimum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

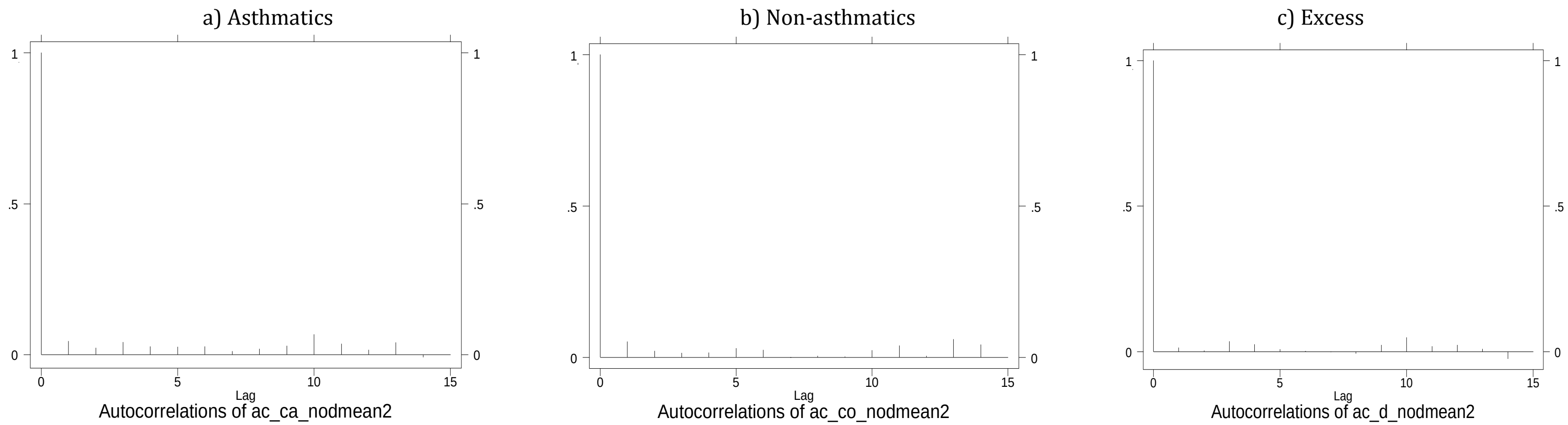

Figure G5. 79: Scotland All Counts - ACF plot ARPOIS (7) model with NOD mean measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

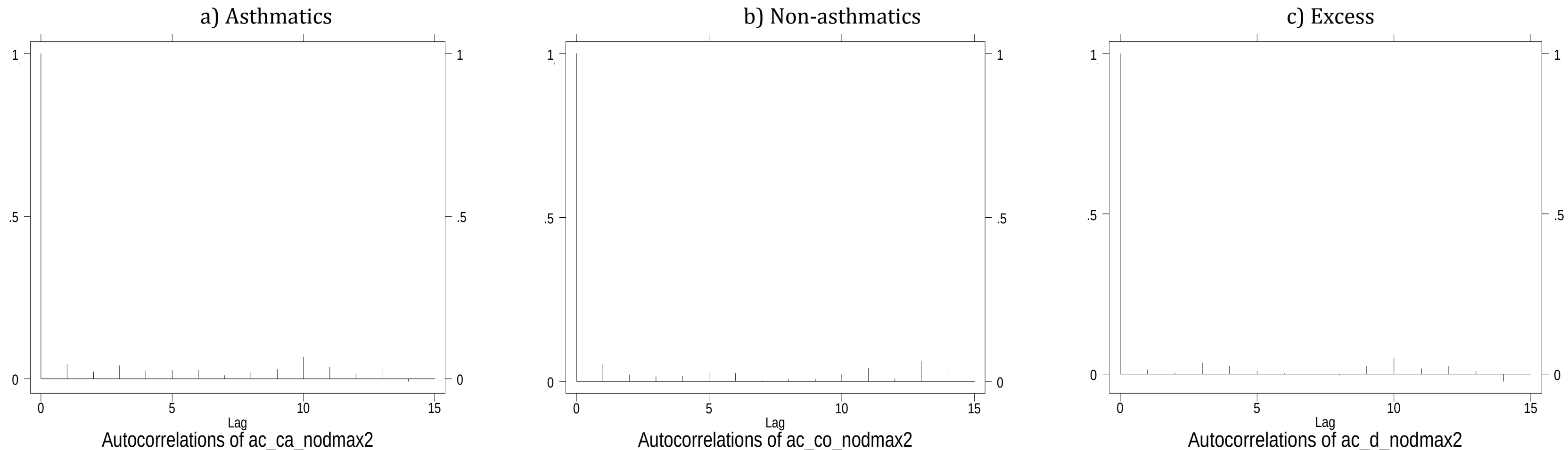

Figure G5. 80: Scotland All Counts - ACF plot ARPOIS (7) model with NOD maximum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

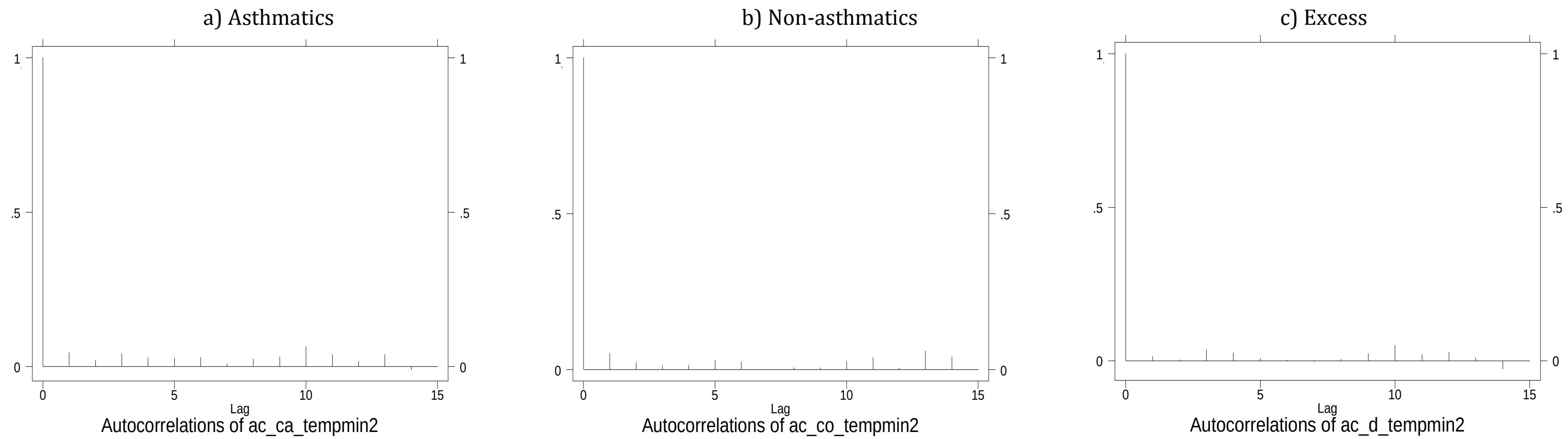

Figure G5. 81: Scotland All Counts - ACF plot ARPOIS (7) model with Temperature Minimum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

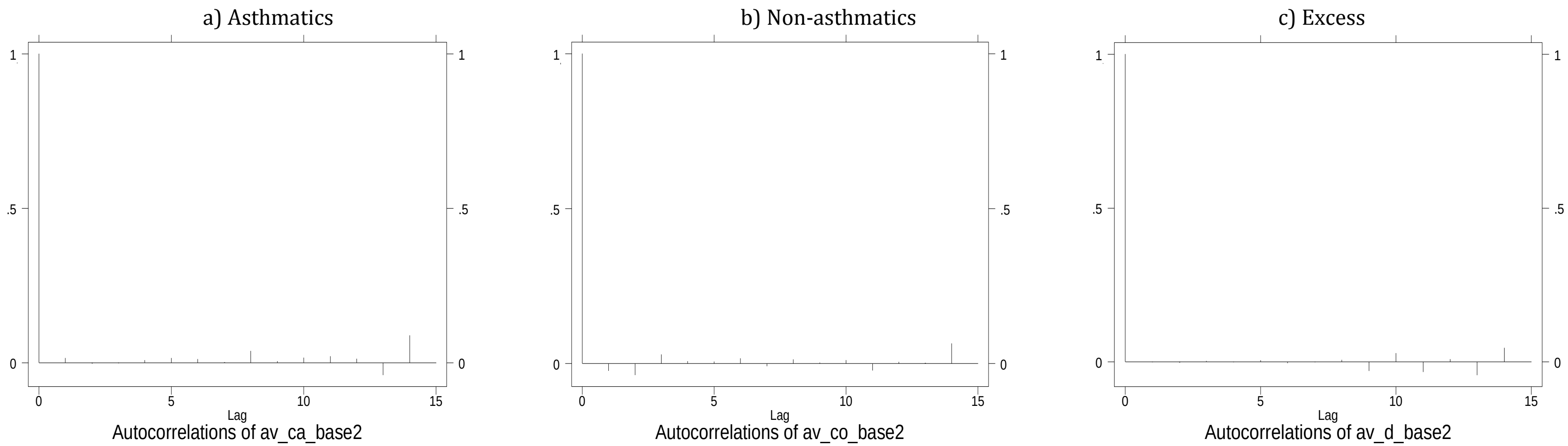

Figure G5. 82: Scotland Acute Visits - ACF plot ARPOIS (7) null model, a) Asthmatics, b) Non-asthmatics, c) Excess.

