Understanding People that Live in Squalor: Individual to the Population Level Factors

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A thesis submitted in partial fulfilment of the requirements for the degree of Doctor of Philosophy

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September 2023

Abstract

Squalor refers to a dwelling that is extremely dirty, disorganised and verminous. The individuals who live in these homes are described by professionals as self-neglecting, reluctant to engage and showing poor insight into their surroundings. However, these views are often not shared by the individual themselves. The present understanding of those who live in squalor is limited, due to a research base lacking in both quantity and quality. Therefore, the aim of this research was to improve the understanding of individuals who live in squalor by summarising the present literature, informing future research and conducting original studies using novel methodologies and reliable processes and analyses.

A scoping review summarised the diverse literature and directed future research. Original studies investigated squalor at both the individual and population levels using both quantitative and qualitative methodologies, including secondary data analysis, comparisons with a control, prevalence meta-analyses and multi-perspective interpretative phenomenological analysis.

The research in this thesis has demonstrated that squalor is present in 8-9 out of every 1000 households in England and that variables such as deprivation and income, which had not previously been considered in this field, are significant risk factors of squalor. Furthermore, it has highlighted the perspectives and experiences of professionals who work with squalor, including the negative effects that squalor can have on them, and the importance of the relationship with the resident.

This research has demonstrated that squalor may be more common than previously thought and that socioeconomic factors have a role to play in understanding whether an individual lives in squalor. However, overall, this thesis has both summarised the present understanding of squalor and informed the future academic and professional approach to the field. Furthermore, it has demonstrated that squalor research is limited by its lack of formal understanding and by access to the individuals themselves. Both of which will require a combined effort from academic and professional groups to overcome.

Acknowledgements

This PhD was supported by a scholarship from the Economic and Social Research Council, without which this research would not have been possible.

The UK Data Service made data from the English Housing Survey available for the two main quantitative studies in the thesis. It would not have been possible to produce research of this type without the data already being available for use.

A number of professionals made contributions to the research included in this thesis. Individuals supported the consultation process in the scoping review and were vital to the success of the qualitative research, making themselves available for interview. In particular, individuals working in Barnsley Metropolitan Borough Council gave up their time for visits, discussions and interviews, which were particularly useful.

Particular thanks must go to my supervisors, Dr Vyv Huddy and Dr Stephen Kellett. They have supported me in all aspects of my PhD journey, but most importantly, kept me moving forwards when motivation was low during the difficult period of COVID lockdown. Thanks also to Dr Mel Simmonds-Buckley for support with the statistical analysis in the quantitative studies.

Finally, and most importantly, I must thank my family and my wife, Suze, in particular. She has consistently supported me emotionally and financially during my years of studying and this was no different during my PhD. Mention must also go to my three children Arietta, Nate and Zac, who are both wonderful and annoying in a ratio of about 3:1.

Declaration

I, the author, confirm that the Thesis is my own work. I am aware of the University's Guidance on the Use of Unfair Means (www.sheffield.ac.uk/ssid/unfair-means). This work has not been previously presented for an award at this, or any other, university.

The Scoping Review in chapter 2 has been submitted for publication:

Norton, M. J., Kellett, S., & Huddy, V. *Living in squalor: A scoping review.* [Manuscript submitted for publication]

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Abbreviations

AH – Animal Hoarding

AUDIT – Alcohol Use Disorders Identification Test

BAME – Black, Asian and Minority Ethnic

DS – Diogenes Syndrome

DUDIT – Drug Use Disorders Identification Test

ECCS – Environmental Cleanliness and Clutter Scale

EHS – English Housing Survey

ESN – Elder Self-Neglect

FTD – Fronto-Temporal Dementia

GE – Gender Egalitarianism

GET – Group Experiential Theme

HD – Hoarding Disorder

HEI – Home Environment Index

IMD – Index of Multiple Deprivation

IPA – Interpretative Phenomenological Analysis

LCRS – Living Conditions Rating Scale

MMAT – Mixed Methods Appraisal Tool

MMSE – Mini Mental State Examination

MSS – Modern Sexism Scale

NCEA – National Center on Elder Abuse

OH – Object Hoarding

ONS-4 – Office for National Statistics Subjective Well-Being Questions

PCT – Perceptual Control Theory

PET – Personal Experiential Theme

PSM – Propensity Score Matching

SDS – Severe Domestic Squalor

SLTQ – Social Loafing Tendency Questionnaire

SN – Self-neglect

Chapter 1

Introduction

This thesis intends to improve the understanding of squalor by first presenting a detailed summary of what is presently known, then using this as a roadmap for applying novel qualitative and quantitative research methods to the issue. Squalor will be investigated at the individual and population level across studies to further develop understanding, and the level of analysis for each study will be clearly presented. This will create new perspectives and directions for future research into squalor and provide evidence for the more effective treatment of squalor in the community. This introduction will firstly explain the clinical and research background to squalor, including the common terms and descriptions used in research and in practice. Then, it will focus on the aims and the structure of the thesis, describing the intentions and processes involved.

Background

In 1975, Clark et al. (1975) described 30 elderly patients showing signs of extreme self-neglect, who lived in dirty homes often featuring hoarding of rubbish. Individuals were described to be commonly aloof, suspicious and aggressive and showed 'no shame' about their environment or personal appearance. Clark and colleagues suggested that this could be referred to as *Diogenes Syndrome* (DS). Diogenes of Sinope was a 4th century BC Greek philosopher, who chose to live in a barrel due to his contempt for wealth and pleasure. However, he showed no sign of squalor or hoarding and enjoyed the company of others, suggesting that Diogenes himself would not have been diagnosed with the disorder bearing his name (Marcos, 2008). More recently a group of Australian researchers introduced the term Severe Domestic Squalor (SDS; Snowdon et al., 2007), defining the condition by the state of the dwelling and focusing less on the characteristics of the individual. Snowdon et al. (2012b) suggested that SDS should be applied when "… *a person's home is so*

unclean, messy and unhygienic that people of a similar culture and background would consider extensive clearing and cleaning to be essential." (p.11). The definition also included reference to insects and vermin, rotted food, excrement, unpleasant odour and retention of items. Nonetheless, most studies continue to use the term DS (Cipriani et al., 2022; L. Ferreira et al., 2021; Ito et al., 2022; Proctor & Rahman, 2021), even though it has no formal definition. As there is no consensus in the literature as to the most appropriate term to use to describe individuals living in squalor, this thesis will not limit itself by referring to DS, SDS or similar terms. Instead, the overarching term of squalor will be used to refer to households which have a filthy and messy environment and 'individuals living in squalor' will be used to highlight those who live in these conditions.

There are many case studies highlighting the profiles and difficulties of individuals living in squalor (Ashworth et al., 2018; Badr et al., 2005; Batool & Hussain, 2015; Biswas et al., 2013; Campbell et al., 2005; Camps & Le Bigot, 2019) and there are several pieces of original research that have investigated samples of these individuals (Halliday et al., 2000; Lee et al., 2014; Monfort et al., 2017; Snowdon & Halliday, 2011). However, the methodologies employed are limited, both in terms of scientific quality and clinical utility. Samples are often small and show bias, limited to older adults, referrals, or are analyses of poorly operationalised secondary data. Furthermore, the types of methods used lack variety, with few quantitative studies utilising controlled samples or examples of rich qualitative methodologies that throw more light on the lived experiences of sufferers, carers or those that intervene. Fundamentally, squalor research has been produced in an isolated fashion. For example, studies have failed to systematically review and then build on what has previously been discovered and have demonstrated little evidence of a plan to conduct research which consecutively and logically builds on previous work to address the wide gaps in the evidence base. This thesis will tackle this lack of direction by conducting a review and using this to develop areas of focus for a multi-method programme of research, both in this thesis and in future studies.

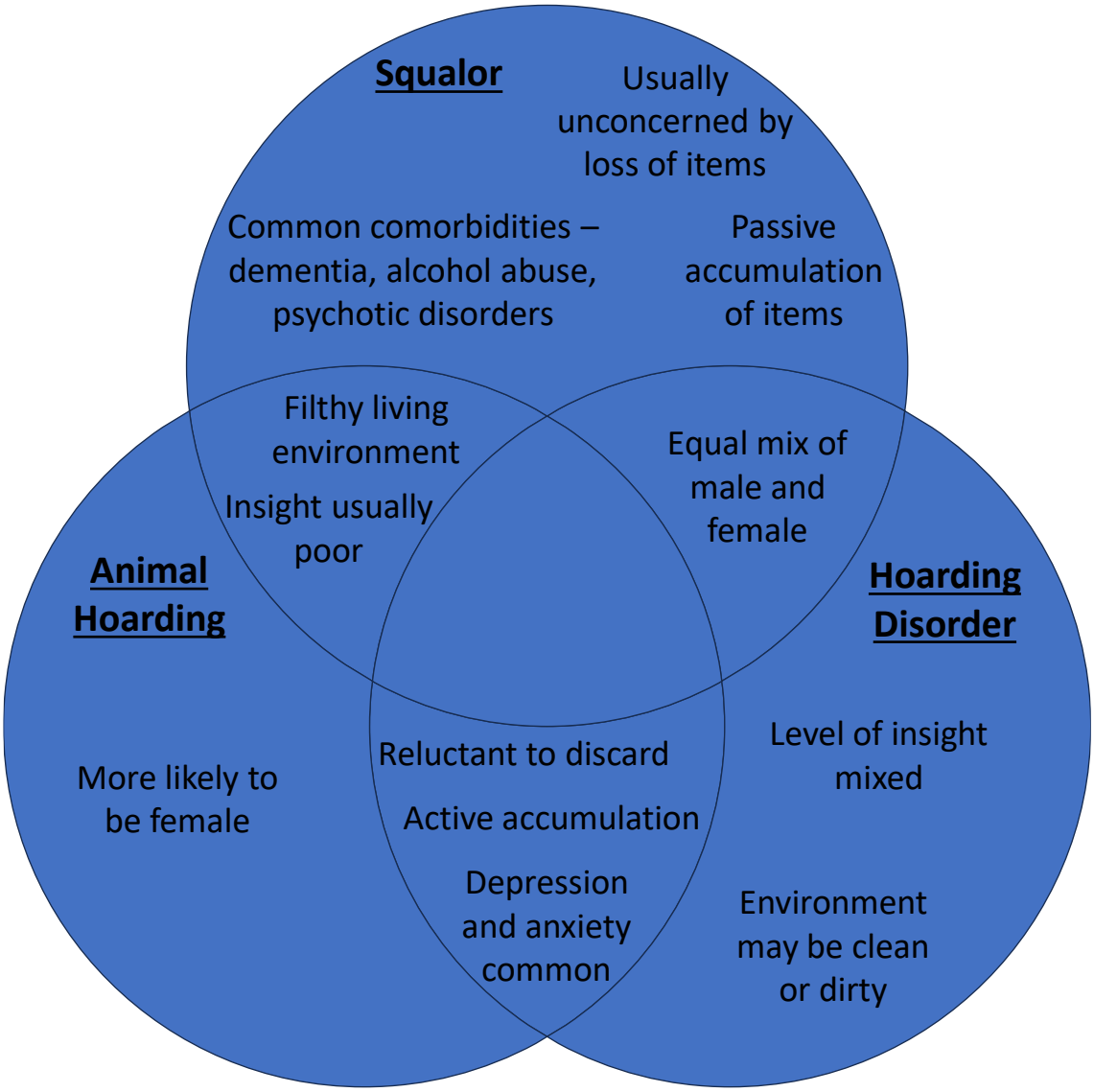
Thesis aims and structure

Initially the research questions consider what is presently known about squalor, asking 'What is the present understanding of squalor?', 'What are the weaknesses and gaps in the squalor literature?' and finally 'How can future research improve the understanding of squalor?' These questions provide three aims that will be addressed with a review of the literature. This will direct the main aim of the thesis, which will be to improve the understanding of people who live in squalor, at the individual and population levels. Individual health refers to the reasons why the health of the individual is threatened and how to solve problems from the perspective of the individual, whereas population health considers reasons why the health of the population is threatened, with associated public health interventions accruing at a population level (Jin, 2020).

Research into squalor has primarily focused on the individual, considering personal demographics, characteristics and health. Conversely, research has not considered squalor in any depth at the population level. The scoping review will make clear that there are still a number of areas at the individual level that would benefit from further attention and improved methodology, such as co-morbidities, insight and risk factors. Furthermore, research considering the individual would also benefit from increased use of qualitative methods, which will add a unique perspective on those who live in squalor, but has been under-utilised in the literature. In addition to improvements in understanding squalor at the individual level, the scoping review will show that the literature base is limited in its investigation of squalor at the population level. In recent years, public health has changed focus, to move away from only delivering interventions, towards understanding the health of people at the population level and addressing risk behaviours to reduce harm (Kaur, 2016). This change in priorities is not apparent in studies on squalor. There has been no research into social and environmental risk factors, such as deprivation and inequality and no consideration of preventative approaches, identifying at-risk individuals. For this reason, it is considered important that this thesis includes research that is designed to engage with squalor at the population level, offering new viewpoints that could develop the present state of understanding at these two levels.

Figure 1.1

Similarities and differences between squalor, hoarding disorder and animal hoarding



The first research chapter in the thesis will feature a systematically conducted review of the literature in the form of a scoping review. Focus will be on squalor, including studies referring to DS and SDS and related terms. Animal Hoarding (AH) will also be included due to its similarities with squalor. However, Hoarding Disorder (HD) will not be included, as there are significant differences in the features of HD, squalor and AH (Figure 1.1) and the research base for HD is more extensive than the two other conditions. Self-neglect (SN) was also considered as a potential inclusion due to the overlap with the features of squalor. However, SN appears to be a broader term which can include

conditions such as HD and squalor, and its understanding varies by location and context (Braye et al., 2011; Day, Leahy-Warren, et al., 2016). Therefore, it will not be included in the scoping review. The review will summarise the present state of the literature, including definitions, demographics, research trends, prevalence, co-morbidities and levels of insight. Furthermore, it will conduct a methodological appraisement of the literature, an assessment method that is not usually included in a scoping review (Lockwood et al., 2019), but will be a valuable addition in this instance due to the wide range of research methods across a diverse field.

The scoping review is significant in that it represents the first instance of squalor literature being systematically collated and summarised. Furthermore, its inclusion of AH is the first time that the AH literature has been studied with the focus on the living environment and the relationship with squalor. Finally, the scoping review will also represent the first attempt to use the present research base to direct and inform future research in this area, formally proposing nine key research priorities for the future study of squalor, including using control groups, estimating prevalence, squalor in the general population and increased use of qualitative methods. The findings from the scoping review will inform the direction and intentions of the thesis, with studies being conducted with the aim of supporting the proposed research priorities.

The quantitative studies featured in chapters 3-5 of the thesis will consider several of the research priorities from the scoping review, investigating at both an individual and population level. The priorities were chosen, in part, due to the lack of research that had investigated these areas. For instance, squalor research has mainly produced studies using a sample of individuals living in squalor, which have been referred to services due to their living conditions. These are commonly older adults, and in most cases no efforts are made to include a control group. The quantitative studies included in this thesis will aim to produce findings that will help fill these gaps in the literature and investigate squalor in alternative samples and using a control group to support the analysis.

Chapter 3 will describe research collecting primary quantitative data from the general population about living conditions, with the intention of using this to investigate moderators and

mediators of squalor at the individual level. The intention will be to conduct a study addressing the research priority of squalor in younger adults. Students were chosen as they are commonly perceived to live in households that are less clean than in the general population and were likely to be less reluctant to engage than other neglecting groups. The study intends to investigate how household cleanliness is predicted by characteristics such as substance use and psychological variables including gender egalitarianism and social loafing tendency.

The quantitative studies featured in Chapter 4 and 5 will use data from the English Housing Survey (EHS), a national study running annually, collecting data on approximately 13,000 households each year (Office for National Statistics, 2022). The EHS has been running for over 50 years and produces extensive, rigorous data regarding the characteristics of individuals and their homes. Chapter 4 will use the data at the individual level to complete a cross-sectional analysis of the role of well-being on the presence of squalor in a household and the relationship between squalor and local deprivation. Deprivation has been shown to be a risk factor for mental ill health (McElroy et al., 2019; K. Visser et al., 2021). Furthermore, self-neglect, which is related to squalor, has been shown to be more common in deprived areas (Day, Mulcahy, et al., 2016; Lauder & Roxburgh, 2012). This investigation into deprivation will be one of only a few squalor studies that have considered the role of local and national factors and the first to do so in detail. In addition to the variables being investigated, the study will advance the research base by comparing a squalor group with a non-squalor control group, something that was a key priority suggested by the scoping review.

Chapter 5 will build on these findings to investigate additional household characteristics alongside local deprivation and analyse these at the population level. As suggested by the scoping review research priorities, this study will also introduce a new estimate of squalor prevalence using a method which is novel to the field - a prevalence meta-analysis on 13 years of EHS data. Previous prevalence estimates have based their calculations on the occurrence of new cases in a known population. However, the present estimate will provide a more reliable and robust value, due to its assessment of squalor in a large random sample from the general population. The quantitative

studies featured in chapters 4 and 5 will both use analytical approaches that are unique to the field, including proximity score matching (PSM; Chapter 4) and meta-analysis with subgroup analysis and meta-regression (Chapter 5). The findings from the two studies will also extend the understanding of squalor, by demonstrating a role for social factors.

The research described in chapter 6 will take a different approach to other studies in the thesis, addressing one of the key research priorities from the scoping review by collecting and analysing data using a qualitative method. As demonstrated by the scoping review, the research base relies heavily on quantitative data and even in the numerous case studies, gives little indication of the views, experiences and perspectives of individuals who live in squalor, their family and neighbours, and the professionals who work with squalor. Qualitative research investigating squalor is limited to only a couple of studies (Karlsson & Gunnarsson, 2018; McDermott, 2011), making all well-conducted research of this form valuable. Furthermore, by using qualitative methods, results can be used to inform future policy (Davidson et al., 2008), complementing the findings from the studies adopting a quantitative approach. Chapter 6 will describe research that will be conducted with professionals who have experience working with squalor. This will be a multi-perspective approach, interviewing individuals from a variety of professions, including social work, environmental health, housing and community safety. Multi-perspective research allows events and processes to be understood in a more complex manner, as it considers several viewpoints from within a system (McInally & Gray-Brunton, 2021). Professionals working within different organisations have different targets and goals and experience squalor according to their own expectations and biases. Combining this with a novel IPA approach will allow themes to be identified that highlight the experiences and interpretations of professionals who work with squalor. These findings will not only support the understanding of squalor from an academic perspective, but also highlight the areas of importance for those who encounter this condition on a daily basis. This information can then be used to guide future developments in community support, potentially developing more effective training, reducing staff burnout and improving the process of services working together.

In the final chapter of the thesis, findings from the scoping review and studies will be drawn together to discuss the conclusions and findings, but also how future research should approach the area to best improve the understanding and treatment of squalor and the individuals involved. The main conclusions will include the need to reconsider the assumptions that are presently held regarding squalor, and the importance of introducing novel research methods and multilevel research. The chapter will also highlight the lack of a formal term, definition or criteria for squalor and the lack of focus on squalor both academically and professionally. Furthermore, chapter 7 will suggest that individual level research needs to receive input from both academic researchers and professionals to produce person-centred studies that investigate squalor from the perspective of the resident. Finally, it will show that the introduction of findings at the population level emphasises the importance of considering preventative measures that could be introduced to manage squalor before it becomes severe. For instance, offering training programmes to professionals who work with squalor, or providing additional resources to proactively identify and support at-risk households.

Limitations

There have been two key limitations during the research process. Firstly, the access to individuals living in squalor. Secondly, the issues that have arisen due to the lack of a consensus on squalor, its causes, treatments and how it aligns with existing conditions such as hoarding and self-neglect.

During the development of this thesis, several studies were considered that conducted research with individuals who were living in squalor. An initial intention was to collect detailed data on the mental health and awareness of relevant participants by interviewing them directly. However, individuals living in squalor are difficult to identify due to the low prevalence of the condition, their isolated nature and their reluctance to engage (Luu et al., 2018; McDermott, 2011) Therefore, attempts were made to make contact through third parties such as environmental health and

housing. However, individuals in these and related fields were commonly not in a position to offer their time or resources to support the research.

Working with individuals living in squalor remains a future aim for research. However, the alternative data sources that have been used to conduct the research in this thesis have produced potentially important and unique findings. The quantitative data from the EHS is based on random sampling of the general population, leading to the production of a reliable estimate of squalor prevalence and statistically robust investigations of the role of deprivation and household income. Findings of this type are difficult to attain in marginalised or hard-to-reach groups, as individuals may not trust the research process and may be concerned about risks emanating from participation (Ellard-Gray et al., 2015). Furthermore, research recommends the use of specialised research teams and stakeholder involvement to produce reliable findings (De Schrijver et al., 2022). Nonetheless, even without the collection of primary research, this thesis has produced research on squalor that aims to be rigorous, novel and impactful.

The second limitation of the research process involved the inability to find where squalor fits academically and professionally. In research, DS is the most common term used to describe individuals living in squalor, usually referring to older adults and to individuals who also hoard (A. Clark et al., 1975; Maliszewska et al., 2018; Monfort et al., 2017; Nath et al., 2018; Sacchi et al., 2021). However, squalor is found amongst all age groups (Halliday et al., 2000) and may or may not include hoarding behaviours (Monfort et al., 2017). Similarly, SDS has been used in research, but limits itself to the living environment (Snowdon et al., 2007, 2012b), whereas the individuals themselves have characteristics that should also be considered, including social isolation and lack of insight. This issue is also reflected in the types of journals covering this material. Almost all the key papers on squalor have been published in journals focusing on older adults (Aamodt et al., 2015; Halliday & Snowdon, 2009; Ito et al., 2022; Lebert, 2005; Lee et al., 2014; Monfort et al., 2017; Snowdon & Halliday, 2011). As stated, squalor is more common in older adults, but it is not limited to this age group (Halliday et al., 2000). Therefore, research investigating the general population, or

younger adults specifically, is not appropriate for these journals. Only a few studies have been published elsewhere and these locations are quite diverse, including social work, dementia and neuropsychiatric journals (S. M. S. Chan et al., 2007; Finney & Mendez, 2017; McDermott et al., 2009). Therefore, there is no clear suitable location in which to publish research on squalor.

Issues were also identified when working with professionals who encounter squalor. DS was not used in reference to squalid homes and the term squalor was rare, due to its judgmental and shaming connotations. Social workers used SN to refer to squalor and similar cases, whereas other organisations referred to it as hoarding or a term specific to their organisation, such as 'Filthy and Verminous'. Overall, the diverse terminology and understanding that is used academically and professionally made it particularly difficult to identify appropriate participants, journals and professional groups to work with on the topic of squalor.

Implications

The research completed in this thesis has implications at both the academic and professional level. From an academic perspective, the scoping review highlighted several research priorities for future study, which will support an improvement in the understanding of individuals that live in squalor. More specifically, the thesis suggests that an increase in the use of person-centred research is key to a better understanding of squalor, and this is likely to be achieved by collaborative research between academics and field workers who have access to the target population. For professionals and services that encounter squalor on a day-to-day basis, the research on prevalence suggests that there is a significant percentage of individuals who are living in some form of squalor who are not receiving support. A more proactive approach to identifying these cases is implied, as is an increased movement towards prevention. Support for at-risk individuals, identified through their medical or socioeconomic characteristics, could reduce the number of severe cases of squalor that develop and require significant environmental, physical and social interventions. Finally, qualitative research conducted in this thesis has identified significant variations in professional services regarding the

language and processes used in the care of individuals living in squalor. Consensus in these matters would improve cross-collaboration of services, which is a common requirement in squalor cases. A starting point for this would be the develop of a training programme to provide services with the knowledge and understanding they require to support individuals living in squalor.

Although the research in this thesis has encountered issues, the conclusions and outcomes represent a significant step forward in squalor research. By systematically summarising the literature, highlighting the most effective future research directions and introducing new findings, the thesis provides both a key starting point and a new understanding for squalor.

Chapter 2

Living In Squalor: A Scoping Review

Introduction

Whilst cases of people living in squalor were noted nearly a century ago (Sacchi et al., 2021), formal study commenced in the 1960s (Macmillan & Shaw, 1966). Since then, a variety of terms have been used, most commonly 'Diogenes Syndrome' (DS; A. Clark et al., 1975; Finney & Mendez, 2017; Lebert, 2005) and 'Severe Domestic Squalor' (SDS; Gleason et al., 2015; McDermott et al., 2009; Snowdon et al., 2007). Squalor has never featured in either the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 2013) or the International Classification of Diseases (World Health Organisation, 2018). Five unsystematic squalor reviews have previously been conducted (Amanullah et al., 2009; Cooney & Hamid, 1995; Maliszewska et al., 2018; Norberg & Snowdon, 2014; Snowdon et al., 2007). However, the squalor literature has yet to be compiled systematically.

Squalor affects people across the age range, but is more common in older adults; it has been estimated to occur in approximately 1 in 1000 individuals over 65 years old (Snowdon & Halliday, 2011). Individuals live in filthy and verminous environments, often accompanied by a sickening smell, but may insist that they do not have any problem with hygiene and cleanliness (Gregory et al., 2011; Halliday et al., 2000). Self and environmental neglect places people at risk of physical illness comorbidities such as asthma, dermatitis, infections (Lacombe & Cossette, 2018), anaemia, dehydration and mineral/vitamin deficiency (Maliszewska et al., 2018).

Squalor can be a component of other disorders, most notably hoarding disorder (HD) and animal hoarding (AH). Table 2.1 sets out the commonalities. Squalor is also related to self-neglect.

However, this is a broader category, which could be said to include squalor, HD and AH and is therefore not appropriate for comparison.

Table 2.1

Key Clinical Features and Characteristics of Squalor, Hoarding Disorder and Animal Hoarding

	Squalor conditions	Hoarding Disorder	Animal Hoarding
Key features	Filthy living environment, Mess and clutter, Lack of concern (Lee et al., 2014; Snowdon et al., 2012b)	Large number of possessions of limited value Cluttered living space preventing use of area Difficulty discarding possessions (Albert et al., 2015)	Excessive animal accumulation Denial of and failure to act on condition of animals or environment Difficulty allowing removal of animals (Patronek, 1999; Steketee et al., 2011)
Gender	Approximately equal (Lee et al., 2014; Snowdon et al., 2007)	Approximately equal (Frost et al., 2011)	Mainly female (Frost et al., 2011)
Age	Mostly older adults but can be present in all adults (Halliday et al., 2000; Lee et al., 2014)	Symptoms usually begin in adolescence though usually not serious until older (Albert et al., 2015)	Usually first identified around middle or older age (Arluke, Frost, Carter, et al., 2002; Patronek, 1999)
Accumulation	Usually a passive build-up of rubbish, but some form of hoarding occurs in around 50% of squalor cases (Gleason et al., 2015; Halliday et al., 2000)	Multiple types of objects, no cohesive theme (Albert et al., 2015)	Usually one type of animal, but objects also hoarded in around 50% of cases (R. Elliott et al., 2019; Frost et al., 2011)
Attachment	Commonly unconcerned by loss of items (Khan, 2017; Norberg & Snowdon, 2014)	Inability to discard items is a core feature of HD (Albert et al., 2015)	Difficulty giving up animals, even the sick and dying (Frost et al., 2011)
Insight	Poor (Lee et al., 2014; Norberg & Snowdon, 2014)	Insight into their condition is varied, likely to be related to help-seeking behaviour (Albert et al., 2015)	Poor (Frost et al., 2011)
Common psychiatric co-morbidities	Dementia, Alcohol abuse, Psychotic disorders (Snowdon et al., 2007)	Depressive disorders, Anxiety disorders, OCD, Impulse control disorders, ADHD (Arluke, Frost, Carter, et al., 2002; R. Elliott et al., 2019; Frost et al., 2011, 2015; Khan, 2017)	Limited data available but depression, anxiety disorders and personality disorders are common (E. A. Ferreira et al., 2020; Frost et al., 2011)
Presence of squalor	Squalid living conditions are a defining feature of squalor conditions such as DS and SDS	In around 50% of cases (Kim et al., 2001; Luu et al., 2018)	Common - Present in around 80-90% of cases (Arluke, Frost, Carter, et al., 2002; Patronek, 1999)

Hoarding Disorder

HD and squalor show a significant level of co-morbidity. Hoarding occurs in 40-90% of squalor cases (Lee et al., 2017; Monfort et al., 2017; Snowdon & Halliday, 2011) and similarly, squalor is found in 20-72% of HD cases (Kim et al., 2001; Luu et al., 2018; Mataix-Cols et al., 2012). In addition, Lee et al. (2014) demonstrated that 40% of a sample of individuals living in squalor had hoarding symptoms that preceded squalor. Specific differences between HD and squalor are shown in table 2.1. However, in summary, HD shows purposeful acquisition with a reluctance to discard possessions, whereas in squalor the environment passively deteriorates due to a lack of ongoing care and maintenance (Gleason et al., 2015). Although there is a significant overlap in the occurrence of HD and squalor, there are specific behavioural and etiological features which differ, suggesting that they should not be researched as one condition. Furthermore, with the much more significant research base associated with hoarding and the better understanding of the condition, priority in this instance will be placed on collating and summarising the present research on individuals who live in squalor, which continues to demonstrate notable gaps in its understanding and definition.

Animal Hoarding

AH is described as “having more than the typical number of companion animals” (Arluke et al., 2017, p. 108). It also involves a failing to provide minimum care, a denial of this failing and persistence of the behaviour (Arluke et al., 2017). Like squalor, the literature base and understanding of AH is limited, particularly in comparison to object hoarding. Furthermore, AH appears to share a number of significant characteristics with squalor. For instance, squalid living conditions are a defining feature of disorders such as DS and SDS and are also identified in a high proportion of those with excessive numbers of animals (C. Chan & Snowdon, 2012). Secondly, lack of insight is consistently high in AH, just as in cases of DS and SDS. Animal hoarders commonly ignore or deny the adverse effects their behaviour is having on the animals in their care and will also not acknowledge the unsanitary conditions which are present in their dwellings (Patronek & Nathanson, 2009). Finally,

AH appears to be similar to squalor in terms of cognitive profiles of the individuals involved (Gleason et al., 2015; Lee et al., 2014; Paloski et al., 2020), although research is lacking in this area.

Self-Neglect

At present, there is no consensus on a common definition of self-neglect, with the understanding of the condition varying from study to study and country to country (Braye et al., 2011; Day, Leahy-Warren, et al., 2016). In some instances, self-neglect may be seen as a phenomenon with a number of sub-groups, such as squalor and hoarding. Whereas it has also been said to be a sub-group itself, of elder abuse, or risky behaviour (Braye et al., 2011; Gibbons et al., 2006).

A significant proportion of the self-neglect literature has been produced in the USA (Braye et al., 2011), where self-neglect is considered to be an all-encompassing term, describing a situation where an individual fails to carry out basic tasks for themselves, such as provision of food and ensuring a safe living environment (McDermott, 2008). However, definitions and rules for reporting do vary by state (Gibbons et al., 2006). The most common definition of self-neglect in the US literature is from the National Center on Elder Abuse (NCEA) and is used by a significant percentage of the self-neglect research papers (X. Dong et al., 2009; Ernst & Smith, 2011; Hansen et al., 2016; Hei & Dong, 2017; Iris et al., 2014). The NCEA define self-neglect as "…the behavior of an elderly person that threatens his/her own health or safety. Self-neglect generally manifests itself in an older person as a refusal or failure to provide himself/herself with adequate food, water, clothing, shelter, personal hygiene, medication (when indicated), and safety precautions" (*NCEA - Abuse Types*, n.d.). Although no specific mention is made of environmental neglect, the same webpage also suggests signs and symptoms of the condition, which include unsafe, unsanitary and unclean living conditions.

Definitions and descriptions of self-neglect in the US research appear to include unclean living conditions in most cases. However, although it seems clear that an individual

living in squalor would be considered to be self-neglecting, the same term can be used for someone who does not live in squalor, but neglects in other ways.

The understanding of self-neglect in the UK is close to how it is presented in the US, although the research base is more limited. UK research papers investigating self-neglect commonly include environmental factors in their descriptions (Lauder, 2001; May-Chahal & Antrobus, 2012), including Martineau (2021), who references the Care Act 2014 supporting guidance (Department of Health and Social Care, 2020) which includes neglect of one's surroundings in its description. However, there is some variation regarding the definition of self-neglect in relation to squalor. Day et al. (2012) suggest that DS and senile squalor syndrome are historical names to describe self-neglect, whereas Lauder (2001) suggests that squalor is linked to *severe* self-neglect. Furthermore, the Social Care Institute for Excellence (Social Care Institute for Excellence, 2018) suggests that DS can be used when the individual's self-neglect is related to deterioration in old age.

In Australia, the understanding of what constitutes self-neglect is different to the definitions used in the US and UK. McDermott (2008) interviewed 24 professionals working in this area, to discover their understanding of the term self-neglect. The results suggested that Australian professionals differentiate between behaviours that involved neglect of self and those which involve neglect of their environment. In fact, the term self-neglect is rarely used in practice, with lack of self-care, squalor and hoarding/collecting treated as separate conditions (Braye et al., 2011). Research in Australia focuses primarily on the condition of Severe Domestic Squalor (SDS), led by John Snowdon and colleagues. Unlike definitions of self-neglect, SDS describes an environment and not an individual. This distinction is supported by research that suggests that personal cleanliness and environmental cleanliness may not always occur together (Macmillan & Shaw, 1966; Snowdon et al., 2012a). Therefore, the definition of SDS focuses on the unclean, messy and unhygienic condition of a dwelling and not the cleanliness of the person who lives there (Snowdon et al., 2012b).

The majority of SN studies include environmental aspects in their definitions of self-neglect and include individuals who could be said to be living in squalor (Gibbons et al., 2006; O'Brien, 2011;

Schillerstrom et al., 2009). However, studies do not identify which participants are living in squalor and which are self-neglecting in other ways (Aung et al., 2006; Burnett et al., 2006; Ernst & Smith, 2011; Hansen et al., 2016; Lauder & Roxburgh, 2012; Naik et al., 2008). Even when a measure of self-neglect severity has been included, it is still not possible to identify what elements of self-neglect are a problem (X. Dong et al., 2009; Dyer et al., 2006; Li et al., 2018; Mardan et al., 2014).

HD and SN are both related to squalor. However, both conditions have received significantly more research focus than squalor or AH. Furthermore, in both cases, not all individuals featured in the research would be living in squalor. Therefore, to ensure the focus of the review remained on squalor, HD and SN were not included as part of the present research. Conversely, environmental decline is a notable feature of AH, occurring in almost all cases (Arluke, Frost, Carter, et al., 2002). Furthermore, there has been limited reviews or analyses of the AH literature and none that focus on the condition's relationship with environmental squalor. On this basis, AH studies were included as part of the scoping review to further the understanding of the condition and its similarities and differences with conditions such as DS and SDS.

The aims of the review were to systematically investigate, summarise and appraise the present state of understanding surrounding squalor, and to use this information to propose future research areas that would benefit the research base. Although narrative reviews of squalor had previously been completed (Amanullah et al., 2009; Cooney & Hamid, 1995; Maliszewska et al., 2018; Norberg & Snowdon, 2014; Snowdon et al., 2007), the squalor literature had never been systematically compiled. Due to the broad and varied nature of the research base, a scoping review method was considered to be the most appropriate approach for the topic and was selected in order to deliver a reproducible and exhaustive investigation of the squalor literature (Munn et al., 2018). Furthermore, a scoping review is an effective method of describing literature with varied research

questions, measures, methodology or populations and to inform future, more focused, evidence synthesis.

Methods

The scoping review was structured using the 6-stage framework initially developed by Arksey and O'Malley (2005) and then enhanced by Levac et al. (2010).

Stage 1: Identifying the research question

A preliminary examination of the literature was conducted to identify what should be the focus of the review. Due to the variety of methods and aims identified in the research base, the depth of literature did not make it possible to complete a review focusing on a specific aspect. Therefore, the following research questions were devised to allow for the largest possible scope while maintaining a focus on squalor:

(1) What information is available regarding all aspects of individuals who live in squalor?

(2) What are the key research priorities?

Stage 2: Identifying relevant studies

To identify relevant studies, it was necessary to establish which databases would be used, the search strategy employed and the eligibility criteria to be used for screening. In each case, a preliminary review of the squalor literature was conducted, from which an initial list was produced. Discussion within the research team led to a final agreement. Criteria and strategies were chosen to offer the best chance of identifying relevant material. Terms referring to squalor and AH were used during database searching during May 2021 and all forms of published primary research was accepted. A further search of databases was conducted in April 2022 to identify any additional studies which had not been included in the original investigations. A significant grey literature

strategy was also included, featuring database searches (May 2021). Furthermore, local councils in the UK were also contacted to identify any materials relevant to the review (June 2021). Contact was in the form of a freedom of information request for reports, research or policy documents related to individuals living in squalid conditions or extreme self-neglect. 426 local councils were contacted, receiving 118 items within a 6-week period.