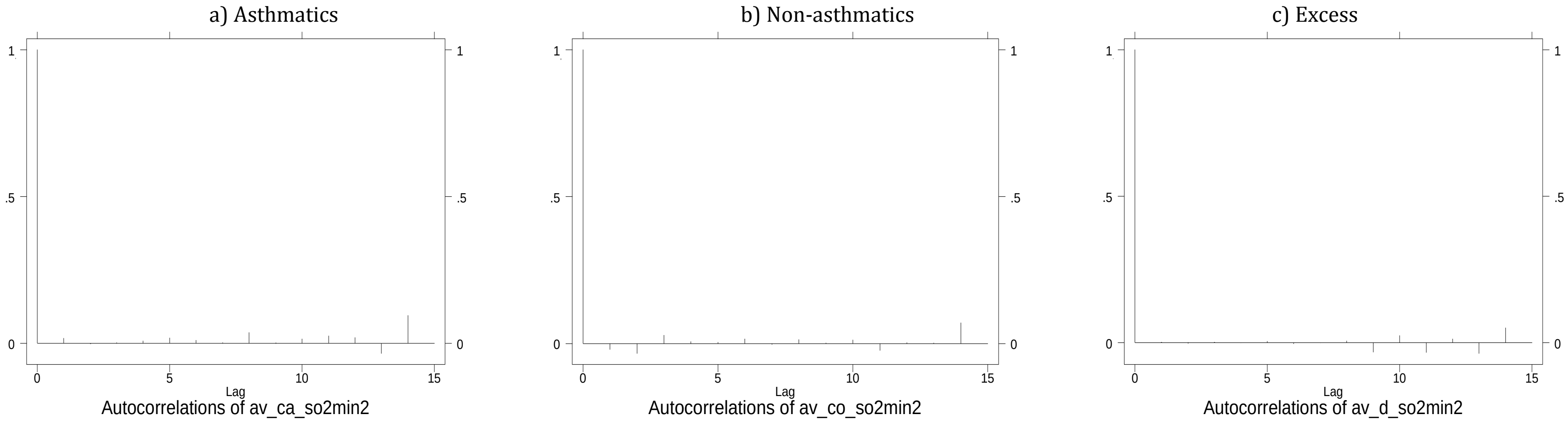

Figure G5. 83: Scotland Acute Visits - ACF plot ARPOIS (7) model with SO_2 Minimum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

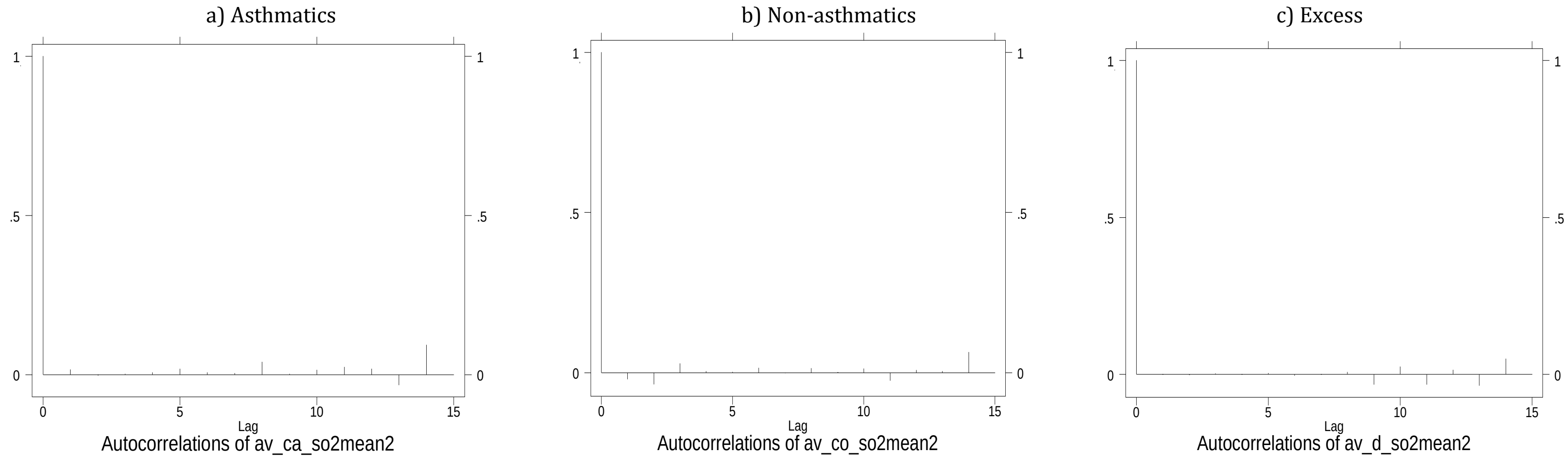

Figure G5. 84: Scotland Acute Visits - ACF plot ARPOIS (7) model with SO_2 mean measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

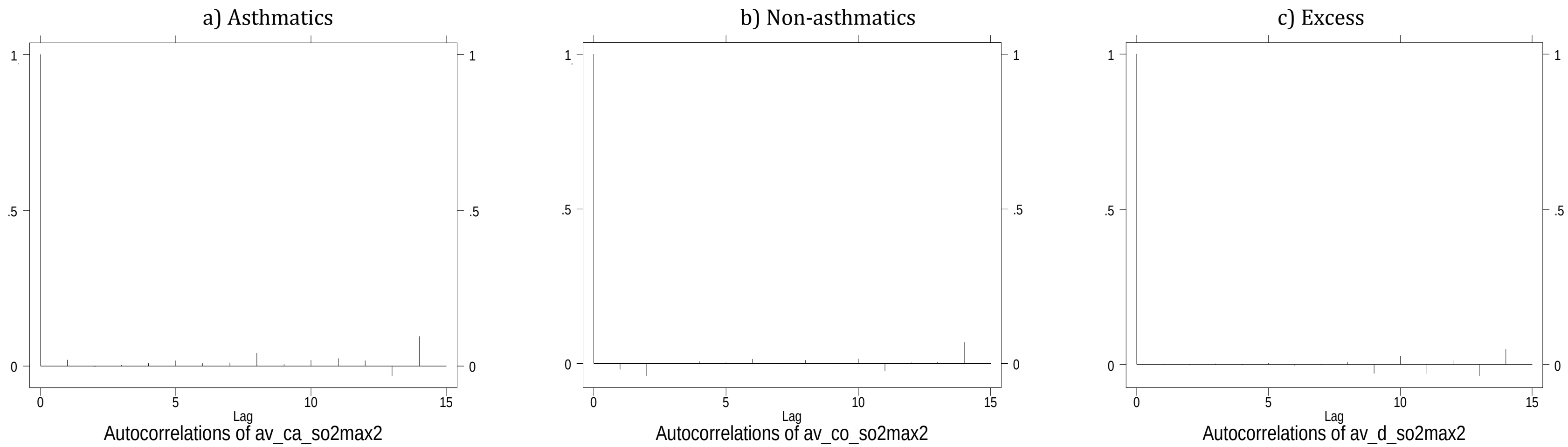

Figure G5. 85: Scotland Acute Visits - ACF plot ARPOIS (7) model with SO_2 maximum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

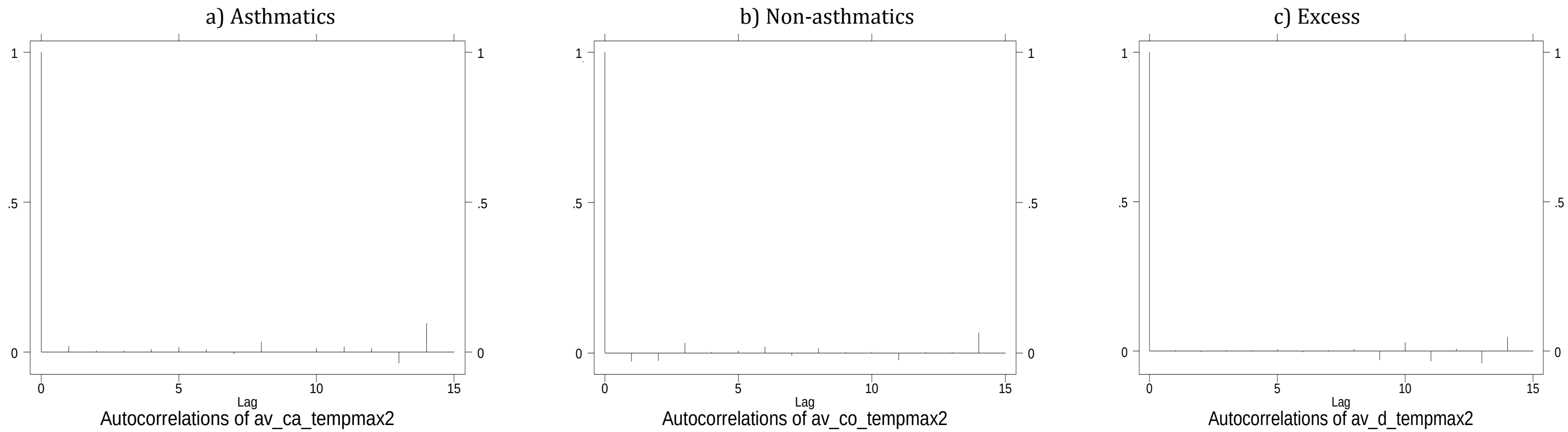

Figure G5. 86: Scotland Acute Visits - ACF plot ARPOIS (7) Temperature maximum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

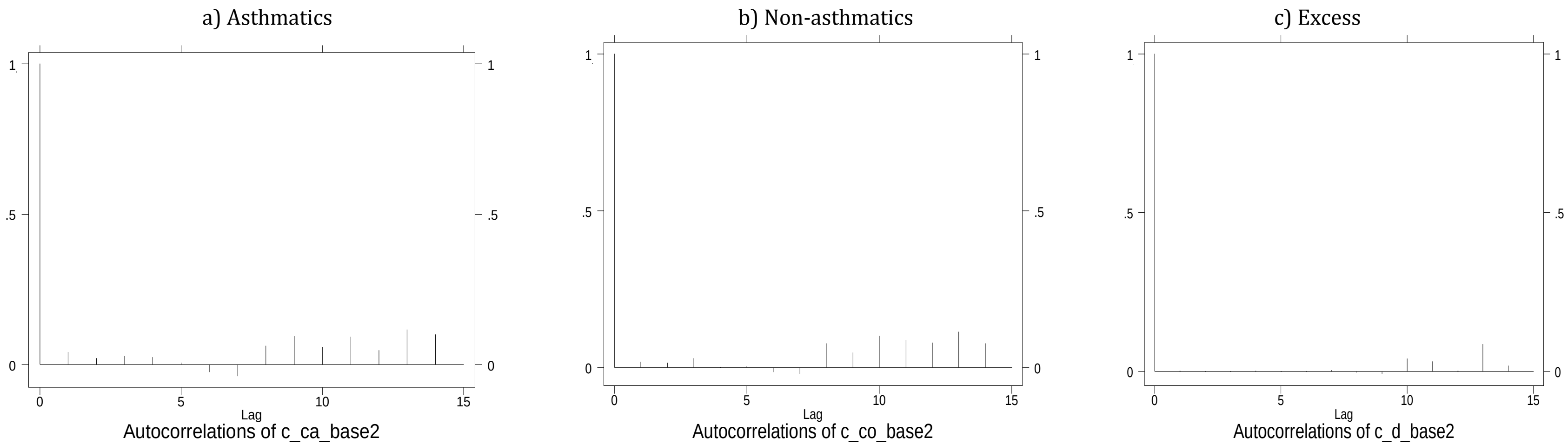

Figure G5. 87: Scotland Casualty Counts - ACF plot ARPOIS (7) null model, a) Asthmatics, b) Non-asthmatics, c) Excess.