The following databases were chosen for the initial search of peer-reviewed material:

- Psycinfo
- Web of Science
- Scopus
- PubMed
- CINAHL
- Google Scholar – Limited search

The following grey literature databases were also included:

- Opengrey.eu
- EThOS
- Proquest Social Sciences Database
- Clinicaltrials.gov
- DART Europe
- Community Care Inform Adults

Eligibility criteria

Due to the limited research identified as part of a preliminary review, criteria were chosen to enable the highest probability of including data relevant to squalor. All methodological approaches were included and all levels of evidence down to case studies and series. However, opinion pieces and narrative reviews were not included unless they also featured original data. To further increase the scope of the search, the review was not limited by a date range, as the quantity of published

research over time is itself significant information to the development of the understanding of squalor. In addition, the review included searches for relevant grey literature. Grey literature is any data produced at governmental, academic, business or industry level that is not controlled by commercial publishers (Hopewell et al., 2007). In the case of squalor, the most likely sources include research reports, dissertations and policy documents. Appropriate literature was identified by using grey-literature-specific database searches, such as opengrey.eu and EThOS and contact with organisations working in the field. Including grey literature in reviews reduces the risk of publication bias and increases the comprehensiveness of the review (Paez, 2017). Furthermore, in the case of squalor, where primary research is limited, it is particularly important to ensure that all avenues are covered to discover sources of data which may not have been identified previously.

Finally, all literature included in the review focused on squalor and AH. Studies investigating hoarding disorder and self-neglect commonly include elements of overlap. However, as discussed in the introduction, these conditions have distinct characteristics and methodological limitations, making it inadvisable to include in a review on squalor.

The following inclusion and exclusion criteria were used to identify and screen potential research:

Inclusion:

- Primary research
- Grey literature included
- English language only
- Focus on squalor or AH
- All methodological approaches accepted, including both qualitative and quantitative, irrespective of sample size
- All publication dates

Exclusion:

- Secondary research where no empirical data is featured, such as narrative reviews, opinion pieces and book reviews
- Studies focusing solely on hoarding, with no features of squalor

Search strategy

An exploratory literature search was initially conducted, including backwards and forwards searching, using 'Diogenes Syndrome' and 'Severe Domestic Squalor' and 'Animal Hoarding' to identify all potential terms used to refer to individuals living in squalor. The research team then agreed which terms would be included in the final search.

The following terms were used during the searching process:

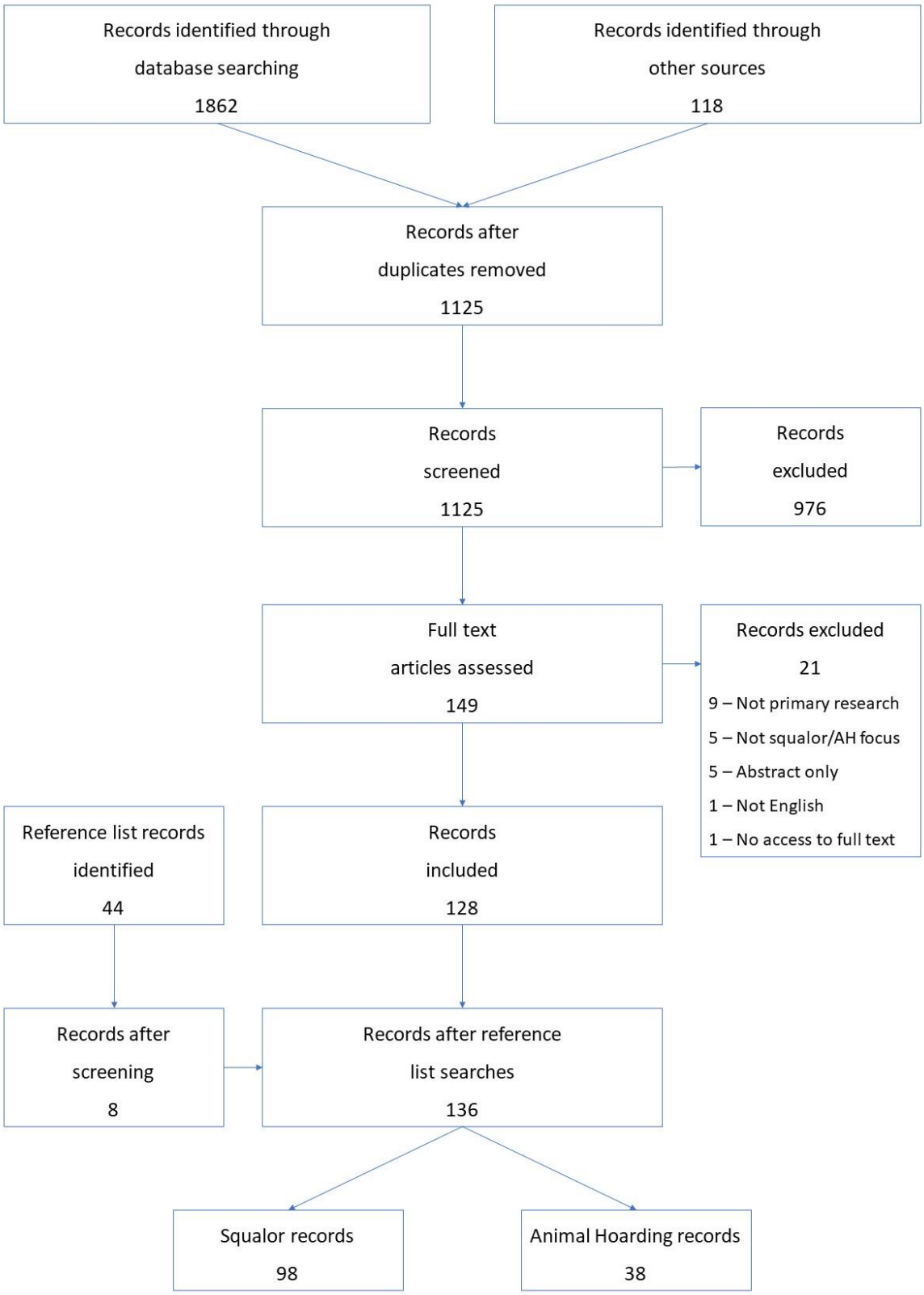
- Severe Domestic Squalor
- Diogenes Syndrome
- Squalor
- Syllogomania
- Senile squalor syndrome
- Severe breakdown syndrome
- Senile breakdown syndrome
- Messy house syndrome
- Havisham syndrome
- Animal Hoarding

Stage 3: Study selection

The study selection process is summarised in the flow diagram in figure 2.1. Results from each search were collated on a single database, including the first 100 results from Google Scholar and all grey literature, before duplicates were removed, leaving 1125 items.

Figure 2.1

Flow diagram summarising the screening process



The lead reviewer assessed the title and abstract of each study, removing or retaining on the basis of the inclusion and exclusion criteria. In the case of the grey literature, where an abstract was not always included, the reviewer considered the article on the basis of an initial scan of the content. Two additional reviewers were given 20 items to assess for inclusion. The results of which were discussed between the research team and decisions were used by the lead researcher in the assessment of the remaining articles. Further elimination took place following the acquisition of the full text for each item, before forward and backwards reference searching was conducted to identify any potential articles which may have been missed during the search process. These were subject to the same inclusion and exclusion criteria before being included in the final selection. In total, 98 squalor and 38 AH articles met the criteria for inclusion in the scoping review. The list of articles included and the data extracted can be found in appendices 2.1 and 2.2.

Stage 4: Charting the data

An extraction form was initially piloted by the research team and then adjusted during the data extraction process to better display the key information identified during the process. The final categories included were as follows:

- Author(s)
- Year
- Title
- Term used to describe the condition
- Methodological approach
- Squalor measurement used
- Sample size and characteristics
- Mental co-morbidities
- Location of study
- Summary of findings

- Level of insight
- Outcome/follow-up

The data extraction process followed a similar method to previous sections. The lead researcher extracted information from each of the chosen studies, while the additional researchers assessed 20 studies, the results of which were discussed between the research team to guide data extraction for the remaining articles.

Critical appraisal

Critical appraisals of the quality of the evidence base are not a common aspect of scoping reviews (Lockwood et al., 2019). However, due to the wide range of research methods across a diverse field (e.g. including mental health, dermatology, pathology, neurology and social care) an assessment of the quality of the squalor evidence base was considered to be valuable. Each study was assessed for methodological quality using the Mixed Method Appraisal Tool (MMAT). Both the 2011 (Pluye et al., 2011) and 2018 (Hong et al., 2018) versions of the MMAT were completed as they considered different elements of the research, so improving the appraisal process. The 2011 and 2018 versions assess each empirical study using 4 and 5 questions, respectively. The MMAT was designed to assess different study designs, including quantitative, qualitative and mixed method. It was the only critical appraisal tool that could be found that included multiple different research methodologies, which was necessary for this scoping review. Although the MMAT was not designed to compare different methodologies, it highlighted areas in which the literature base was limited, guiding future research, regardless of methodological approach employed. As with previous stages, the lead researcher assessed all items using the MMAT 2011 and 2018 and additional researchers considered a random sample of 20 items. However, the nature of the MMAT requires the item to be assessed by different questions based on the methodology used. Therefore, an additional step was included at this point, whereby an initial assessment of methodological approach was conducted for each item and an agreement reached between all researchers before the critical appraisal process

was conducted. Although this is not normally included in the process, the eclectic nature of the research base meant that it was important to come to a consensus on the methodology employed to guide the critical appraisal process. Following the completion of the review items, the inter-rater reliability between the lead reviewer and reviewer 1 was almost perfect (Landis & Koch, 1977) on both the 2011 and the 2018 version of the MMAT ($\kappa = 0.92$ & $\kappa = 0.91$, respectively). Between the lead reviewer and reviewer 2, reliability for the 2011 version was substantial ($\kappa = 0.66$). However, for the 2018 MMAT, reliability was only fair ($\kappa = 0.33$). The poor inter-rater agreement on the MMAT 2018 was discussed between the lead reviewer and reviewer 2. There were 15 items across the 10 reports where there was disagreement. Following discussion, in all but one case, consensus was reached in accordance with the opinion of the lead researcher. On this basis, the ratings of the lead researcher on the full literature base were considered to be acceptable.

Stage 5: Collating, summarising and reporting

The structure of the study list is initially demonstrated graphically, highlighting how the number of relevant articles has changed over time, what methodologies have been applied most often in the literature and the location where research has taken place. From the extraction framework, data was then collated by category, including a summary of gender, co-morbid conditions, level of insight and outcome and follow-up data. Although not consistently included in all reports, additional sections on the incidence of squalor and the research around the cognitive characteristics of squalor individuals were also included, as these were deemed to be valuable elements to understanding the condition. Where possible, analysis was conducted to identify whether there was a significant difference between the data from the squalor and AH studies. Chi-squared tests were used for this purpose, allowing comparisons of gender ratio, level of insight and the presence of object hoarding. Unlike most scoping reviews, the analysis of the studies was supported by the critical appraisal, which provided analytical evaluation of the quality of a study (Katrak et al., 2004). This process is more often seen in a systematic review (Munn et al., 2018).

However, unlike many areas of focus, research in squalor sees particular difficulties involved in accessing willing participants, leading to reliance on small and bias samples, or retrospective data. These methodological limitations potentially influence results and interpretations of the findings, and ultimately ascertain whether they can be trusted (Katrak et al., 2004). Therefore, the quality review of the squalor literature is beneficial to understanding the validity of the research base and where it can be improved. By including this element in the review, areas that require further research can be identified, not just by the scarcity of published studies, but also by their methodological limitations.

Collecting data by category, summarising the findings and exposing them to critical appraisal demonstrated what areas had featured most prominently in the squalor and AH literature and what could be concluded. Furthermore, it also showed what topics would benefit from further research and helped identify areas that had been neglected entirely and would offer new research directions.

Stage 6: Consultation

Once preliminary results have been collated, these findings will be shared with professionals that work with squalor. Due to the variety of organisations that encounter it, more than one group will be used in the consultation process. An individual representing mental health, one from a housing association and one from environmental health will be contacted for feedback. This process will involve a copy of the full article, along with a summary of the findings being emailed, along with a questionnaire with quantitative and qualitative elements, to be completed by the consultant. The aims of this stage will be to identify whether the academic findings are in line with what is encountered on a daily basis. Furthermore, whether the future research priorities suggested by the review are supported by those who work directly with squalor individuals, or whether additional areas should be considered. By receiving input from three different representatives, it allows multiple perspectives to be considered, which is particularly important with SDS as it is encountered by a variety of organisations with different priorities and expectations.

Results

Descriptors

Most studies (67/98; 68%) use the term Diogenes Syndrome (DS), followed by Severe Domestic Squalor (SDS; n = 7, 7%), Senile Squalor Syndrome (SSS; n = 2, 2%), Senile Breakdown (SB; n = 1, 1%) and Social Breakdown in the Elderly (SBE; n = 1, 1%). Table 2.2 reports the definitions extracted. SDS is unique by focusing solely on the home environment, removing the need to assess the individual. AH studies used a common definition (see Table 2.3).

Table 2.2

Terms and Descriptions Used to Describe an Individual Living in Squalor

Diogenes Syndrome (A. Clark et al., 1975)	Severe Domestic Squalor (Snowdon et al., 2012b)	Social Breakdown in the Elderly (Ungvari & Hantz, 1991)	Senile Breakdown (Macmillan & Shaw, 1966)	Senile Squalor Syndrome (J. Clark, 1999)
• Dirty, untidy home • Filthy personal appearance • No shame • Distinct personality characteristics • Possible hoarding of rubbish	• House unclean, messy and unhygienic • Revulsion from visitors • Possible hoarding • Possible presence of vermin and insects	• Neglected self-care • Neglected personal environment • Social isolation • Shameless attitude • Refusal of help • Collection of useless objects	• Filthy personal appearance • Filthy dwelling • Possible presence of vermin • Possible human waste	• Gross self-neglect • Extreme squalor • Social isolation

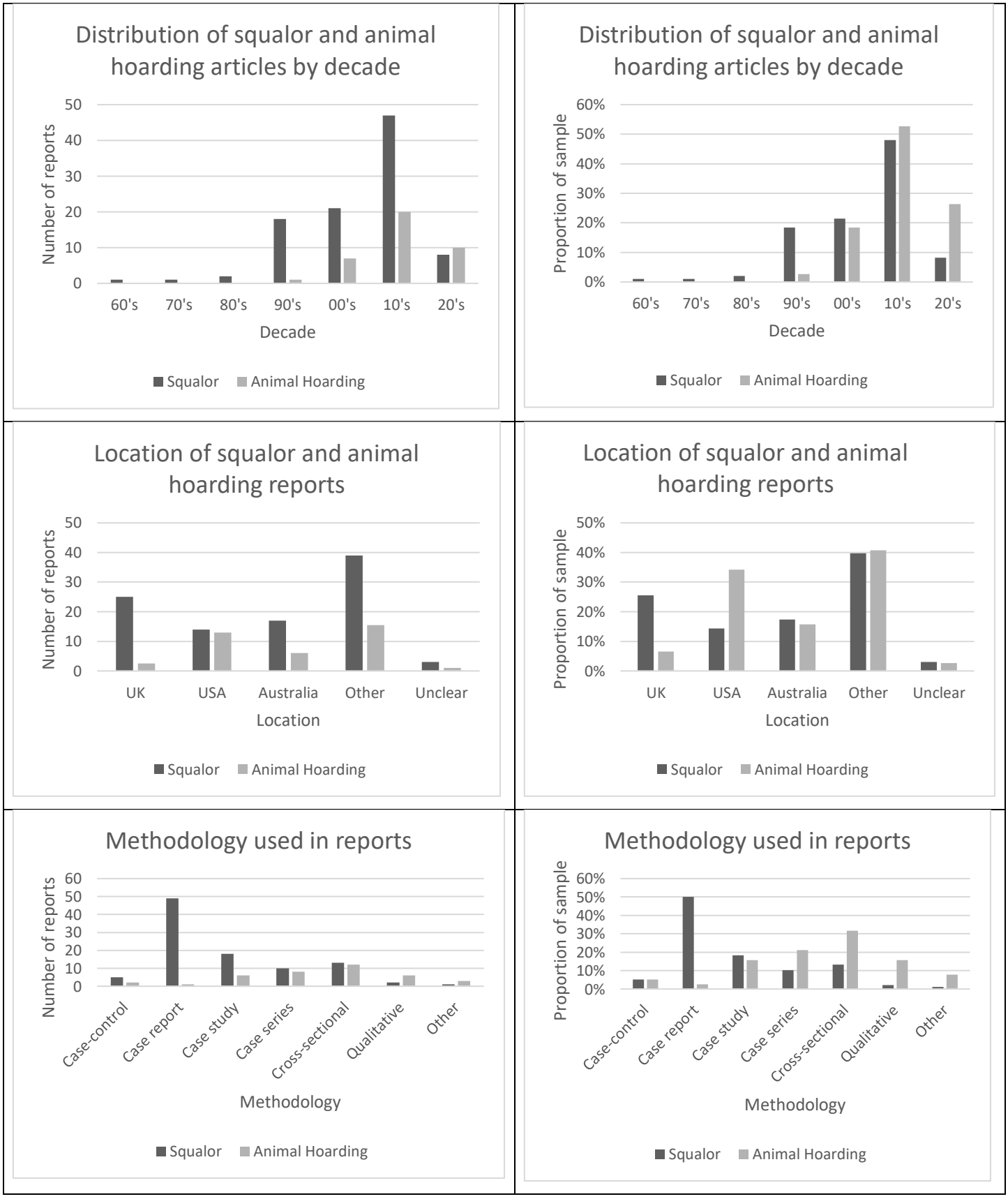
Table 2.3

Characteristics of Animal Hoarders

Animal Hoarding (Arluke et al., 2017; C. Chan & Snowdon, 2012)
• More than typical number of companion animals • Failure to provide minimum care to the animals • Denial of the inability to provide care • Persistence in accumulating animals

Figure 2.2

Squalor and AH Articles by decade, location and methodology



Evidence base

Figure 2.2 shows that squalor research increased in the 1990s, whereas AH has been more recently studied, with the 2010s accounting for most AH research. Over time, AH has received increased research attention and squalor relatively less. Figure 2.2 shows that 60% of all squalor and AH research is conducted in the UK, USA and Australia. Figure 2.2 also shows that methodologically, squalor studies tend to be case reports or case studies (n = 67, 68%), whilst the AH evidence base is more methodologically varied.

Measures

Assessment of squalor severity is uncommon. Most studies rely on short descriptions of living conditions or from case identification from medical notes. In AH studies, the number and range of animals are the main focus, with around a third of studies not reporting on environmental conditions. Three measures of squalor have been developed (Table 2.4). Macmillan and Shaw (1966) created an observer-rated measure that was adapted (Samios, 1996; Snowdon, 1987) to create the *Living Conditions Rating Scale* (LCRS). However, no reliability or validity evidence has been reported. A multi-agency adjustment to the scale created the *Environmental Cleanliness and Clutter Scale* (ECCS; Halliday & Snowdon, 2009). The self-report *Home Environment Index* (HEI; Rasmussen et al., 2014) is designed to measure squalor in HD.

Table 2.4

Summary of the Measures of Squalor Used in Research

	Living Conditions Rating Scale (LCRS)	Environmental Cleanliness and Clutter Scale (ECCS)	Home Environment Index (HEI)
Reporting method	Observational measure	Observational measure	Self-report
Target population	General population	General population	Hoarders
Mean scores	Squalor sample – Mean = 17, SD = 6 (Interior items only) (Halliday et al., 2000) Squalor sample – Mean = 17.7 (Interior items only) (Gregory et al., 2011)	Squalor sample – Mean = 18.5, SD = 4.0 (Snowdon et al., 2013) Squalor sample – Mean = 18.8 Following intervention – Mean = 6.5 (McDermott & Gleeson, 2009)	HD sample – Mean = 12.96, SD = 6.86 (Rasmussen et al., 2014)
Psychometric properties	20 items, rated 0-3 Maximum score 60. Score >13 suggests moderate or severe squalor (Interior items only) (Halliday et al., 2000) Reliability and validity statistics not reported	10 items, rated 0-3 Maximum score 30 Score > 12 suggests moderate or severe squalor (Halliday & Snowdon, 2009) Internal reliability - Cronbach's alpha = 0.87 Inter-rater reliability - Cohen's kappa = 0.48 Validity - Cohen's kappa = 0.73 (Halliday & Snowdon, 2009) Cronbach's alpha = 0.71 (Snowdon et al., 2013)	15 items, rated 0-3 Maximum score 45 Internal reliability - Cronbach's alpha = 0.89 (Rasmussen et al., 2014) Convergent validity moderate in relation to the Hoarding Rating Scale (Rasmussen et al., 2014) Divergent validity good as there was a stronger relationship with hoarding symptoms than OCD or negative affect symptoms (Rasmussen et al., 2014)

Incidence and presence

Table 2.5 summarises the eight studies that have reported prevalence estimates. In the majority of these (Cunha et al., 2017; Halliday & Snowdon, 2009; Macmillan & Shaw, 1966; Patronek, 1999; Snowdon & Halliday, 2011), an estimate was found by assessing the number of referred cases per population per year. The combined estimate for squalor was 7/10000 and was 3/100000 for AH.

Table 2.5

Estimates of Incidence Featured in Squalor and AH Research

Study	Sample	Incidence (%)
Squalor		
(Macmillan & Shaw, 1966)	60+ years, UK	0.5/1000 (0.05)
(Wrigley & Cooney, 1992)	65+ years, Ireland	0.5/1000 (0.05)
(Halliday et al., 2000)	65+ years, UK	1/1000 (0.1)
(Halliday et al., 2000)	Under 65 years, UK	1/6000 (0.02)
(Snowdon & Halliday, 2011)	65+ years, Australia	0.66/1000 (0.07)
		Combined estimate – 7/10000
Animal Hoarding		
(Patronek, 1999)	All ages, USA	0.8/100000 (0.0008)
(Joffe et al., 2014)	AH prosecutions, all ages, USA	1-2/1600000 (0.00006-0.0001)
(Campos-Lima et al., 2015)	OCD individuals, all ages, Brazil	1/210 (0.47)
(Cunha et al., 2017)	All ages, Brazil	3.71/100000 (0.004)
		Combined estimate – 3/100000

Table 2.6 shows that for those AH studies that gave information regarding the condition of the dwelling, a high percentage (81%) were found to be living in squalor.

Table 2.6

Presence of Squalid Living Conditions in AH Studies

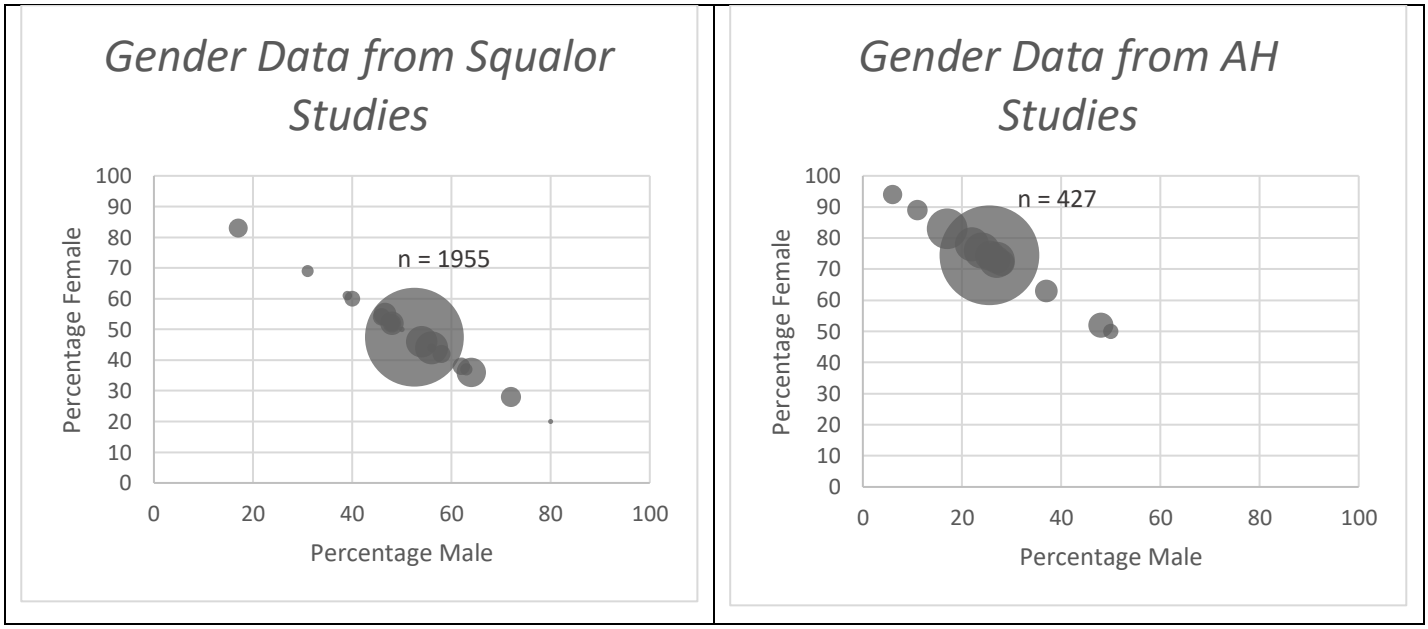
Study	Total living in squalor	Total assessed	Percentage living in squalor
Case reports/studies	16	20	80%
(Arluke, Frost, Carter, et al., 2002)	66	71	93%
(Calvo et al., 2014)	7	11	64%
(R. Elliott et al., 2019; Snowdon et al., 2019)	21	29	72%
(Mielke, 2015)	2	2	100%
(Ockenden et al., 2014)	15	22	68%
(Patronek, 1999)	38	49	78%
Total	**165**	**204**	**81%**

Gender

There was an approximately even male:female split across nearly 2000 squalor cases (53:47) (See Figure 2.3). AH has a significantly different gender ratio compared to squalor ($\chi^2(1, N = 2382) = 101.37$, $p < .001$), suggesting that around three-quarters of AH cases are female.

Figure 2.3

Comparison of Gender Data for Squalor and AH Research



Note. Each circle represents a research study. Larger circles indicate larger sample size. Largest circle in each graph indicates the total of all studies.

Insight

In around 33% of squalor and AH studies some attempt had been made to measure insight (see Table 2.7). Approximately 70% of individuals living in squalor lack insight, with no significant difference in insight between squalor and AH ($\chi^2(1, N = 327) = 0.04$, $p > .05$).

Table 2.7

Levels of Insight in Squalor and AH cases

Study	Number with impaired insight/awareness	Total in sample	Percentage with impaired insight/awareness
Squalor			
Case reports/studies	29	37	78%
(Halliday et al., 2000)	23	69	33%
(Lebert, 2005)	30	30	100%
(Gleason et al., 2015; Lee et al., 2014, 2017)	64	69	93%
Total	**149**	**210**	**71%**
Animal Hoarding			
Case reports/studies	4	10	40%
(Calvo et al., 2014)	21	24	88%
(Dozier et al., 2019)	12	17	71%
(E. A. Ferreira et al., 2017, 2020; Paloski et al., 2020)	24	33	73%
(Patronek, 1999)	28	38	74%
Total	**89**	**122**	**73%**
			$\chi^2 = 0.04, df = 1, p > .05$*

*Chi-squared test to investigate the difference between the levels of insight in squalor and AH studies.

Cognitive characteristics

Of the 39 squalor and AH reports including details of cognitive testing, the Mini Mental State Examination (MMSE) featured in 30 (77%) and results commonly suggest no significant impairments. However, impairments in executive functioning (Guinane et al., 2019; Lee et al., 2014) have been found in both squalor and AH (Aamodt et al., 2015; Finney & Mendez, 2017; Gleason et al., 2015; Paloski et al., 2020). More specifically, Lee et al. (2014) found that 93% of a squalor sample had frontal executive dysfunction, with the most common deficits in higher attentional skills, mental flexibility and abstraction. The impairments in higher order executive processes often seen in squalor indicate the involvement of the dorso-lateral pre-frontal cortex (DLPFC; Lee et al., 2014). Orbitofrontal impairment appears less likely, as this would produce impulsivity and overfamiliarity and affect theory of mind and emotion processing, which are not commonly encountered in squalor

samples (Gregory et al., 2011; Lee et al., 2014). Executive dysfunction appears to be a consistent feature of squalor and related conditions, such as HD, dementia, psychotic disorders and alcohol abuse (Ayers et al., 2013; Gleason et al., 2015; Gledhill et al., 2021; Stopford et al., 2012; Wobrock et al., 2009). However, Aamodt, Terracina and Schillerstrom (2015) compared executive functioning in a sample of older adults living in squalor with those living in normal conditions. Although both groups were impaired, there was no significant difference.

Co-morbidities

Information regarding co-morbid conditions is included in the squalor literature in various forms and has been collected using a variety of methods. Several studies state whether a condition is present or absent (Aamodt et al., 2015; T. Shaw & Shah, 1996), whereas others state it's severity or specific type (S. M. S. Chan et al., 2007; Gregory et al., 2011; Monfort et al., 2017). Furthermore, co-morbidity data is sometimes assessed in person (S. M. S. Chan et al., 2007; Gregory et al., 2011; Monfort et al., 2017) or collected from medical records (Aamodt et al., 2015; Wrigley & Cooney, 1992) and sometimes it is stated as a suspected or historical condition (Badr et al., 2005; Campbell et al., 2005; Grignon et al., 1999; O'Shea & Falvey, 1997). Nonetheless, a number of studies summarised data on the co-morbidities of a squalor sample, focusing most often on object hoarding, dementia, alcohol abuse and psychosis.

In DS and SDS research, hoarding may refer to the build-up of waste (S. M. S. Chan et al., 2007) or the purposeful collection of items (Halliday et al., 2000). Studies may refer to Syllogomania, using it to mean excessive hoarding (Lebert, 2005) or more often the hoarding of rubbish (Lee et al., 2014; Wrigley & Cooney, 1992). Table 2.8 shows that object hoarding appears the most common co-morbidity across squalor and AH. People living in squalor were significantly more likely to hoard objects compared to animal hoarders ($\chi^2(1, N = 842) = 5.26, p < .05$).

Table 2.8

Presence of Object Hoarding in Squalor and AH Samples

Study	Sample size	Percentage with object hoarding
Squalor		
(S. M. S. Chan et al., 2007)	18	83%
(Guinane et al., 2019)	82	78%
(Halliday et al., 2000)	76	53%
(Hurley et al., 2000)	110	72%
(Lebert, 2005)	30	50%
(Gleason et al., 2015; Lee et al., 2014, 2017)	69	41%
(Monfort et al., 2017)	50	90%
(Snowdon & Halliday, 2011)	115	66%
Total	**550**	**66%**
Animal Hoarding		
(Arluke, Frost, Carter, et al., 2002)	71	100%
(Calvo et al., 2014)	18	44%
(Cunha et al., 2017)	65	37%
(Dozier et al., 2019)	17	53%
(R. Elliott et al., 2019; Snowdon et al., 2019)	50	46%
(E. A. Ferreira et al., 2017, 2020; Paloski et al., 2020)	33	55%
(Ockenden et al., 2014)	22	45%
(Steketee et al., 2011)	16	31%
Total	**292**	**58%**
		$\chi^2 = 5.26, df = 1, p < .05$*

*Chi-squared test to investigate the difference between the levels of object hoarding in squalor and AH studies.

In AH studies, information on co-morbidities other than object hoarding is not routinely reported. However, Ockenden, De Groef and Marston (2014) found around a quarter of animal hoarders had a diagnosed mental disorder. Furthermore, Ferreira et al. (2020) assessed symptoms of mental disorders, finding depression and anxiety as the most common comorbidities in AH (Both 36%). There is significantly more research into comorbidities in squalor than in AH. These findings can be summarised by condition, or in some cases, the lack of any disorder.

Table 2.9

Prevalence of Co-Morbid Mental Conditions in Squalor Cases

Study	Sample size	No additional disorder	Dementia	Alcohol or Substance Abuse	Psychotic Disorder
(Aamodt et al., 2015)	50	Not reported	38 (76%)	Not reported	Not reported
(S. M. S. Chan et al., 2007)	18	2 (11%)	11 (61%)	3 (17%)	1 (6%)
(A. Clark et al., 1975)	30	15 (50%)	Not reported	Not reported	Not reported
(Gregory et al., 2011)	6	2 (33%)	2 (33%)	2 (33%)	Not reported
(Halliday et al., 2000)	81	24 (30%)	13 (16%)	26 (32%)	17 (21%)
(Halliday & Snowdon, 2009)	55	6 (11%)	27 (49%)	8 (15%)	16 (29%)
(Ito et al., 2022)	61	3 (5%)	37 (61%)	Not reported	Not reported
(Lee et al., 2014)	69	1 (1%)	40 (58%)	16 (23%)	Not reported
(Macmillan & Shaw, 1966)	72	34 (47%)	Not reported	3 (4%)	38 (53%)
(Monfort et al., 2017)	50	23 (46%)	20 (40%)	Not reported	12 (24%)
(T. Shaw & Shah, 1996)	16	0 (0%)	8 (50%)	Not reported	1 (6%)
(Snowdon & Halliday, 2011)	120	6 (5%)	42 (35%)	29 (24%)	18 (15%)
(Wrigley & Cooney, 1992)	29	10 (34%)	13 (45%)	3 (10%)	3 (10%)
Total/Average	**657**	**21%**	**45%**	**20%**	**24%**

Note. Values may not total to 100% as some individuals may have more than one condition.

Table 2.9 illustrates that in N=607 squalor cases where it was reported, 21% presented with no other illness. The wide variation observed may be an artefact of studies assessing only a limited number of conditions (Monfort et al., 2017; Wrigley & Cooney, 1992), or the different methods employed across studies. E.g. Neuropsychological reports (Lee et al., 2014), non-structured interview (Monfort et al., 2017) or formal psychiatric interview (S. M. S. Chan et al., 2007; Halliday et al., 2000; T. Shaw & Shah, 1996; Snowdon & Halliday, 2011; Wrigley & Cooney, 1992).

Other than hoarding, dementia appears to be the most commonly occurring co-morbidity with squalor. Table 2.9 illustrates that in N=555 squalor cases where it was reported, 45% also presented with dementia. However, dementia may not be more common in those living in squalor than in other similar individuals. Aamodt, Terracina and Schillerstrom (2015) found that a dementia

diagnosis was just as common in squalor as those not living in squalor. In terms of types of dementia, both Monfort et al. (2017) and Lebert (2005) found the most common was fronto-temporal dementia (FTD). Conversely, other studies have found Alzheimer's Disease or vascular dementia to be more likely (S. M. S. Chan et al., 2007; Lee et al., 2014), or suggested that FTD commonly demonstrates more significant cognitive impairment and language disturbances (Zuliani et al., 2013).

Alcohol misuse in squalor is a more common occurrence than the abuse of other substances (Halliday et al., 2000). Table 2.9 shows that the proportions of substance abuse in those who live in squalor appear consistent at around 10-35%. Excessive alcohol use decreases neuron density and increases volume loss in the frontal lobes creating and maintaining poor home management (Gleason et al., 2015). Squalor with accompanying alcohol misuse appears in younger sufferers, and these appear more likely to be male and more likely to have associated hoarding. However, they do not differ from non-alcohol squalor-dwellers in terms of their neuropsychological profiles (Gleason et al., 2015).

Table 2.9 summarises the limited research conducted into psychotic disorders in squalor, with studies identifying the likelihood of occurrence and little else. The rate of psychotic disorders (24%) is broadly similar to substance use disorders. However, the total is heavily affected by the Macmillan and Shaw (1966) study, in which few additional conditions are considered in any detail. Positive psychotic symptoms in particular, can be associated with dementia and substance abuse (Ballard et al., 2000; Shinagawa et al., 2014; Targum, 2001; Waldö et al., 2015). Therefore, it is possible that a percentage of the psychosis identified by Macmillan and Shaw may be due to another condition, reducing the overall proportion of squalor individuals with psychotic disorders.

Personality disorders have been identified in squalor samples as well as in case studies (Greve et al., 2004; S. Smith, 2001). Snowdon and Halliday (2011) found 11 out of 120 (9%) participants were personality disordered and Lee et al. (2014) found that around 20% of a squalor sample had personality disorders.

HD research has found high levels of depression and anxiety (Frost et al., 2015) and depression has also been identified in SN studies (Papaioannou et al., 2012). Both HD and SN share features with individuals who live in squalor, suggesting that mood and anxiety disorders could be common in squalor. As squalor is noted for its lack of insight, this may however be protective for depression and anxiety. Squalor studies have generally not identified high levels of affective disorders, usually around 0-5% (S. M. S. Chan et al., 2007; Halliday et al., 2000; Snowdon & Halliday, 2011). Conversely, Lee et al. (2014) found a high proportion of historical affective disorders. A number of case reports have identified depression or Bipolar I in squalor, although usually as a secondary condition (Batool & Hussain, 2015; Biswas et al., 2013; Blagodatny et al., 2007; Fond et al., 2011; Grignon et al., 1999; Irvine & Nwachukwu, 2014; McDermott et al., 2009; Sheehan & Geddes, 1998). Anxiety has been measured less often, has not featured in case reports and when studied has been found to have low rates of comorbidity (Halliday et al., 2000; Lee et al., 2014). OCD particularly bears investigation due to its relationship with hoarding, which in turn is related to squalor (Monfort et al., 2017; Samuels et al., 2007; Snowdon & Halliday, 2011; Wu & Watson, 2005). Studies identifying OCD in squalor have been mainly limited to case reports and studies (Fontenelle, 2008; Rosenthal et al., 1999). However, Drummond et al. (1997) investigated N=50 OCD patients, finding 9 (18%) lived in squalor.

Additional conditions occur alongside squalor. For instance, learning disabilities were found in 11% of a squalor sample (Halliday et al., 2000) and similarly, intellectual impairment was identified in 4/69 (6%) individuals living in squalor (Lee et al., 2014). Individuals suspected of being on the autistic spectrum with no additional psychiatric condition have also been found living in squalor (Padovan et al., 2018; Sadlier et al., 2011). Finally, Khan (2017) reported a case of squalor where the only accompanying psychiatric condition was nicotine use disorder.

Follow-up, mortality and recidivism

Follow-up data for squalor studies is summarised in Table 2.10. The duration of follow-up was inconsistent across studies and follow-up status was difficult to accurately assess. Case reports and case studies rarely reported any follow-up. In the group studies, follow-up times varied considerably even within a study (S. M. S. Chan et al., 2007; Ito et al., 2022) or were not reported (A. Clark et al., 1975; Wrigley & Cooney, 1992). Follow-up was reported in 18 squalor studies, with a range of 6-months to 9-years (mean = 35.4 months, SD = 31.4). The mortality rate was 26%. Follow-up data from AH studies is not usually reported, with only 6 studies providing information. Recidivism has featured in three reports, with rates varying from 13%-64% (Calvo et al., 2014; Joffe et al., 2014; Ockenden et al., 2014).

Table 2.10

Follow-up Results from Squalor Studies

Study	Follow-up	Sample size	Died	Nursing home	Home	Hospital	Lost to follow-up
Squalor							
Case reports/studies	Varied	16	3 (19%)	3 (19%)	10 (63%)	0	0
(S. M. S. Chan et al., 2007)	1-2 years	18	2 (11%)	10 (56%)	3 (17%)	0	3 (17%)
(A. Clark et al., 1975)	Unspecified	30	14 (47%)	8 (27%)	5 (17%)	3 (10%)	0
(Ito et al., 2022)	Varied	61	27 (44%)	13 (21%)	18 (30%)	3 (5%)	0
(Macmillan & Shaw, 1966)	1 year	72	36 (50%)	0	18 (25%)	15 (21%)	3 (4%)
(Snowdon & Halliday, 2011)	1 year	156	13 (8%)	50 (32%)	74 (47%)	0	19 (12%)
(Wrigley & Cooney, 1992)	Unspecified	29	5 (17%)	9 (31%)	14 (48%)	1 (3%)	0
Total		**382**	**100 (26%)**	**93 (24%)**	**142 (37%)**	**22 (6%)**	**25 (8%)**

Note. Individuals living at home includes those who moved in with a relative.

Risk of bias

Studies fitted the MMAT categories of qualitative, quantitative non-randomised and quantitative descriptive, with a single report also being considered as using mixed methods (Appendix 2.3). Some criteria were often not applicable (e.g. such as analysis methods, non-response

bias and response rate). There were multiple issues with sampling and/or data collection processes in both AH and squalor studies highlighting selection bias and poor representativeness of the target population. Confounds were not accounted for in the majority of quantitative non-randomised studies (24/33). In the quantitative descriptive studies, measures were deemed to be "not appropriate" in over 60% of studies (35/58) and included measures not being defined, being unvalidated or being limited in scope. Qualitative studies often did not consider the context in which the data was collected (15/29), or the bias that the researcher may have brought (26/29).

Consultation

During the consultation process, N=10 differing professionals with experience of working with squalor (health and social care managers, environmental health, housing, social work, general practitioner and a clinical psychologist) were sought to provide feedback on the scoping review. Subsequently, N=4 (community protection manager, GP, senior social worker and clinical psychologist) completed the consultation questionnaire and one (housing management group leader) provided a brief informal response. The scoping review was considered to be clear and understandable and reflected professional experiences relatively well. The main key research priorities identified were collecting short and long-term clinical and environmental outcomes, qualitative research on experiences and perspectives of individuals living in squalor and improving the understanding of co-morbid mental conditions.

Discussion

The central objective of this scoping review was to locate and synthesise the squalor evidence base, to inform research progress/priorities and guide applied practice. The state of the squalor evidence base fitted better to the goals and processes of a scoping review than they did a systematic review. This was because the purpose of the review was to identify absences in the

evidence base and associated knowledge, scope a diverse range of literature that has used many different research methods, clarify the concept of what squalor is and examine the methodological quality of the studies conducted (Munn et al., 2018). This review is a methodological advance on the previous five non-systematic reviews conducted. It has also considered several aspects of squalor not previously reviewed and included AH as an additional disorder. This allows for an understanding of how these two conditions compare and possibly interact. The squalor evidence base is undermined by the absence of a universal definition, and definitions and descriptions of squalor have varied considerably across studies. This scoping review therefore proposes a squalor definition drawn from the most consistently included items across included studies:

> *An individual living in a filthy and cluttered house, commonly showing evidence of infestation. The individual will be demonstrating significant self-neglect and likely to have a build-up of objects and waste, or an excessive number of animals. Individuals have poor insight and may demonstrate executive function deficits.*

This definition includes excessive numbers of animals as a feature of squalid living, allowing research to study the phenomenon of squalor in an additional population and identify individuals at risk of living in squalor who would previously not been included. However, it also avoids reference to hoarding, as this suggests intentional collecting and retention, whereas research has suggested that squalor may be due to a passive, rather than active, build up of items (Gleason et al., 2015; Snowdon & Halliday, 2011).

In recent years there has been an increase in the studies focusing on AH, which is encouraging as this evidence base has been previously limited in scope. However, squalor studies have been reciprocally decreasing in frequency at the same time. This is a concern, as disinvestment in squalor from the research community means that professionals will not be led by sufficient evidence in their assessment and intervention approaches. Squalor studies rarely contain a control

group and the use of active and passive controls in the design of squalor intervention trials is indicated. This would enable identification of the features of squalor that are unique to the condition. This scoping review has found squalor to be evenly distributed across the genders, whereas previously it was considered to present more frequently in females. This is like object hoarding, where the gender ratio has more recently been found to be approximately equal (Frost et al., 2015). The mortality rate was found to be 26%, and this is lower than the often previously quoted 46% five-year mortality rate (Badr et al., 2005; Cipriani et al., 2022; Khan, 2017; Sacchi et al., 2021).

In AH, focus is usually on the animals and the individual, not the environment in which they are living, with studies commonly only including cursory environmental descriptions at best. Alternatively, squalor studies frequently rely more on an environmental description and less on the individual person. Across both AH and squalor studies, the use of validated and reliable assessment measures could be more widespread. Furthermore, using a validated measure of environmental conditions (e.g. such as the ECCS) would allow features of squalor and AH to be investigated in association with squalor severity, instead of in relation to just the presence or absence of squalor. Squalor measure development and associated evaluation is therefore another key research priority. For example, the development of a primary squalor outcome measure that could be used in methods of intervention studies. The self-report HEI is useful for assessing squalor in cases where the individual shows acceptable levels of insight as to their surroundings. However, as insight and awareness decrease (i.e., this scoping review found that around 70% of squalor cases had poor insight), the HEI is less likely to provide reliable data.

Evaluations of interventions with those with poor insight would be particularly useful. Not including case reports, only three squalor and four AH studies have used a measure of insight and results have varied significantly. Methods of assessing insight have included individuals showing a lack of concern or considering their house to be clean (Calvo et al., 2014; Halliday & Snowdon, 2009; Lebert, 2005; Patronek, 1999). However, in some cases, a measure of insight is given with no clear justification (Dozier et al., 2019; Lee et al., 2014). Research should use a clear and agreed index of

insight and a common valid and reliable measurement method. For example, Gregory et al. (2011) detailed a system for investigating an individual's understanding of their environment, asking a variety of questions. This process, combined with a validated measure of squalor severity would give significantly more information than is presently collected in studies. There is a lack of research investigating environmental conditions in the general population. Use of the HEI is indicated here as assessment would not require a home visit.

The point and lifetime prevalence of squalor and AH are both under-researched. The few studies that have investigated this area have relied on incidence and have commonly limited their calculations to a specific age or population. To improve the understanding of these conditions, squalor research would particularly benefit from more studies investigating prevalence in younger adults. However, the AH literature would benefit from more research into its prevalence in general populations. Well conducted epidemiological studies of squalor and AH to reliably identify point and lifetime prevalence rates would be very welcome. These studies would need a home visit in order to reliably assess the domestic environment and so identify cases with confidence.

Co-morbid conditions have received different levels of focus in squalor and AH research. In most AH studies, the only disorder investigated has been object hoarding, making this a key area for future research. The rate of co-morbid conditions in DS, SDS and AH were difficult to assess as many studies do not report co-morbidity information or consider a limited number of diagnoses. A better understanding of the mental health problems associated with AH is needed and has the potential to be a treatment target to reduce risk of recidivism. When studies have investigated co-morbidity in squalor conditions, common methodological issues have been identified. For example, disorders have not been measured in a consistent way, particularly in studies that have relied on medical records. Furthermore, several studies have focused on only a few conditions, making it difficult to identify whether patients have no other co-morbid disorders, or whether they have just not been identified. These issues are evidenced by the variation in occurrence of conditions such as dementia and psychosis. This suggests that no single piece of published research accurately represents the

actual distribution of psychological disorders in individuals living in squalor. On this basis, additional studies into co-morbidities in squalor would also be beneficial. This research needs to use validated assessment methods that are capable of considering and identifying a wide range of potential comorbid disorders.

In terms of assessment of cognitive capacity in squalor, the MMSE should not be the sole measure employed. The MMSE is not designed to measure impairments in executive function, so may give a misleading view of the cognitive abilities of the individual. Dementia-led research would benefit from further studies where measurements of dementia are completed using validated tools, and FTD is considered as a potential condition. More research investigating psychosis and how it co-occurs with conditions such as dementia would help identify at-risk individuals. Use of validated diagnostic interviewing to identify mental health disorders is therefore indicated.

It appears that there is a small percentage of squalor individuals who appear to present with OCD or a personality disorder. Therefore, additional studies are needed in which OCD and personality disorders are assessed in squalor individuals.

The final area where further research would be beneficial is that of follow-up. AH studies that have included follow-up information have focused primarily on whether the individual continued to hoard animals, or their medical progress. Data related to the environmental conditions of the home over time and in response to intervention is rarely included and so would be welcome. Although some follow-up research regarding squalor has been conducted, relatively little can be accurately determined due to the wide variation in the timescales and the methods employed. Future studies with universal short and long-term follow-up assessments would help identify the squalor relapse rate. These follow-up assessments should be performed by researchers that are blind to the intervention in treatment comparison studies. Long-term outcomes would be particularly valuable to complete when there is a forced and mandated clearance and clean of the property in severe cases or cases that lack insight.

To conclude, the key clinical and research priorities identified by this scoping review are summarised as (a) use of comparison and control groups to identify unique characteristics of the conditions and also to evaluate interventions with more precision, (b) more use of qualitative research with individuals living in squalor, (c) increased use of the ECCS, (d) research into the living conditions in the general population, potentially using the HEI to assess cleanliness and tidiness, (e) well conducted epidemiological research to reliably estimate point and lifetime prevalence of squalor, (f) more research into the squalor in younger adults, (g) investigating insight in squalor and AH using a replicable and valid system of measurement, (h) increased use of a validated assessment method when investigating co-morbid conditions and finally (j) long-term follow-up studies using consistent methods and timescales.

Conclusions

The objectives of this scoping review have been achieved in that the heterogenous evidence base has been located, then reviewed and synthesised. New findings have emerged from the synthesis (and new analysis) of the studies and this has enabled distinct recommendations to be made concerning the evolution of the squalor evidence base. The development of an integrative definition of squalor will assist in clinical work. This scoping review has usefully identified squalor as a multifaceted problem that has a biopsychosocial profile. Squalor continues to be a problem in which chronic environmental and personal neglect is unfortunately mirrored by lack of adequate research attention.

Chapter 3

Factors Influencing the Cleanliness and Organisation of Home Environments: A Longitudinal Study in a Student Sample

Introduction

The scoping review in chapter 2 proposed a number of key research priorities that future studies should consider to improve the understanding and management of squalor. This study intends to consider two of these, 'research into living conditions in the general population,' and 'research into squalor in younger adults', both of which have received little attention in the literature. Studying the range of levels of cleanliness and organisation in households will provide information on the origins of living in squalor and the characteristics of those who are most at risk. Furthermore, by investigating younger adults, the research can identify whether those who live in unclean dwellings share the characteristics of older individuals living in squalor, or whether the factors determining squalor in these individuals are distinct.

Previous research in this area has selected squalor samples based on clinical characteristics and referrals to specialist services. Most commonly because the potential participant is currently living in squalor. Squalor research has also used alternative 'proxy' samples, such as hoarders, service refusers and OCD patients (Drummond et al., 1997; Hurley et al., 2000; Rasmussen et al., 2014). The current study would be the first to select a sample from the general population, in this case students, to investigate the home environment and its relationship with several variables. This approach will also support the demand for squalor research in younger adults. Squalor research has previously focused mainly on older adults, with many of the most significant papers excluding participants under 65-years old (S. M. S. Chan et al., 2007; A. Clark et al., 1975; Snowdon & Halliday, 2011; Wrigley & Cooney, 1992). Whilst there are studies which have included individuals below this age, in

each case, the majority, if not all, of participants were still over 40-years old (Darke & Duflou, 2017; Halliday et al., 2000; Lebert, 2005; Lee et al., 2014; McDermott & Gleeson, 2009). Therefore, conducting squalor research in younger populations has not been previously attempted and would therefore make an innovative contribution to the field.

Collecting data from a student population will help identify the risk factors that could place a person at risk of continuing to live in squalor in later life. A student sample was selected because they are assumed to be one of the groups with the least evidence of commitment to household cleaning and organisation (Walsh, 2000). However, it is worth considering the empirical basis of this assumption. The limited published research suggests that students do not differ significantly from other households. For example, when dust and allergens were measured in a variety of types of household, student dwellings did not show higher levels than other demographics, such as families (Casley et al., 2018). However, as the research is limited in this area, further detailed and reliable analysis will benefit the understanding of household conditions in this demographic.

Rental contracts for student dwelling are commonly under 1-year (Jones & Blakey, 2020), meaning that students will generally only remain in a dwelling for a relatively short time. This means that the condition of the property at a single time point may be related not just to the individuals living there at that time, but also to the behaviours of the previous tenants and the efforts made by the landlord when the property is vacant. This suggests that judging the cleanliness of a student dwelling at a single time point may not be representative of the behaviour of the students presently in residence. Instead, a more reliable estimate of a students' effect on a dwelling would be how the condition of the dwelling changes over time. This suggests the use of a longitudinal approach, taking measures of household cleanliness on several occasions. This would account for both student houses that are taken on clean and then allowed to deteriorate, and houses that are already unclean when the student first moves in.

There are several variables which may influence how the cleanliness of a student household may deteriorate over time. As the primary variable, this study considered *Gender Egalitarianism* (GE),

the belief in equal rights, roles and responsibilities for men and women and rejection of the idea that men and women are suited to different roles (Thijs et al., 2019). One of the key locations for enacting gender roles is in the home. Particularly, the amount and type of housework that is completed (Schneider, 2012). There is evidence that females complete more household chores than males, with women completing approximately 2/3 of the housework in both co-habiting couples and other households (Bianchi et al., 2000, 2012; Lachance-Grzela & Bouchard, 2010). Gender ideology, the beliefs about what is "appropriate" male or female behaviour (Van der Vleuten et al., 2016), has been shown to be an important determinant of the division of housework (Geist, 2005; Starrels, 1994) and that men and women with more liberal attitudes expect the division of household labour to be more equal (Askari et al., 2010). Therefore, the research suggests that there may be a link between the gender mix, gender egalitarianism and variations in cleanliness in student houses.

There are several factors that may have relationships with both gender egalitarianism and change in the home environment and may mediate the relationship between these variables. The factors that will be considered here are substance use, mental health and social loafing.

Research investigating substance use in students suggests that usage is higher than in nonstudent populations. Studies have focused mainly on those in the 18-24 years old groups, but also included mature students and both undergraduate and postgraduate courses (Carter et al., 2010; Kypri et al., 2005; Palmer et al., 2012; Webb et al., 1996). There is also a link between gender attitudes and the perception of the use of substances, particularly alcohol, with women facing more judgement over their drinking than men (De Visser & McDonnell, 2012; Plant, 2008). No research has investigated the link between substance use and cleanliness in student homes. However, studies have shown that a significantly unclean household is a common feature in those who abuse alcohol (Halliday et al., 2000; Karlsson & Gunnarsson, 2018) and similarly, alcohol abuse is common in those who are living in squalor (Gleason et al., 2015). In fact, Gleason et al. (2015) also showed that gender played a role in this relationship, such that alcohol abusers who live in squalor were more likely to be male than squalor dwellers who did not abuse alcohol.

Psychological distress is a common concern in university students (Macaskill, 2013; Stallman, 2010). Although there appears to be no research that has investigated student well-being and the cleanliness of their home, well-being and related concepts such as depression, stress and anxiety, appear to be related to both procrastination and lack of motivation in students (Eisenbeck et al., 2019; Elmelid et al., 2015; Habelrih & Hicks, 2015; Mortazavi, 2016; Park et al., 2012; Pascoe et al., 2020). Procrastination refers to the postponement of an intended course of action, despite the knowledge that it will have negative effects (Habelrih & Hicks, 2015) and appears to more common when well-being is low in students (Eisenbeck et al., 2019; Mortazavi, 2016). Motivation is generally thought to be affected negatively by depression (B. Smith, 2013) and in students, research has suggested that stress and anxiety are also related to motivation (Elmelid et al., 2015; Park et al., 2012; Pascoe et al., 2020). Although procrastination and motivation do not necessarily link directly to living conditions, it suggests that lower well-being in students could lead to housework such as cleaning, dusting and waste disposal being neglected leading to a deterioration in living conditions. Mental health and well-being also appear to be related to gender egalitarianism. Although not studied in students specifically, individuals from a general population who have more traditional gender role attitudes appear to have poorer mental health and higher psychological distress (T. King et al., 2022; Sweeting et al., 2014). Therefore, there is some, although limited, support in the literature for a link between mental health and both gender attitudes and household cleanliness, suggesting that it should be considered as a potential mediator between the two variables.

In additional to substance use and mental health, social loafing is also considered as a potential mediator of the relationship between gender egalitarianism and household conditions. Social loafing refers to the tendency for individuals working in groups to make less effort than individuals working alone (Simms & Nichols, 2014). The tendency to socially loaf has been demonstrated amongst university age student groups in both physical and mental tasks (Karau & Williams, 1993; Z. Luo et al., 2021; C. Peterson et al., 1986). There does not appear to be any research which has investigated social loafing in a student home. However, social loafing of one or

more members of a group has been shown to lead to other members of the group withdrawing their labour so that they are not taken advantage of (V. Clark et al., 2019). In the context of a multi-person, student home, this may mean that a high level of social loafing in some individuals could cause other residents to also refuse to maintain the dwelling, leading to a deterioration of the home environment. The relationship between GE and social loafing has also not been considered in research. However, Plaks and Higgins (2000) showed that gender stereotyping of other group members can lead to a change in motivation and effort. Furthermore, literature has shown that gender is itself a factor in social loafing, with males more likely to social loaf than females (Simms & Nichols, 2014; Stark et al., 2007).

The research investigating GE and household cleanliness is limited. However, it does suggest that there may be a relationship between the two variables. It also suggests that other variables may act as moderators and mediators of the relationship. A moderator is a factor that affects the slope of the relationship between a predictor and a dependent variable, and a mediator represents a factor which explains an indirect associations between two variables (Holland et al., 2017). Gender, of the individual, or of the household, appears as though it may have a significant effect on the relationship between GE and household cleanliness. Therefore, this study predicts a model in which gender acts as a moderator. Furthermore, research has shown that the additional variables of substance use, mental health and social loafing tendency also demonstrate links with both GE and household conditions. Therefore, these additional variables were investigated as potential mediators of this relationship. From these predictions, this study proposes the model shown in Figure 3.1, which supports the following aims and hypotheses:

Aims:

- To investigate how the cleanliness and organisation of a student flat or house changes over time.

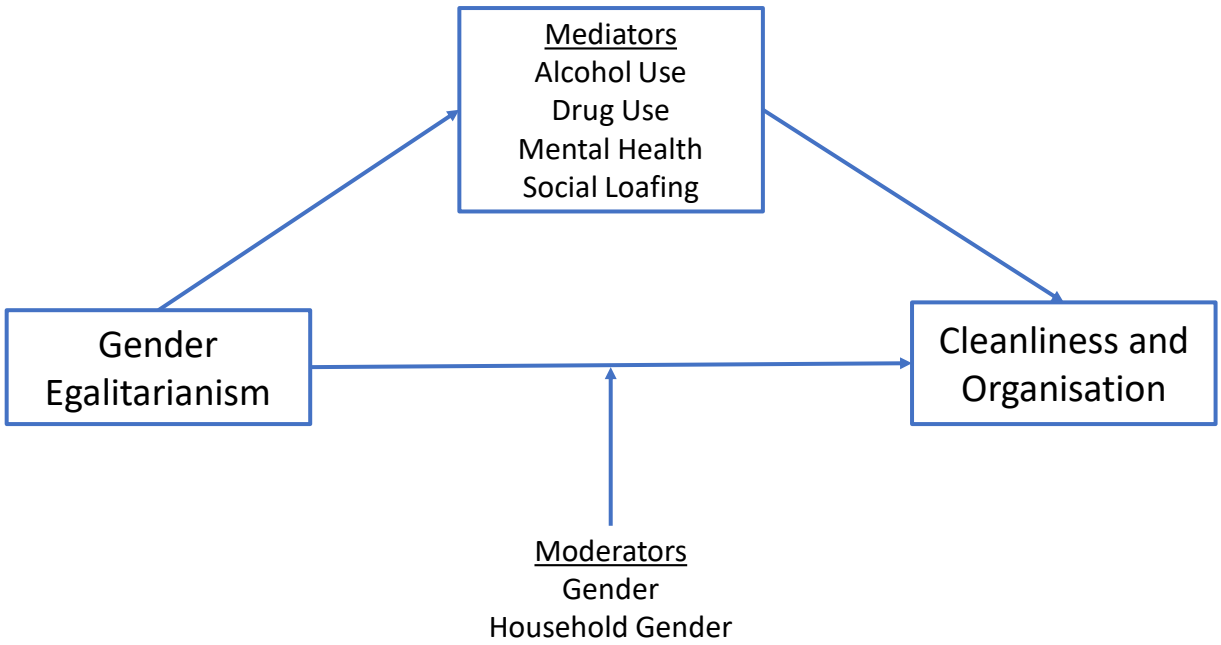
- To investigate how gender, gender egalitarianism, substance use, social loafing and mental health affect the change in the change in cleanliness and organisation of a student flat or house.

Hypotheses:

- Gender egalitarianism will predict the change in household cleanliness and organisation.
- The gender of the individual, or of the household, will moderate the relationship between gender egalitarianism and change in household living conditions.
- Alcohol use, drug use, mental health and social loafing tendency will separately, or in combination, mediate the relationship between gender egalitarianism and change in household living conditions.

Figure 3.1

Model showing the proposed relationship between Gender Egalitarianism and change in household living conditions



Methods

Design

There were two methods used and two populations. The first method was cross-sectional in a community sample and the second was longitudinal in a student sample. In advance of the main, longitudinal element of the research, an initial cross-sectional study was conducted with N=70 individuals from the general population. It was conducted using the online study website Prolific and included all the measures intended to be used in the final survey. There were two reasons for including the initial, cross-sectional stage of the research. Firstly, to assess the reliability of the proposed measures. Although several of the measures intended to be used in the research, such as the Alcohol Use Disorders Identification Test (AUDIT; Saunders et al., 1993) and the Kessler K10 (Kessler et al., 2002) have been employed in numerous studies (Bergman & Källmén, 2002; Blanc et al., 2014; Fleming et al., 1991; O'Connor et al., 2012; Piccinelli et al., 1997; Qamar et al., 2014), others were more limited in their use. For instance, the Home Environment Index (HEI; Rasmussen et al., 2014) is a self-report measure of household sanitation and cleanliness that had previously only been used with hoarding individuals. Therefore, before being used in the longitudinal data collection, the initial study gave an opportunity to assess the reliability of this measure in a general population. Similarly, the Modern Sexism Scale (MSS; Swim et al., 1995) and the Social Loafing Tendency Questionnaire (SLTQ; Ying et al., 2014) were both limited in their research use, so this was a chance to confirm their suitability for use when collecting the longitudinal data. The second purpose for the cross-sectional stage was to investigate whether the proposed associations between variables occurred as suggested by the research. Although each variable had some support for its position in the model, confidence in the proposed relationships would be improved by initial analysis of a sample from a general population. The aim was not to investigate the complete model, but to consider the individual connections and whether there was justification for their inclusion. Although no specific effect size was required, it was expected that the associations which were to be

investigated in the main study would show a minimum of a small correlation, or a significant regression effect in this initial dataset. This would provide support for the proposed relationships alongside the background research.

The main, longitudinal part of the study collected data at two time points, Mid-November 2021 and Mid-March 2022, with the survey being open for completion for one week in each case. Data was collected using an online survey through the survey platform Qualtrics (Appendix 3.1). As proposed by the British Psychological Society's guidelines for online research (British Psychological Society, 2013), the survey fulfilled the principles of respect, integrity, responsibility and minimising harm. It took approximately 10-15 minutes to complete and participants were asked basic demographic questions and completed measures on gender egalitarianism, social loafing, alcohol and drug use, psychological well-being and household sanitation and cleanliness. Participants were students at the University of Sheffield. They were all over 18 years old and not living with their parents or in halls of residence. Recruitment for the first round of data collection was through the University's volunteer list (Appendix 3.2). At this point, an email address was requested, which was used to contact participants for the second round of data collection. Both the cross sectional and longitudinal studies received ethical approval from the University of Sheffield (#040075 and #043439, respectively).

Measures

The measures used in this study were as follows:

- Home Environment Index (HEI) – Rasmussen et al. (2014) – Measure of household cleanliness and organisation - 15 items – Cronbach's α = .89 in hoarders (Rasmussen et al., 2014), cross-sectional data Cronbach's α = .81.
- Alcohol Use Disorders Identification Test (AUDIT) – Saunders et al. (1993) – Measure of alcohol use - 10 items. 92% sensitivity, 94% specificity (N. Williams, 2014); Kappa = 0.691

(Selin, 2003); Cronbach's α = .83 (Daeppen et al., 2000), cross-sectional data Cronbach's α = .84

- Drug Use Disorders Identification Test (DUDIT) – Berman et al. (2005, 2003) – Measure of drug use - 11 items. 96% sensitivity, 94% specificity (Evren et al., 2014), Pearson's r = .77; Cronbach's α >.90 (Hildebrand, 2015), cross-sectional data Cronbach's α = .85
- Kessler K10 - Kessler et al. (2002) – Measure of psychological distress - 10 items. 81% sensitivity, 83% specificity (G. Andrews & Slade, 2001); Pearson's r = .72-.81 (Merson et al., 2021); Cronbach's α = .93 (Fassaert et al., 2009), cross-sectional data Cronbach's α = .94
- Modern Sexism Scale (MSS) - Gender egalitarianism – Swim et al. (1995) – Measure of gender egalitarianism - 13 items – Cronbach's α = .75-.82 (Swim et al., 1995; Swim & Cohen, 1997), cross-sectional data Cronbach's α = .84
- Social Loafing Tendency Questionnaire (SLTQ) - Ying et al. (2014) – Measure of tendency to social loaf - 7 items – Cronbach's α = .88 (Novliadi & Barus, 2018), cross-sectional data Cronbach's α = .59

Analysis

Analysis for the cross-sectional data involved descriptive and inferential statistics and an assessment of reliability for each measure. Mean differences were tested for each variable, before correlations were calculated between them. Following this, multiple linear regression was used to investigate the influence of each variable on household conditions. Finally, each measure was assessed for reliability by calculating Cronbach's alpha. The intended analysis for the main study was to follow the structure of the proposed model, initially looking at the direct relationship between gender egalitarianism and change in living conditions and the role of gender and household gender as moderators. Mediation analysis was to be completed using the Process Macro in R and would have investigated whether alcohol, drug use, mental health or social loafing tendency mediated the relationship between egalitarianism and change in home cleanliness.

Results

Table 3.1

Summary statistics and mean analysis of cross-sectional study data

Variable	Freq	HEI	AUDIT	DUDIT	K10	MSS	SLTQ
Age group							
18-24	19	4.63 (2.45)	5.74 (4.53)	1.58 (3.27)	19.58 (6.41)	22.21 (6.86)	14.53 (2.95)
25-34	31	6.77 (3.60)	5.06 (3.96)	0.48 (2.08)	22.74 (9.17)	22.29 (7.67)	13.00 (3.35)
35-44	10	6.60 (3.69)	2.90 (1.85)	0.40 (0.84)	22.00 (5.12)	22.50 (7.72)	14.60 (4.77)
45-54	6	10.17 (7.94)	10.00 (10.18)	3.00 (3.69)	29.50 (10.67)	26.67 (7.97)	13.67 (4.55)
55-64	3	4.33 (2.31)	4.33 (2.52)	0.00 (0.00)	18.67 (11.59)	28.00 (4.36)	12.67 (1.15)
65 and over	1	2.00 (N/A)	5.00 (N/A)	0.00 (N/A)	13.00 (N/A)	28.00 (N/A)	12.00 (N/A)
K-W Chi-Squared		9.192	3.933	12.91	6.757	5.624	3.827
p-value		.1016	.5591	.0242*	.2394	.3445	.5746
Gender							
Male	19	6.53 (5.38)	6.95 (5.67)	0.37 (0.90)	20.16 (7.24)	27.53 (9.25)	14.95 (3.31)
Female	49	6.18 (3.53)	4.73 (4.44)	1.14 (2.92)	22.33 (8.73)	21.47 (5.80)	13.12 (3.51)
t-test		-0.257	-1.529	1.664	1.044	-2.660	-2.006
p-value		.7993	.138	.1009	.3027	.0138*	.0527
Household Gender							
Mostly male	10	8.80 (6.32)	9.80 (7.70)	1.00 (3.16)	23.10 (8.99)	30.20 (6.75)	15.5 (2.99)
Equal	35	6.03 (3.75)	4.34 (2.82)	0.66 (2.00)	21.2 (7.30)	23.69 (7.45)	13.43 (3.33)
Mostly female	23	5.57 (3.06)	4.96 (5.01)	1.30 (3.02)	21.91 (9.77)	19.30 (4.81)	13.23 (3.71)
One-Way ANOVA		1.627	3.855	0.411	1.312	7.129	1.240
p-value		.191	.0132*	.746	.278	.0003***	.302
Presence of children							
Yes	19	8.26 (3.41)	4.74 (4.51)	1.26 (2.49)	24.11 (10.01)	23.74 (7.21)	14.11 (3.74)
No	51	5.55 (4.04)	5.55 (4.95)	0.84 (2.56)	21.27 (7.75)	22.73 (7.44)	13.51 (3.43)
t-test		-2.602	0.625	-0.614	-1.253	-0.510	-0.630
p-value		.0114*	.5342	.5412	.2145	.6117	.5307
Total	70	6.29 (4.04)	5.33 (4.81)	0.96 (2.53)	22.04 (8.44)	13.67 (3.50)	23.00 (7.34)

Note. HEI – Home Environment Index, AUDIT – Alcohol Use Disorders Identification Test, DUDIT – Drug Use Disorders Identification Test, K10 – Kessler K10, MSS – Modern Sexism Scale, SLTQ – Social Loafing Tendency Questionnaire.

Age and Gender categories did not show homogeneity of variance so Kruskal-Wallis and Welch's test used (Respectively).

Household Gender and Presence of Children both showed homogeneity of variance so used one-way ANOVA and Independent Samples t-test were used.

Descriptive statistics shown are mean and standard deviation in brackets.

p-values: * - <.05, ** - <.01, *** - <.001

Cross Sectional Stage

This stage of the research surveyed N=70 individuals of varying ages from the general population (27% male, 70% female). Summary statistics and mean comparisons can be seen in Table 3.1. Cronbach's alpha scores (see Table 3.2) showed good reliability for all measures, except the SLTQ, which showed moderate reliability. This suggested that these measures were fit-for-purpose for the longitudinal element of the research.

Table 3.2

Cronbach's alpha reliability scores for the 6 measures included in the research

Measure	Cronbach's alpha
Home Environment Index (HEI)	.81
Alcohol Use Disorders Identification Test (AUDIT)	.84
Drug Use Disorders Identification Test (DUDIT)	.85
Kessler K10	.94
Modern Sexism Scale (MSS)	.84
Social Loafing Tendency Questionnaire (SLTQ)	.59

Tables 3.3 and 3.4 report the associations between the variables, showing the correlations between the variables and the relationships that were identified from regression of the cross-sectional data on HEI, the measure of household cleanliness. Most of the correlation values suggest small associations. However, both alcohol use (AUDIT) and psychological distress (K10) showed a moderate positive association with the HEI (r = 0.27 & 0.32, respectively) such that an increase in either measure was associated with more dirty and disorganised dwelling. Furthermore, the measure of gender egalitarianism (MSS) was correlated to a moderate to large level with both measures of gender (Participant gender, r = -0.39; Household gender, r = -0.48), such that females, and households with more females, were associated with a lower MSS score and therefore, less sexist views. Gender egalitarianism was also positively associated with the tendency to social loaf (SLTQ) (r = 0.40), suggesting that individuals who show more gender egalitarianism are less likely to social loaf.

Table 3.3

Correlation coefficients between studied variables

	HEI	AUDIT	DUDIT	K10	SLTQ	MSS	Participant age	Total adults	Participant gender	Household gender	Children
HEI	X	0.27	0.16	0.32	0.10	0.08	0.14	0.01	-0.03	-0.20	0.30
AUDIT		X	0.41	-0.11	0.17	0.14	0.04	-0.03	-0.20	-0.23	-0.07
DUDIT			X	0.08	0.13	-0.05	0.03	0.15	0.15	0.09	0.07
K10				X	0.06	0.15	0.10	0.01	0.20	0.07	0.15
SLTQ					X	0.40	-0.08	-0.08	-0.18	-0.10	0.08
MSS						X	0.20	-0.07	-0.39	-0.48	0.06
Participant age							X	-0.32	0.02	-0.14	0.30
Total adults								X	0.08	0.12	-0.19
Participant gender									X	0.61	0.17
Household gender										X	0.01
Children											X

Regression analysis identified a final model featuring psychological distress (β = 0.22, $p < 0.01$), the presence of children in the household (β = 0.11, $p < 0.01$) and gender egalitarianism, measured by the MSS (β = 0.58, $p < 0.05$), as significant predictors of household conditions. Furthermore, the interaction between gender egalitarianism and the household gender was also identified as significant (β = -0.34, $p < 0.01$), such that in a household with more males, gender egalitarianism had a more significant effect on the change in the household living conditions. Alcohol use was initially demonstrated to be a significant predictor. However, significance was lost when the gender interaction was included in the model.

The results of the analysis of this initial dataset suggested that there were a number of significant associations between variables, including household conditions with psychological distress, alcohol use and gender egalitarianism, and gender egalitarianism with gender and social

loafing. Although support for other relationships was varied, the results in conjunction with the background research provided support for the proposed model to be employed in the longitudinal element of the study.