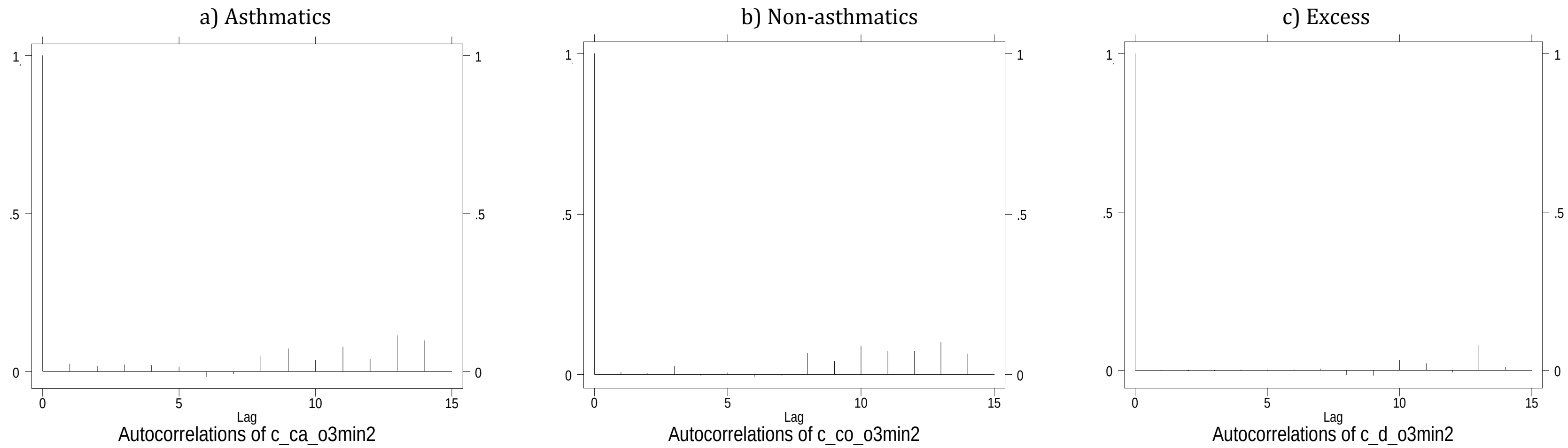

Figure G5. 88: Scotland Casualty Counts - ACF plot ARPOIS (7) model with O_3 Minimum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

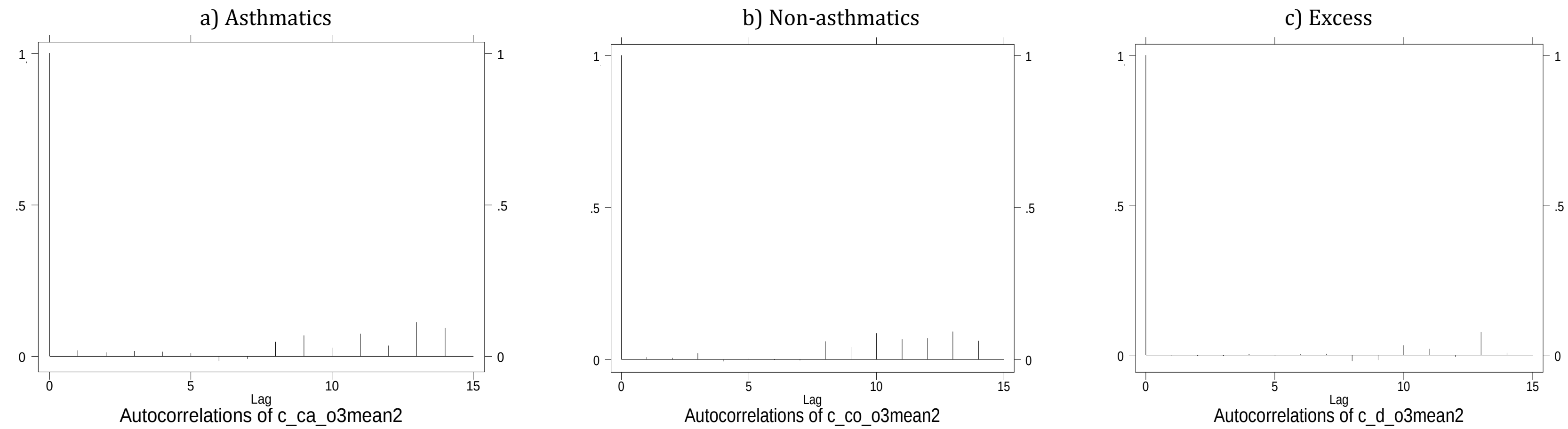

Figure G5. 89: Scotland Casualty Counts - ACF plot ARPOIS (7) model with O_2 mean measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

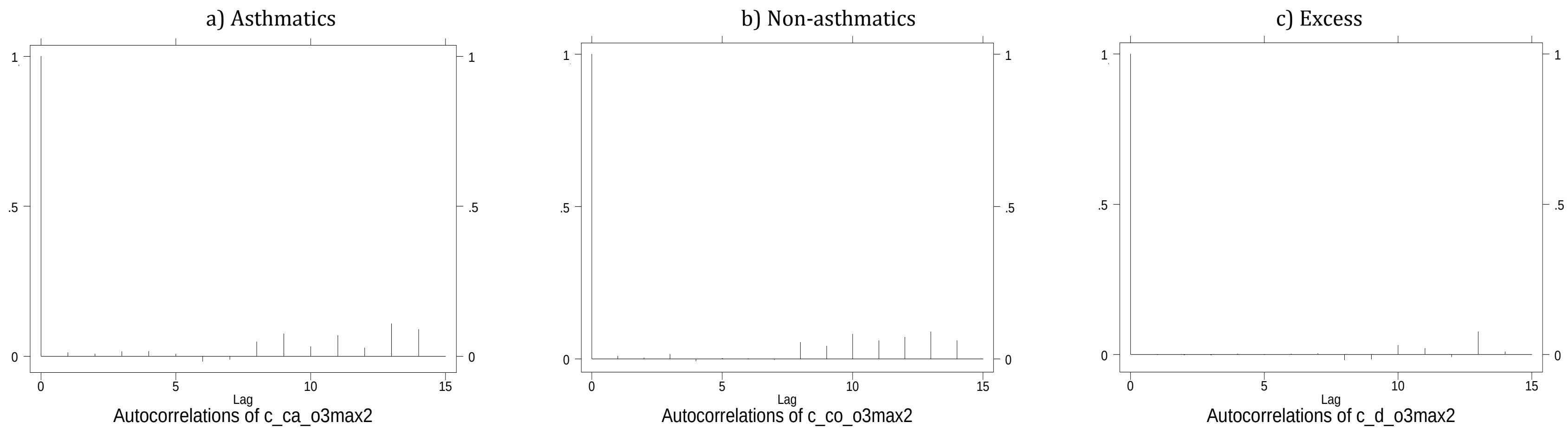

Figure G5. 90: Scotland Casualty Counts - ACF plot ARPOIS (7) model with O_3 maximum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

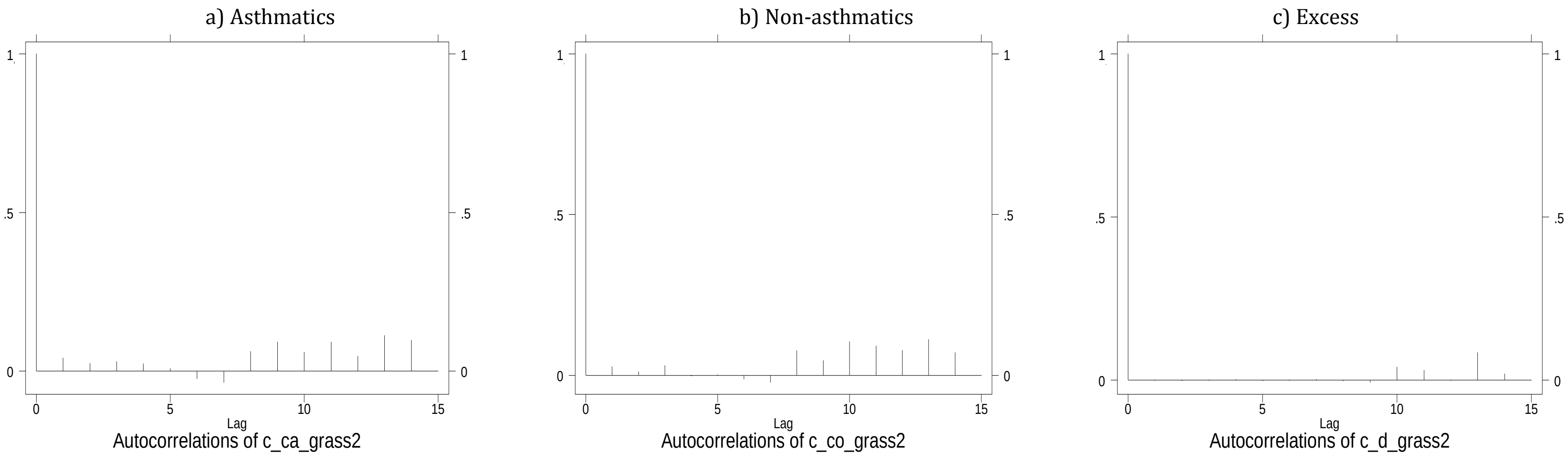

Figure G5. 91: Scotland Casualty Counts - ACF plot ARPOIS (7) Grass measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