Table 3.4

Outcomes of multiple regression on HEI

	Model 1	Model 2	Model 3	Model 4
Constant	0.25 (0.11)*	0.10 (0.04)*	0.05 (0.14)	0.05 (0.11)
AUDIT	0.27 (0.12)*	0.31 (0.10)**	0.20 (0.18)	0.17 (0.10)
DUDIT	0.00 (0.09)			
K10	0.24 (0.08)**	0.22 (0.08)**	0.23 (0.10)*	0.22 (0.07)**
SLTQ	0.03 (0.09)			
MSS	-0.12 (0.10)		0.58 (0.31)	0.58 (0.25)*
Participant age	0.00 (0.02)			
Participant gender	0.00 (0.05)		-0.00 (0.08)	
Household gender	-0.06 (0.04)		0.05 (0.05)	0.05 (0.05)
Children	*0.11 (0.05)	0.11 (0.04)*	0.11 (0.04)*	0.11 (0.04)**
Interaction effects				
Participant gender * MSS			-0.00 (0.16)	
House gender * MSS			-0.34 (0.13)*	-0.34 (0.12)**
AUDIT*K10			-0.06 (0.37)	
Variation				
Adjusted R^2	0.21	0.24	0.29	0.33

Note. HEI – Home Environment Index, AUDIT – Alcohol Use Disorders Identification Test, DUDIT – Drug Use Disorders Identification Test, K10 – Kessler K10, MSS – Modern Sexism Scale, SLTQ – Social Loafing Tendency Questionnaire.
p-values: * - <.05, ** - <.01, *** - <.001

Longitudinal data

At time one there were n = 39 complete responses and n = 25 of these completed the follow-up survey. This represents a completion rate of 64%. Unfortunately, the numbers who completed the study were significantly below the intended sample size making the study underpowered. Therefore, detailed moderation and mediation analysis was not possible. Instead, analysis involved testing mean

differences over time for each measure and calculations of correlations to investigate associations between the variables. Table 3.5 shows the summary statistics for each variable. There was no significant difference between time 1 and time 2 except in alcohol use, which decreased significantly, $t(24) = 2.382$, $p = .025$. The K10 values suggest an increase in psychological distress amongst students, but the difference was not significant.

Table 3.5

Summary statistics and mean analysis of variables

Variable	Time 1	Time 2	t-test	*p*-value
Age	25.16 (11.27)			
Gender (Male/Female)	7/18			
Household Gender (Mostly Male/Equal/Mostly Female)	2/11/12	1/16/8		
HEI	6.84 (3.94)	6.88 (4.19)	-0.108	.915
AUDIT	7.12 (6.27)	5.6 (5.5)	2.382	.025*
DUDIT	2.28 (5.19)	1.84 (3.47)	0.658	.517
K10	20.96 (7.52)	22.76 (9.41)	-1.505	.145
MSS	21.52 (5.95)	21.12 (6.9)	0.564	.578
SLTQ	12.12 (3.17)	12.36 (3.24)	-0.399	.693

Note. HEI – Home Environment Index, AUDIT – Alcohol Use Disorders Identification Test, DUDIT – Drug Use Disorders Identification Test, K10 – Kessler K10, MSS – Modern Sexism Scale, SLTQ – Social Loafing Tendency Questionnaire. Descriptive statistics shown are mean and standard deviation in brackets.

Repeated measures correlation values between the variables can be seen in table 3.6. Coefficients for the main independent and dependent variables (Gender egalitarianism and home cleanliness, respectively) suggested weak correlations for most variables. There was a moderate relationship between home cleanliness and gender such that when the participant was female, the household was rated as being cleaner that if the participant was male. However, all correlations were shown to lack significance when multiple comparisons corrections were completed (Appendix 3.4).

Table 3.6

Repeated measures correlation coefficients between studied variables

	HEI	AUDIT	DUDIT	K10	SLTQ	MSS	Participant gender	Household gender
HEI	X	0.16	0.15	0.25	0.06	-0.15	-0.35	-0.06
AUDIT		X	0.47	-0.29	-0.29	0.10	0.09	0.09
DUDIT			X	-0.29	-0.58	-0.03	0.14	N/A
K10				X	0.15	-0.28	-0.24	0.07
SLTQ					X	-0.09	0.37	0.09
MSS						X	N/A	-0.01
Participant gender							X	N/A
Household gender								X

Discussion

The aims of this study were to investigate how the cleanliness and organisation of a student dwelling changes over time, and to investigate how gender, gender egalitarianism, substance use, social loafing and mental health affect the change in cleanliness. The intention was to use moderation and mediation analysis on longitudinal data to investigate these aims.

The longitudinal element of the study intended to use students as participants, which is common in psychology research, with around 70-90% of studies using them as participants (Foot & Sanford, 2004). Druckman and Kam (2011) suggest that using a student sample does not pose a problem for the external validity of the study and rarely constrains the experimental inferences. Similarly, Wiecko (2010) indicates that there are only minor differences in the behaviours and attitudes of students and non-students. However, there does appear to be problems when generalising the findings from student research to the general public (Hanel & Vione, 2016). For

instance, Peterson (2001) completed a second order meta-analysis on social science research using students, finding student responses to be more homogenous and effect sizes to vary in direction and magnitude. This suggests that findings from the longitudinal stage of this research may not reliably inform household cleanliness in the general public.

The initial cross-sectional study was conducted to investigate the reliability of the measures being used and to investigate the associations between the variables and whether there was enough support for the proposed model. Calculations showed good reliability in five of the six measures. In the case of the AUDIT, DUDIT and K10, this is to be expected as they have been used extensively in research (Anderson et al., 2013; Basedow et al., 2021; Higgins-Biddle & Babor, 2018; Qamar et al., 2014; Reinert & Allen, 2002; Voluse et al., 2012). However, the MSS has had limited use and the HEI has only previously been used with a hoarding sample, so these scores offer support for their future use in general population research. The moderate reliability of the SLTQ is lower than observed by Novliadi and Barus (2018). However, it has had limited use in research previously, so further studies are needed to inform its future use. Nonetheless, the results suggested that the measures chosen were appropriate for use in the main part of the study. Correlations and regression analyses of variables varied in their support of associations proposed by the model. However, taking into account both the background research and the results from the cross-sectional data, it was concluded that there was support for the approach that was to be conducted in the longitudinal part of the research.

For the main study, the cross-sectional analysis was used to estimate the required sample size to identify mediations with a power of 80%. Estimates were calculated using Monte Carlo Power Analysis for Mediation Models (Schoemann et al., 2017) and suggested that the sample size should be approximately 350-400 participants. However, this is based on results from a sample from the general population. A sample from a more homogenous population, in this case students, would have reduced variability, increasing the power of the study and therefore, reducing the required sample size (Norton & Strube, 2001). Nonetheless, the actual sample size for the study was well

below the required amount, making the intended analysis not possible. Instead, basic longitudinal and correlation analysis was conducted. The results were underpowered, but suggested that over time, student alcohol use decreased significantly. There was also a minor, but non-significant, increase in psychological distress and almost no change in the dependent variable, household cleanliness. Correlations suggested a potential relationship between household cleanliness and the gender of the participant. However, none of the associations between variables were shown to be significant.

The number of individuals who completed the study was significantly below the intended number and made it impossible to assess the aims and hypotheses proposed. Therefore, the key result of this study is the failure to attain a sufficient sample size. Recruitment was based on the University of Sheffield volunteers list, which sends a recruitment email to all students at the university who have not opted out. The university student population totals over 30,000 students. Therefore, if the recruitment email was sent to the student population as suggested, then 39 completed surveys would suggest a successful response rate of around 0.1%. As no details were found regarding the expected completion rate using the University's volunteers list, it is not possible to know whether this is as expected, or whether it suggests an error in the process which led to only a small number of students receiving the invitation. Further issues with the recruitment process may relate to the timings and research design of the study, or the decision not to include incentives. The study recruited its initial cohort mid-way through the Autumn term and explained that a secondary data collection would take place mid-way through the Spring term. It may be that the initial recruitment dates were not convenient for some students, or that the longitudinal nature of the study felt like too significant a commitment. Regarding incentives, Abdelazeem et al. (2022) suggests that incentives increase research participation around 26%. However, this was calculated from research dissimilar to this study and furthermore, an increase of this size would not have led to participation numbers of the level required to fulfil the aims of the study.

Conclusions

The study intended to investigate the cleanliness of student dwellings and associated factors. An initial cross-sectional investigation suggested that the measures and methods being used were appropriate. However, the main longitudinal stage of the study did not meet the required sample size to investigate the proposed aims. Calculations suggest that a significant increase in sample numbers would have been required to provide enough data to make conclusions regarding the proposed model and variables being investigated. Several factors (E.g., Errors using the volunteers list, the longitudinal design, lack of incentives) may have contributed to the poor recruitment rate. However, it is likely that a combination of issues were involved and significant alterations would need to be made to the recruitment method if these methods were to be used again in future research.

Future Directions

The poor response rate for this study suggested that a reconsideration of how to acquire quantitative data on squalor was necessary. Due to the rarity of squalor and the isolated nature of the individuals (Luu et al., 2018), it appeared unlikely that a sufficiently large dataset could be produced from individuals who were living in squalor. Therefore, a general sample was chosen as a target group to increase the chance of attaining a data set of suitable size. However, as this was not successful with the chosen population, a new approach was deemed necessary. Alternatively, therefore it was considered that more informative outcomes could be acquired from locating and analysing secondary squalor data, as has commonly been done in previous squalor research (Hurley et al., 2000; Ito et al., 2022; Lee et al., 2014). Therefore, the following chapters will detail the benefits of the English Housing Survey and how the methods of this survey accurately identify those living in squalor. Two new research methods (propensity score matching and prevalence meta-analysis) in the squalor field will be described and conducted.

Chapter 4

Deprivation and Well-Being in Squalid Living: A Propensity Score Matched Cross-Sectional Study of the English Housing Survey

Introduction

Several studies have investigated characteristics of individuals who live in squalor (Aamodt et al., 2015; Gleason et al., 2015; Halliday et al., 2000; Lee et al., 2014, 2017; T. Shaw & Shah, 1996; Snowdon & Halliday, 2011; Wrigley & Cooney, 1992). These studies suggest that people living in squalor often live alone, commonly show hoarding behaviours and are likely to have a mental disorder or cognitive impairment. However, as discussed in the Scoping Review (Chapter 2), research in this area has a wide range of methodological issues. Studies are almost always limited to a 65 years and older population. Samples often have sampling bias, being limited to referred cases or being a selective sample. The studies are also limited in that they tend not to use valid and reliable measures of squalor. Furthermore, there is also a lack of detailed and appropriate statistical methods and analysis.

Another area of methodological weakness in the field is the limited use of a control group as a comparison. This means that there is little evidence on the systematic ways in which people living in squalor differ from community controls. Indeed, only three studies have compared individuals living in squalor with a non-squalor control (Aamodt et al., 2015; Ito et al., 2022; T. Shaw & Shah, 1996). Aamodt et al. (2015) used a sample of 230 Adult Protective Services clients, separating them into 50 who were living in squalor and 180 who were not. The focus was primarily on the cognitive profiles, in which those living in squalor actually performed slightly better. There was also a comparison of demographic data, finding no difference in sex, education or ethnicity. The only difference identified was age, with individuals living in squalor being older than those who weren't.

Age was also identified as a difference by Ito et al. (2022) in their research with a similar size sample (n = 61 in the non-squalor group compared with n = 209 in the squalor group) and like Aamodt et al., no significant difference was identified in sex or education. Ito and colleagues also noted that individuals with DS appeared to be more likely to be single and more likely to be living alone. Shaw and Shah (1996) identified no significant difference in their sample (16 squalor v 17 non-squalor) with regard to age, sex, marital status or whether they were living alone. However, the sample was noticeably smaller than that used by Aamodt et al. and Ito et al. In each of these studies, the sample was limited to older adults, either over 60 years or over 65 years old. By using samples limited by age, it is difficult to generalise findings to the larger population, particularly in terms of variables such as marital status and whether they are living alone.

A final area of concern in the squalor literature is the focus on the individual. The research base has focused primarily on specific characteristics of the person who is living in squalor, especially their cognitive profile. Local and household factors such as unemployment, socioeconomic status and ethnic composition have been considered in very few studies. Social determinants contribute to the risk of psychiatric conditions and many factors have been shown to relate to the mental health of an individual (Compton & Shim, 2015; Silva et al., 2016). These include variables related to the individual and the household such as financial strain and unemployment, and local factors such as neighbourhood problems, built environment and deprivation (Silva et al., 2016). Local deprivation, in particular, has been identified as a factor in mental health both in young and older adults (McElroy et al., 2019; K. Visser et al., 2021) and encompasses a range of aspects of an individual's living condition (Ministry of Housing, Communities and Local Government, 2019) referring to more than just financial factors. The Index of Multiple Deprivation (IMD) is the official measure of relative deprivation in England. It is made up of seven distinct domains, including income, employment, education, health and disability, crime, housing and living environment, which are then combined and weighted (Ministry of Housing, Communities and Local Government, 2019). To date, there has been no previous studies investigating squalor and its relationship with local deprivation. However, research

into self-neglect (SN), which includes individuals living in squalor, has shown a significant relationship, such that self-neglect is more common in deprived areas (Day, Mulcahy, et al., 2016; Lauder & Roxburgh, 2012). If local deprivation is related to self-neglect, this suggests that it could also be related to squalor, a more specific form of self-neglect. Therefore, this may represent a new area of focus in squalor research and opens up the possibility of community level interventions, rather than individual interventions.

Mental health is a significant issue in squalid living, with conditions such as dementia, alcohol abuse and psychotic disorders commonly identified (S. M. S. Chan et al., 2007; Halliday et al., 2000; Halliday & Snowdon, 2009; Snowdon & Halliday, 2011; Wrigley & Cooney, 1992). Measures of psychological well-being has been shown to be related to dementia (Gotanda et al., 2022; St. John & Montgomery, 2010; Zank & Leipold, 2001), alcohol and substance misuse (Mäkelä et al., 2015; M. Visser & Routledge, 2007) and psychosis (Broyd et al., 2016; Uzenoff et al., 2010; Weintraub & de Mamani, 2015). Furthermore, well-being measures have been shown to correlate strongly with mental health scales (Bech et al., 2003) and to predict the risk of common mental disorders (Grant et al., 2013; Santini et al., 2022). This suggests that well-being questions are a good method of measuring the overall mental health of an individual, even in conditions such as dementia and psychosis. However, it should be noted that, unlike many populations, individuals living in squalor commonly show poor insight and awareness (Gleason et al., 2015; Gregory et al., 2011; Lee et al., 2014). In the case of squalor, if individuals do not consider their environment to be a problem, it may not affect their subjective well-being, meaning that they do not show a significant difference to those who are not living in such conditions.

Due to the isolated nature of squalor (Luu et al., 2018), access to individuals who live in these conditions is particularly difficult and many individuals are also uncooperative with services (McDermott, 2011), so they are unlikely to agree to participate in research, reducing the number of possible participants even further. In addition, due to the low prevalence of squalor in the general population, a survey of considerable size is required to provide an appropriately sized sample for the

study of individuals living in squalor. Therefore, it is not uncommon for squalor studies to use medical records to provide a sample which can be used to make significant inferences regarding the individuals in question (Aamodt et al., 2015; Darke & Duflou, 2017; Lee et al., 2014). However, unlike previous research, the dataset being analysed in the present study is from the general population and includes adults of all ages. A number of studies have used the proposed approach with mental health conditions. Torres et al. (2007) and Shevlin et al. (2008) used the British Psychiatric Morbidity Survey to analyse demographic and mental health data in people with psychosis and OCD, respectively. Similarly, Nordsletten et al. (2013) used the results of a community health study to assess the prevalence and co-morbidity of individuals who hoard. Regarding more closely related conditions, Lauder and Roxburgh (2012) and Abrams et al. (2002) both used secondary data to investigate factors influencing self-neglect. Therefore, the present study uses a method not uncommon in mental health research. Nonetheless, it has not previously been used to investigate squalor, which has often been limited to convenience samples due to the difficulty of identifying eligible participants.

This study intends to identify a sample of individuals living in squalor and use Propensity Score Matching (PSM), also previously unused in this field, to create a non-squalor sample, matching on several demographic and household variables. The study will investigate two variables which have been identified as factors in related conditions, or have indirect support for their influence, but have not previously been considered in squalor research. Firstly, measuring the well-being of squalor and non-squalor individuals in the general population gives an opportunity to investigate the role of mental health in an unbiased sample and help identify what elements of well-being, if any, have a relationship with an individual's living conditions. Secondly, by investigating deprivation, a new direction in squalor research is introduced to the field that focuses on the role of socioeconomic, rather than individual, factors and whether they are connected to an individual's personal environment.

Based on the rationale for the study, the following hypotheses are proposed:

Hypotheses:

- The rate of individuals living in squalor will be significantly higher when there is a context of higher severity of local area deprivation.
- Individuals with lower subjective well-being are more likely to be living in squalor.

Methods

Design

The study was ethically reviewed and approved by the University of Sheffield as a secondary data analysis (Ref: 049202) and complied with the requirements of the UK Data Service (UK Data Service, n.d.) regarding using their datasets for research purposes. The current study used data provided by the English Housing Survey (EHS; Office for National Statistics, 2022). The EHS is a continuous national UK survey, first conducted in 1967, that collects information about people's housing circumstances. To maintain the standard of the results produced, yearly reports on the technical processes and data quality are written and acted upon (Office for National Statistics, 2020). Furthermore, the UK Statistics Authority states that the statistics in the EHS are "produced according to sound methods and managed impartially and objectively in the public interest." (UK Statistics Authority, 2010). Each year a sample of houses are drawn at random and invited to participate by letter. Those that agree to take part in a face-to-face interview survey are also invited to take part in the physical survey element of the study, where a qualified surveyor comes to the property and completes a visual inspection of the interior, exterior and local area (Appendix 4.1). The EHS makes contact with a significant number of randomly-selected households each year with around 13,000 households taking part in the face-to-face survey and another 6,000 also allowing their property to be subject to the physical inspection (Office for National Statistics, 2022). In this study, data from both the 2016 (Includes data from April 2015 to March 2017) and 2018 (Includes data from April 17 to March 19) datasets were investigated to identify individuals living in squalor (Department for

Communities and Local Government., 2019; Ministry of Housing, Communities and Local Government, CADS Housing Surveys., 2021). Data was accessed via the UK Data Service, which is a location for the curation and management of social science data, providing long-term access to high-quality data. The UK Data Service is funded by UK Research and Innovation (UKRI) and holds the largest collection of economic, social and population data in the UK (UK Data Service, n.d.).

Measures

The English Housing Survey collects data on a wide range of variables, including demographic characteristics, health, education and employment. In addition, questions regarding the home and neighbourhood ask about energy efficiency, disrepair, fire safety and adaptations. This study will include several variables from the survey, two of which will operate as the main independent variables and one as a dependent variable. These will be local deprivation, mental well-being of the individual and the presence of squalor, respectively.

Local deprivation

Each area in which individuals were questioned was given a score for deprivation. Values range from 1 to 10, with a value of 1 showing that the property resided in one of the 10% most deprived locations and a value of 10 suggesting the property is in one of the 10% least deprived areas. All deprivation rankings were based on the IMD ratings from 2015 (T. Smith et al., 2015).

Subjective well-being

Four questions investigate subjective well-being. Although a house may have multiple residents, well-being measures are only assessed for the individual who completes the face-to-face questionnaire. The four survey items are “Overall, how satisfied are you with your life, nowadays?”, “Overall, to what extent do you feel that the things you do in your life are worthwhile?”, “Overall, how happy did you feel yesterday?” and “On a scale where 0 is ‘not at all anxious’ and 10 is ‘completely anxious’, overall, how anxious did you feel yesterday?”. Each question is scored from 0 to 10. The four questions make up the Office for National Statistics Subjective Well-Being Questions

(ONS-4; Tinkler & Hicks, 2011). The ONS-4 are commonly used in community surveys and questionnaire studies (Office for National Statistics, 2018) and have also been used in published research (Collin et al., 2019; Wallace et al., 2022; R. Williams et al., 2021). The ONS-4 is not a fully validated measure (Wallace et al., 2022), but has been shown to have good internal reliability (α = 0.90) (Benson et al., 2019). In the present study, across the whole dataset, the ONS-4 had an acceptable internal reliability (α = 0.75). Nonetheless, it is recommended that the questions are not aggregated as the items represent distinct conceptual domains (VanderWeele et al., 2020). Therefore, scores will be given for each measure.

Squalor

This was based on a measure from the physical survey of the property. The surveyor rated the risk due to 'domestic hygiene, pests and refuse' inside the property. Potential ratings were 'significantly lower risk than average', 'average', 'significantly higher risk than average' and 'extreme'. In the 2018 physical survey data, over 99% of households were ranked as 'average'. For the purposes of this study, any individual deemed to be at 'significantly higher risk' or 'extreme' risk were considered to be living in squalor.

Supplementary variables

In addition to the main independent and dependent variables, data from additional factors was also collected. These were included as potential controlling variables or future areas of investigation.

- Sex – male or female
- Age - values up to 85. Any individual 85 or older is given a value of 85. Only individuals 18 or older will be included.
- Gross household income – total annual income from both the individual and their partner, including state and housing benefits. Ranges from £0 to £100000. Values greater than £100000 are given a value of £100000.

- Tenure – the ownership status of the house. Potential responses are owner occupier, private rented, local authority or housing association.
- Household type – this variable gives information as to who is present in the household. 6 categories are included; couple with or without children, lone parent, other multi-person household, one person (Under 60 years old) or one person (60 years and older).
- Ethnicity – 8 possible answers – White, Black/African/Caribbean/Black British, Indian, Pakistani and Bangladeshi, Other Asian, Chinese, Mixed/Multiple ethnic groups, Other ethnic group. To remain in line with the ethical requirements of the UK Data Service, this has been reduced to two categories in some sections of the analysis – 'White' and 'Black, Asian and Minority Ethnic' (BAME) – This is due to the low numbers of individuals in some of the groups.
- General health – this question asks "How is your health in general?" with 5 possible options - very bad, bad, fair, good, very good.
- Long-standing disability or illness - Any physical, mental health conditions or illness lasting 12 months or more? Options are yes, no, don't know, or refuse to answer. Follow-up questions for those with a disability/illness include:
    - Day-to-day activities - whether the condition affects ability to carry out day-to-day activities – Yes, a lot; Yes, a little; Not at all.
    - Nature of condition – does the condition affect you in the following areas? Vision, hearing, mobility, dexterity, learning difficulties, memory, mental health, stamina, socially, other

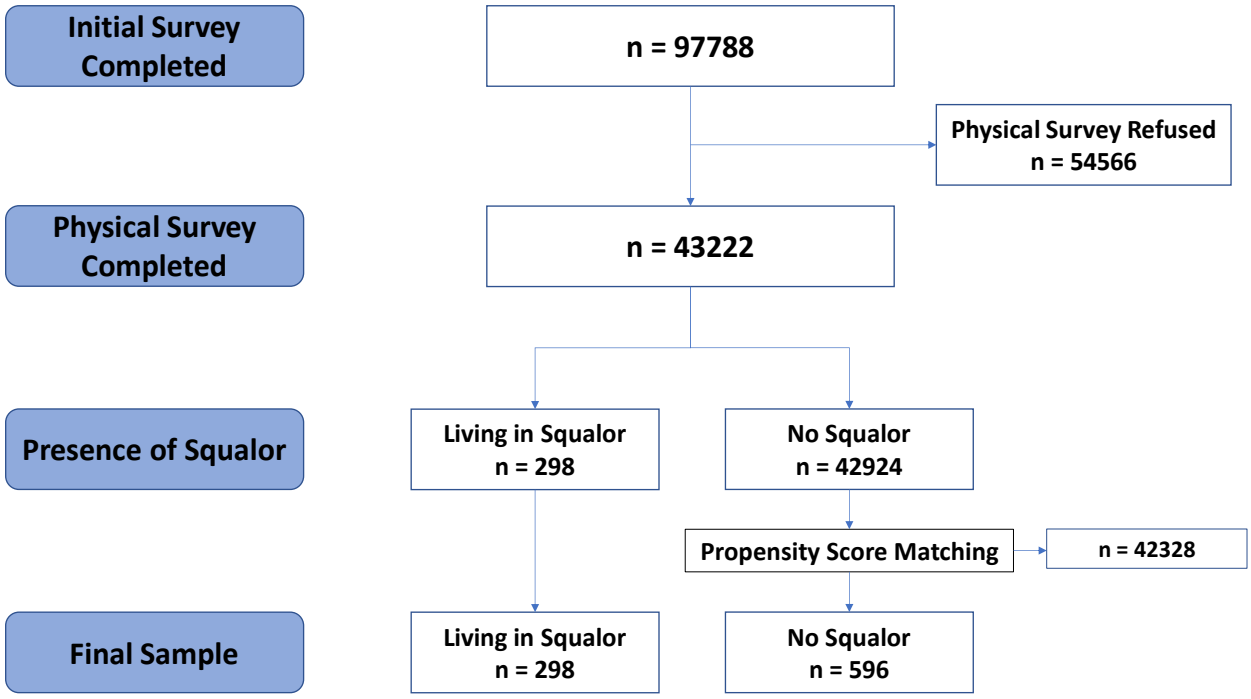
Analysis

All analysis was conducted using R, version 4.1.2. The code used can be found in the appendices (Appendix 4.3). Figure 4.1 details the process by which the data was reduced to form a squalor group and a control group. Once under-18s had been removed, the study was left with n =

97788 adults. These were initially split into individuals who chose not to complete the physical survey and those that agreed for it to take place. These two groups were then compared using t-tests, chi-squared tests and effect sizes (Cohen's d and Cramer's V) to identify any significant differences between the two groups. A Bonferroni correction was applied to the t-tests to reduce the risk of type-I errors (Armstrong, 2014). The 43222 adults who came from households which had agreed to the physical survey were then split into those who lived in squalor (n = 298) and those who lived in more typical conditions (n = 42924). The two groups were compared as before, and differences identified.

Figure 4.1

Flow chart showing the sample size at each stage of the data analysis process



To enable logistic regression to take place and to improve confidence in the findings, propensity score matching (PSM) was used. PSM creates a balanced dataset for comparison, resembling randomisation in clinical trials, so allowing for effective comparisons of variables of interest between the two groups (Littnerova et al., 2013). The propensity score is produced using

modelling that gives a value which represents the probability of an individual being in a particular group based on their baseline characteristics (Zhao et al., 2021). Matching by propensity score involves forming matched sets of 'treated and untreated' individuals based on their propensity score (Austin, 2011). In this study, this allowed a control group to be produced which matched the squalor group on key covariates. Given that the focus of the study was on the relationship between squalor and the two variables deprivation and well-being, PSM was based on all additional variables which had a complete set of data. This meant that the two study groups were matched by database, age, sex, general health, household income, whether they lived alone, whether they owned their house and number of people in the household. It was not possible to match by ethnicity or illness data as there was a significant number of missing values. Instead, these variables were included as controls in the regression analysis.

Although it is conventional to produce a control group which uses 1:1 matching, other ratios can be used (Austin, 2011). However, Austin (2010) suggests that a ratio of more than 2:1 can lead to increased bias. Using the nearest neighbour propensity score matching and assessment methods proposed by Zhao et al. (2021), the approach that produced the most balanced set of control group data was using a ratio of 2 non-squalor individuals for every squalor individual. The final squalor and non-squalor groups were compared using t-tests and chi-squared tests and effect sizes calculated. Furthermore, logistic regression was employed to assess the effect of the independent variables of deprivation and well-being and to control for ethnicity and illness.

To help direct future research, additional calculations were also completed, investigating additional individual and household variables (Appendix 4.2). Firstly, a new control group was produced, matched by household variables. This allowed comparisons to be made between the individual characteristics of squalor and non-squalor groups. Comparisons and logistic regression was completed as before. This process was then repeated, creating a new control group matched by individual characteristics. This allowed comparison of the groups on household factors, such as income and whether someone owned their own home.

This analysis process allowed for the main independent variables of deprivation and well-being to be compared and investigated with a statistically robust comparison group, identifying significant differences and helping to understand whether these factors predict the likelihood of an individual living in a squalid home. In addition, by repeating the process with altered control groups in the post-hoc analysis, potential approaches for further research in this area have also been suggested.

Results

Table 4.1 shows the summarised data and comparisons between the individuals who chose to allow their home to be surveyed and those who did not. The two groups showed a significant difference in almost all categories of study, including personal characteristics such as age and health, and characteristics of the household, such as household income and whether the home was owned or rented. The only variables where no significant difference was identified was in the happiness of the individual, the size of the household, the ratio of male to female and the presence of certain physical limitations.

Table 4.1

Comparison of individuals who allowed their home to be surveyed and those who did not.

Variable	Physical survey completed N = 43222	Physical survey refused N = 54566	Significance	Effect size (Cohen's/ Cramer's)
Deprivation	5.04 (2.88)	5.45 (2.88)	$p < .0001$	$d = 0.14$
Well-being –				
Satisfaction	7.56 (1.97)	7.64 (1.88)	$p < .001$	$d = 0.04$
Worthwhile	7.82 (1.89)	7.89 (1.80)	$p < .01$	$d = 0.04$
Happy	7.48 (2.24)	7.53 (2.16)	n.s.	$d = 0.02$
Anxious	2.85 (2.96)	2.75 (2.89)	$p < .01$	$d = 0.03$
Age	48.26 (18.30)	49.1 (18.34)	$p < .0001$	$d = 0.05$
Household size	2.77 (1.41)	2.78 (1.38)	n.s.	$d = 0.01$
Income	£35084 (23160)	£38137 (24046)	$p < .0001$	$d = 0.13$
General health	3.97 (0.99)	4.08 (0.93)	$p < .0001$	$d = 0.12$

Age (%)				
18-19	2.9	2.9	$p < .0001$	$v = 0.03$
20-29	16.3	15.0		
30-39	18.1	16.7		
40-49	16.4	17.0		
50-59	16.0	17.3		
60-69	14.8	14.6		
70-79	10.7	16.9		
80-	4.8	5.6		
Ethnicity (%) –				
White	87.2	86.7	$p < .0001$	$v = 0.05$
Black+	3.8	3.0		
Indian	2.1	2.9		
Pakistani+	2.4	3.1		
Other Asian	1.1	1.0		
Chinese	0.4	0.7		
Mixed/Multiple	1.5	1.2		
Other	1.5	1.4		
White	87.2	86.7	$p < .01$	$v = 0.01$
BAME	12.8	13.3		
Sex (% Male)	47.2	47.5	n.s.	$v = 0.00$
Tenure (%) -				
Owner Occupied	45.6	69.5	$p < .0001$	$v = 0.25$
Private Rented	20.6	15.1		
Local Authority	14.2	6.4		
Housing Association	19.5	9.0		
Owned	45.6	69.5	$p < .0001$	$v = 0.24$
Rented/council/housing association	54.4	30.5		
Household type (%) -				
Couple, no children	38.5	43.9	$p < .0001$	$v = 0.06$
Couple + children	26.1	25.2		
Lone parent	6.5	45.6		
Other multi-person	12.2	11.7		
One person <60	6.8	6.3		
One person 60+	9.8	8.4		
Living alone	16.6	14.7	$p < .0001$	$v = 0.03$
Living with others	83.4	85.3		
Illness (% with illness)	35.2	28.9	$p < .0001$	$v = 0.07$
Limitations due to illness (%) -				
Not at all	27.7	29.9	$p < .0001$	$v = 0.03$
A little	36.5	36.9		
A lot	35.7	33.2		
Type of limitations (% of ill with this limitation) -				
Vision	13.3	11.8	$p < .0001$	$v = 0.02$

Hearing	13.8	13.4	n.s.	*v* = 0.01
Mobility	43.4	40.8	p < .0001	*v* = 0.03
Dexterity	23.6	20.6	p < .0001	*v* = 0.04
Learning Difficulties	10.9	9.0	p < .0001	*v* = 0.03
Memory	14.4	12.9	p < .001	*v* = 0.02
Mental Health	20.8	16.8	p < .0001	*v* = 0.05
Stamina	36.0	32.5	p < .0001	*v* = 0.04
Social	5.6	4.4	p < .0001	*v* = 0.03
Other	5.9	6.3	n.s.	*v* = 0.01
None	20.5	23.2	p < .0001	*v* = 0.03

Note. Standard Deviation (SD) included in brackets.

The sample of n = 43222 individuals who allowed their home to be surveyed produced n = 298 who were found to be living in some form of squalor and n = 42924 who were not. The full details of these two groups can be seen in Table 4.2. These groups are not matched. However, the data suggests that there is a number of significant differences between those who were living in squalor and those who were not. This is the case in the levels of deprivation and three of the four measures of well-being, the main variables of interest. Furthermore, household income, general health and household personnel and type of tenure also appear to differ.

Table 4.2

Comparison of individuals living in squalor and those not living in squalor

Variable	Living in squalor N = 298	No squalor N = 42924	Significance	Effect size (Cohen's/ Cramer's)
Deprivation	3.70 (2.39)	5.05 (2.88)	p < .0001	*d* = 0.47
Well-being –				
Satisfaction	6.99 (2.43)	7.56 (1.96)	p < .05	*d* = 0.29
Worthwhile	7.43 (2.11)	7.82 (1.89)	n.s.	*d* = 0.21
Happy	6.96 (2.44)	7.48 (2.24)	p < .05	*d* = 0.23
Anxious	3.52 (3.25)	2.84 (2.96)	p < .05	*d* = 0.23
Age	46.03 (17.89)	48.27 (18.30)	n.s.	*d* = 0.12
Household size	2.88 (1.57)	2.77 (1.41)	n.s.	*d* = 0.08
Income	£25488 (16966)	£35151 (23184)	p < .0001	*d* = 0.42
General health	3.71 (1.12)	3.97 (0.99)	p < .01	*d* = 0.26
Age (%)				
18-19	4.7	2.9	n.s.	*v* = 0.02
20-29	18.8	16.3		

30-39	16.4	18.1		
40-49	17.8	16.4		
50-59	17.8	16.0		
60-69	12.4	14.8		
70-79	9.7	10.7		
80-	2.3	4.8		
Ethnicity (%) –				
White	85.2	87.2	n.s.	*v* = 0.00
BAME	14.8	12.8		
Sex (% Male)	53.0	47.2	n.s.	*v* = 0.01
Tenure (%) -				
Owner Occupied	27.2	45.8	p < .0001	*v* = 0.03
Private Rented	22.8	20.6		
Local Authority	19.8	14.2		
Housing Association	30.2	19.4		
Owned	27.2	45.8	p < .0001	*v* = 0.03
Rented/council/housing association	72.8	54.2		
Household type (%) -				
Couple, no children	24.2	38.6	p < .0001	*v* = 0.05
Couple + children	18.5	26.2		
Lone parent	17.4	6.4		
Other multi-person	18.8	12.1		
One person <60	10.1	6.8		
One person 60+	11.1	9.8		
Living alone	21.1	16.6	p < .05	*v* = 0.01
Living with others	78.9	83.4		
Illness (% with illness)	40.9	35.2	p < .05	*v* = 0.01
Limitations due to illness (%) -				
Not at all	20.7	27.8	n.s.	*v* = 0.02
A little	35.5	36.5		
A lot	43.8	35.7		
Type of limitations (% of ill with this limitation) -				
Vision	14.9	13.3	n.s.	*v* = 0.00
Hearing	15.7	13.8	n.s.	*v* = 0.00
Mobility	47.9	43.4	n.s.	*v* = 0.01
Dexterity	26.4	23.5	n.s.	*v* = 0.01
Learning Difficulties	9.9	10.9	n.s.	*v* = 0.00
Memory	16.5	14.4	n.s.	*v* = 0.00
Mental Health	33.1	20.7	p < .01	*v* = 0.03
Stamina	32.2	36.0	n.s.	*v* = 0.01
Social	8.3	5.6	n.s.	*v* = 0.01
Other	7.4	5.9	n.s.	*v* = 0.00
None	18.2	20.5	n.s.	*v* = 0.00

Note. Standard Deviation (SD) included in brackets.

PSM was used to identify a control sample which could be analysed alongside the squalor group. The final sample included n = 298 individuals living in squalor and n = 596 who were not. The two groups were matched on databases (2016 or 2018), on age, sex, general health, household size, household income, whether they lived alone and whether they owned their own house. Table 4.3 shows the variables by which the two groups were matched and their average values following the PSM process. The Standard Mean Difference (SMD) and Variance Ratio (VR) of the matched variables were between -0.1 and 0.1, and between 0.5 and 2.0, respectively, showing them to be well-balanced (Zhao et al., 2021).

Table 4.3

Comparison of the squalor and non-squalor group on the matched variables

Variable	Living in squalor N = 298	No squalor N = 596	Standard Mean Difference (SMD)	Variance Ratio (VR)
Database (%)				
2016	56.0	57.9	0.019	
2018	44.0	42.1		
Age	46.03	47.45	-0.080	0.948
Sex (% Male)	53.02	55.03	0.020	
General health	3.72	3.71	0.009	1.040
Income	25488	25428	0.004	1.190
Household size	2.88	2.86	0.016	0.916
Tenure (%) -				
Owned	27.2	27.2	0.000	
Rented/council/housing association	72.8	72.8		
Household type (%) -				
Living alone	21.1	21.3	0.002	
Living with others	78.9	78.7		

Note. -0.1 < SMD < 0.1 and 0.5 < VR <2.0 suggests balanced data (Zhao et al., 2021).

The independent variables of interest were then compared between the matched squalor and non-squalor groups (Table 4.4) to demonstrate whether there were significant differences and provide evidence for the acceptance or rejection of the study hypotheses.

Table 4.4

Comparison of mean values for deprivation and well-being measures.

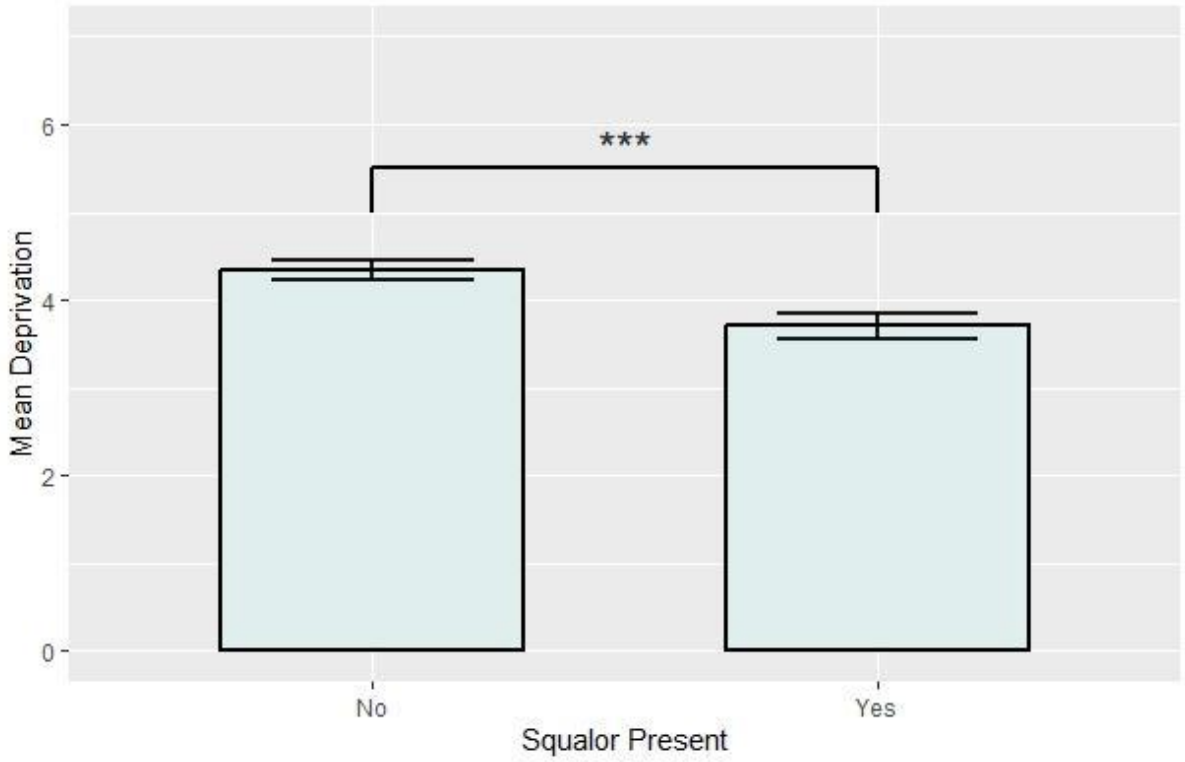
Variable	Living in squalor N = 298	No squalor N = 596	Significance	Effect size (Cohen's)
Deprivation	3.70 (2.39)	4.35 (2.75)	$p < .001$	$d = 0.25$
Well-being –				
Satisfaction	6.99 (2.43)	7.14 (2.22)	n.s.	$d = 0.07$
Worthwhile	7.43 (2.11)	7.42 (2.15)	n.s.	$d = 0.02$
Happy	6.96 (2.44)	7.12 (2.42)	n.s.	$d = 0.07$
Anxious	3.52 (3.25)	3.30 (3.25)	n.s.	$d = 0.07$

Note. Standard Deviation (SD) included in brackets

In comparison to those not living in squalor (M = 4.35, SD = 2.75), individuals living in squalor (*M* = 3.70, *SD* = 2.39) were shown to reside in significantly more deprived areas (t(671.93) = -3.62, p < .001) (Figure 4.2). Conversely, none of the well-being measures showed a significant difference between the squalor (Satisfaction: M = 6.99, SD = 2.43; Worthwhile: M = 7.43, SD = 2.11; Happiness: M = 6.96, SD = 2.44; Anxiety: M = 3.52, SD = 3.25) and non-squalor groups (Satisfaction: M = 7.14, SD = 2.22; Worthwhile: M = 7.42, SD = 2.15; Happiness: M = 7.12, SD = 2.42; Anxiety: M = 3.30, SD = 3.25).

Figure 4.2

Bar chart showing the difference in mean deprivation score.



Note. Error bars represent standard errors (SE)

The results of the logistic regression (Table 4.5) support the findings from the comparisons. Model 1 shows that deprivation is a significant predictor of whether an individual lives in squalor, such that an individual living in a more deprived area is more likely to be living in squalid conditions. In fact, the coefficient of the deprivation variable suggests that an increase of 1 level on the deprivation scale will decrease the risk of living in squalor by around 9%. Deprivation continued to be significant regardless of the inclusion of well-being or control variables. However, the significance level did adjust to $p < 0.05$ when other factors were added.

Measures of well-being were shown to be poor predictors of an individual's risk of living in squalor (Model 2) and this continued to be the case when included with deprivation and with the control variables of ethnicity and illness. However, although well-being measures were not

significant, they did appear to improve the model fit, as their inclusion reduced the Akaike Information Criterion (AIC) significantly.

Table 4.5

Regression outcomes for the main variables and control variables

Variable	Model 1	Model 2	Model 3	Model 4
Intercept	-0.31 (0.13)*	-0.64 (0.47)	-0.42 (0.48)	-0.40 (0.63)
Deprivation	-0.10 (0.03)***		-0.09 (0.04)*	-0.10 (0.04)*
Well-being – Satisfaction		-0.03 (0.06)	-0.03 (0.06)	-0.04 (0.07)
Well-being - Worthwhile		0.03 (0.06)	0.04 (0.07)	0.03 (0.07)
Well-being – Happy		-0.02 (0.05)	-0.01 (0.05)	-0.00 (0.05)
Well-being – Anxious		0.01 (0.03)	0.02 (0.03)	0.03 (0.03)
Ethnicity				0.13 (0.30)
Illness				-0.29 (0.21)
Akaike Information Criterion (AIC)	1130	604	601	593

Note. Standard Error (SE) included in brackets
* - $p < 0.05$, ** - $p < 0.01$, *** - $p < 0.01$

Post-hoc analysis (Appendix 4.2) gave further information as to the role of the additional variables included in the study. When a control group was created by matching on household and neighbourhood variables (Deprivation, income, number in household, whether an individual lived alone, whether property is owned or rented), this allowed focus to be on the individual characteristics of the residents. Comparisons of mean and logistic regressions suggest that the sex of the individual and whether they have a stamina related illness may have a relationship with whether an individual lives in squalor, though both have low effect sizes.

When individual characteristics were matched and household variables studied in more detail, a number of significant differences were identified between squalor and non-squalor groups. In addition to deprivation, household income, ownership status and the make-up of the household all showed significant differences. However, when included in regression models, only deprivation and income appeared to predict squalor status.

Discussion

The aim of this study was to investigate whether there was a relationship between an individual living in squalor and either the individual's mental well-being, or the deprivation in their local area. The study tapped a previously unused research resource, the English Housing Survey, and this was fit for purpose and generated a large and suitably powered sample. The study also used PSM to enable accurate comparisons to be made, as this method has not been used previously in the squalor field. Based on previous data into squalor and related conditions, two hypotheses were proposed. The rate of squalor was expected to be higher in areas where deprivation was more severe and in individuals with lower well-being.

Initial analysis compared those who agreed to have a physical survey completed, with those who did not. The two groups differed significantly in almost all aspects. However, this is to be expected with such a large sample (Choi & Nandram, 2021). Furthermore, the between group effect sizes were very small in 28 out of the 30 tests, with only the tests of tenure status found to have a small to medium effect size. Nonetheless, there did appear to be some notable differences, such that individuals who refused to have their house surveyed lived in less deprived areas, had a higher income and were more likely to own their own home. This suggests that individuals who were more affluent were less inclined to allow a physical survey of their house. Several significant differences, such as deprivation, well-being measures, household income and general health, were also identified when the individuals who completed the physical survey were separated into those who were living in squalor and those who were not. However, due to the difference in the sample sizes of the two groups, it was not possible to confidently state which of the factors were responsible for the differences. Logistic regression would have provided more statistical support in this area. However, logistic regression is considered to be ineffective in data where one outcome is significantly less likely, due to its tendency to underestimate the probability of rare events (G. King & Zeng, 2001). The final squalor and non-squalor groups were identified by PSM, allowing for regression to be used

and for the independent variables of deprivation and well-being to be investigated while controlling the other factors.

Local deprivation had not previously been considered in the squalor literature. Therefore, this represented a new approach in the research base. The mean data suggested that local deprivation was more severe in squalor households than in more typical households, though this was only supported by a small Cohen's *d* effect size. However, the regression analysis also supported deprivation as a key variable, showing it to be a predictor of whether an individual lived in squalor. These findings support the first hypothesis and suggest that deprivation is a significant factor in the household cleanliness of an individual. Although no deprivation research had previously been completed in the squalor literature, studies had looked at the relationship between deprivation and a number of mental health conditions (Baumann et al., 2007; Day, Mulcahy, et al., 2016; Lauder & Roxburgh, 2012; McElroy et al., 2019; Solmi et al., 2020). Findings suggested that there is a higher risk of mental health problems in areas that were more deprived and this appears to have been supported by the present study which found an increased risk of squalor in more deprived areas. Although the significance of deprivation agrees with previous research, it also builds on the findings. It demonstrates that deprivation is a key factor specifically in the cleanliness and squalor of a household. This is not dissimilar to the findings of the studies on self-neglect (Day, Mulcahy, et al., 2016; Lauder & Roxburgh, 2012). However, self-neglect does not limit itself solely to individuals living in squalor conditions. Furthermore, Day et al. and Lauder and Roxburgh's identified characteristics of individuals reported to be self-neglecting, whereas this study considered a general population, comparing those living in squalor with those who were not. Finally, the studies by Day et al. and Lauder and Roxburgh found that their self-neglect sample were more likely to be older (65+). The present study did not find any evidence for an association between age and squalor, finding squalor in a more varied age group (18-85+, mean = 46 years) which did not differ from the non-squalor sample.

Mental health has been shown to be a significant concern for individuals who live in squalid conditions. Most notably, conditions including dementia, psychosis and addiction (S. M. S. Chan et al., 2007; Halliday et al., 2000; Snowdon & Halliday, 2011). Measures of mental well-being have been shown to be associated with each of these conditions (Mäkelä et al., 2015; Uzenoff et al., 2010; Zank & Leipold, 2001) and also to predict the risk of common mental disorders and to be strongly associated with self-reported mental health (Bech et al., 2003; Grant et al., 2013; Lombardo et al., 2018; Santini et al., 2022). In the current study, well-being was initially shown to be worse in squalor individuals. However, once variables were controlled using PSM, no significant difference was found between the well-being of those living in squalor and those not living in squalor. Therefore, the second hypothesis, that individuals with lower well-being are more likely to be living in squalor, was not supported. Although this goes against much of the literature on squalor, the issue may be that well-being was measured using a relatively simple four-question measure that has not received significant validation. A more extensive and reliable measure that has been designed to produce a total score may have been more sensitive to differences in well-being. Alternatively, research suggests that individuals living in squalor often have a poor awareness of their surroundings, seeing little to be concerned about (Gleason et al., 2021; Gregory et al., 2011; Lee et al., 2014). If this was the case in the present sample, then the well-being of the participants was unlikely to be affected by their living environment and would not be represented in the self-report scale used in the EHS. Nonetheless, if individuals living in squalor commonly have dementia, psychosis and addiction issues, as the squalor research suggests, this should still be reflected in their level of well-being. However, the majority of research into co-morbidities in squalor have focused only on adults over 65 years of age (S. M. S. Chan et al., 2007; Halliday & Snowdon, 2009; Snowdon & Halliday, 2011; Wrigley & Cooney, 1992). Therefore, the present sample, which has a more diverse range of ages (80% under 65 years old) may not have the same rates of these conditions, particularly dementia.

Post-hoc tests offered additional options for future research. Much of the squalor research base has focused on the individual. However, the results from the present analysis suggest that only

sex and particular illness characteristics show differences when comparing individuals in squalor with non-squalor. This contrasts with the household variables, such as income, ownership of the home and living alone, where significant differences appeared to be more common. If socioeconomic variables are shown to play a significant role in squalor, then this represents a new direction in squalor research. Furthermore, in combination with what is already known about the mental health and neurological links with squalor, this could suggest that squalor should be considered as a potential biopsychosocial phenomenon.

Future Research

This study is the first to demonstrate a link between deprivation and squalor. However, additional research will be needed to identify whether the relationship is consistently identified in additional datasets and to investigate whether deprivation is a causal link, or driven by a third, unknown variable. Furthermore, as deprivation refers to the local neighbourhood, this suggests that community-level indicators, such as social cohesion and ethnic fractionalisation, may also be worth investigating to consider their relationship with squalor.

Future research should also investigate why no difference in well-being was identified between those living in squalor and those who weren't. Firstly, more detailed information on the mental health of the individuals being surveyed is needed. The EHS survey limits its investigations to measures of well-being and a simple yes or no to a mental health condition. Additional information such as a mental health diagnosis would help explain the well-being results found in this study, but would also add to the literature on squalor, which has limited data on the relationship between squalor and mental health in the general population. Secondly, although the study uses a physical survey to measure household cleanliness and risk, it does not record how clean the individual themselves believes their dwelling to be. This information would allow for a comparison between their own view of their home and the view of an independent surveyor, demonstrating the awareness of individuals living in these conditions. However, as domestic cleanliness is not a

significant element in the EHS, it is likely that for this information to be acquired, it would need a separate study to be conducted into awareness and insight in individuals living in squalor.

Finally, post-hoc analysis suggested that household factors may have a more significant role to play in squalor than has previously been considered in the literature. Future studies will need to investigate variables such as income, home ownership and household make-up to better understand the role they have to play.

Limitations

Due to the nature of squalor, which occurs in less than 1% of the population, a large sample is required to identify a suitably large group of individuals living in squalor. Therefore, any survey of the general population will show a significant difference between the squalor and non-squalor groups. In the present study, PSM was used to create a matched control group to compare with the squalor individuals. However, this did mean the loss of significant amount of data. In this instance, the control group was reduced from n = 42924 to n = 596, a loss of 42328 participants' data. Although this approach allowed for more valid comparison of squalor and non-squalor individuals, it also meant that a large proportion of the overall sample was discarded.

In this study, squalor was ascertained from a domestic hygiene rating taken as part of a physical survey. Therefore, the dependent variable was not based on a validated measure of squalor, but instead a surveyor's judgement of the risk associated with domestic hygiene, pests and refuse. Consequently, it is not possible to identify how the rating of squalor in this study compares to that used in other research, including those that have used squalor measures such as the LCRS or ECCS to provide an indication of the level of squalor present in a dwelling (Gregory et al., 2011; Halliday et al., 2000; McDermott & Gleeson, 2009). Furthermore, unlike these scales, the measure used in the EHS had only 4 levels and most individuals (over 99%) were rated as 'average'. This provided limited detail as to the conditions in most households and only allowed for a basic identification of squalor or no squalor. In addition, multiple surveyors were used in the collection of data for the EHS and no clear

indication is given as to how surveyors were directed to rate this measure, or a level of agreement between surveyors. From the EHS data, squalor occurs in around 0.7% of houses visited. This is higher than prevalence estimates previously calculated in research (Halliday et al., 2000; Snowdon & Halliday, 2011). This may suggest that the individuals rated as living in squalor in this study may be demonstrating less extreme conditions than would generally be considered in the squalor literature. However, it may possibly be a better representation of the prevalence of squalor in a general population. This could be ascertained, and it would be beneficial to future users of the EHS, if a measure such as the ECCS was included as part of the physical survey completed by the surveyor. However, this would require the surveyor to be trained in and complete a number of additional questions on the dwelling and this may not be considered a valuable use of their time if the data is rarely used in reports or by external researchers.

There were also limitations surrounding the use of well-being as a variable and the use of the ONS-4 as a measure. Previous research has primarily focused on the specific mental health disorders of individuals living in squalor, rather than measures of psychological well-being. Although there is support for the relationship between mental health and well-being, to relate the present research to past studies, an indication of the mental health symptoms and diagnoses of the individuals would have been preferred to well-being. In addition, the measure of well-being that was used by the EHS, the ONS-4, is based on just four questions. Although used in a number of other surveys and studies, a more accurate understanding of the mental health of the individuals living in squalor could have been achieved had the survey used a more extensive and validated measure, such as the Kessler K10, which was used in the study in chapter 3. Finally, well-being measures were only assessed with the individual who completed the survey. Other adults in the household who were not present when the survey was completed would be missing data in this area, which could lead to a less reliable outcome.

Conclusions

This study represents a unique approach to squalor research. It is the first study to consider squalor in a random sample from the general population, rather than a sample selected for the presence of squalor, or the increased likelihood of squalor. The consideration of the general population has also enabled squalor to be investigated in a more diverse age range, as it was not limited to those who had become known to services, or those in older age care. It is also the largest sample of squalor individuals investigated in any study and the first to create a matched control group using PSM to identify individuals with similar characteristics. In addition, it has been the first study to consider the role of local deprivation and one of only a few to include other household factors such as home ownership, household income and number of individuals in the dwelling. Finally, it has also considered a new measure of mental health, investigating the well-being of individuals living in squalor and comparing it to others living in more typical surroundings. This research has produced three key findings, while also introducing the field to several new avenues of investigation to better understand the risk factors for squalor. Firstly, deprivation in the local area appears to be a significant predictor of whether an individual lives in squalor. Secondly, this study offered no support for the hypothesis that low well-being leads to an increase in the risk of living in squalor. Thirdly, future research should consider focusing on factors related to the household as much as individual characteristics, as these may be significant predictors of whether an individual lives in squalor.

The next step in the research process will be to investigate the role of deprivation in squalor using alternative methods to consider whether the findings from this study are supported. Furthermore, future research would also develop the understanding of the additional household factors and their influence. The present study considers these using a cross-sectional design. However, the EHS offers data on the condition of an individual's home each year beginning with the 2007/2008 wave of the survey. Therefore, to build on the present findings, the next stage will be to investigate how squalor prevalence has changed from this question first being introduced up until the most recent data

available. This data can then be used to consider deprivation and additional factors, whether they support the findings of this study and investigate how they change over time in relation to squalor prevalence.

Chapter 5

Household Factors and Prevalence of Squalor:

Meta-analysis and Meta-regression

Introduction

This study aims to build on the findings from chapter 4, in which EHS data was used to investigate whether deprivation and mental well-being predicted whether an individual lived in squalor. Whilst it was shown that well-being was not a factor, living in an area that was significantly more deprived contributed to living in squalor, even when other factors were controlled for. Post-hoc tests suggested that other household factors, such as income and type of tenure may also have a relationship with squalor. The study concluded that local and household variables could be significant factors predicting whether an individual lives in squalor, and therefore were worthy of more detailed investigation.

Household variables have been previously reported in squalor studies, but with some problems in terms of the sample used, what was reported and how the information was gathered. Studies have narrowly focused on adults over 65 years old (A. Clark et al., 1975; T. Shaw & Shah, 1996; Snowdon & Halliday, 2011; Wrigley & Cooney, 1992), been cross-sectional in nature (A. Clark et al., 1975; Hurley et al., 2000; Monfort et al., 2017; Wrigley & Cooney, 1992) and unfortunately used methods lacking in reliability and validity (A. Clark et al., 1975; Hurley et al., 2000; T. Shaw & Shah, 1996; Wrigley & Cooney, 1992). These methodological concerns make the reported results on income and housing arrangements less reliable and therefore less generalisable. Furthermore, although data has been reported on these factors, it has usually not been statistically tested, often because the sample size was too small (A. Clark et al., 1975; Wrigley & Cooney, 1992), or the data was not pertinent to the focus of the study (Halliday & Snowdon, 2009; Hurley et al., 2000; Monfort

et al., 2017; Snowdon et al., 2013).

It appears that squalid homes contain an individual living alone on approximately 65-94% of occasions (A. Clark et al., 1975; Halliday et al., 2000; Hurley et al., 2000; Ito et al., 2022; Lee et al., 2014; McDermott & Gleeson, 2009; Monfort et al., 2017; T. Shaw & Shah, 1996; Snowdon et al., 2013; Snowdon & Halliday, 2011). Furthermore, one study did identify that lone living was significantly higher than in a non-squalor control group (Ito et al., 2022). Data on home ownership in squalor cases varies. The majority of studies had home ownership rates between 39-59% (Halliday & Snowdon, 2009; Lee et al., 2014; McDermott & Gleeson, 2009; Snowdon & Halliday, 2011; Wrigley & Cooney, 1992), although one study reported a much lower rate of 4% (Halliday et al., 2000). No meaningful data was reported in these studies on household income, number of people in the property or the type of household, such as presence of children.

The SN literature (I.e. Day et al., 2013; Poythress et al., 2006), which includes, but is not limited to, people who live in squalor, contains a more convincing evidence base with regards to these factors. Living alone was identified as being significantly more common in individuals who SN (Abrams et al., 2002; Burnett et al., 2006; Naik et al., 2008) and this was also found in the related condition of HD (Frost et al., 2004; Kim et al., 2001; Samuels et al., 2008). A number of studies index a link between SN and income, with SN more common when income was lower (Abrams et al., 2002; Burnett et al., 2006; L. Dong & Sun, 2021; X. Dong et al., 2012; X.-Q. Dong et al., 2010; Yu et al., 2019). However, results from other SN studies contradict these findings (X. Dong, 2016; Mardan et al., 2014; Naik et al., 2008).

A major absence in the squalor literature is an accurate estimate of the occurrence or prevalence of squalid living in the community. Therefore, the point, period and lifetime prevalence of squalor is unknown. Point prevalence is the proportion of a population living in squalor at a given time. Period prevalence refers to the proportion living in squalor over a period of time, and lifetime prevalence is the proportion who, at some point, have lived in squalor (Carroll, 2013). A different, but related estimate is 'incidence' which, like period prevalence, considers squalid cases over time,

but only includes new cases of squalor (Smink et al., 2012). Prevalence has previously been considered in the squalor literature (Halliday et al., 2000; Macmillan & Shaw, 1966; Snowdon & Halliday, 2011; Wrigley & Cooney, 1992), with estimates ranging from 0.05-0.12% in adults over 60, or 65 years, depending on the study. A single study has considered the occurrence of squalor in all age groups (Halliday et al., 2000), finding likelihood of squalor to be 0.03% when individuals under 65 years old were included. However, these studies are methodologically and definitionally lacking because they calculated incidence, not prevalence, finding their estimates from the number of referred cases per year from a known population size.

The present study will therefore provide the first point estimate of squalor based on adults of all ages and furthermore, will base its estimate on a sample in which all types of dwelling are included, not relying just on referred cases for its estimation. Case identification will be robust as this will be based on the valid and reliable methods used by the EHS in which domiciliary visits form part of the assessment of the home environment.

Using data from multiple years of the EHS provides a large dataset to analyse and will investigate squalor in a random sample from the general population (i.e., not just referred cases) and in adults of all ages (i.e., not just the over 65s). Furthermore, it enables the investigation of factors that have previously received little attention, including deprivation, household income and other household characteristics, via regression analyses. The approach resembles a panel study in that it collects prospective data from groups of individuals at multiple time points (J. Elliott et al., 2008). In the case of the EHS, data is collected annually from a random sample of households in England.. However, the data does not use the same participants each year and is therefore not a true panel study, but it is a good estimate of the point prevalence of squalor year-on-year. The distribution of prevalence over time will also allow any temporal trends in the prevalence of squalor to be considered for the first time.

Prevalence meta-analyses combine prevalence estimates from multiple studies to produce a summary estimate of the rate of a disorder or occurrence (Barendregt et al., 2013). In this study, the

meta-analysis will synthesise results from 13 annual administrations of the EHS to then enable a pooled estimate of the prevalence of squalor and identify differences between years of the EHS. This is novel in the squalor evidence base. Prevalence meta-analyses have become significantly more common in the last decade as they increase precision by minimising the error in the estimates (Suvarnapathaki, 2021). By using this method, an estimate of the point prevalence of squalor can be produced that is more reliable and robust than previous estimates. This will allow health and social services to effectively plan for the needs of individuals living in the community whose dwellings show signs of squalor (Ward, 2013). Furthermore, by using a meta-analytical approach with subgroup analysis, it will be possible to identify the characteristics of households that have an increased risk of their dwelling becoming squalid. This will further inform services regarding where their resources should be focused to provide support to those most in need. Finally, by also using meta-regression to investigate the effect of the key variables over time and their relationship with squalor, it may be possible to suggest which variables have a prominent role to play in the trends in squalor prevalence and inform the focus of future longitudinal research.

Therefore, the aims of this study are as follows:

- To estimate the point prevalence of squalor in the general population.
- To estimate the variability of the point prevalence of squalor in the general population over time.
- To investigate the relationship between squalor and household factors.

The specific hypotheses focusing on the role of household factors are as follows:

- Risk of household squalor will be higher in areas of more severe deprivation and when the household income is lower.
- Number of individuals in the household, whether the home is owned or rented, and whether the individual lives alone will all predict squalor.

Methods

Ethics and source data

The study complied with the requirements of the UK Data Service (UK Data Service, n.d.) regarding using their datasets for research purposes. Ethical approval for the use of this dataset was confirmed as part of the self-declaration process completed for the study in chapter 4 (Ref: 049202).

This study will use data from the English Household Survey (EHS). Specific details of the EHS can be found in chapter 4. This study will include data from the 2007/08 wave of the study, through to the 2019/20 version and so represents squalor prevalence data from 13 separate years (Department for Communities and Local Government., 2017a, 2017b, 2017c, 2019, 2020; Ministry of Housing, Communities and Local Government., 2022; Ministry of Housing, Communities and Local Government, CADS Housing Surveys., 2021). Although not a fully longitudinal study, as the participating households are not the same each year, the structure of the EHS allows for this research to be conducted using a panel study approach. A panel study investigates a random sample of individuals from the general population at numerous time points and investigates their characteristics (Lugtig & Smith, 2019). In this instance, the presence of squalor and the household and local variables are the factors of interest.

Measures

The EHS collects data on a significant number of areas and topics. Questions about the residents include demographics, health, education and employment. In addition, questions regarding the home and neighbourhood ask about energy efficiency, disrepair, fire safety and adaptations. Data on each household is collected from an interview with an individual who lives there. Although the household may have multiple occupants, each residency is included only once, as the study investigates household, rather than individual, characteristics. Several variables from the EHS are included in this research.

Presence of squalor

This is based on a measure from the physical survey of the property during the EHS. The surveyor rated the risk due to 'domestic hygiene, pests and refuse' inside the property. Potential ratings are 'significantly lower risk than average', 'average', 'significantly higher risk than average' and 'extreme'. For the purposes of this study, any individual deemed to be at 'significantly higher risk' or 'extreme' risk were considered to be living in squalor.

Year

Data is analysed across 13-years of the EHS. The first instance of a question being asked about household cleanliness was in the 2007/08 wave of data collection. The same question was then asked every year, up to 2019/20. It was impossible to use more recent data, as physical inspections stopped due to the Coronavirus pandemic. Each year group will be referred to as its latest year, such that the 2007/08 year will be referred to as 2008.

Local deprivation

Each area in which individuals were surveyed was given a deprivation score, with values from 1-10 identifying whether the area was in the most deprived 10% of areas, to the least deprived 10% of areas, respectively. The deprivation for each year group was based on the most accurate deprivation criteria available. Therefore, deprivation data from 2015 onwards was based on the Index of Multiple Deprivation (IMD) 2015 criteria. Data from 2010 to 2014 was based on IMD2010 and earlier datasets were based on IMD2007. Due to the low occurrence of squalor in some of the deprivation categories, it was not always appropriate to complete statistical analysis with deprivation separated into ten groups. Therefore, in these instances, the deprivation category was split into three groups; most deprived (Categories 1-3), average deprivation (4-7) and least deprived (8-10).

Gross household income

Total annual income from both the individual and their partner, including savings. Values from £0 to £100000. Values of more than £100000 are still given a value of £100000. The study in chapter 4 used a measure of income based on the annual income of both the individual and their

partner and any state or housing benefits. However, this measure was not available throughout all the year groups in the present study. Therefore, a slightly different measure was used, which does not include benefits, but does include savings, to ensure consistency throughout the yearly datasets. To enable a variety of statistical analyses to be completed, the continuous income data was also split into four quartiles to allow for analysis as a categorical variable.

Tenure

The ownership status of the house. Potential responses are owner occupier, private rented, local authority or housing association. Where a binary category was required for analysis and for comparison with previous research, this category was simplified to those who owned their home and those who did not.

Household type and size

These variables give information as to who is present in the household. 6 categories are included; couple with or without children, lone parent, other multi-person household, one person (Under 60 years old) or one person (60 years and older). Where a binary category was required for analysis and for comparison with previous research, this category was simplified to those who live alone and those who live with others. Household size reported the total number of individuals in the household, including children.

Analysis Strategy

Data from 13 years of the EHS were assessed and each separate year was treated as an independent data set. Therefore, analysis assessed 13 sets of EHS results. Initially, a meta-analysis and forest plot were completed on the 13 datasets, calculating a random effects model estimate of squalor prevalence and measures of heterogeneity. As the identified proportions were all close to 0, meta-analyses throughout the study were run using a Freeman-Tukey double arcsine transformation, to stabilise the variance (Barendregt et al., 2013; Mansfield et al., 2016). Analysis was then split into two areas. Firstly, the role of the variables and their influence on squalor and secondly, their effect

over time. For the first stage, subgroup analysis on participant level data was used to compare the meta-analyses of households based on each independent variable. For each variable (deprivation, home ownership, whether they lived alone, income and household size) the data for each year group was separated by category and a meta-analysis produced. To compare prevalence according to the levels of the variable, the subgroup analysis was used with each to identify significant differences in their prevalence rates. Secondly, the variables were analysed using meta-regression at the study level. Prevalence estimates for each year were compared with a mean or representative value from the independent variables. In the case of deprivation, income and household size, this was a mean value. In the case of home ownership and household type, this was a proportion of individuals. Meta-regression was used to investigate whether there was a relationship between the squalor prevalence values and the values for each independent variable. Finally, variables were also investigated with the complete dataset using logistic regression. As the squalor prevalence values are low, Firth's Bias-Reduced logistic regression (Firth, 1993) was used to account for the rarity of squalor events in the datasets (Leitgöb, 2013)

To analyse squalor prevalence over time, fixed prevalence data was calculated for each variable and for each year and displayed in values and as line graphs. Meta-regression was used to investigate whether squalor prevalence showed a significant change over time. This was also repeated for each variable separately to identify whether the same patterns were identified when the data was separated by variable level.

Results

Table 5.1 summarises the complete dataset. Overall, n = 85681 households were surveyed, with n = 763 identified as living in squalor, producing a fixed rate of 0.89%. Households had on average 2.4 inhabitants, were more likely to be rented than owned by the resident and the most common household type was a couple with no children.

Table 5.1

Summary of Data Set and Variables

Variable	Representative value
Total sample	85681
Total squalor	0.89%
Average deprivation score	4.966
Average household income	24886
Average household size	2.386
Tenure	
Owner occupied	45.87%
Private rented	18.85%
Local Authority housing	16.05%
Housing Association housing	19.23%
Owned occupied	45.87%
Not owned	54.13%
Household type	
Couple with no children	31.36%
Couple with children	21.42%
Lone parent	9.90%
Other multi-person household	8.04%
One person less than 60	12.41%
One person 60+	16.87%
Living alone	29.28%
Living with others	70.72%

Figure 5.1 shows the results of a meta-analysis. The 13 yearly datasets totalled n = 85681 households, producing a point prevalence estimate of squalor of 0.85% (95% CI's 0.72 to 1.00). This suggests approximately 8-9 of every 1000 households feature some form of squalid living. There was a significant and high heterogeneity between years of the EHS (I^2 = 82%, 95% CI 70% to 89%, Q = 65.61, p <.01).

Figure 5.1

Forest Plot of Squalor Prevalence by Year

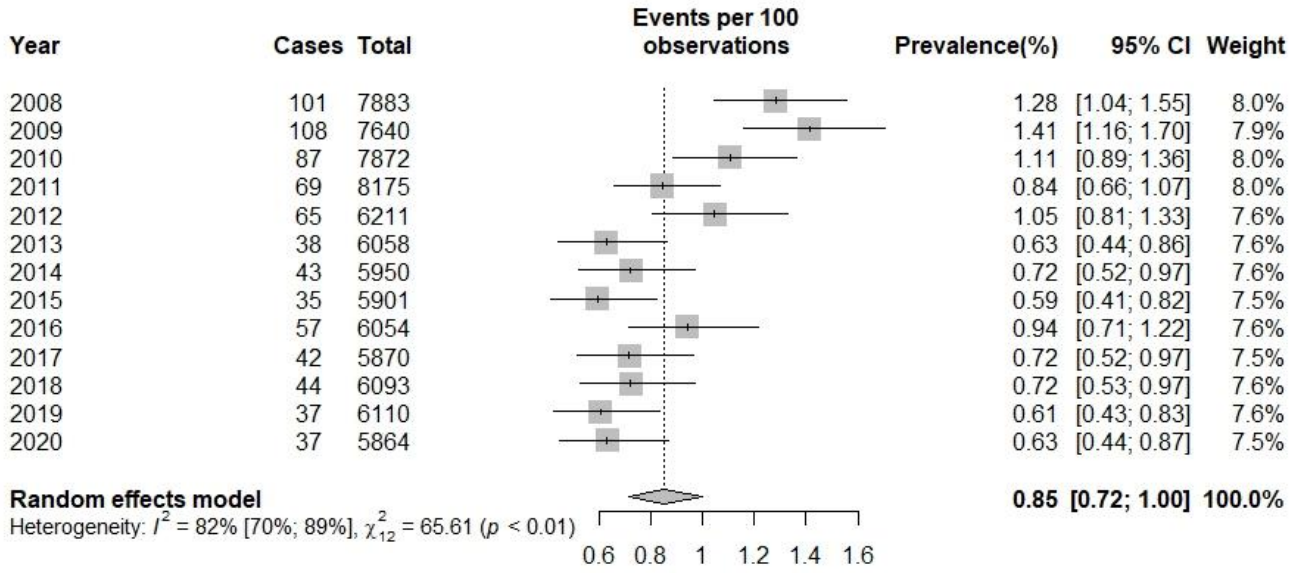


Table 5.2 contains the subgroup analysis results and suggests that all the independent variables, except household type (Q = 1.54, p = 0.2151), had a significant effect on the presence of squalor. Squalor prevalence was higher in areas with the most deprivation (Q = 46.32, p < .0001), in households with income in the lowest quartile (Q = 105.61, p < .0001) and in houses which were not owned by the resident (Q = 30.31, p < .0001). The number of individuals in the household was also shown to have a significant effect on squalor prevalence, with 2-person households showing the lowest prevalence and households with 5 or more individuals having the highest risk (Q = 25.61, p = <.0001).