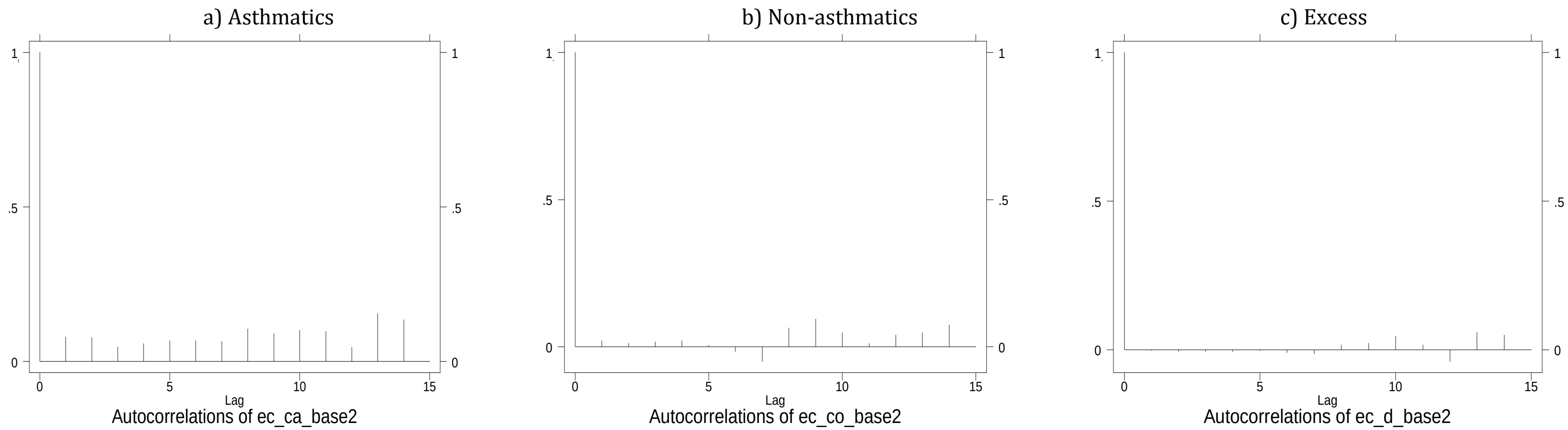

Figure G5. 92: Scotland Emergency Consultations - ACF plot ARPOIS (7) null model, a) Asthmatics, b) Non-asthmatics, c) Excess.

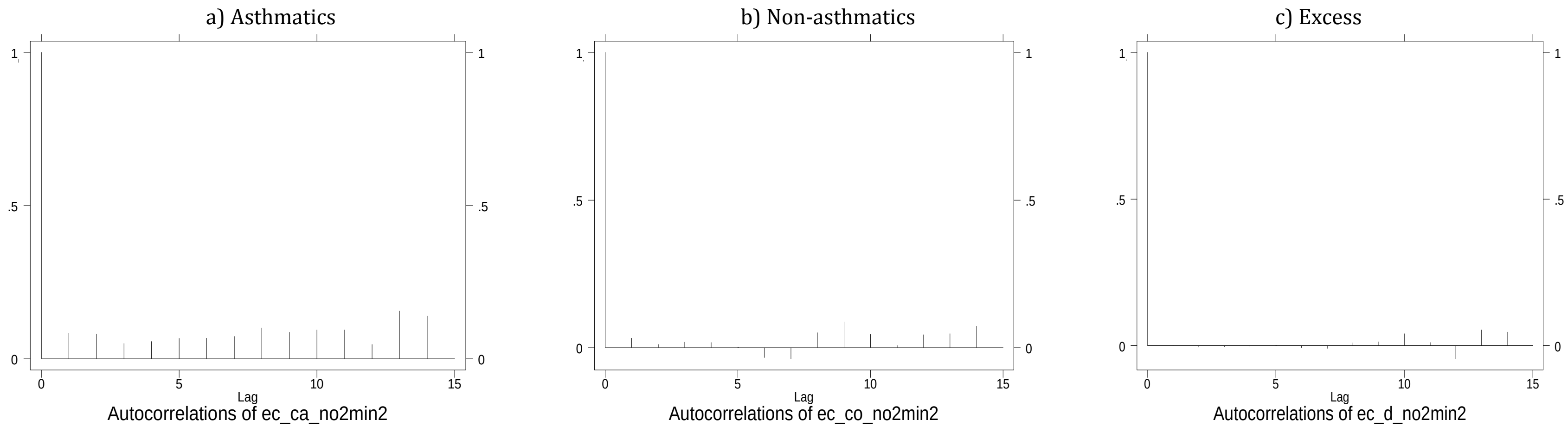

Figure G5. 93: Scotland Emergency Consultations - ACF plot ARPOIS (7) model with NO_2 Minimum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

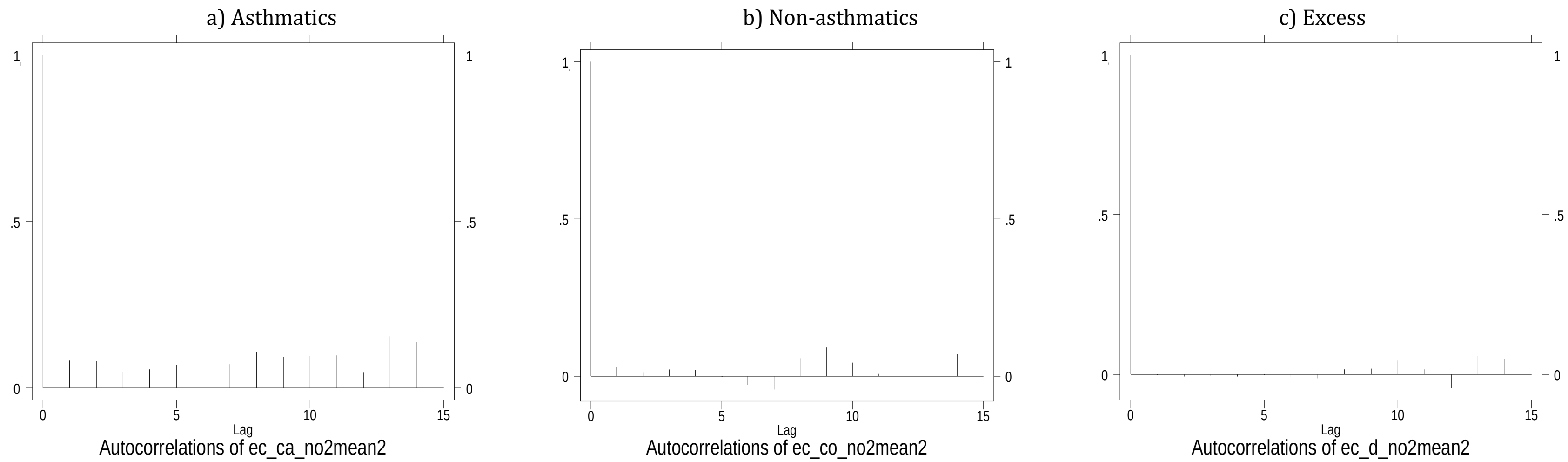

Figure G5. 94: Scotland Emergency Consultations - ACF plot ARPOIS (7) model with NO_2 mean measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

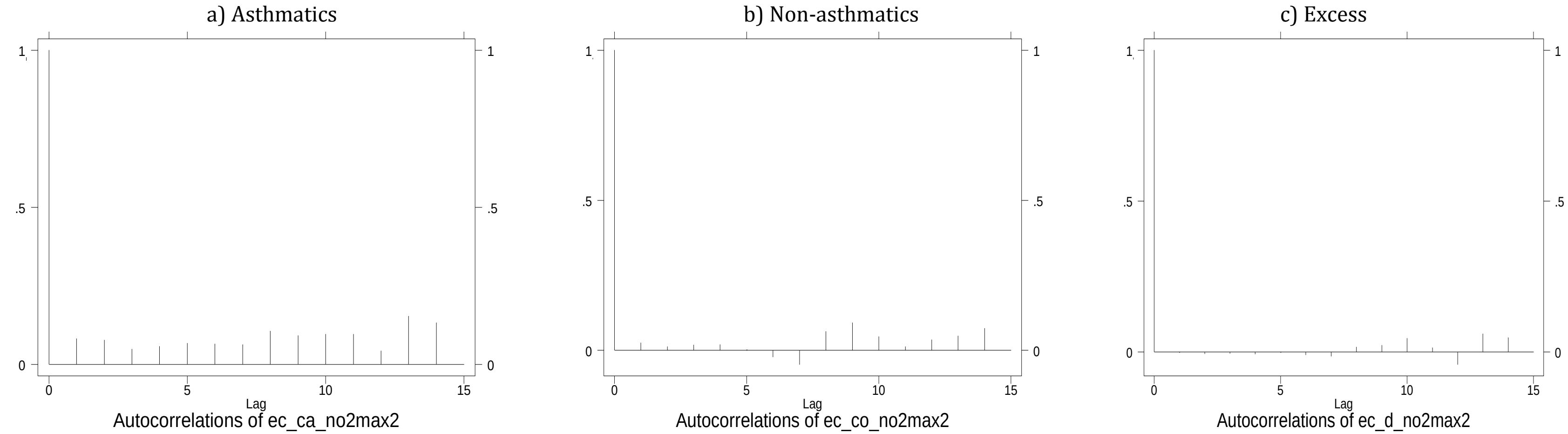

Figure G5. 95: Scotland Emergency Consultations - ACF plot ARPOIS (7) model with NO_2 maximum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