Table 5.2

Subgroup Analysis for Moderators of Squalor Prevalence

Variable	Subgroup	Prevalence	95% CI	*p*-value	I^2	*Q*	*p*-value
Deprivation						46.32	<.0001
	Most deprived	1.23%	1.04-1.43%	0.0015	62.3%		
	Average deprivation	0.76%	0.59-0.94%	0.0001	69.2%		
	Least deprived	0.38%	0.25-0.53%	0.0025	60.4%		
Income						105.61	<.0001
	0-25%	1.31%	1.08-1.57%	0.0019	61.5%		
	25-50%	1.05%	0.92-1.19%	0.7414	0.0%		
	50-75%	0.68%	0.49-0.90%	0.0001	69.1%		
	75-100%	0.36%	0.28-0.45%	0.7041	0.0%		
Home ownership						30.31	<.0001
	Owned	0.50%	0.41-0.60%	0.0399	44.9%		
	Not owned	1.15%	0.93-1.39%	<0.0001	82.9%		
Household type						1.54	.2151
	Living alone	0.94%	0.82-1.06%	0.2653	17.7%		
	Living with others	0.82%	0.66-0.99%	<0.0001	80.7%		
Household size						25.61	<.0001
	1 person	0.94%	0.81-1.07%	0.2653	17.7%		
	2 people	0.62%	0.52-0.73%	0.2636	17.8%		
	3 people	0.76%	0.53-1.03%	0.0012	63.0%		
	4 people	1.01%	0.76-1.29%	0.0273	47.9%		
	5+ people	1.36%	0.88-1.94%	<.0001	69.5%		

Table 5.3 reports the meta regression. The meta-regression analysis found no relationship between squalor prevalence and average deprivation level (Q_M = 1.4468, *df* = 1, *p* = .2290), average household size (Q_M = 1.5216, *df* = 1, *p* = .2174) or rate of living alone (Q_M = 1.1118, *df* = 1, *p* = .2917). However, squalor prevalence did show significant variation over time, with squalor decreasing from 2008 to 2020 (Q_M = 17.2851, *df* = 1, *p* < .0001). Household income also showed a significant relationship, such that as average income increased, squalor prevalence decreased (Q_M = 7.8942, *df* =

1, p = .0050). Furthermore, home ownership also had a significant relationship, such that as home ownership decreased, so did squalor prevalence (Q_M = 4.9260, df = 1, p = .0265). Additional calculations (Appendix 5.1) showed that income remained as a significant predictor, even when compare with a national average. Furthermore, mean income and home ownership were still significant when both variables were included in a model.

Table 5.3

Meta-regression of Independent Variables and Squalor Prevalence

Variable	Coefficient	CI 95%	Standard Error	I^2	R^2	Test of Moderators (Q_M)	p-value
Year (2008-2020)	-0.0533	-0.0784, -0.0282	0.0128	57.60%	70.75%	17.2851	**<0.0001**
Deprivation (Mean)	0.4643	-0.2923, 1.2209	0.3860	81.59%	4.12%	1.4468	0.2290
Income (Mean)	-0.0001	-0.0001, -0.0000	0.0000	72.05%	44.31%	7.8942	**0.0050**
Household Size (Mean)	3.1814	-1.8736, 8.2365	2.5792	81.47%	4.13%	1.5216	0.2174
Living alone (%)	-0.0685	-0.1959, 0.0589	0.0650	82.05%	0.18%	1.1118	0.2917
Home ownership (%)	0.0290	0.0034, 0.0546	0.0131	76.45%	30.10%	4.9260	**0.0265**

Table 5.4 demonstrates the regression values when the data was analysed as a single dataset. The only variable which was not found to be a significant predictor of squalor was whether the individual lived in the household alone, or lived with others (OR = 0.91, 95% CI [0.78, 1.06], p = 0.21). Income and household size were both significant predictors of whether a household was living in squalor. Deprivation was also found to be a significant predictor, suggesting a decrease in the prevalence of squalor of around 13% for each deprivation increment (OR = 0.87, 95% CI [0.84, 0.89], p < .0001). Similarly, whether an individual owned the home predicted squalor, with a rented home being 127% more likely to be squalid (OR = 2.27, 95% CI [1.94, 2.67], p < .0001). When all variables

were combined to form a model for predicting squalor, significance remained in all cases and whether an individual lived alone was also included as a significant element of the model.

Table 5.4

Logistic Regression of Independent Variables and Squalor with the Complete Dataset

Variable	Coefficient	Standard Error	Odds Ratio	95% CI	*p*-value
Variables analysed separately					
Deprivation (1-10)	-0.1422	0.0137	0.8674	0.8442, 0.8909	**<.0001**
Income (£0-100,000)	-0.0000	0.0000	0.9999	0.9999, 0.9999	**<.0001**
Household Size	0.1303	0.0813	1.1392	1.0847, 1.1951	**<.0001**
Living alone/with others	-0.0989	0.0784	0.9058	0.7779, 1.0577	0.2095
Home owned/rented	0.8212	0.0815	2.2732	1.9411, 2.6723	**<.0001**
Variables analysed together					
Deprivation	-0.0627	0.0149	0.9392	0.9120, 0.9668	**<.0001**
Income	-0.0000	0.0000	0.9999	0.9999, 0.9999	**<.0001**
Household size	0.2585	0.0304	1.2950	1.2187, 1.3734	**0.0028**
Living alone/with other	-0.2230	0.1074	0.8001	0.6481, 0.9881	**0.0383**
Home owned/rented	0.2673	0.0906	1.3064	1.0953, 1.5637	**<.0001**

Table 5.5 and Figure 5.2 show the fixed prevalence rates and meta-regression results for each year and for each variable category. Overall, squalor prevalence significantly decreased over time (β = -0.053, 95% CI [-0.078, -0.028], $p < .0001$), with each year producing a decrease in squalor of around 0.05 percentage points. A similar decrease in squalor was identified in many of the variable categories, including all levels of deprivation, individuals who own or rent privately and households with more than one person. Exceptions included Local Authority and Housing Authority housing, lone parents and those living alone, all of which did not show a significant decrease in squalor prevalence over time.

Table 5.5

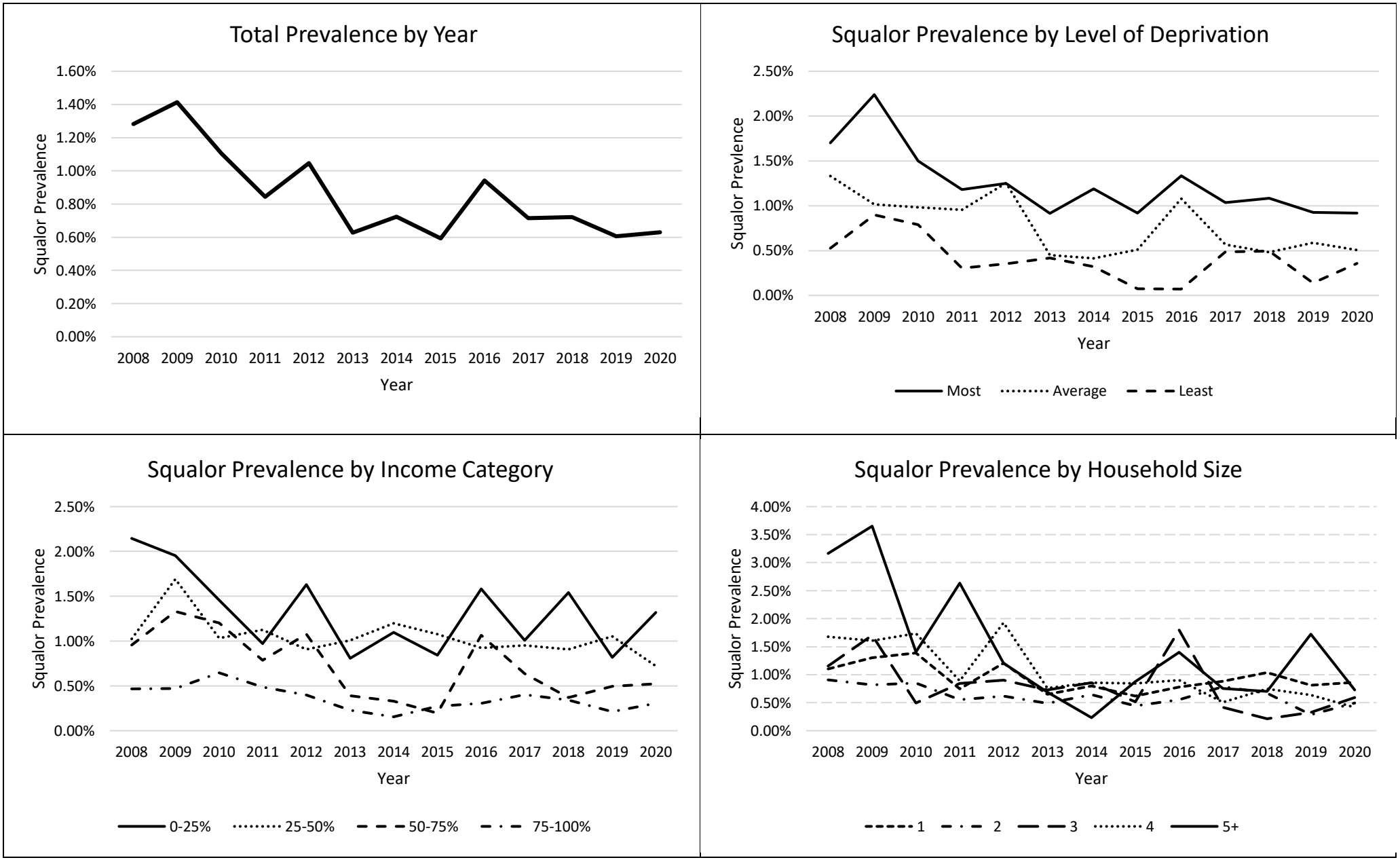
Squalor Prevalence Values (%) and Meta-regression by Time

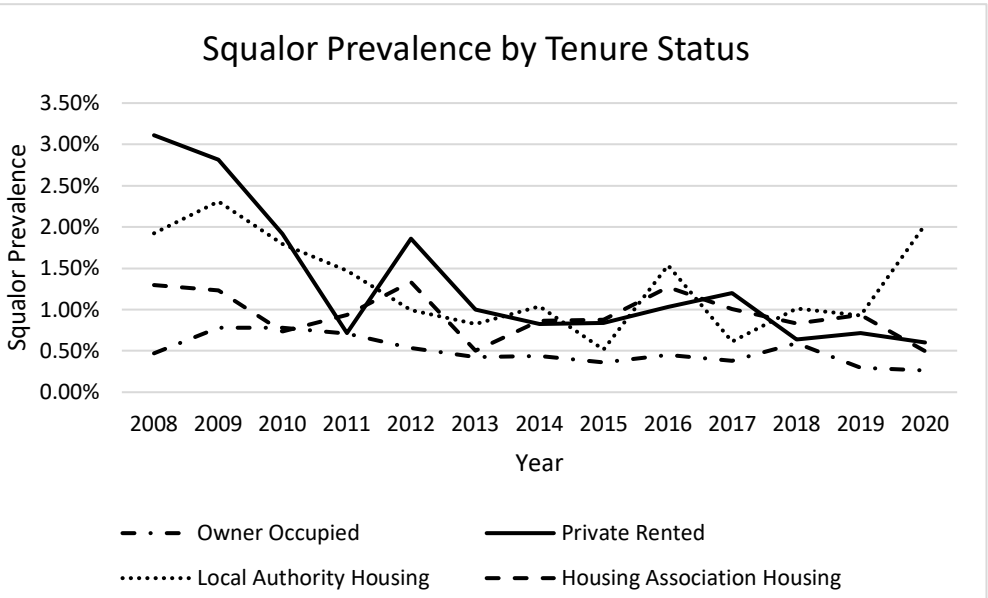
	Total	Sq. cases	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	All years	β-coefficient (CI 95%)	*p*-value
Total			7883	7640	7872	8175	6211	6058	5950	5901	6054	5870	6093	6110	5864	85681		
Squalor cases			101	108	87	69	65	38	43	35	57	42	44	37	37	763		
Total prevalence	85681	763	1.28	1.41	1.11	0.84	1.05	0.63	0.72	0.59	0.94	0.72	0.72	0.61	0.63	0.89	-0.0533 (-0.0784, -0.0282)	**<0.0001**
Deprivation																		
Most deprivation	32393	411	1.70	2.24	1.50	1.18	1.25	0.92	1.19	0.92	1.33	1.03	1.09	0.93	0.92	1.27	-0.0638 (-0.0985, -0.0291)	**0.0003**
Average deprivation	32335	261	1.33	1.01	0.98	0.96	1.25	0.45	0.41	0.51	1.08	0.57	0.48	0.59	0.51	0.81	-0.0552 (-0.0904, -0.0199)	**0.0021**
Least deprivation	20933	90	0.53	0.90	0.79	0.30	0.35	0.42	0.32	0.08	0.07	0.48	0.49	0.14	0.36	0.43	-0.0348 (-0.0676, -0.0020)	**0.0378**
Household income																		
0-25%	21421	299	2.15	1.95	1.46	0.97	1.63	0.81	1.10	0.84	1.58	1.01	1.54	0.82	1.32	1.40	-0.0600 (-0.1212, 0.0012)	0.0547
25-50%	21419	227	1.03	1.69	1.03	1.12	0.91	1.01	1.20	1.08	0.92	0.95	0.91	1.05	0.72	1.06	-0.0279 (-0.0633, -0.0075)	0.1223
50-75%	21422	158	0.96	1.33	1.20	0.78	1.08	0.39	0.33	0.20	1.07	0.64	0.37	0.50	0.52	0.74	-0.0564 (-0.01033, -0.0096)	**0.0182**
75-100%	21419	79	0.47	0.47	0.65	0.49	0.40	0.23	0.16	0.27	0.30	0.40	0.34	0.21	0.30	0.37	-0.0183 (-0.0394, -0.0029)	0.0904
Tenure																		
Owner occupied	39304	208	0.47	0.78	0.78	0.71	0.54	0.43	0.44	0.36	0.45	0.38	0.59	0.30	0.26	0.53	-0.0477 (-0.0477, -0.0137)	**0.0004**
Private rented	16148	212	3.11	2.81	1.92	0.72	1.86	1.00	0.83	0.84	1.03	1.20	0.64	0.71	0.60	1.31	-0.1432 (-0.2204, -0.0661)	**0.0003**
Local Authority housing	13756	186	1.92	2.31	1.80	1.47	1.00	0.82	1.04	0.52	1.54	0.62	1.01	0.93	2.03	1.35	-0.0705 (-0.1464, 0.0054)	0.0688
Housing Association housing	16473	157	1.30	1.24	0.73	0.94	1.33	0.50	0.86	0.88	1.27	1.01	0.83	0.93	0.50	0.95	-0.0287 (-0.0708, 0.0134)	0.1816

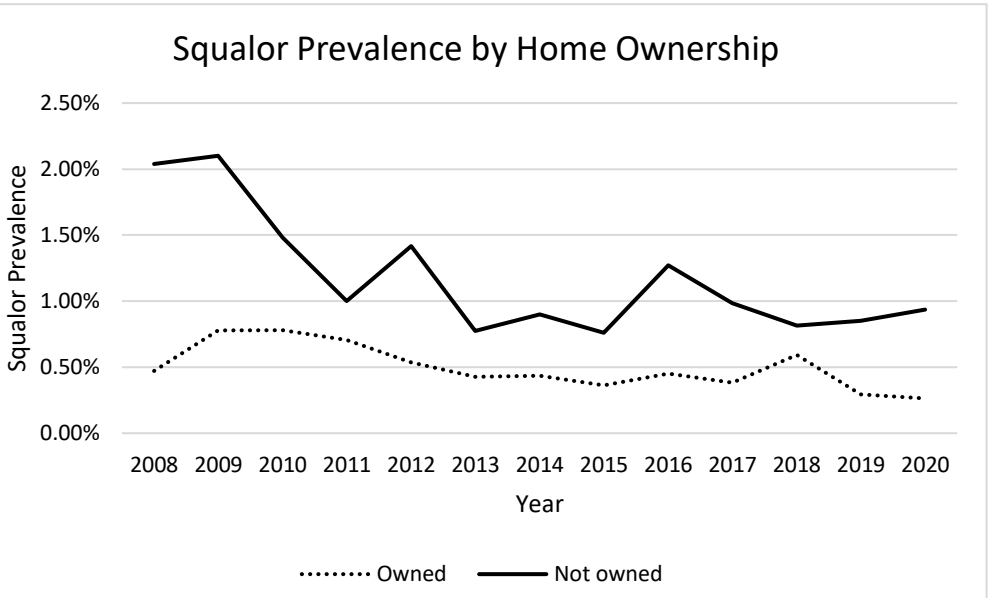
Owned	39304	208	0.47	0.78	0.78	0.71	0.54	0.43	0.44	0.36	0.45	0.38	0.59	0.30	0.26	0.53	-0.0477 (-0.0477, -0.0137)	**0.0004**
Not owned	46377	555	2.04	2.10	1.48	1.00	1.42	0.77	0.90	0.76	1.27	0.98	0.81	0.85	0.94	1.20	-0.0817 (-0.1288, -0.0347)	**0.0007**
Household type																		
Couple with no children	26870	148	0.61	1.03	0.69	0.55	0.70	0.28	0.57	0.45	0.49	0.59	0.37	0.22	0.38	0.55	-0.0354 (-0.0581, -0.0127)	**0.0022**
Couple with children	18355	144	1.49	1.59	1.08	0.72	1.26	0.48	0.24	0.30	0.52	0.31	0.47	0.62	0.59	0.78	-0.0773 (-0.1279, -0.0267)	**0.0028**
Lone parent	8484	130	2.43	1.99	1.65	1.52	0.62	0.87	1.76	1.19	2.78	2.15	1.04	0.93	0.60	1.53	-0.0717 (-0.1604, 0.0171)	0.1136
Other multi-person household	6887	102	2.66	2.29	1.31	2.08	1.70	1.90	0.80	1.00	2.04	0.00	1.16	0.89	0.88	1.48	-0.1414 (-0.2432, -0.0396)	**0.0065**
One person < 60	10629	127	1.99	1.60	2.17	0.62	1.52	0.48	1.06	0.61	1.18	1.15	0.68	1.07	0.93	1.19	-0.0625 (-0.1377, 0.0127)	0.1034
One person ≥ 60	14456	112	0.55	1.04	0.79	0.84	0.93	0.80	0.60	0.63	0.49	0.69	1.28	0.64	0.81	0.77	0.0001 (-0.0358, 0.0361)	0.9947
Living alone	25085	239	1.11	1.30	1.39	0.74	1.20	0.65	0.80	0.62	0.78	0.88	1.04	0.81	0.86	0.95	-0.0270 (-0.0607, 0.0067)	0.1163
Living with others	60596	524	1.36	1.46	0.99	0.88	0.98	0.62	0.69	0.58	1.01	0.65	0.59	0.52	0.52	0.86	-0.0626 (-0.0873, -0.0378)	**<0.0001**
Household size																		
1 person	25085	239	1.11	1.30	1.39	0.74	1.20	0.65	0.80	0.62	0.78	0.88	1.04	0.81	0.86	0.95	-0.0270 (-0.0607, 0.0067)	0.1163
2 people	29474	188	0.91	0.82	0.85	0.55	0.62	0.49	0.64	0.44	0.56	0.79	0.67	0.29	0.49	0.64	-0.0329 (-0.0559, -0.0099)	**0.0051**
3 people	13477	113	1.15	1.70	0.50	0.84	0.90	0.73	0.86	0.52	1.80	0.42	0.21	0.33	0.59	0.84	-0.0619 (-0.1095, -0.0144)	**0.0107**
4 people	11310	122	1.68	1.60	1.74	0.89	1.93	0.76	0.86	0.84	0.90	0.51	0.75	0.64	0.42	1.08	-0.0939 (-0.1402, -0.0475)	**<0.0001**
5+ people	6335	101	3.16	3.65	1.40	2.63	1.21	0.69	0.23	0.88	1.40	0.76	0.70	1.72	0.73	1.59	-0.1517 (-0.2739, -0.0295)	**0.0150**

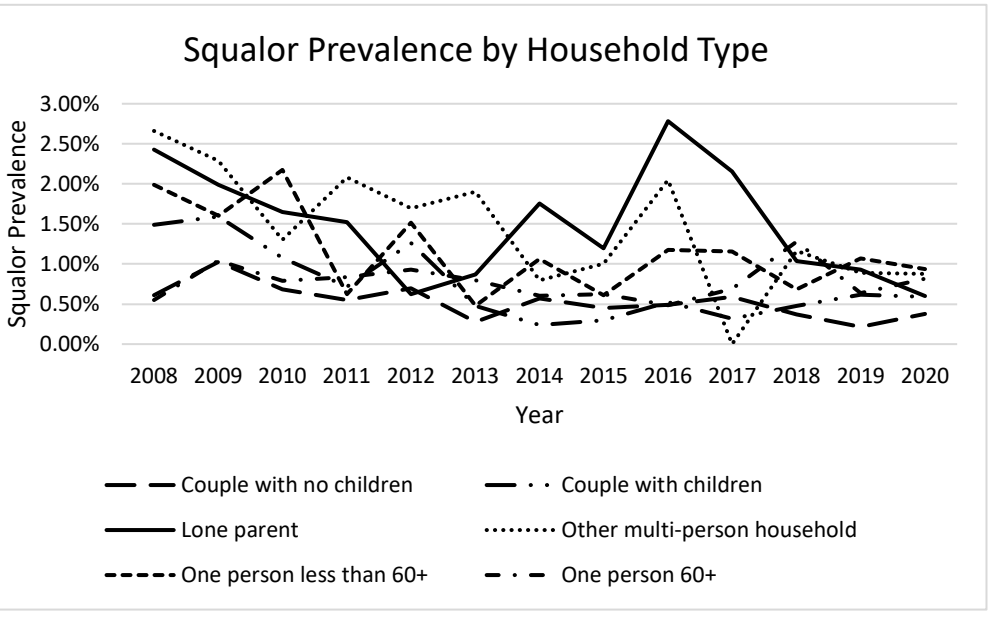
Figure 5.2

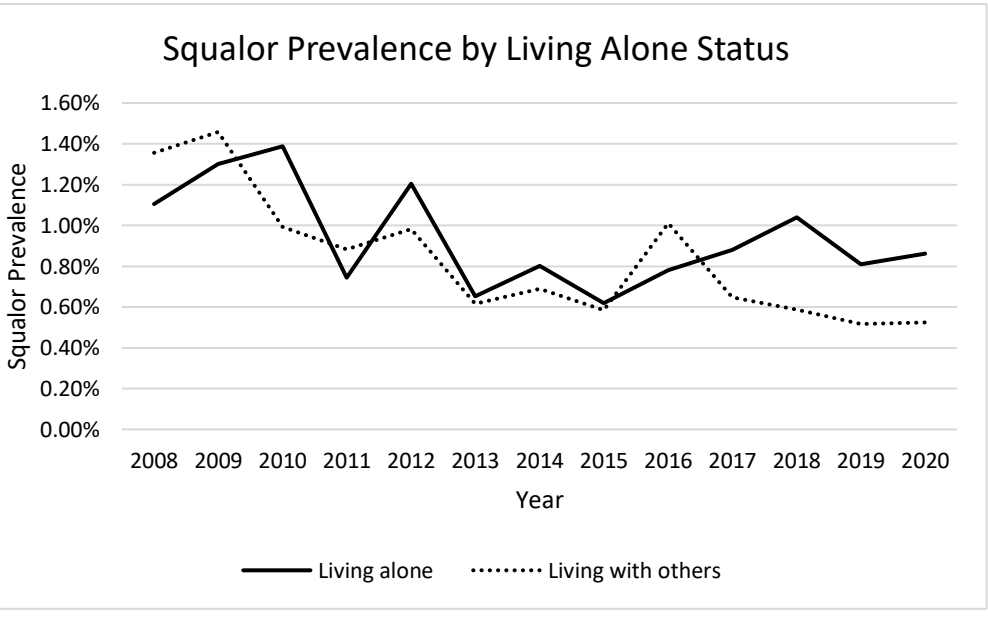
Squalor Prevalence Over Time and by Variable




Squalor Prevalence by Tenure Status
Squalor Prevalence
3.50%
3.00%
2.50%
2.00%
1.50%
1.00%
0.50%
0.00%
2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020
Year
Owner Occupied
Private Rented
Local Authority Housing
Housing Association Housing


Squalor Prevalence by Home Ownership
Squalor Prevalence
2.50%
2.00%
1.50%
1.00%
0.50%
0.00%
2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020
Year
Owned
Not owned


Squalor Prevalence by Household Type
Squalor Prevalence
3.00%
2.50%
2.00%
1.50%
1.00%
0.50%
0.00%
2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020
Year
Couple with no children
Couple with children
Lone parent
Other multi-person household
One person less than 60+
One person 60+


Squalor Prevalence by Living Alone Status
Squalor Prevalence
1.60%
1.40%
1.20%
1.00%
0.80%
0.60%
0.40%
0.20%
0.00%
2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020
Year
Living alone
Living with others

Discussion

The squalor evidence base has previously lacked reliable findings on the prevalence of squalor and lacked knowledge on the causes and correlates of the condition. Squalor prevalence estimates have been unreliable as they almost always used individuals already identified as living in squalor, used unvalidated assessment methods, been cross-sectional and have been commonly limited to older adults. The current study sought to correct these limitations and contribute by providing the first reliable estimate of the prevalence of squalor. The present study therefore took a novel meta-analytic approach in studying a large dataset from a random sample of the general population, using a reliable assessment method, and taking a 'longitudinal' approach. The aims of this study were to provide a reliable estimate of the prevalence of squalor in the general population, to investigate the relationships between squalor and household factors and to investigate annual trends in the prevalence of squalor. We can now state with much more confidence that 8-9 out of every 1000 households will be living in squalor. The aims of the study were therefore met and now the results will be discussed and connected to the extant evidence base.

Squalor Prevalence

The meta-analysis conducted on the EHS data used each yearly dataset as a separate event, generating an estimate of squalor prevalence of 0.85%. Previous estimates were summarised in the scoping review in chapter 2, with a combined incidence rate of 0.07% in older adults from four studies (Halliday et al., 2000; Macmillan & Shaw, 1966; Snowdon & Halliday, 2011; Wrigley & Cooney, 1992) and 0.03% when all ages were included, though this was from a single study (Halliday et al., 2000). Therefore, the point prevalence rate suggested by the present study (i.e., 8-9 households out of every 1000 live in squalor) is higher than previous estimates. However, when comparing present and historical estimates, it is important to note that there are significant differences between how values were calculated in previous research and how they have been perhaps more reliably

calculated in this study. Previous research has relied on producing squalor estimates based on referral rates. In each study, the number of cases referred to a service per year and the population of the area was used to calculate prevalence. However, as stated by Snowdon and Halliday (2011), this only considers cases which have become known to services and true estimates would likely be "substantially higher". The present study, which estimated prevalence from the results of surveying over 85000 dwellings therefore used a more reliable and extensive dataset, acquired using more robust interviewing and actual home visits. In using a meta-analytical approach with a larger dataset, a more reliable and precise estimate of prevalence of squalor has been achieved (Møller & Myles, 2016).

Household factors

Deprivation, when broken down into three categories from the most deprived to the least deprived areas, showed a significant relationship with squalor prevalence, with squalor being over three times more likely in the most deprived areas than in the least. This was supported by the analysis of deprivation in the individual regression using the 1-10 scale, where a score of 1 represented the most deprived neighbourhoods. It was found to be a significant predictor of squalor such that an increase of one level represented a 13% decrease in the likelihood of a dwelling being squalid. An association was not observed in the meta-regression between the yearly squalor prevalence and average deprivation. However, this may be due to the deprivation values being calculated nationally, so being designed to be broadly the same year on year. These findings support the first hypothesis and reinforce the findings from the control study in chapter 4, which found deprivation to be a predictor of whether an individual lived in squalor. Although the data for both studies was based on EHS participants, this study investigated deprivation at both the population level and the individual level, whereas the control study only considered deprivation at the individual level. Furthermore, the data selected for this study was larger and more temporally varied. These findings also concur with the research from the SN literature, which identified a relationship with

deprivation (Day, Mulcahy, et al., 2016; Lauder & Roxburgh, 2012). These findings suggest that squalor is not something that is evenly distributed throughout society, but rather is more likely in areas of high deprivation. Future research should now investigate whether the relationship between deprivation and squalor is causal, or whether there is an additional variable that influences both deprivation and squalor, such as historical trauma, mental health, or social cohesion.

The first hypothesis also suggested that income would also be a factor, suggesting that squalor would be more common in households with a lower income. The results in this study support this assertion. In the previous quantitative study in this thesis, income was only considered during post-hoc analysis. However, as a focused variable, it appears to have a significant role in squalor prevalence, with the bottom quarter of households, by income, being more than three times more likely to live in squalor than individuals in the highest income quartile. Furthermore, income is shown to be related to squalor prevalence at the yearly level in the meta-regression, even when adjusted for inflation, and at the individual level using logistic regression, even when included with other variables. Income had not previously been considered as a main variable in the squalor literature. Therefore, this represents a new area of focus and strengthens the findings that household variables have a significant role to play in squalor. The findings regarding income also mirror many SN studies that found income to be a factor (Abrams et al., 2002; Burnett et al., 2006; L. Dong & Sun, 2021; X. Dong et al., 2012; X.-Q. Dong et al., 2010; Yu et al., 2019). However, all of these studies were limited to older adults (60+ or 65+). Therefore, the outcomes of the present study are unique in that they investigate squalor, but also, in finding income to be a factor when investigating all adults, not just older individuals.

The second hypothesis suggested that additional household factors, such as whether someone lives alone, whether they own their home and how many people are in the home, would also play a role in squalor. Post-hoc analysis from chapter 4 suggested that this was an area for investigation, and squalor and SN literature also supported this (Abrams et al., 2002; Burnett et al., 2006; Ito et al., 2022; Naik et al., 2008; Yu et al., 2019), though research has previously only been

conducted on whether squalor is more common in those who live alone. This study found support for elements of hypothesis two, demonstrating that home ownership and household size were related to squalor prevalence, both in the subgroup analysis and individual regression. Individuals who did not own their own homes had a squalor prevalence more than double that of homeowners. This could potentially be because individuals who own their homes are more likely to look after the property, as it is 'their property.' It may also be related to financial conditions, with homeowners more likely to have higher income and lower deprivation. However, when ownership was included in the regression with income and deprivation, it was still a significant predictor of whether an individual lived in squalor, suggesting that it has an effect beyond other variables. Conversely, the meta-regression found an opposite effect of home ownership, as year by year, squalor prevalence decreased, but so did home ownership. However, this was based on significantly less data points and is more likely to be driven by the national trend of increased renting (Office for National Statistics, 2023).

Squalor prevalence was also shown to vary significantly by household size, with the individual regression suggesting that increased household size produces an increased risk of squalor. It may be the case that larger households are more likely to live in squalor, as more mess/dirt is created when more people cohabit and the responsibility for who cleans the property is unclear. Alternatively, social loafing may be factor, when individuals in groups make less effort than when they are working individually (Simms & Nichols, 2014). However, it is worth noting that squalor did not increase linearly with household numbers. Prevalence calculations in the subgroup analysis showed that the lowest rate of squalor was seen in 2- and 3-person households and the highest in those with 4 or more individuals, with the prevalence in single-person households in between. Potentially, individuals living alone may struggle to find the time to maintain a household by themselves, or they may have less motivation to do so if no one else is regularly present. Further research in this area would be required to fully understand these findings.

Solitary living is one of the few household variables that has been covered in multiple squalor studies and has also received attention in related disorders, such as SN and HD. Rates of living alone in squalor cases have been shown to be high (A. Clark et al., 1975; Halliday et al., 2000; Hurley et al., 2000; Ito et al., 2022; Lee et al., 2014; McDermott & Gleeson, 2009; Monfort et al., 2017; T. Shaw & Shah, 1996; Snowdon et al., 2013; Snowdon & Halliday, 2011). Furthermore, Ito et al. (2022) showed that, compared to a control group, individuals living in squalor were more likely to be living alone. Studies have also consistently found that individuals who SN or hoard are more likely to be living alone (Abrams et al., 2002; Burnett et al., 2006; Frost et al., 2004; Kim et al., 2001; Naik et al., 2008; Samuels et al., 2008). In the present study, the rate of squalor in individuals living alone was higher than multiple-person households. However, the difference was not significant at the .05 level. Furthermore, living alone also showed no relationship with squalor in the meta-regression or the individual logistic regression, except when the model included all factors. The lack of a relationship in the present study appears to disagree with the research base, as it suggests that squalor is not more common in individuals living alone. However, this may be due to the age of the participants in previous studies. The SN studies referenced (Abrams et al., 2002; Burnett et al., 2006; Naik et al., 2008) and the single squalor study which used a control (Ito et al., 2022) only investigated older adults. Therefore, this may suggest that if the EHS data was limited to older adults, they may have identified significantly higher rates of squalor in individuals living alone. However, further studies on squalor in the general population would need to be completed to identify whether this is the case.

Time trends

Studies that assess squalor over time are extremely rare and are usually conducted unsystematically. Furthermore, they are limited to follow-up data assessing outcomes for patients (S. M. S. Chan et al., 2007; A. Clark et al., 1975; Ito et al., 2022; Macmillan & Shaw, 1966; Snowdon & Halliday, 2011; Wrigley & Cooney, 1992). Although this study is not truly longitudinal, it does

represent a significant step in squalor research, as it looks at time trends in squalor prevalence taken over a 13-year period. This identified a significant relationship between squalor prevalence and time, such that squalor appeared to be decreasing over the 13-year period. This could be explained by an overall improvement in general housing conditions during this time. It may also suggest a change in the way that the EHS assessed household cleanliness, such that less squalid dwellings were previously more likely to be rated as 'at risk'. However, there is nothing in the EHS notes that indicates that a change in the rating methods occurred, suggesting that this is not the case.

A significant decrease in squalor prevalence was also observed in many of the variables and categories, such as homeowners, multiple-person households and all deprivation levels. However, others did not show the same pattern. These included those in both of the below-average incomes (0-25% and 25-50%) and several other groups who would be considered to be of a low income, such as those living in local authority or housing authority housing and lone parents. However, the lack of a decrease in prevalence in the lowest income groups was not consistently the case as the most deprived group still saw a significant decrease in squalor over time. Nonetheless, these findings suggest that certain groups of individuals do not see the same improvements in housing conditions as others. Further research into national patterns should be conducted to consider this in more detail.

Strengths and Limitations

The strengths of this study are based around the use of the EHS as a dataset and the analytical methods employed. The EHS has been running annually for over 50 years and reports regularly on technical processes and data quality (Office for National Statistics, 2020). Therefore, the data included appears robust and reliable and the surveying methods were gold standard in that a domiciliary visit was conducted (Postlethwaite et al., 2019). In addition, the significant size of the survey has allowed for a squalor sample to be produced from a general population, even when the prevalence of the condition is low. This makes the research unique, as no previous study has

investigated squalor in a sample of this kind and size. Secondly, regarding the analysis used in the study, no previous squalor research has been able to use a meta-analytical approach, as this has been the only study using multiple datasets. This has allowed for a robust random effects estimate of squalor prevalence. Furthermore, the combination of subgroup analysis, meta-regression at the year level and individual logistic regression has informed the understanding of squalor risk factors at multiple levels.

In terms of limitations, as discussed in chapter 4, using the EHS as a source of data on squalor has drawbacks. Firstly, all surveyed households had agreed to be included in the study. It is possible that those who refused access to their homes varied significantly from those that agreed, suggesting that the sample used in the present study may not have been free of bias. Research suggests that individuals living in squalor are socially withdrawn (Fond et al., 2011; Lee & LoGiudice, 2012; Proctor & Rahman, 2021) and will refuse entry to their property or any form of help (Matsuoka et al., 2020; McDermott, 2011; Snowdon, 2014), which would drive avoidance of engagement with the EHS. Secondly, household conditions were measured on a 1-4 scale. However, this is not a validated measure and will possibly have been used differently by different surveyors, who may have interpreted conditions in an idiosyncratic manner. Therefore, it is difficult to assess whether the individuals considered to be living in squalor in this study had similar living conditions to those identified in other squalor studies. Finally, out of over 85000 households, only 763 were living in some form of squalor. This prevalence of less than 1% makes for an unbalanced sample and restricted the use of some analytical procedures. Furthermore, it meant that when data was separated by year, certain categories, such as deprivation, could not remain in their original groupings, as the numbers of squalor cases were low or zero. By creating smaller groupings, some of the accuracy of the data was lost and patterns in the analysis more difficult to identify.

Methodological and Practical Implications

Methodologically, this study emphasises the importance of using both robust and novel methods in the field of squalor. Previous research into squalor prevalence and squalor factors have followed similar methods, producing broadly similar outcomes. However, by using a unique approach, a more reliable estimate of squalor prevalence has been produced, which differs from previous estimates. Likewise, it has allowed for the investigation of previously unstudied variables related to the home and the neighbourhood. Future studies should consider alternative methodological approaches when planning new studies, including research in the general population, research using a control group and research from the client's perspective. Studies that enable ethical access to the homes of people considered at risk of squalor and refusing entry would be at a premium.

Practically, a better understanding of squalor is vital for those who work in the field. Compared to conditions such as Hoarding Disorder (Frost & Steketee, 2014) and SN (Day, Leahy-Warren, et al., 2016; Papaioannou et al., 2012), much less is known about individuals who choose to live this way and how they can be supported. A more reliable estimate of prevalence is an important step in supporting individuals living in squalor as it allows services to plan appropriately for the health care needs of the individual (Ward, 2013). Evidence that squalor occurs in almost 1% of households enables workforce calculations and emphasises the importance of having professionals who are trained in how to psychologically manage the people and the environmental conditions. This study has also helped inform the understanding of the local areas and types of households that are most at risk of living in squalor. This can help direct resources into the locations where squalor is most likely, ensuring the available support is used most efficiently.