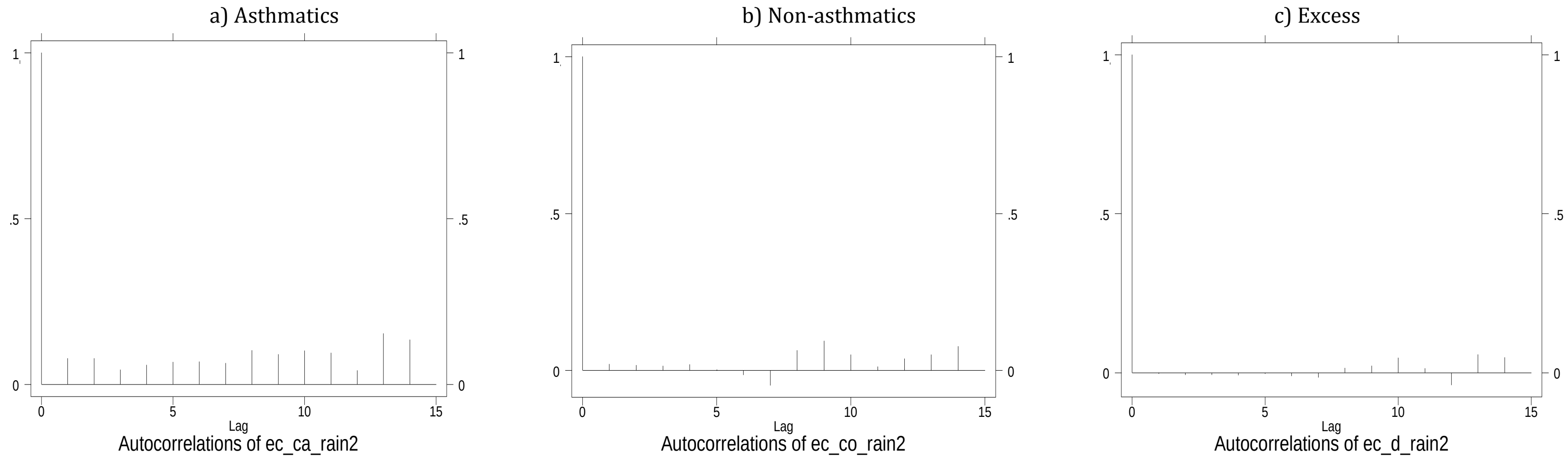

Figure G5. 96: Scotland Emergency Consultations - ACF plot ARPOIS (7) Rain measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

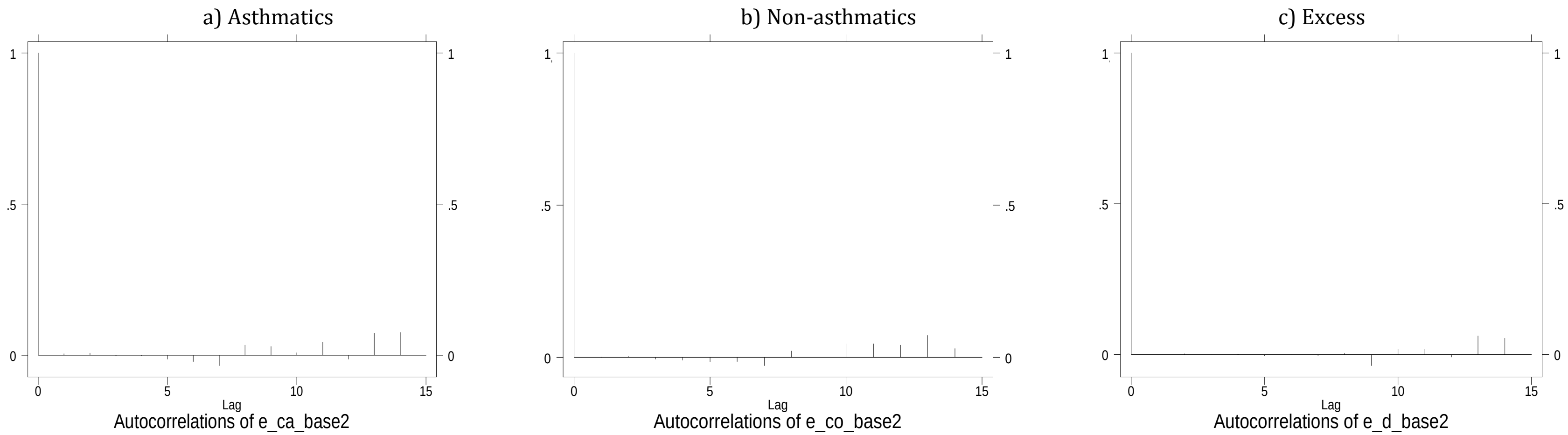

Figure G5. 97: Scotland Emergency Counts - ACF plot ARPOIS (7) null model, a) Asthmatics, b) Non-asthmatics, c) Excess.

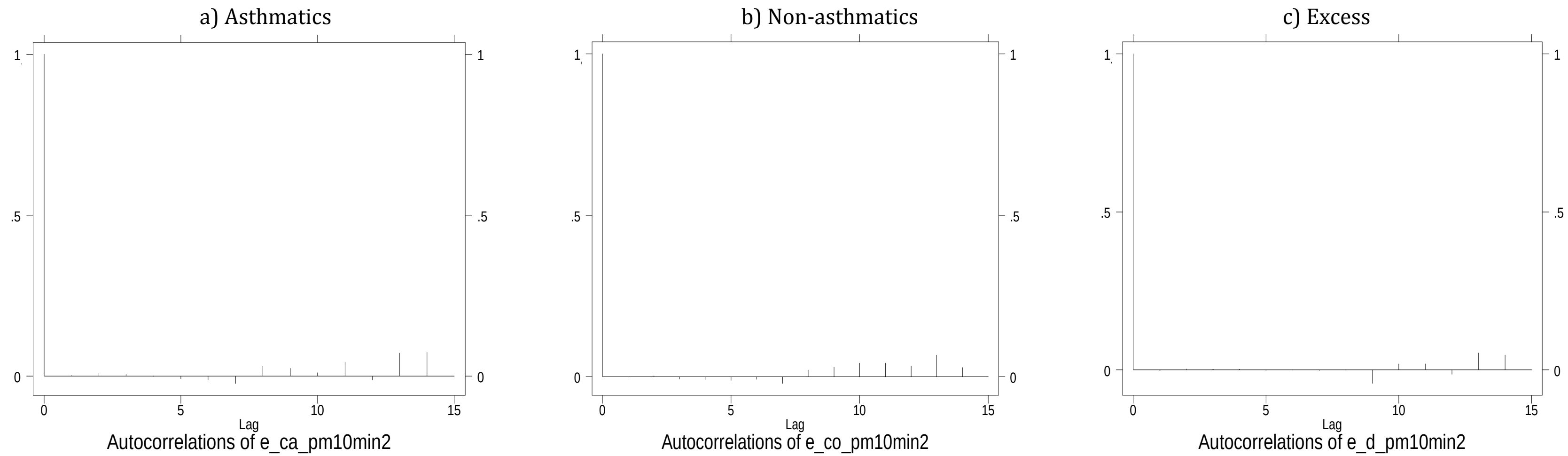

Figure G5. 98: Scotland Emergency Counts - ACF plot ARPOIS (7) model with PM_{10} Minimum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

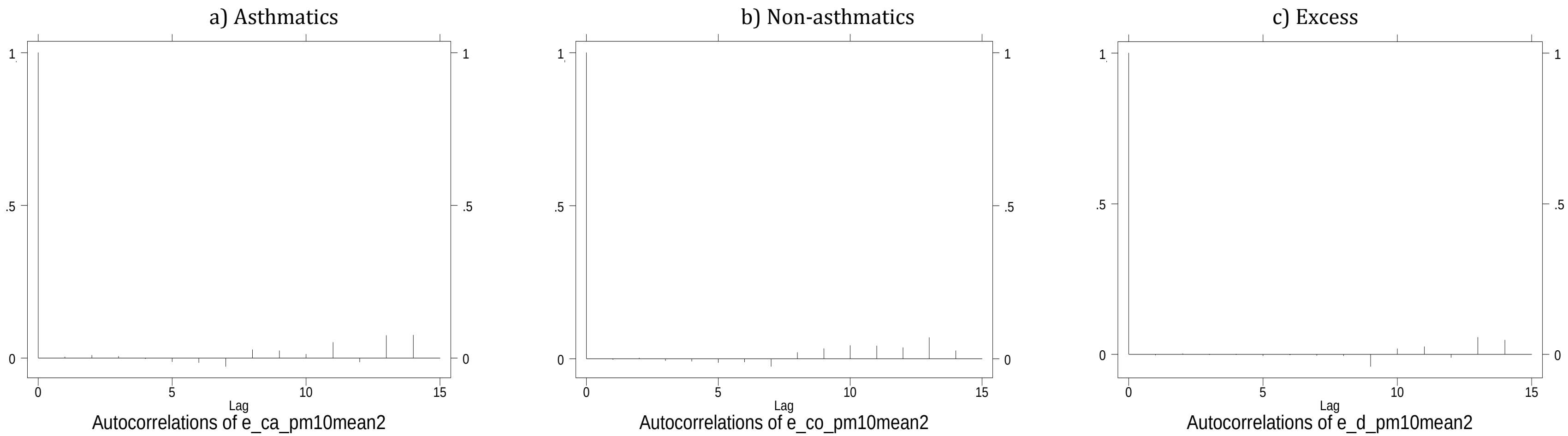

Figure G5. 99: Scotland Emergency Counts - ACF plot ARPOIS (7) model with PM_{10} mean measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

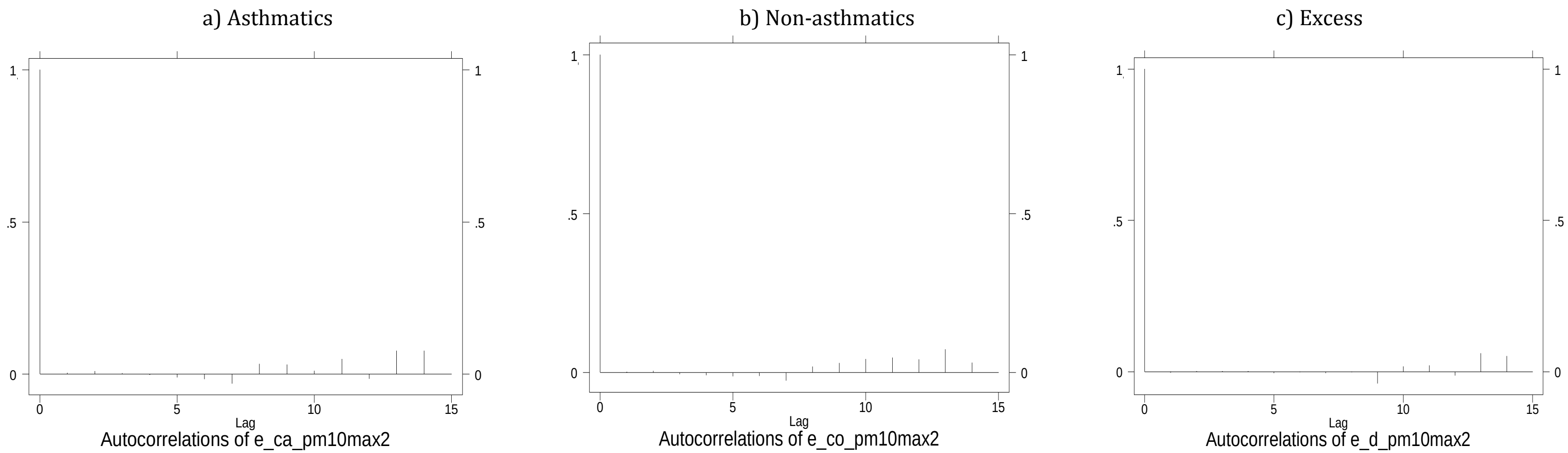

Figure G5. 100: Scotland Emergency Counts - ACF plot ARPOIS (7) model with PM_{10} maximum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

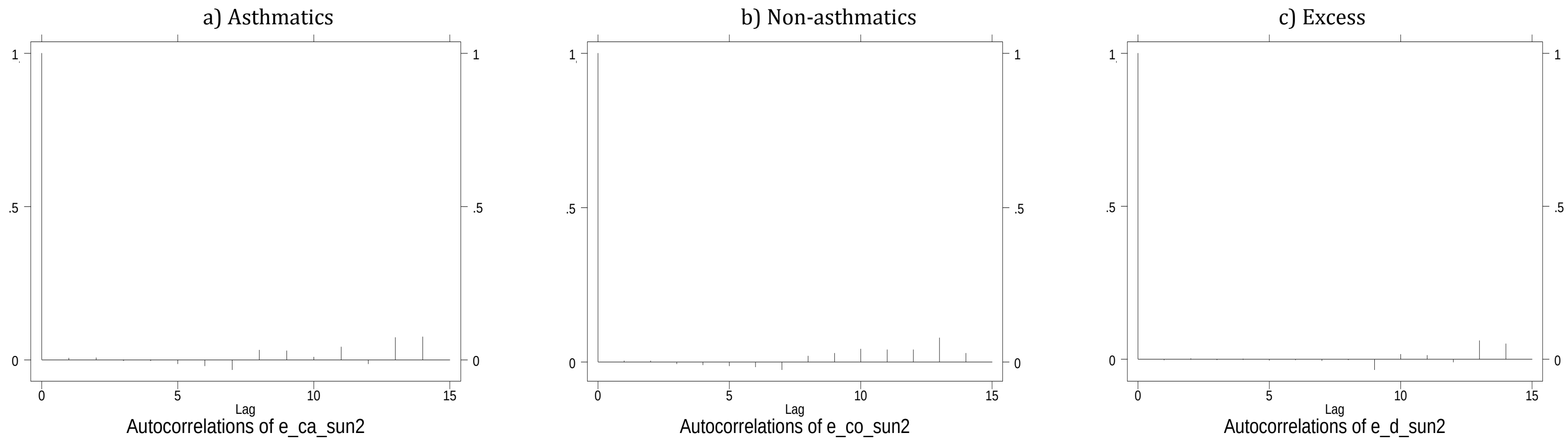

Figure G5. 101: Scotland Emergency Counts - ACF plot ARPOIS (7) Sun measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

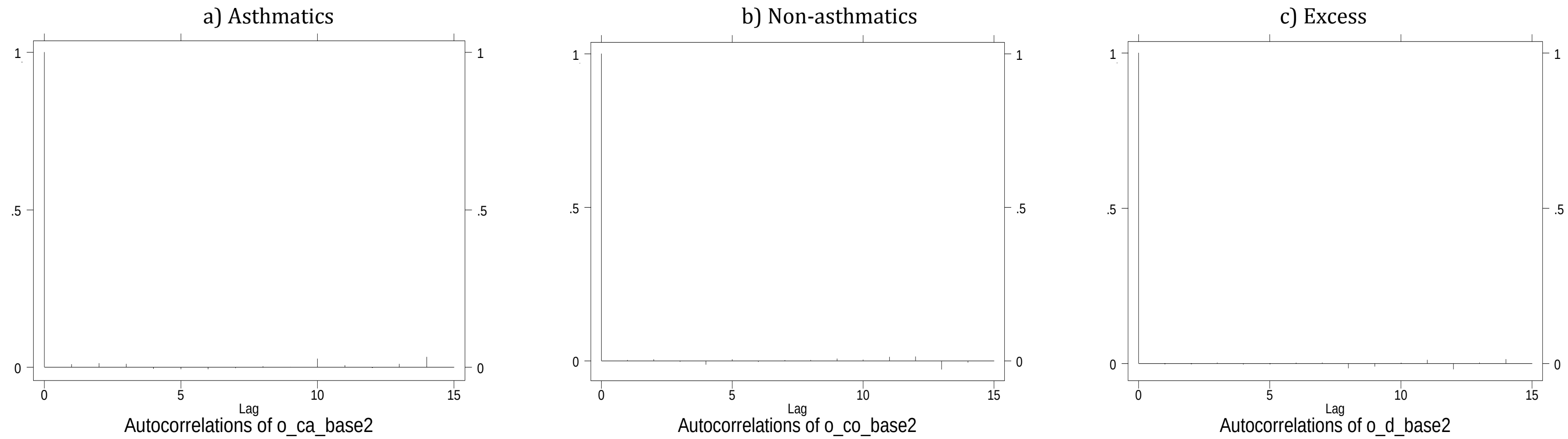

Figure G5. 102: Scotland Out of Hours Counts - ACF plot ARPOIS (7) null model, a) Asthmatics, b) Non-asthmatics, c) Excess.

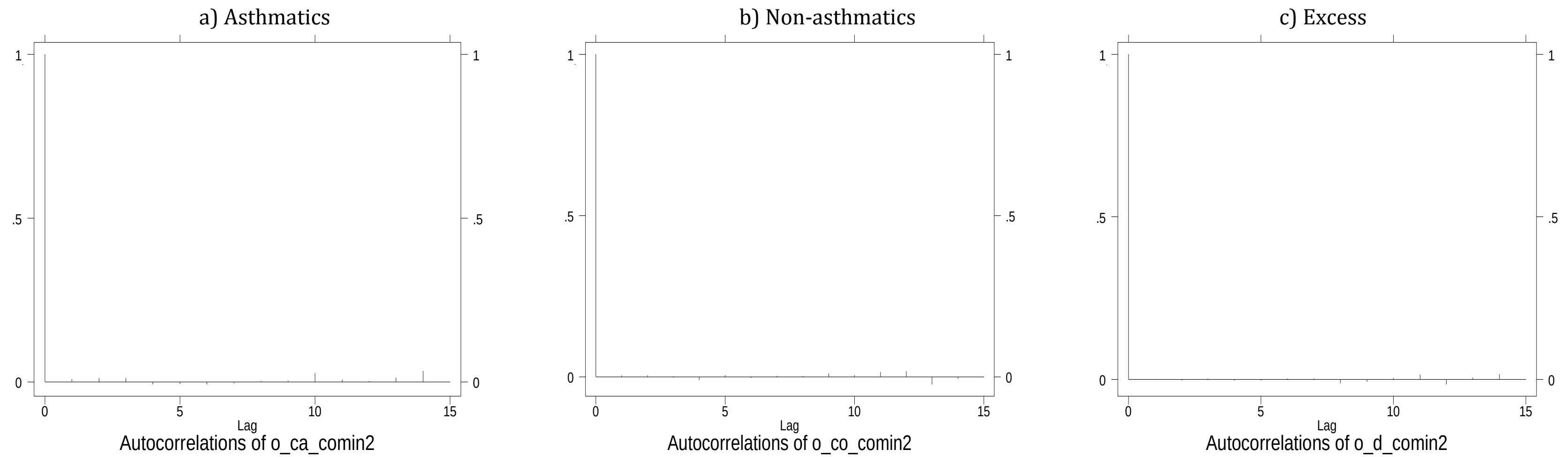

Figure G5. 103: Scotland Out of Hours Counts - ACF plot ARPOIS (7) model with CO Minimum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