Conclusions

This study used a unique approach in squalor prevalence research, investigating adults of all ages, taking reliable data from a general population survey and conducting a prevalence meta-

analysis using 13-years of data. Furthermore, unlike many published squalor studies, it did not focus on the individual, but instead the household and local area factors, which have received little attention previously. The study produced a squalor prevalence estimate higher than identified in previous squalor studies, suggesting that squalor could be more common than previously realised. The study showed a significant relationship between squalor prevalence and the variables of local deprivation, household income, home ownership and household numbers. However, no relationship was found when considering whether individuals lived alone, which contradicted previous squalor and SN research. Time trends, which have also received little attention in squalor, were also investigated, finding a significant decrease in squalor prevalence between 2008 and 2020. This synthesis of prevalence has highlighted that more people are living in squalid conditions than previously thought. More robust assessment methods, engagement strategies and multidisciplinary interventions packages now need to be developed and these interventions be thoroughly and well evaluated.

Chapter 6

Professional Perspectives of Individuals who Live in Squalor: A Multi-perspective IPA Study

Introduction

Individuals living in squalor rarely seek help themselves, so they come to the attention of authorities via a number of different routes. These may include GPs, environmental health, housing services and fire safety. Furthermore, once identified, squalor individuals will often require continued support from these groups and additional support from home care, cleaning teams and social workers.

Qualitative research in the field of squalor is limited. The scoping review (Chapter 2) identified only two studies of this type (Karlsson & Gunnarsson, 2018; McDermott, 2011). McDermott (2011) did talk to professionals. However, she focused only on ethical decision making. Furthermore, Karlsson and Gunnarsson (2018) only included squalor as a theme when working with individuals with alcohol problems. There has been no research specifically focused on the experiences and views of professionals beyond the ethical dilemmas they encounter. However, research considering related conditions have produced studies covering more broad topics.

Animal Hoarding (Burniston, 2016), Hoarding Disorder (Holden et al., 2019; Koenig et al., 2013, 2014) and Elder Self-Neglect (Day et al., 2012; Doron et al., 2013; Yu et al., 2022) have all featured in studies assessing the perspectives of professionals. All these conditions coincide with or have squalor as an element, though none of them focus on squalor specifically. Yu et al. (2022) completed a systematic review of qualitative studies focusing on the perspectives of professionals working with elder self-neglect (ESN). The first theme identified was 'Features of ESN' which included service refusal, isolation and consequences. This theme dealt heavily with the professionals'

experiences of the self-neglecting individual. However, unlike with ESN, uncleanliness and lack of hygiene is present in all squalor cases. As these environments are such a fundamental part of squalor, the professionals' emotional and physical responses to them is also an important area for investigation.

The present study intends to build on previous research, particularly with professionals working with self-neglect. However, the focus will be on the unique elements of squalor and the effects that these have on those who work in these environments. Therefore, specifically, the study will consider the professionals' experiences of both the environments they attend and the individuals that they attend to, and the impact that these dwellings and residents have on them.

On this basis, the aims of this study are as follows:

- To investigate the professionals' experiences of a squalor environment, and how it affects them.
- To investigate the professionals' experiences of individuals who live in squalor and how they interact with them.

Methods

Design

This study will employ a multi-perspective Interpretative Phenomenological Analysis (IPA) research design with a semi-structured interview schedule. As squalor is experienced by many different organisations, with different restrictions and requirements, a multi-perspective approach was chosen to allow these different viewpoints to be considered and compared. The theoretical approach of IPA is based on the importance of examining experience as it occurs and is underpinned by an idiographic and hermeneutic approach. Idiography emphasises focus on the particular, considering each case in its own context, while the hermeneutic approach directs the researcher to make sense of the participant making sense of their experiences (J. A. Smith & Nizza, 2022). The study included professionals who have experience working in difficult conditions and with

challenging individuals, making their experiences and their interpretation of them valuable to better understand their roles. A phenomenological approach allowed for this focus on the experiences of the professionals and more specifically, using an interpretative process focused the research towards the professional's interpretation, rather than just their descriptions of the cases and individuals that they encounter. In squalor cases, both the environments and the people themselves are likely to create an emotional and potentially physical reaction in those who encounter them. To fully understand the effect of these factors on the professionals who work in the field, it was important to focus less on the descriptions of the dwellings or residents, but on the way the professional chooses to describe them and the meaning behind the language they use. Therefore, IPA was the most appropriate method to achieve these goals.

Reflexivity

In IPA, analysis depends not just on the words of the participants, but on the interpretation of the researcher as well. For this reason, researchers need to be aware of their opinions and feelings in relation to the research and how they may influence the outcomes (J. A. Smith & Nizza, 2022). Shaw (2010) suggests that this process of reflexivity is not just beneficial, but vital to studies that explore human experiences.

The researcher for this study is a PhD student, who was employed previously as an 11–16-year-olds teacher, before re-joining academia and focusing much of their learning on mental health, now considering squalor in detail. The author is a white male in his 40s, who had not previously been exposed to squalor or any related conditions, instead being raised in a normal lower middle-class household. His focus on mental health and his studies in this field make him more likely to consider this explanation for squalor rather than assuming situational or related factors. Similarly, the two supervisors of the author also have a mental health background, increasing the likelihood that this viewpoint would be considered first. Finally, the author holds a moderate liberal attitude and is

therefore more likely to assume that individuals who are struggling may be doing so for medical or other unavoidable reasons, rather than personal effort or attitude.

During the data collection process, the researcher kept a journal considering each interview, focusing particularly on the quality of the material produced and how the interview process could be improved to encourage more in-depth data to be provided by the participant.

Ethics

Ethical approval was granted by the University of Sheffield Research Ethics Committee, administered by the Psychology department (Ref: 045820). The ethics approval letter and related documents are contained in appendices 6.1-6.3.

Table 6.1

Demographic and experience data for the participants featured in the study.

Participant number	Gender	Age	Role	Time in role	Total time in field	Total squalor cases involved with
1	Female	36	Housing & Environment Officer	6 years	10 years	7
2	Female	63	Hoarding Specialist	13 Years	15 years	Many
3	Female	41	Housing & Environment Officer	3 years	3 years	10
4	Female	-	Social Worker	12 years	28 years	5 in the last year
5	Female	25	Social Worker	62 days	62 days	12
6	Female	44	Environmental Health	22 years	22 years	>50
7	Female	-	Adult Safeguarding Consultant	8 years	35 years	>100
8	Female	46	Housing Officer	9 Years	12 Years	>30
9	Male	62	Community Safety Officer	12 years	44 years	>100
10	Female	54	Nurse	36 years	36 years	Many
	1:9 (M:F)	M: 46.4 SD: 13.0		M: 12.1 SD: 10.3	M: 20.5 SD: 14.9	

Recruitment and Participants

Smith and Nizza (2022) suggest an IPA sample size should be aiming to be between 10-12 individuals. However, the majority of IPA studies use a homogenous sample. In the present study,

which is multi-perspective, the goal was not to achieve a target, but to ensure that the sample represented a variety of occupations. On this basis, sampling was purposive, with the aim to contact and recruit individuals from fields including environmental health, social work, community nursing, housing associations and other community groups who encounter squalor. Given the lack of a clear definition of squalor, it was not possible to provide strict criteria by which an individual would be accepted. However, any individual who had experience entering dwellings that were particularly unclean and unhygienic, and interacting with the residents, was accepted as a potential participant. This included individuals whose specialism was Hoarding Disorder, if they had encountered squalid dwellings as part of their work.

A number of methods were employed to make contact with potential participants. Firstly, individuals already known to the researcher or his supervisors were approached if they were considered to be suitable. Secondly, introductory emails, or online forms, were sent to local councils, cleaning teams, relevant charity groups, housing associations and home care teams to investigate whether they had experience in the relevant field. Finally, individuals in the targeted occupations were identified using the search function on LinkedIn. Initial contact was made, but was brief, due to a low word limit on messages. Individuals who responded were then able to receive a more detailed response regarding the field of research and the proposed study. In total, 63 individuals and organisations were contacted by email/online form (56%) or via LinkedIn (44%) with details of the field of research, with 16 agreeing to consider a formal invitation (Appendix 6.4) to participate in the study. Of these, 15 agreed to an interview. However, 3 individuals did not attend the interview at the agreed time and did not respond to further contact. In total, 12 interviews took place. However, as two of the final interviews were individuals specialising in environmental health and social work, which were already represented in the sample, this was reduced to a final sample of size of 10 individuals (Table 6.1) with the majority being female (90%), an average age of 46.4, and all participants stating that they were White-British. The 10 interviewees offered a range of experience in the field, from being in a training role (P5), through to 36 years of working in this area (P10). There

were also several different ways in which the professional came into contact with individuals living in squalor, with some doing so as part of their work with hoarding (P2) and others focusing more on addiction (P4) or environmental considerations (P1, P3, P6). Overall, the participants offered a broad range of perspectives and viewpoints, leading to a variety of themes and topics being covered in each interview.

Data Collection

Potential interviewees were asked to complete an online consent form and demographic survey in advance of the interview (Appendix 6.3). This included an information sheet, a consent document and several questions collecting information on their age, gender, ethnicity and occupational details. All interviews were conducted using Google Meet online video calling software, though in person options were made available. Online calling was chosen primarily for the convenience of both the researcher and the participant, allowing a geographical more diverse group of individuals to be contacted and interviewed. Although qualitative research has historically been completed in person, research suggests that videoconferencing is considered to be more convenient and cost-effective for researchers (Thunberg & Arnell, 2022) and a preferred option for participants (Archibald et al., 2019).

The interview schedule (Appendix 6.5) was designed to meet the aims of the study, investigating what squalor meant to those working in the field and how they reacted to the squalor environment and to the resident. Due to the lack of qualitative research in the squalor field, and no previous IPA studies being completed on squalor, the goal was to allow a broad and open discussion, driven by the participant. The schedule reflected this, focusing on open questions and prompts to allow the interviewee to discuss the factors that they felt were important. The schedule remained broadly unchanged throughout the data collection process with only minor changes employed to focus the participant towards their own experiences and views. The interviews that were included in the analysis took between 45-78 minutes with an average interview length of 59 minutes.

Quality of Rigour

The methods used in this study demonstrate many of the guidelines recommended for qualitative study by Elliott et al. (1999). Demographic and occupation data was collected from all participants in advance of the interviews to give a better understanding of the individuals and the sample. Furthermore, the analysis is grounded in the data, using the quotes from interviewees to guide the findings. The themes identified in the study are described as part of an overall framework, rather than as separate items and, finally, the researchers considered their own perspective in detail. As an additional quality check, a pilot interview took place in advance of the official data collection process, with an individual who had some, but not significant experience of squalor. This interview was made available to the researcher's supervisor for quality checking and the supervisor also liaised with the interviewee to collect their perspective on the process. A meeting was then held between researcher and supervisor to discuss the pilot interview and to consider where improvements could be made to generate the most effective data.

Analysis

Each interview was transcribed from the video footage, followed by a second read through to check for accurate transcription and to better understand the data. The transcript was then printed and the analysis followed the process suggested by Smith and Nizza (2022), who recommend the following four steps for analysing a transcript:

Step 1: Reading and exploratory notes.

Step 2: Formulating experiential statements.

Step 3: Finding connections and clustering experiential statements.

Step 4: Compiling the table of personal experiential themes (PETs).

More specifically, in the present study, the following process was followed. For each transcript, exploratory notes were added to the paper copy and once complete, a second read

through took place to consider what had initially been written and to add any additional comments. The exploratory notes were used to produce experiential statements summarising what has been learned from each portion of text, which were then arranged to identify connections and clusters of statements. Each cluster represented a PET and was supported by several quotes from the transcript. A set of PETs were created for each interview. Cross-case analysis was then employed to create a series of Group Experiential Themes (GETs) which, supported by quotes from the transcripts, informed the study's results and findings.

Results

Table 6.2

Experiential themes and subthemes.

Theme 1: The Individual Living in Squalor
● 1.1: Understanding the individual's perceptions of their environment
● 1.2: Reluctance to engage with me
Theme 2: The Relationship Between the Individual and the Professional
● 2.1: "I'm trying to build a relationship"
● 2.2: Working together to improve their environment
● 2.3: "I have always struggled with people latching on to me"
Theme 3: The Impact on the Professional
● 3.1: "The first time you see it, you are speechless"
● 3.2: Managing the reaction to the squalor environment
● 3.3: The right level of impact
Theme 4: The Challenges Associated with Service Cooperation

The analysis process identified four group themes, shown in table 6.2. The distribution of these themes among the participants is shown in table 6.3.. The first theme discusses the professionals' views and experiences of the individual they are working with. Focus is on how the

professional makes sense of the individuals' perception of their environment, and why the individual is reluctant to engage with services. The second theme has significant connections to the first, particularly in terms of their reluctance to engage, but focuses not solely on the individual, but on the *relationship* between the professional and the resident, a key element to the professional's role. The third theme discusses the professional themselves. How they react to the squalor that they encounter and how they manage that reaction. Also, whether there is an optimum level of impact for these cases to have on them. The final theme considers some of the challenges associated with working with other services, with particular focus on the different priorities and expectations of different organisations and the effects of reduced resources.

Table 6.3

Distribution of theme discussions by participant

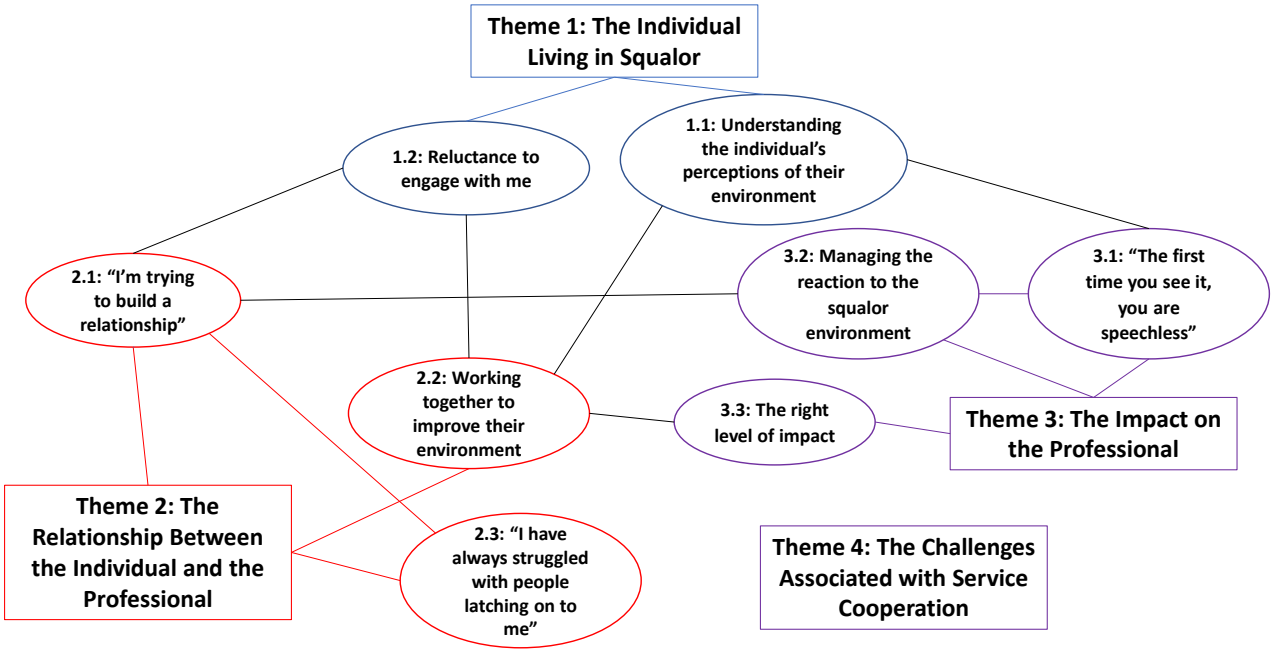
	Participant number									
	1	2	3	4	5	6	7	8	9	10
Theme 1										
1.1	✓	✓	✓	✓	✓			✓	✓	✓
1.2	✓	✓				✓	✓		✓	✓
Theme 2										
2.1	✓	✓	✓	✓	✓	✓	✓		✓	
2.2			✓	✓	✓		✓	✓		
2.3	✓	✓							✓	
Theme 3										
3.1	✓	✓			✓	✓			✓	✓
3.2		✓		✓	✓		✓		✓	✓
3.3	✓	✓	✓	✓	✓		✓			
Theme 4	✓	✓		✓		✓		✓		✓

The interrelations between the themes are shown in a thematic map (Figure 6.1). The themes interact in a number of ways. However, the first three themes are each informed by the previous one. By understanding the individual (Theme 1), they are able to build the necessary relationship between professional and resident (Theme 2). Furthermore, the elements discussed in theme 3 are related to the role itself and are heavily influenced by the relationships that they build

with the squalor individual. Theme 4 was identified as a significant issue for participants, but did not show the same type of interrelations. Therefore, it is featured as a theme in its own right.

Figure 6.1

Thematic Map Illustrating the Four Main Themes and the Subthemes



Theme 1: The Individual Living in Squalor

1.1: Understanding the individual's perceptions of their environment

This initial subtheme focused on whether the professional considered that the individual who was living in squalor understood the extreme nature of their environment. 9 of the 10 participants included some element of discussion on this area, with perspectives varying, depending on the professional being interviewed. Several professionals were of the view that the individuals could see that the environment was not an appropriate way to live:

You can't not know that is not right and they do. We've had conversations with the first case and he's very aware that how he was living is not appropriate, as was the other lady that I told you about. (P1, Housing/Environment)

…usually, to be fair, when we go and see people, they're apologetic. It's not like they don't know that the place is a mess. They usually… there's usually a lot of shame attached to it. (P4, Social Work)

As indicated by the final quote, some professionals had found that not only did the individual understand that their environment was unclean, but they were also feeling a significant amount of associated shame. This is also discussed further by Participant 1:

She was severely embarrassed by it and really disgusted in herself that she'd let it get like that. And a lot of times that is what it's like. That embarrassment, that they've let it get to that point… (P1, Housing/Environment)

Participants 1 and 4 suggest that the individuals they encounter understand that the way they are living is "not appropriate". In fact, Participant 1 suggests that they "can't not know that is not right," suggesting that they would expect anyone living in these conditions to be aware of this. Nonetheless, other participants suggested that actually, residents showed a variety of attitudes and appraisals of their environment. Participants 9 and 10, a fire safety officer and a community nurse, identified individuals who thought that the way they were living was "fine".

…very often people realise it themselves and they're very ashamed. Erm, er, sometimes people don't. Er, they think their living is fine, it's up to them, it's their home, they can live how they want. (P9, Safety Officer)

…there's quite a lot of people whose houses you'd go into that were really dirty and it wouldn't, they wouldn't… Not everybody would be, you know, ashamed or embarrassed about it. They'd be quite happy for you to come in, because they didn't notice, because they didn't always notice it. (P10, Community Nurse)

In fact, Participant 2, a hoarding specialist with significant experience of squalor, discussed a case where conditions were not acknowledged, even though they were of the most extreme level of uncleanliness:

> *His house was absolutely awful, you know, there were all sorts of infestations and… and then there was just shit down the walls really. And I said 'Can you see that [Individual's name]?' and he said 'No'. He said 'Honestly, I can't see it.' (P2, Hoarding Specialist)*

As it appears that there are individuals who genuinely do not see an issue with their living conditions, why do some professionals not identify or acknowledge this? Maybe they have not encountered any cases of this type. Or, potentially, their view that the individual "Can't not know," may be an assumption about the resident's insight due to their own expectations.

Participants 3 and 8, both working in Housing, suggested that in some cases, the conditions were the normal situation for the individual, as they had been exposed to it for so long.

> *…for some people that is the norm and it maybe what we would term as filthy, erm, but sometimes that is their norm and they don't know any different. (P3, Housing/Environment)*
>
> *…they'd lived there for 40, 50 years. That's how they lived. So it was, it was just how… they didn't see it, they were one of the people that didn't see it. (P8, Housing)*

Participant 10, a community nurse, however, suggested that the lack of interest in the environment may have more to do with the additional concerns of the individual. In this quote, they refer to an individual with significant mental and physical health problems, who did not consider their living environment to be a high priority.

> *I think there was just probably more important things that he, that were problematic to him, than what was going on around him. You know, other things that he, yeah, other things that he saw as problems and that wasn't one of them. (P10, Community Nurse)*

As a Community Nurse, she may be more aware of the additional mental and physical concerns of the individual, information that is unlikely to be as accessible to professionals working in Housing. Therefore, she is able to explain the squalor in terms of the individual's priorities, whereas

other professionals may only be able to suggest that they "don't know any different" or that it's just "How they lived."

1.2: Reluctance to engage with me

The second subtheme considers the experiences of professionals trying to work with individuals in the squalor environment and their perspectives regarding why the individual may be reluctant to accept their help.

Five of the ten professionals who were interviewed gave some indication as to the negative way in which services were viewed by the individuals who were living in squalor conditions:

> *…when you go to the property and knock on the door, a lot of times you'll not get an answer, because obviously they don't want people to see that property. And then obviously, when you do make contact, they're very reluctant to let you in, to open the door. (P1, Housing/Environment)*
>
> *With anger, with anger usually. Anger and…well, fear, fear, to me anger is fear, you know… (P2, Hoarding Specialist)*
>
> *I think sometimes people are very, at first, reluctant to engage…… I have tried on numerous occasions, erm, occupier won't answer the door. The fire service have tried, occupier won't answer the door. (P6, Environment)*

Participant 2 states that anger is a common response. However, she also suggests that the anger is often fear. Participant 9's statement on why services encounter negative reactions may explain why individuals are fearful of services:

> *Er, they might think they're going to take something off me, or take away my liberty, or whatever it is… (P9, Safety Officer)*

Participant 9's view that residents are concerned that items, or they themselves may be removed from the house is not unexpected, given that services do have to do this on occasion and it is not welcomed, even if it is beneficial to their health and quality of life.

Participant 10 also gave their own view as to why services and support might be ignored or responded to negatively:

> *"…people find it so difficult to admit defeat. That they can no longer maybe get in and out of the shower, or they can no longer clean. Erm, so they don't… It's a, it's a real pride thing about 'I can still do this myself,' when you realise that you just physically… they can't actually do it themselves. They can't maintain it to the level they used to. So, there can be a bit of a refusal of help, for some people. Erm, because of a pride issue." (P10, Community Nurse)*

The idea that an individual may be too proud to accept help is not one that was suggested by other participants. This may be because they have not considered this aspect themselves, or it may be that Participant 10 suggested this as it places the blame for refusing services at the feet of the resident, rather than anything that the services have done.

It was also suggested that services are rejected due to the way in which they treat the individual, decreasing an individual's confidence and self-worth, rather than increasing it.

> *I can see actually, it's terrifying what services do to people. The lack of empathy and positive regard from people who profess… you know, they should know how to make a person's self-confidence grow, to increase personal self-worth. And yet, what they do is they decrease it. They blame and they hold them accountable for things that they can't do. (P7, Adult Safeguarding)*

Participant 7 was unique amongst the interviewees in the study in the level of concern regarding the methods employed by services. This may be due to her experience observing the field as a whole, following many years of one-to-one work. Her perspective was that services continue to blame and judge individuals, reducing their self-worth. This perspective, or at least the level to which it was expressed, was not reflected by other participants in the study. However, the majority of interviewees only had experience of one particular occupation.

Participant 2, a specialist in hoarding and accompanying squalor, suggested that ineffective behaviours by professionals could be due to the way in which they were reacting to the conditions around them.

> *…a lot of professionals are reacting to their own reactions, which makes them very curt, very rude. (P2, Hoarding Specialist)*

If this was the case, it is unlikely to be fully acknowledged by the professional themselves. They may be having an unintentional negative effect on the resident as their subconscious behaviours are a response to the emotional and physical reactions that they are experiencing. Professionals working in the field of squalor may find it difficult to understand how someone living in such unpleasant and unhygienic circumstances would not want support to improve their environment. They may explain this in terms of the fears of the individual or their reluctance to admit that they need help. However, it is also possible that the negative attitude to services may have more to do with the way in which professionals have engaged with them in the past, potentially due to their own negative response to the extreme conditions that they find themselves working in.

Theme 2: The Relationship Between the Individual and the Professional

Theme 2 explores the perceptions of the relationship between the professional and the individual living in squalor. This is a key element of working with squalor and has been broken down into three subthemes. The first subtheme highlights the process of building a relationship with the individual. The second discusses how the professional builds on this relationship and works with the resident to improve their living conditions. Finally, the third theme considerers how the relationship with the individual may need to be managed to ensure that they do not become too reliant on the professional.

2.1: “I’m trying to build a relationship”

Building a relationship with individuals who commonly do not want to engage will often be a difficult process. However, eight of the participants emphasised how important they considered this to be if they were to support the individual:

We would very much build that rapport and that's sometimes what, is what takes the longest part of the process, is building that confidence and that trust before you start encroaching on the issue that you're really there for. (P6, Environment)

Participants 1 and 4 discussed the importance of the initial communications and the impressions made:

First impressions count don't they. If you create that wrong first impression and somebody doesn't respond to you then it's very rare that you'll get that back. (P1, Environment/Housing)

I'm trying to build a relationship. So it's not about going in and saying 'Wow, this is a bit of a mess. What are we going to do about it?' It's about thank you, thank you for letting me, you know, come and visit you, you know. (P4, Social Work)

Participant 4 suggests that the emphasis of the initial discussions is key to building the relationship. Additional participants agreed that it was important not to judge or be critical of the individuals and how they are living:

I said to him 'Why did you calm down and why did you talk to me and let me in?' and he said, 'Well, because you came, and you didn't say I was smelly and you didn't tell me to have a wash,'. (P2, Hoarding Specialist)

…firstly it's building a relationship with no judgement and to not, yeah, to not kind of throw any shame on the decisions they've made. (P5, Social Work)

These two quotes highlight how important the professionals felt that it was to not impose their own views and expectations on the individual. Participant 2 emphasises this by highlighting the response from the resident, who states that they only allowed the specialist into the property because they did not criticise them or make demands of them.

Participants also discussed other strategies that they used to build a relationship. One of the most effective ways of building trust appeared to be through talking:

I really could talk to him and have some really good… and obviously I'd spent hours talking… because I needed him to… that was the necessary thing in this case… I had to talk to him…… So that he could trust me as an individual. (P1, Housing/Environment)

…sometimes it's just finding that one little bit of conversation to build on, that puts them at ease and then it opens the door to have more conversations. (P6, Environment)

Both participants 1 and 6 worked in the field of environmental health. Although there are pressures placed on professionals in this occupation, such as from neighbours, landlords, or alternative services, the environmental health officers appeared to feel confident in taking additional time to build a relationship before moving on to the issue of the conditions of the dwelling. This may be due to support from more senior figures, as discussed by Participant 3, who also worked in the same field:

I spoke to the team leader and said, 'I feel like I'm not doing anything'. And she said 'No, you're supporting her, you know. You're actually there, you're supporting her and you're still present and she still knows that you've got a purpose, that things need to progress, but at the minute she just needs that bit of sort of downtime and support, rather than, let's go in and tidy up.' (P3, Housing/Environment)

Participants 1, 3 and 6 were the only interviewees who specifically mentioned the importance of talking as a way of building a relationship. Although many other professionals may have agreed with this, had it been proposed, it was only participants working in environmental health who discussed this theme. This may possibly be that it is an element that is emphasised as part of training in that area or, possibly, environmental health professionals are given more time to build a relationship this way.

Participants almost universally agreed that building a relationship was a necessity if progress was to be made on the living conditions of the individual and many gave an indication that the key to

this was not judging them or their environment. For those working in environmental health, the main strategy appeared to be to build confidence and trust through talking, even if this meant that little progress was made in the initial stages.

2.2: Working together to improve their environment

Making progress with the environment of an individual who lives in squalor continues to be a difficult process, even when there is a strong relationship between professional and client. Participant 3 felt that the key was to empower the client to maintain their own environment and this could be achieved by ensuring that they have the knowledge and practical information to enable them to complete basic maintenance tasks themselves:

> *A lot of it is about empowering them to… and saying 'Look, this is what day your bin is, have you got all your bins, do you know what goes in your bins for the waste, sort of, and the squalor sort of stuff?' and you know, 'You haven't got lightbulbs, why haven't you got lightbulbs, what's happening here?' (P3, Housing/Environment)*

In addition, allowing them to make decisions about their items and about how to proceed with the cleaning process:

> *It's still, it's still their items, so it's giving them the power to say 'Right, we're going to do this today, let's get rid of that.' (P3, Housing/Environment)*

Participant 4 suggested one of the reasons that empowering the individual can be such an important part of the process:

> *…it's about him being able to take power over that decision and work together. Erm, a lot of people have been, erm, have had either sexual abuse, physical abuse, emotional abuse as children and young people. Erm, so it's about not taking power and control from them and enabling them to feel like we're partners. (P4, Social Work)*

This quote suggests that the individuals in question have a history of control being taken away from them. Squalor may represent their efforts to control their environments and any actions

which seek to change their environment against their wishes are likely to represent new trauma for the individual involved. Many services understand that enforced cleaning or clearing can have a negative impact, as referred to by Participant 5, also a social worker:

> *"This housing officer doesn't want a court order, because it creates, it creates more problems than it's worth. It fractures the relationship more than it's worth." (P5, Social Work)*

Participants appeared to feel that enforced action removes the trust that has been built up between the professional and the client over a period of time and once the trust was gone, progress was likely to be even more difficult.

In addition to empowering the individual, interviewees also suggested that the key to progress being made was to focus on what the environment tells them about the resident:

> *I would never ever react to a citizen by saying 'This is disgusting, this is foul.' Do you… I would never use those… Because also I don't think of it like that either. I think of it like 'Oh, something's really not okay here and this is why you live like this'. (P5, Social Work)*

By focusing on the person and not their living conditions, the individual is seen as more than just their environment. Participant 7 suggests that this then enables the professional to support the individual to change their perspective of themselves:

> *All I'm doing is allowing them to see that this image that they have of themselves that somebody else has given them, somehow, through their negative connections is wrong and actually, that they have those qualities. (P7, Adult Safeguarding)*

Participant 7 had significant experience in social work and safeguarding, and had visited many properties where self-neglect, hoarding and squalor were present. She emphasised that if an individual can begin to see themselves in a more positive light, with their own goals, strengths and qualities, progress with their environment is a much easier process.

2.3: "I have always struggled with people latching on to me"

The relationship between the professional and the client is a necessity to make progress and support the individual. However, many professionals found that individuals were isolated and had limited personal relationships, making it common for them to become too attached to the professional who was working with them:

> *…that relationship, I've got to manage because she really really does like my company. She looks forward to me going round and I have to manage that because she stops doing things, so I need to manage that relationship (P1, Housing/Environment)*
>
> *I've got, like, two or three people who won't see anybody other than me and that's like… That's a failure for me really. Because I want to integrate people back into the big wide world. (P2, Hoarding Specialist)*

Participant 2 believed that being the single point of interaction with an individual was not beneficial, as it did not support their integration back into the community. Furthermore, interviewees found that a strong relationship with the client could be a particular issue when it came time for the case to be closed, or for support to be passed onto another service or individual:

> *I have always struggled with people, like I say, latching on to me as a person. It's something that, over the last few cases, I've tried to work on. Now, it's difficult when somebody lives on their own and they are lonely and you can see that they are lonely. It's difficult to say I'm backing off. (P1, Housing/Environment)*
>
> *…that particular lady, erm, when we said we had to close it, she was quite angry about that and she said "Well, [Participant name] comes to see me all the time, you know. What's going to happen, who's going to come and see me?" And, although it'd be nice to be able to do that, we're not really there for that. (P9, Safety Officer)*

In most cases, there will come a point where the professional needs to reduce the commitment to an individual, for the benefit of both parties, even if this is not welcomes. Participant 1 discussed how she started to identify this issue and take steps to reduce the risk of it happening:

I have to put barriers in place, to protect them and to protect myself. So, a lot of the times, if we're visiting, I would… we had a social worker… I would go with the social worker, so it wasn't just me. (P1, Housing/Environment)

As discussed in theme 2.1, participants agreed that building a strong relationship with the client was important to working with them effectively. However, it was also acknowledged that this commonly led to unwanted attachment and difficulty when withdrawing from the case. However, in the case of Participant 1, careful management of the relationship reduced the risk of this happening.

Theme 3: The Impact on the Professional

The third group theme focuses on the professional themselves and their experiences and reactions to squalor and to squalor cases. The initial subtheme considers the ways in which the professional describe the squalor environment and its effect on them.

3.1: "The first time you see it, you are speechless"

For interviewees, the first reaction to a squalor environment was often one of shock:

…as soon as I looked through the letter box I thought 'Oh my god'. If there is somebody in there, they could potentially be dead. (P1, Housing/Environment)

So the first time you see it, you are speechless, you don't you don't know what to say to the person, 'cause you're like 'Like, are you okay?' I think it's so shocking, you're speechless. (P5, Social Work)

Both participants use additional language to emphasise the extent to which it had an effect on them. Participant 1 states that they were concerned that the resident "could potentially be dead" and Participant 5 emphasises the idea that she is stunned into silence by repeated use of the term 'speechless', and by stating that "you don't know what to say to the person."

Nonetheless, it also appeared that the feeling of shock became less significant the longer you worked in the field.

…I do find myself getting a bit numb these days, because I've seen so many. You go in and… I tend to think, 'Well, it is bad, but it's not as bad as that one I saw last week, or that one I've seen in previous time,' and then I think, well, that's wrong, because obviously it is bad and it's still got the dangers. It might not be as bad as the one I saw a few months ago, but it's, it's bad, you know. (P9, Community Safety Officer)

It's been such a long time, I don't get shocked, but I do know it's shocking. So, erm, I suppose sometimes we'd take students with us. You know, we've got student, trainee students and we'd know it'd be shocking to them. But it wasn't shocking to us anymore, because we'd seen it so many times. (P10, Community Nurse)

Both participants 9 and 10 had significant experience entering unclean and disordered houses, acknowledging that they have become "numb" to the conditions and that they didn't feel the same level of shock as they had previously. However, in both cases, they still acknowledge that the conditions are a significant issue. Participant 9 understood that the dangers to the occupant remained, regardless of if it was "not as bad" as other cases he'd seen. Participant 10 knew that other less-experienced individuals would find it shocking, even if they themselves didn't. This suggests that they realise that their own response is not necessarily a good representation of the actual condition of the property.

Nine of the interviewees referred to the squalor environment in descriptive terms, emphasising the physical characteristics, such as faulty amenities (P2), the dark atmosphere (P6) and the smell (P10). However, their were differing views as to whether the dwellings shared similarities. Participant 5 suggested that there were consistent elements in squalor:

I would say what's present in all of them is thick layers of dust. Thick layers of dust and there's just like, erm, little bits and stuff on the floor that, like, if you hoovered or you dusted, that wouldn't be there. Erm, and then I'd say it can progress, so erm… Also, what's nearly always present is cat hair. Cat hair and overflowing litter trays. (P5, Social Work)

Whereas Participant 6 suggested that the particular items which were present in the property appeared to vary:

> *No, it's all different, they're all different, they're all different. Erm, my colleague has a job at the minute, the occupier's an alcoholic, the house is filled with empty bottles. Erm, and erm, yeah, we've had a resident that had a house full of boxes of wool. Erm, had a resident that didn't put any of their food waste out, or any of their, erm, food packaging, so that was littered around the house. (P6, Environment)*

Participants 5 and 6 may possibly be referring to different aspects of the dwellings, in that Participant 5 may be focusing on the dirt and dust, whereas Participant 6 is focusing more on the contents. However, the difference may also represent the different levels of experience in the field. Participant 5 was a student social worker, who specialised in hoarding and self-neglect. However, their lack of time working in this area may have meant that they found it easier to identify common characteristics due to the smaller number of cases they had encountered.

3.2: Managing the reaction to the squalor environment

As discussed in 3.1, participants felt that professionals were subject to physical and emotional reactions when confronted with the squalor environment. However, the way in which a professional manages those reactions can have significant consequences to the relationship with the resident. Participant 4 suggested that any negative reactions need to be subdued, to ensure that the resident did not feel ashamed:

> *Because if you go in the house and you show any sort of revulsion or distaste, that's really shaming and you're not going to be able to continue working effectively with those people. (P4, Social Work)*

Participants 2 and 5 suggested that to manage this, the focus needed to be moved from the environment to the person:

I try not to respond to it at all. I try and have a chat with them as though… I try to imagine that's not there… (P2, Hoarding Specialist)

It's very hard to connect with that person 'cause you're so preoccupied by the condition of the home. Erm, so what I've found has helped me, is to just focus on the person. Literally stop staring at everything round the home and just look at, look at the person. (P5, Social Work)

The suggestion that attention should be focused on the resident instead of the environment ("…stop staring at everything round the home and just look at the person." P5) offers more than just a practical way to manage the squalor environment. The following quote by Participant 7 is in relation to building rapport with the client and suggests that focusing on them and not the environment can be helpful in addressing the source of the problem, as squalor is not about the environment, but actually about the person.