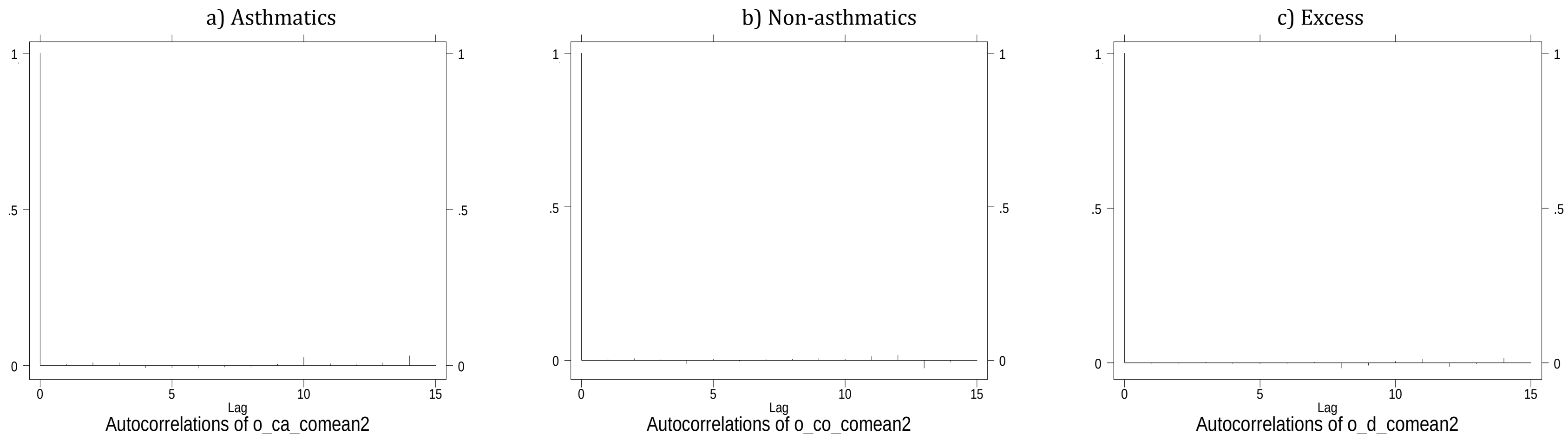

Figure G5. 104: Scotland Out of Hours Counts - ACF plot ARPOIS (7) model with CO mean measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

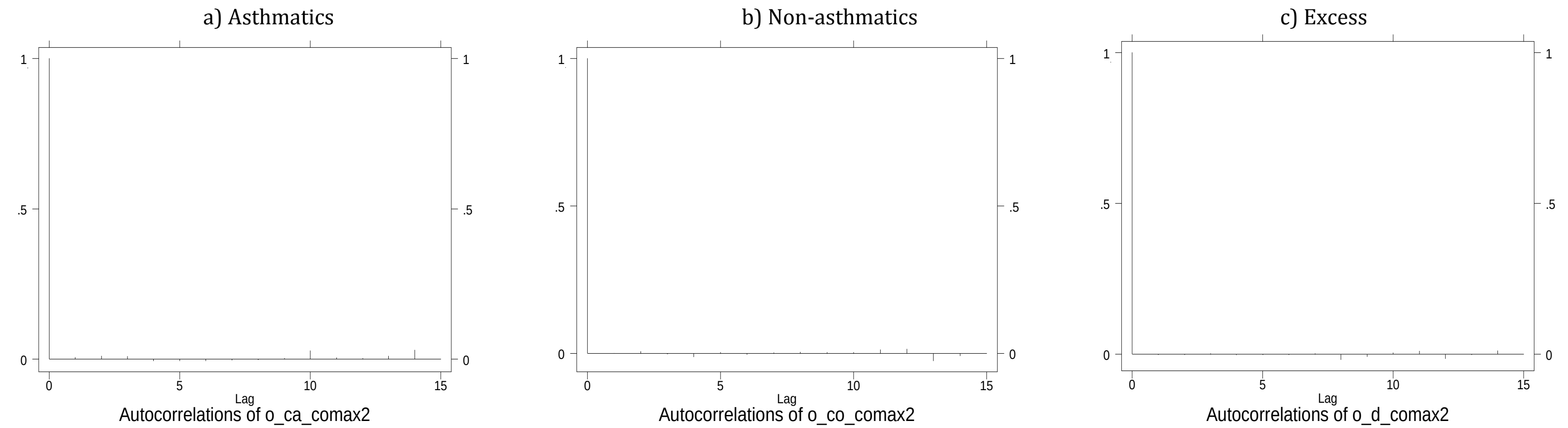

Figure G5. 105: Scotland Out of Hours Counts - ACF plot ARPOIS (7) model with CO maximum measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

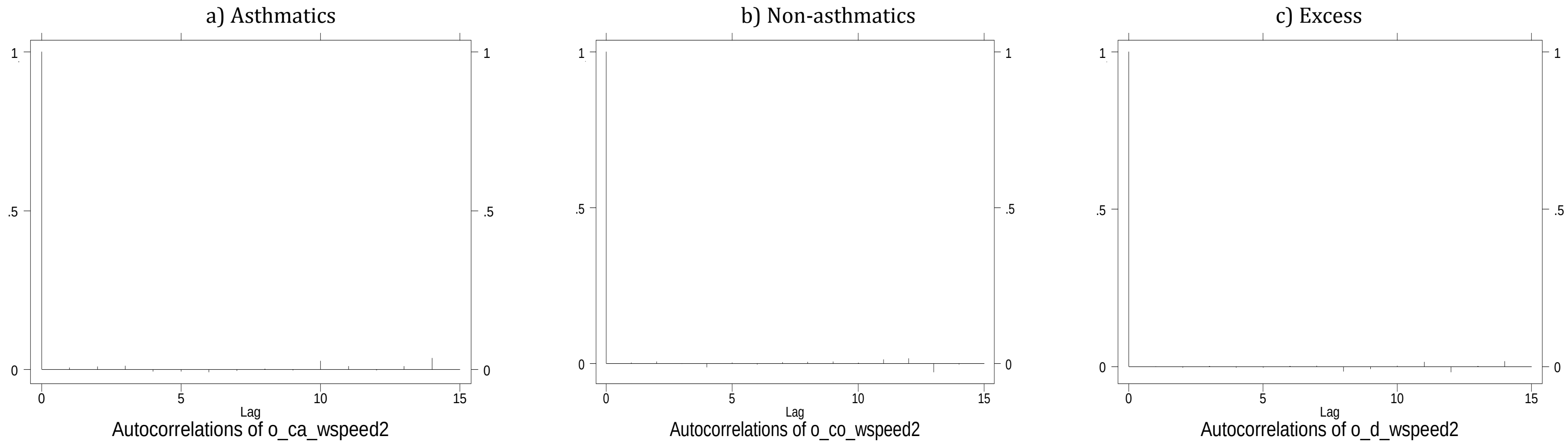

Figure G5. 106: Scotland Out of Hours Counts - ACF plot ARPOIS (7) Wind speed measures, a) Asthmatics, b) Non-asthmatics, c) Excess.

Appendix H

Additional Analyses

Investigation of High Pollution Days and corresponding daily medical counts of school age Asthmatics and non-asthmatics in the UK

Objective

The objective was to explore daily counts on days where pollution levels surpass World Health Organisation guidelines. We also wish to inspect any possible lag effects looking at daily counts after days with high pollution levels.

Background

Exposures to high levels of pollution were associated with higher rates of respiratory illness; one of those illnesses being asthma (ref). In particular, vulnerable groups i.e. children were more at risk. The World Health Organisation's (WHO) pollutant guidelines report that pollution levels should not exceed then following thresholds:

- Nitrogen Dioxide : $40_{ugm}{}^3$ per annual mean; $200_{ugm}{}^3$ per hourly mean
- Sulphur Dioxide : $20_{ugm}{}^3$ daily mean
- Ozone: $100_{ugm}{}^3$ per 8 hour mean
- Particulate Matter 10: $20_{ugm}{}^3$ per annual mean; $50_{ugm}{}^3$ per daily mean

Method

Pollution data were sourced from Aberdeen (Scotland) via the National Air Archive. Nitrogen Dioxide (NO_2), Sulphur Dioxide (SO_2), Ozone (O_3) and Particulate Matter 10 (PM_{10}) were sourced from Minimum, Mean and Maximum daily measures were obtained from the 1st of January 1999 to the 31st of December 2004.

Daily counts of medical contact were sourced from the General Practice Research Database (GPRD). Asthmatics and non-asthmatics were obtained from the 1st of January 1999 to the 31st of December 2005. Daily Counts were obtained from Scotland. All counts were used in this analysis. All counts include a number of different types of medical contact as illustrated by Figure 1.

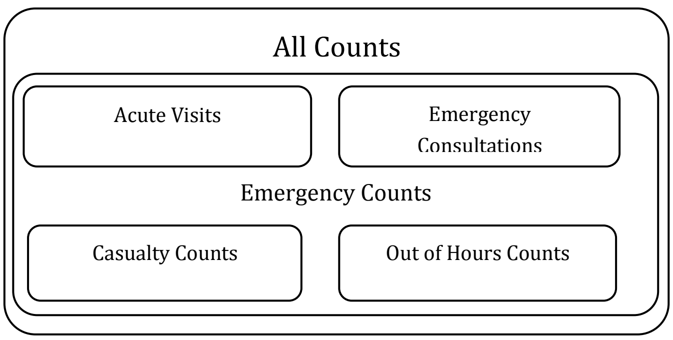

Figure H. 1: Schema of daily counts

SPSS16 was used to conduct the statistical analysis. A filter was applied to sift out days where pollutant measures that surpass WHO guidelines. For pollutants where daily mean guidelines were not specified by the WHO: an upper limit $200_{ugm}{}^3$ for NO_2 and $100_{ugm}{}^3$ for O_3 was used. Even when daily mean guidelines were specified, pollutant thresholds from the WHO were not comparable with the daily Minimum and maximum pollutant measures in this study.

There were a surprising number of days where maximum daily measures of SO_2 and PM_{10} exceeded WHO guidelines. Between 1999 and 2004, for Scotland, more than 400 days were found to have high levels of SO_2 and PM_{10} levels above WHO standards. Due to the high number of days where maximum measures exceeded WHO guidelines, every third high pollutant days were examined. England and Scotland were explored separately.

To compare daily counts on days with pollution levels above the WHO guidelines (High Pollution days (HP)), daily counts on days where pollutant levels were of acceptable measures were used as comparison. Low Pollution Days (Control Day (LP)) also had to match high pollution days by day of the week. If possible, Non-asthmatics days were selected two week prior to the high pollution day. However, particularly in reference to Maximum measures, control days were selected up to six weeks prior to the high pollution day, this was due to the high incidence of days where pollutants exceeded WHO guidelines.

Daily All Counts of Asthmatics and non-asthmatics were matched to High Pollution and Low Pollution Days. To look at lag effects, daily counts on the following seven days were extracted.

Results

Table H 1: Number of days where pollutant measure exceeds WHO guidelines (n=2164)

Pollutant	Scotland (Nº of Days)
NO_2 Minimum	-
SO_2 Minimum	2
PM_{10} Minimum	4
O_3 Minimum	5
NO_2 Mean	-
SO_2 Mean	42
PM_{10} Mean	40
O_3 Mean	14
NO_2 Maximum	1
SO_2 Maximum	400
PM_{10} Maximum	418
O_3 Maximum	53

The number of days with measures exceeding WHO guidelines were low for:

- Minimum, Mean and Maximum measures of NO_2
- Minimum Measures of SO_2, O_3 and PM_{10}
- Mean Measures of O_3

These pollutants were omitted from further analysis.

Reminder, for Maximum Measures, as the number of days with measure above the WHO standards was high; every third High Pollution day was selected for analysis.

Table H 2: Scotland High Pollution days and Low Pollution (Control) day Descriptives

Pollutant	High Pollution/Low Pollution (Control) day	Number of Days	Mean	SD	Min'	Max'
SO_2 Mean	High Pollution	43	27.56	9.31	20.11	73.52
	Low Pollution	43	7.31	4.27	0	17.57
PM_{10} Mean	High Pollution	41	62.54	10.07	51	90
	Low Pollution	41	18.45	7.58	5.49	37
SO_2 Maximum	High Pollution	165	34.55	15.44	20.01	117.93
	Low Pollution	165	10.44	5.00	0	19.71
PM_{10} Maximum	High Pollution	134	68.77	27.69	51	324
	Low Pollution	134	31.87	10.34	12	48
O_3 Maximum	High Pollution	54	121.20	40.85	100.40	376.78
	Low Pollution	54	72.40	17.15	35.49	98

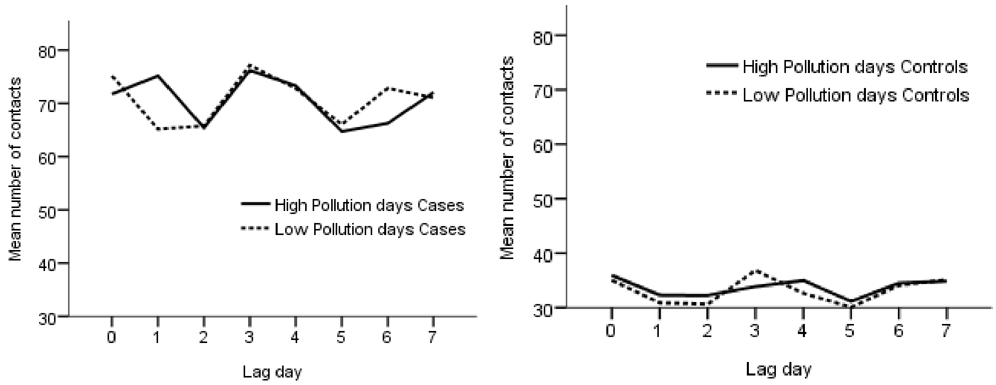

Figure H. 2: Scotland SO_2 Mean Measures: Mean Number of Daily Counts by Lag day a) Asthmatics and b) Non-asthmatics.

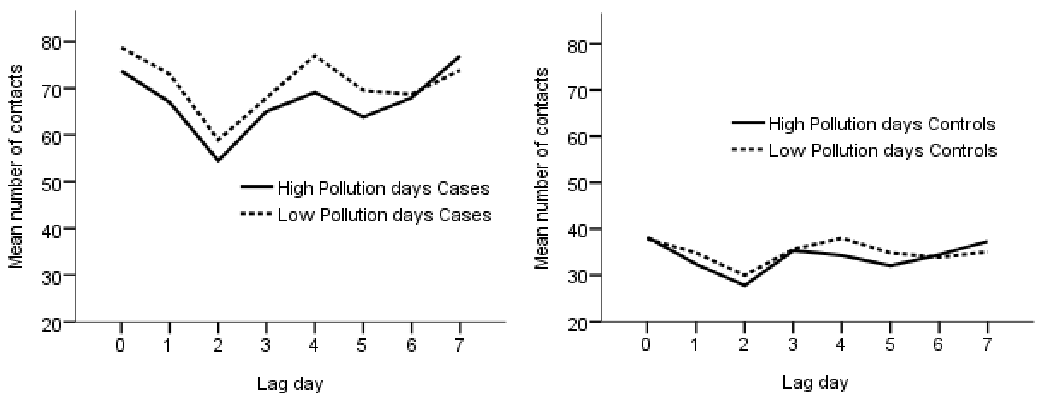

Figure H. 3: Scotland PM_{10} Mean Measures: Mean Number of Daily Counts by Lag day a) Asthmatics and b) Non-asthmatics.

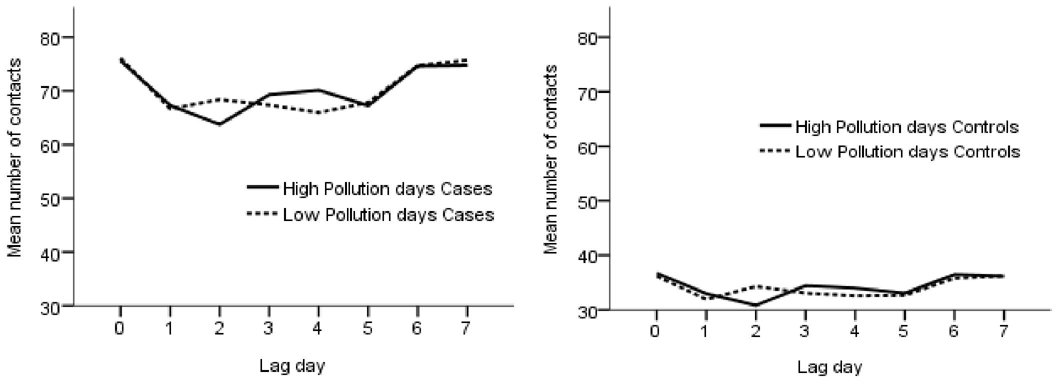

Figure H. 4: Scotland SO_2 Maximum Measures: Mean Number of Daily Counts by Lag day a) Asthmatics and b) Non-asthmatics.

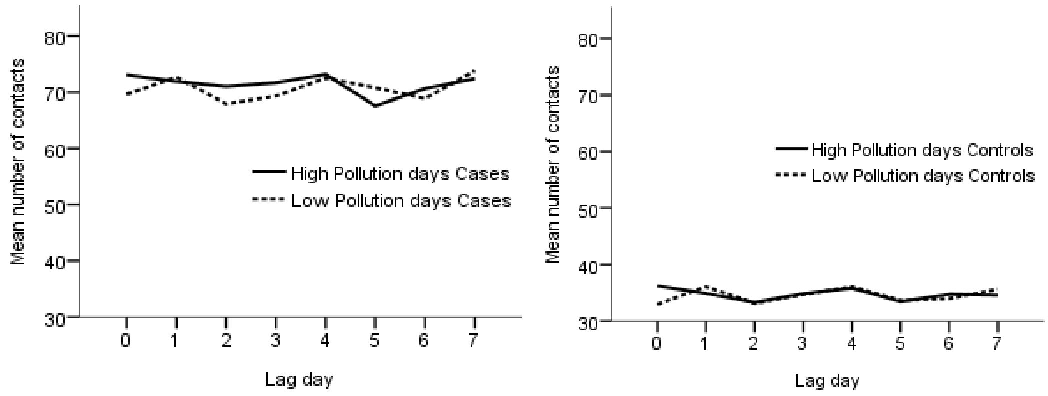

Figure H. 5: Scotland PM_{10} Maximum Measures: Mean Number of Daily Counts by Lag day a) Asthmatics and b) Non-asthmatics.

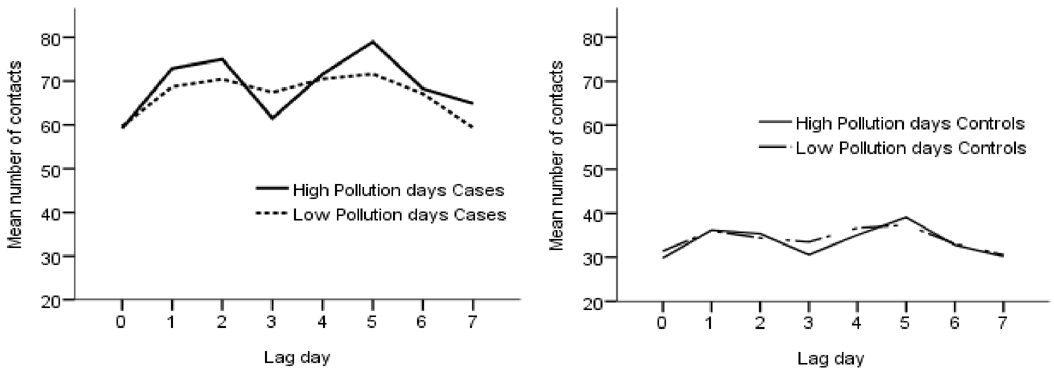

Figure H. 6: Scotland O_3 Maximum Measures: Mean Number of Daily Counts by Lag day a) Asthmatics and b) Non-asthmatics.

Figures 22 to 31 show little difference between counts that occur on days whereby pollutant levels surpass WHO guidelines and counts that occur on days whereby pollutant levels were below WHO guidelines. We have only observed the effects of one day measure on daily counts. Thus, this does not rule out whether more long term, persistent exposure to pollutants has an effect. Perhaps asthmatics were effected whether pollution was as low or high levels.