It's making sure that the person realises you're interested in them, not the condition of the house. That's the most important thing…… It's not about the environment, it's about the person and understanding the person. (P7, Adult Safeguarding)

Therefore, by focusing attention on the individual, it appears as though it not only makes the visit itself easier and more successful, but is also an important step towards supporting the individual with their fundamental issues.

Very few participants discussed ways in which they prepared for visits in advance or managed the related emotions after the visit. Participant 5, a student social worker, discussed this in more detail:

I never just walk into a house. I always stand first and like, give yourself 5 or 10 seconds and go in. (P5)

I have to get back into my car in a controlled environment and choose the playlist. (P5)

I think writing notes helps. Genuinely writing notes because it's like, if you can write it and if you can show it, you can leave it behind and move on. (P5)

As a student, she had less experience, particularly in terms of time spent in the role, than the other participants in the study. Therefore, the methods she describes may be necessary to manage the emotions related to something that is still quite new. More experienced professionals may not need these processes due to their time working in the field. However, potentially, all professionals may use these methods, or similar, to manage their reactions to squalor, but are less aware that this is something that they do and therefore, were less likely to discuss it.

3.3: The right level of impact

Although the squalor conditions themselves may have an effect on professionals who encounter them, the cases can feature individuals who are subject to significant neglect and appalling conditions and may also feature vulnerable adults, children and animals. The impact that this can have on the professional was discussed by several interviewees.

> *I try not to let them have an impact on me, because of the amount… because if I did, I'd never sleep…… it would just, it would just burn you out too quickly. (P2, Hoarding Specialist)*

Participant 2 emphasised the significant impact that cases of this type can have on the professional. Nonetheless, even though she had significant experience in both hoarding and squalor, she still did not say that they don't have an impact on her. Instead, she states that she tries not to let them.

Participant 4, also with significant experience in the field, suggested that it's not possible to remain detached:

> *I'd like it to be detached. It's never detached, no. Erm, just because I think that you have that thing don't you, where you go and see people living in utter misery and then you come home to your nice middle-class life. So, if it didn't have an impact, you shouldn't really be doing it. (P4, Social Work)*

The quotes from participants 2 and 4 suggest that there may be an ideal middle ground, where the cases are not significantly draining for the professional, but have enough of an impact that

you are impelled to help the individual. Participant 3 highlights this when talking about wanting to help someone because you realise how difficult their circumstances are:

> *He hasn't had heating for about 5 years, erm, and no hot water or anything. So, I think when it was really freezing cold and my heating broke at home and all I could think was… Like, I was freezing at home. Kids were freezing and we'd got electric heaters and all I could think was 'This guy's not had it for like 5 years.' Erm, and I sometimes… I don't feel guilty, but I think it makes me want to help them more. (P3, Housing/Environment)*

Caring enough about the person that you are encouraged to help them, but not so much that it has a negative effect on your mental health must be a difficult balancing act for professionals working in the field. Participant 7 suggested that the professionals (In this case, social workers) who work with squalor would benefit from a better understanding of the impact that cases have on them:

> *I think reflective practice, where you understand your background. How it impacts on you and how that… have that open discussion in supervision, would be really helpful. I think social workers themselves are sometimes scared that it affects them. (P7, Adult Safeguarding)*

Participant 5 went as far as to say that individuals would benefit from visiting a therapist to deal with the "emotional effect" it has:

> *I think some students find the adjustment really difficult. I found the adjustment really difficult. Erm, I think some students, I would… I've actively said, 'I think you just need to go and get a therapist,' because of the emotional effect it has on you. (P5, Social Work)*

Nonetheless, it appeared that Participant 5 had found a level of emotional impact that allowed her to leave a case with a positive attitude:

> *…I like to think that I could have done something, I've done something for them by the time… Not for them, but I've helped them to do something they needed to do. So, the toilet, or the deep clean, or… And I know it's part of my job to move away and I have to do that. Erm, so sometimes I leave very hopeful, because sometimes I leave thinking 'They've done it, they've done it... (P5, Social Work)*

It is clear from the data that squalor cases have a significant impact on the professional, whether they intend for that to be the case or not. However, it is possible that a level of emotional impact is necessary for you to do the best you can for the individual. Nonetheless, this may be a difficult balancing act, where the right approach can leave you with a positive view of cases, whereas not dealing with or understanding the impact may lead to burn out.

Theme 4: The Challenges Associated with Service Cooperation

As with theme 3, theme 4 relates to the role of the professional. However, it is featured as a theme in its own right, as it does not directly relate to other elements that were discussed in the interviews. Theme 4 focuses on the experiences of professionals when working with other services, a significant element of working with individuals living in squalor. Although not connected to other themes, it was discussed in 9 out of the 10 interviews, suggesting that it represents a key element in the role of professionals. Participant 2 suggested that the most effective approach to working with other services was to form a team to support the individual:

> *So that's what I just try and do, I try and work… because I know what social workers need. I know what environmental health need. I know what the fire service can and can't do. And if you can get that combined well, it can actually… I want it, I want it to be like a team of people. We call it supportive intervention, where everybody forms a team with the client. So, the client is part of a team. (P2, Hoarding Specialist)*

However, although this approach is the ideal, many of the participants found that there were barriers which made this difficult.

Participant 1, working in Housing and Environmental Health, found that in some cases she was the only contact with the resident, meaning that any progress relied on her involvement:

> *But I did find it hard in that instance because social care were heavily reliant on us, because I was the only person at the point that had got… that had had that… they were just, 'Do this,*

you need to have this done by this date', and really you don't really know… And I found that hard. (P1, Housing/Environment)

Even when services worked together, there were issues in terms of the priorities of each group and what they would accept in terms of the environment or the individuals' behaviour:

"Well, this is just not my priority at the minute," I said, "So, you're just going to have to wait." (P1, Housing/Environment)

I think that quite often, we've maybe got a different level of acceptability of people's behaviour. (P4, Social Work)

…our goal is to look after somebody's physical and emotional health and make sure that they're safe and looked after. Their goal is not always… It'll be slightly different. (P10, Community Nurse)

In addition, a number of participants highlighted the issues surrounding the limited and reducing resources professionals have available:

They're so overwhelmed, they get no training and to be honest, from what I can gather, they're really badly paid... (P2, Hoarding Specialist)

…it's just a shame that everything, all the situations, all the referring into places, all the support networks, all the social care system, all that's just going. And it's just everybody's under too much pressure. (P8, Housing Association)

…and often it's just a restriction of money. I think, that's what often it is. It's the same with social services, it's like, what we want for patients might not always be what they want, or what they feel… or what they can provide. (P10, Community Nurse)

Although many services demonstrate good cooperative working, the professionals in this study highlighted a number of barriers when collaborating. There are undoubtedly areas where improvements could be made to support the resident more effectively. However, with the available resources already limited and likely to decrease, this becomes a more difficult endeavour.

Summary

The results highlight the main themes and subthemes arising from the interviews with professionals working with squalor. Theme 1 focused on the professionals' experiences of the residents, their views of their own environment and of working with services. Professionals' views varied regarding the extent to which the residents were aware of the condition of their home and reasons were proposed as to why individuals may show little concern. Workers agreed that services were often viewed negatively, and a variety of reasons were suggested as to why this was, including fear of enforced action and their previous experiences of service providers.

Theme 2 highlighted the professionals' views of the relationship between them and their clients. Initial focus was on building the relationship, including avoiding judgement of the individual and accepting that initial progress may be slow. This theme also discussed strategies to improve the environment of the individual, including providing them with control over the process and understanding their view of themselves as a person and how this can be improved. Finally in theme 2, professionals discussed how the worker-client relationship, although important, can sometimes be difficult to disengage from. However, it was suggested that with careful introduction of additional professionals, this process can be made less distressing for the resident.

The final theme focused on the role of the professional and how working with squalor cases could affect them. Initially, discussions surrounded the squalor environment itself, how shocking it can be and how you can eventually become used to the conditions. Connected to this was how the professionals managed their reaction to the squalor environment and how important it was not to acknowledge the conditions in front of the client so they do not feel judged. Finally, professionals considered the impact that working with squalor cases had on them, with there appearing to be an ideal level of impact, such that they were still impelled to help the resident, but not so affected that it had significant emotional or psychological consequences. The last theme, theme 4, looked at the professionals' views on working with other services. It was considered to be important to build a

team around the client. However, services had different priorities and were often limited by the resources that they had available, sometimes making this more difficult.

Discussion

The aims of the research were to consider the professionals' experiences and perspectives of the squalor environment and the individual themselves. Three group experiential themes were identified: *The individual living in squalor*, *the relationship between the individual and the professional* and *the role of the professional*.

Theme 1: The Individual Living in Squalor

Participants appeared to vary in their view of whether the individuals were fully aware of their surroundings. Some of the professionals appeared to find it difficult to believe that the resident wasn't aware of the level of uncleanliness and that this was often accompanied by a sense of shame and embarrassment. In hoarding research, shame and self-criticism are common (Chou et al., 2018), whereas in squalor conditions, such as Diogenes Syndrome (DS), lack of shame is considered to be a key characteristic (Irvine & Nwachukwu, 2014). Nonetheless, several professionals had clear examples of individuals who did not see the squalor. This is in line with quantitative research into squalor, which suggests that at least some of those living in squalor do not see their environment as dirty (Gregory et al., 2011; Lee et al., 2014). The view of whether an individual can see their squalor may be related to the perception of the professional. Those working with squalor may feel that the conditions are so significant that they can't accept that it may not be observed by the resident, even if the individual suggests otherwise.

Participants highlighted a reluctance to engage as a common occurrence in the squalor cases they had encountered. Individuals would often decline to answer the door or refuse entry, and in some cases, react with anger. This is in line with Social Workers' view on self-neglect cases (Day et al.,

2012) and is also referred to in the squalor literature (Lee et al., 2017). Interviewees suggested two potential explanations as to why someone may not wish to engage. Firstly, that pride in their own abilities may be factor, with them not wanting to admit that they could no longer clean themselves or their property without help. This was mentioned by professionals working with older self-neglecters, who didn't want to admit that they were too frail to manage their home (Yu et al., 2021). A second interviewee, who had a significant amount of experience in adult safeguarding, suggested that the way individuals are treated by services leads to them being rejected next time. Services workers appear to blame and hold the individual accountable for the state of their home, which can reduce their feelings of self-worth. In both cases, by rejecting the support of services, the individual is focusing on the more immediate goal of avoiding negative emotions, rather than the longer lasting goal of improving their health, their living conditions and ultimately, their quality of life. Perceptual Control Theory (PCT: Powers & Powers, 1973) suggests that this conflict between goals can lead to psychopathology such as depression and anxiety (Higginson et al., 2011).

Theme 2: The Relationship Between the Individual and the Professional

Participants emphasised the value of building a relationship with the individual, and particularly the importance of initial communications. Furthermore, having a non-judgemental approach was suggested to be a key element of building the relationship. This importance of relationship-building and a non-judgemental approach is supported by research in hoarding, squalor and self-neglect (Anka et al., 2017; F. Brown & Pain, 2014; McDermott, 2011). The professionals in the study who had roles in environmental health gave more information as to how they went about this. They explained that talking was the best way of building that relationship, particularly at first. They would often spend a long time doing so, even if it meant that no other progress was made. Although this approach would appear to be common sense for many, it was not mentioned by other professionals in the study and does not appear to be a named strategy in the hoarding or self-neglect literature.

In squalor cases, although different professionals will have different aims, the goal will commonly be to improve the environment. This may be to improve the health of the resident and to reduce the risk of injury, or it may be to reduce the risk of fire or to improve conditions for neighbours. However, the goal of the professional to clean and clear may not be the same as the goal of the resident. In squalor, the resident and the professional will have different expectations of a normal household and both will have the goal of bringing the dwelling towards their view of normal. Initially at least, the two goals will clash, potentially creating negative emotions in both the resident and the professional. The participants in this study focused on two main approaches which they used to help make progress with the condition of the dwelling. In both cases, the goal of the resident and the goal of the professional became less conflicted, making progress easier. Firstly, interviewees discussed the role of empowering the individual. This included practical aspects, but also giving them control over how the clean-up would take place. This was considered to be particularly important, as many of the individuals living in squalor had a history of lack of control due to abuse and trauma, which is also reflected in the hoarding and self-neglect literature (Bozinovski, 2000; Landau et al., 2011). Considering PCT, by passing control to the client, conflict is reduced and the individual is able to adjust their goals from short-term, such as reducing anxiety, to a more long-term approach like improving living conditions. Participants also discussed the importance of focusing not on the environment, but on the person, their issues and how to improve their vision of themselves. By reducing focus on the environment, the professional can reduce the conflict between how they expect a house to look and how the present environment is. This reduces the negative emotions they are feeling and allows them to work with the resident more effectively. This person-centred approach is recommended when working with self-neglecters (Day, 2020), with one stating that they “Wished others to perceive them beyond the immediate external ‘shell’.” (Band-Winterstein et al., 2012, p. 115).

Although the importance of building a relationship with the client was agreed, a number of participants also identified issues with the relationship becoming too important to the resident.

Interviewees described instances of them being the only person they would see, or being upset or angry when it was time for them to reduce their involvement. Given that isolation is common in squalor (Luu et al., 2018; McDermott & Gleeson, 2009), it is not surprising that the relationship with the professional becomes so important to them. The key to avoiding this could be to ensure that visits and support are by a team of individuals, not a single worker. This is in line with research which has emphasised the importance of operating as a team in self-neglect and hoarding cases (Day, Leahy-Warren, et al., 2016; Gunstone, 2003; Koenig et al., 2013). However, this was primarily focused on improving the quality of life of the individual and not on the attachment between client and professional.

Theme 3: The Reaction of the Professional to the Squalor Environment

Several participants described their reactions to squalor, referring to the "Shock" of seeing the conditions and being "Speechless". Given the conditions they are referring to, this response is not surprising and has also been documented in self-neglect and hoarding research (Band-Winterstein & Naim, 2013; Frost & Hristova, 2011). Nonetheless, two of the professionals who had significant experience with squalor properties felt that over time, you became "numb" to the conditions. Self-neglect research is mixed on this. Mental Health workers interviewed by Gunstone (2003) suggested that their tolerance to poor conditions had been influenced by exposure to cases of severe self-neglect. However, Social Workers said that encountering self-neglect was newly disturbing each time (Doron et al., 2013). Gunstone (2003) also suggested that tolerance of self-neglect conditions was affected by personal values and attitudes and both personal and professional experiences, suggesting that each professional's reactions are likely to be different.

Professionals in the study indicated that the most effective way of managing squalor was to not acknowledge the conditions. They suggested that not acknowledging the mess reduced the risk of the resident feeling judged or blamed, which echoes the views of professionals in McDermott's (2011) paper. Furthermore, this approach focused their attention on the individual and their needs.

According to PCT this may represent the professional altering their goal from one that is environment focused, such as cleaning, to one which is client-focused. The client-centred goal is more likely to be achieved as it is more in line with the goals of the resident. Furthermore, the professional reduces the negative emotions related to their need to bring the environment closer to their own expectations of a home. Hoarding research supports the client-focused approach (Holden et al., 2019). However, this is mainly in relation to supporting the resident, not as a way in which professionals can manage the environment.

Methods for coping with the extreme environments encountered in squalor were not discussed by the majority of professionals and don't appear to be considered in detail in either the squalor, hoarding or self-neglect literature. Nonetheless, one study participant was able to explain her routines for before and after visiting with cases, discussing moments of contemplation and the need for a controlled environment. Her status as a trainee may have meant that she was more aware of her strategies, or more likely to have strategies in place.

Although there is little research on the professionals' reaction to the squalor environment, the professionals' management of the impact that the cases have on them is covered in more detail. Self-neglect studies have suggested that cases project themselves onto the personal and professional lives of the worker and lead to "unavoidable emotional involvement" (Doron et al., 2013). An interviewee in the present study suggested that you had to try and limit the impact otherwise it would lead to burnout. However, another suggested that you shouldn't be doing the job if it didn't have an impact on you. This suggested that there might be an ideal level of impact, which motivates you to act and this is supported by the self-neglect literature. Doron (2013) suggests that a feeling of sadness and compassion about a case can motivate a professional to act, particularly if the individual is reluctant about accepting help. More specifically, a nurse working with self-neglecting older adults suggested that "…the stronger the feelings, the stronger is my will to help him and treat him the best I can." (Band-Winterstein, 2018, p. 13). Participants in the present study suggested that to manage the impact, it was beneficial to reflect on how the cases affected you, potentially through a therapist.

Doron (2013) also suggests that the self-reflection process should be emphasised more in training programmes, stating that:

> *"Through self-reflection, students and professionals can become aware of their own cultural backgrounds, biases, stereotypes, and prejudices regarding old age in general, and self-neglect in particular. Through this process, students and social workers can better position themselves when encountering older adults. This can also better equip them to handle the difficult personal and professional dilemmas in this context."* (Doron et al., 2013, p. 31)

Theme 4: The Challenges Associated with Service Cooperation

Day et al. (2012) states that a multidisciplinary and interagency approach are critical when building relationships and trust, and this was reflected by participants in the study. However, although professionals were mainly positive about working with other services, they did encounter barriers when doing so. Several interviewees suggested that services had different priorities and accepted different levels of behaviour from the clients. Lauder et al. (2005) also identified this as an issue, suggesting that different professional groupings respond to self-neglect according to their own agency's perspectives. In addition, participants also agreed that limited resources were a problem, highlighting lack of training, poor pay, reduced support options and poor funding as key issues within the field, many of which were also echoed in both the self-neglect and hoarding literature (Koenig et al., 2013; Yu et al., 2022).

Implications

Many of the elements discussed by participants were also identified in the self-neglect or hoarding literature, though very few were supported by extensive research. Furthermore, a number of areas were highlighted where it would be beneficial for professionals to have a better understanding of themselves and their clients.

Professionals would benefit from a wider discussion regarding the level of awareness that individuals living in squalor have regarding their environment, as some workers may find it difficult to accept that the resident doesn't see the squalor. In addition, the relationships between the professional and the resident could be improved by a better understanding of the background and experiences of the client and how that affects their acceptance of services.

Participants agreed that the relationship between the professional and the client was important in making progress. Nonetheless, it appeared as though the main consideration in all cases should be the individual and not their environment. The person themselves should be the focus, including their past traumas and their vision of themselves. However, this relies on the professional to have the time, the inclination and the resources to adopt this approach. Connected to the professional-client relationship was the issue of closing a case, or passing it onto another service. This can be a negative experience, particularly for the resident, and particularly if they are isolated. Services could benefit from more consideration of this stage of the process, gradually introducing other support where possible, and if no further professional support is possible, considering what alternatives are available.

Finally, professionals need to better understand how the squalor environment and the extreme nature of the cases can affect them. Individuals may be living in extremely poor conditions and be subject to significant neglect. Furthermore, there may also be vulnerable adults and children involved, adding to the impact. Using discussion and reflection, the aim would be for the professional to maintain a level of concern which impels them to support, while also allowing them to manage their emotions in such a way to avoid burnout.

Strengths and Limitations

The combination of methodological elements in this study make it a unique piece of research. There have been a limited number of qualitative studies involving squalor, none of which consider the wider perspectives of professionals. Although this methodology has been used in self-

neglect and hoarding research, the combination of a multi-perspective approach and IPA is unique. Nevertheless, the research does have some limitations. The CASP (Critical Appraisal Skills Programme) guidelines for reviewing qualitative research (Critical Appraisal Skills Programme, 2018) ask 10 questions assessing the methodological rigour of a research project. The majority of the guidelines are supported by this research. However, some elements could have been conducted more thoroughly. Regarding the recruitment strategy, efforts were employed to ensure that as many services as possible were represented. However, some professions, such as GPs and charity groups were not included in the interviews. Overall, the sample would have been improved by stronger representation from the NHS, in particular. A more detailed recruitment strategy, considering who could be recruited and considering the processes that would be needed to reach these participants, may have improved the chance of including the more difficult to reach groups. Secondly, considering the data analysis process, the procedures in this study followed the stages set out by Smith and Nizza (2022). However, additional evidence, such as photographs or scans of the analysis process, would have allowed the rigorous methods to be understood more easily by the reader and improved the replicability of the research. Furthermore, although not specifically recommended by Smith and Nizza, it is not uncommon in qualitative research to increase the validity and credibility of the study by using data triangulation to support the selection of themes (N. E. Andrews et al., 2015; Maggs-Rapport, 2000; Rivituso, 2014). In the present study, only a single form of data (Interviews) was used. This could have been supported by additional sources, such as reports by the professional, or communications between individuals, anonymity notwithstanding.

The CASP guidelines also query the role of the researcher and whether this could be a source of bias in the research. Although an initial reflexivity statement was included to highlight the position of the researchers involved in the study, no formal action was put into place to ensure that these views did not influence the outcome. The lead researcher and his supervisors did confer at each stage of the analysis process. However, the similar field of the researchers made this a less validating process than if an external individual had been employed to oversee the procedure. Future research

of this type should consider including an academic from an alternative field or one with an alternative epistemological stance in the analysis process to identify areas of concern. Similarly, this role could be conducted by an experienced professional who did not participate in the study.

A final limitation of this study was that, in almost all cases, the professionals who were interviewed also worked with hoarding and although the focus on squalor was regularly reinforced, the discussion that took place may also have referred to cases of hoarding. Unfortunately, as an agreed definition of squalor is yet to be produced academically or professionally, it was not possible to completely limit discussions to this condition.

Conclusions

This study has used a multi-perspective IPA approach to consider the important factors involved in working with individuals living in squalor. Three of the identified themes interacted significantly, with focus on the individual themselves, the relationship between the individual and the professional and the effects of working with the individual on the professional. A final theme regarding cooperation between services was also identified and found to be an important factor for professionals. However, this was not directly related to the other main themes. The outcomes support much of the research from self-neglect literature, while introducing new considerations and elements unique to squalor. The findings from this study have implications for individuals working in this field, promoting a person-centred approach, with a focus on understanding the individual's background, experiences and perceptions of themselves. Furthermore, it emphasises the importance of the professional having a good understanding of the effect that cases have on themselves and how best to manage the emotional consequences.

Chapter 7

General Discussion

The main aim of this thesis was to improve the understanding of people who live in squalor, and to do this both at the individual and population levels. Previous research had focused heavily on understanding squalor mainly at the individual level, such as health, demographic characteristics and insight, and these studies have tended to rely on very similar methods. The field had very little research considering squalor in populations, such as national estimates of prevalence, or squalor likelihood in neighbourhoods with high levels of deprivation. Therefore, this thesis sought to study squalor both at an individual and population level. This required employing methods that had not been used with this population before.

This thesis began with a scoping review of the literature, offering a systematic summary of the research base. A scoping review was selected over a systematic review as it is an effective method of describing literature such as the squalor research, which has varied research questions, measures, methodology or populations (Munn et al., 2018). In addition to synthesising what was currently known about squalor, the scoping review also considered some of the main areas where future research could improve understanding of individuals who live in squalor. The research studies completed for this thesis were therefore informed and led by the findings of the scoping review and included both quantitative and qualitative analysis that contributes to the understanding of squalor.

The scoping review enabled identification of previous poorly conducted estimates of the prevalence of squalor and this stimulated the need to produce a new, reliable, estimate of squalor in the general population. In addition, deprivation and income have become a focus of this thesis due to their relationship with related conditions such as SN, HD and AH (Abreu & Marques, 2022; Day, Mulcahy, et al., 2016; X.-Q. Dong et al., 2010; Samuels et al., 2008; Wilkinson et al., 2022). Deprivation and income have not previously been considered in detail in the field and, as with other measures of local and household factors, were not identified as an issue in the scoping review.

However, the scoping review did prioritise investigations into squalor in the general population, which led to the consideration of wider factors beyond the individual themselves.

In addition to the areas studied using secondary data, the thesis has also investigated individuals living in squalor through the professionals who work with them. It has considered how the professionals perceive them and their environment and the importance of the relationships that are formed between the professional and the client. Furthermore, in this case, the individuals being discussed may represent the most severe cases of squalor; those that would not engage voluntarily with surveys and home visits, providing information on individuals that could not be accessed by other means. In addition to considering new areas of focus and original methodologies, the studies in this thesis also investigate squalor at both the individual and population levels. Samples of students (Chapter 3), individuals living in squalor (Chapter 4) and professionals who work with squalor (Chapter 6) are investigated at the individual level. Squalor prevalence and risk factors at the population level are assessed in chapter 5.

This final thesis chapter will discuss and interpret the research findings, focusing initially on the overall prevalence of squalor and then on risk factors measured at both the individual and population level. Furthermore, it will discuss the implications of the research findings, both academically and professionally, and consider future directions that would continue to improve the understanding of individuals who live in squalor.

Squalor prevalence

Four studies (Halliday et al., 2000; Macmillan & Shaw, 1966; Snowdon & Halliday, 2011; Wrigley & Cooney, 1992) had previously produced estimates of the incidence of squalor. These were calculated from the number of cases that presented in a year from a known population size. However, no previous research had produced an estimate of the point or lifetime prevalence of squalor. Estimates from previous studies had suggested that approximately 7 cases presented per year, per 10000 older adults. As discussed by Snowdon and Halliday (2011), this only includes new

cases, making it likely that the actual prevalence might be significantly higher. Accurate estimates of the prevalence of a condition are important for services to plan appropriately for the health care needs of those individuals (Ward, 2013). The prevalence estimate calculated in chapter 5 was based on a more robust methodology than previously used and calculated an estimate for the point prevalence of squalor. Unlike previous estimates that had only looked at squalor in a particular area, calculations in chapter 5 were based on assessments from a large random sample of the English population. Furthermore, estimates of squalor included all adults and all cases, not just those that presented to services.

Using this approach, it appears that around 0.85% of households in England featured some form of squalor, as measured in the EHS physical survey. This was higher than the previous estimates of around 0.07%, calculated from the rate of referrals in an area. Furthermore, this only included individuals who agreed for their house to be surveyed. Given that the reaction to services and organisations from those who are living in squalor is often negative, there may have been a number of households that were squalid that didn't engage with the survey process, making the actual prevalence possibly higher still. However, it is also important to note that the measurement of squalor from the EHS is based on a 4-point survey rating, whereas previous estimates had been based on cases severe enough to be referred to services. The different assessment methods suggest that comparisons between the rates should be tentatively interpreted.

In a city such as Sheffield, with over 230,000 households (*Census and Population | Sheffield City Council*, n.d.), a point prevalence of 0.85% suggests that there are around 2000 households that feature squalid conditions. This thesis further suggests that the distribution of the houses is likely highly influenced by local deprivation. Data such as this allows services such as environmental health, adult social care and housing to better understand what proportion of individuals in squalor homes are being supported and how many are being missed. Furthermore, as discussed in chapter 6, resources in community services are limited. Therefore, data on the households and areas which are

most at risk supports services in assigning resources more efficiently, making the most of their limited budgets and staffing options.

Risk factors

The scoping review featured in chapter 2 provided the initial base for further investigations into variables associated with squalor. Previous research had primarily been at the individual level, with studies assessing the characteristics of a sample of people living in squalor. Studies in the present thesis also investigated squalor at the individual level, collecting primary data in chapter 3 and using secondary data in chapter 4 to assess health, psychological measures, demographics and living arrangements. Chapter 5 focused primarily on characteristics of a squalor household and assessed these at a population level by calculating the prevalence of squalor. The populations of study included groups such as households with high, medium or low deprivation, and households that were owned compared to those that were rented. This level of investigation was unique to the squalor field and represented a new approach in assessing variables of interest.

The main factors investigated in the scoping review were the gender, insight and co-morbidities of individuals living in squalor. Insight and co-morbidities, in particular, needed further investigation to develop a better understanding of their role in squalor and were therefore included as part of the original research conducted for this thesis.

Gender

Gender was the key demographic variable investigated in the scoping review and demonstrated that neither gender was more likely to live in squalor. This was supported by the cross-sectional data from the study in chapter 3 that found no link between gender and household cleanliness. This outcome was in line with the ratio from HD research (Frost et al., 2015), but different to the data on AH (Chapter 2) and SN (Yu et al., 2021), that showed more women and more men, respectively. In the control study (Chapter 4), gender was not included as a main variable.

However, post-hoc tests using a matched control group did suggest that there were more men in a sample of individuals living in squalor, than in a sample from non-squalor households. Although this is not compelling evidence compared to the data collected in the scoping review, it does represent a more diverse age-group, as it was collected randomly from the general population, whereas data in the scoping review was collected from previous studies, which have been heavily weighted towards older adults. Further studies considering squalor in the general population, which focus on gender as a main variable, may offer more clarity. However, if there is shown to be a gender difference, it is unlikely to be of a magnitude that would inform future procedures or policies.

Insight

An area of particular interest at the individual level is the insight or awareness that individuals living in squalor have of their surroundings. In the scoping review, any indication from the journal authors that there was a lack of understanding or awareness of their living conditions was considered as a lack, or deficit of insight and this was suggested to be the case in around 70% of individuals living in squalor. Although the understanding of insight does vary by psychiatric condition (Reddy, 2016), a formal understanding of insight would involve recognition that they have a mental illness and that treatment is needed (Slade & Sweeney, 2020). Although this fits the description of many individuals who live in squalor, the term insight has also been used in studies to represent poor or absent awareness of the uncleanliness of their dwelling or themselves (Browne & Hegde, 2015; Ferry, 2013; Irvine & Nwachukwu, 2014; Proctor & Rahman, 2021). Furthermore, in many studies, particularly the case studies on squalor, the term is used with no clear indication of its meaning (Castro & Ribeiro, 2009; Luu et al., 2018; Sacchi et al., 2021).

In the professional domain, the concept of insight also lacks clarity. Interviews with professionals (Chapter 6) identified insight as a theme when working with squalor. Their perceptions of the insight of the individual varied. Some interviewees claimed that individuals living in squalor were very aware of their surroundings and felt shame and embarrassment because of them. Others

suggested that they had clients who genuinely could not see the filth that they were surrounded by. However, in some cases, the professional felt that the issue was neither of these. They thought that the person could see and acknowledge their surroundings, but was unconcerned, possibly because it had become their norm, or because it was a low priority compared to other issues that they were facing. It is also important to consider that interviews were conducted with professionals, not with the individuals living in squalor, and there were suggestions that the perceptions of the professional may have been subject to their own biases. For instance, anyone working with extreme living conditions may find it impossible to consider that the individual can not identify the filth themselves, making statements such as "You can't not know…", which may say more about the professional than the resident.

It appears therefore that insight in squalor is far from straightforward. This is consistent with the findings of Gregory et al. (2011) and Halliday et al. (2000). Their investigations into insight were based on quantitative, not qualitative methodology. However, they demonstrated that individuals living in squalor show a variety of levels of awareness, with some being able to identify squalor in others, but not necessarily in themselves. Furthermore, some felt that their dwelling was clean, but still had concerns about their living conditions and admitted that it was likely to be less clean than others of their age. Fundamentally, it is too simple to state that individuals living in squalor "lack insight", as has often been the case in squalor articles (Assal, 2018; Browne & Hegde, 2015; Lee et al., 2022). When used in the squalor literature, it is usually not clear where any deficiencies lie. The author may be referring to the individual's perceptions of their mental illness and need for treatment. However, they may also be referring to the individual's awareness of their environment. In all but two studies (Gregory et al., 2011; Halliday et al., 2000), no indication was given by the author as to how insight was measured. The individual is only described as having a lack of, or no, concern or insight (Browne & Hegde, 2015; Lebert, 2005; Lee et al., 2014; Proctor & Rahman, 2021). This suggests that this is a judgement made by the professional in attendance, possibly based on little or no formal criteria or expertise and is unlikely to represent the view of the individual in

question. Furthermore, as demonstrated by the studies involving Gregory and Halliday, and by the views of the professionals who took part in the qualitative study featured in chapter 6, insight is not a binary question. It should not be considered as present or absent. Individuals may be aware of the squalor in their dwelling but still be unconcerned, whereas others may be able to identify squalor from pictures, but not acknowledge the problem in their own dwelling. It may be the case that insight in relation to squalor is a multicomponent concept as it would need to contain both internal insight (i.e., the thoughts and feelings of the person and the need for treatment and change) and also environment (i.e., awareness of the state of the home and the need for change). Nonetheless, studies need to give more indication as to their meaning of 'insight' when describing individuals living in squalor. Ideally, to fully understand insight and awareness in squalor, studies need to use replicable quantitative methods, ideally supported by interviews with residents, to better understand what they are and are not aware of, and why this may be the case. Also, longitudinal research is needed to track insight over time both with and without intervention.

Co-morbidities

Existing research

Co-morbidity data from squalor research identified hoarding symptoms in 66% of squalor cases. However, in most instances, it was unclear what objects were being hoarded. It could refer to syllogomania, the hoarding of rubbish and waste, included in the description of DS by Clark et al. (1975). However, it may also refer to a more intentional and active accumulation of items such as newspapers, books and clothes, as suggested by clinical HD (Yap & Grisham, 2021). Nonetheless, accumulation and retention of many items in some form does appear to be a common feature of squalor. Research has also identified dementia as present in around 45% of cases and alcohol abuse and psychosis in 20% and 24%, respectively. Affective and anxiety disorders have not received significant attention in the squalor literature, though both have generally been found to have low

prevalence when included (S. M. S. Chan et al., 2007; Halliday et al., 2000; Snowdon & Halliday, 2011), though Lee et al. (2014), showed that 36% of their sample had a *history* of affective disorders.

Affective and anxiety disorders

Two studies in this thesis investigated a measure of psychological well-being, producing contrary results. The cross-sectional data collected in chapter 3 investigated the link between psychological distress and household cleanliness. Distress was measured by the Kessler K10 scale, which features questions on depressive and anxiety symptoms (Kessler et al., 2002) and was shown to predict cleanliness of a household. However, this was in a relatively small sample. Conversely, in the control study featured in chapter 4, psychological well-being was measured using the ONS-4, four questions that asked about life satisfaction, happiness, anxiety and whether they considered their life to be worthwhile. None of these showed significantly different results between people living in squalor and those who were not. However, this was based on a brief measure of psychological well-being and a more extensive or focused measure may have provided different results.

Although the evidence supporting a role for mood and anxiety disorders in squalor is weak, it remains an area of interest because anxiety and depression have been shown to be common in HD, AH and SN (E. A. Ferreira et al., 2020; Frost et al., 2015; Papaioannou et al., 2012). Due to the overlapping relationship between these conditions and squalor, it seems likely that mental health conditions common to HD, AH and SN would also be apparent in squalor. Potentially, the apparent lack of depression and anxiety symptoms may be explained by the lack of insight commonly seen in individuals living in squalor, as demonstrated in the scoping review. If an individual is not concerned by their extreme environment, it may not cause them psychological distress. However, the scoping review also confirmed that lack of insight is often seen in AH, but depression and anxiety are still common in this condition, querying this explanation.

Historical research and the studies featured in this thesis offer mixed evidence as to the role of depression and anxiety in squalor. The most significant evidence appears to suggest that psychological well-being, including depressive and anxiety symptoms, do not appear to be more

prominent or severe in individuals living in squalor. If this is confirmed in future research, then a new question becomes apparent. If the conditions most closely related to squalor; HD, SN and AH, all show depression and anxiety as common problems, then why does this not appear to be the case in samples of individuals living in squalor? As proposed by the scoping review, further research into insight and co-morbidities would be valuable for a better understanding of both these features separately. However, if studied together, they could potentially investigate whether the low levels of depression and anxiety in squalor are due to the poor insight of the individual. Low depression and anxiety already suggests that squalor is unique to similar conditions. However, if it can be shown that this is due to poor insight, then this represents a significant step in understanding the characteristics of individuals who live in squalor. Furthermore, this information would help professionals build relationships with the individuals they are working with as they would have a better understanding of the characteristics of their client.

Deprivation

The primary measure in the case-matched control and panel studies in chapter 4 and 5 was local deprivation. In chapter 4, deprivation was investigated at the individual level and suggested that deprivation scores were higher for people who were living in squalor than those who were not. In chapter 5, the sample was divided into households living in areas of high, medium and low deprivation and this showed a significantly higher prevalence of squalor in the neighbourhoods with high deprivation. It is not unusual for deprivation and mental health to be linked. Skapinakis et al. (2005) showed that the prevalence of mental health disorders was partly explained by social deprivation at the regional level, and Fone et al (2014) showed that poor mental health was associated with an individual's level of income deprivation. More specifically, AH and SN, both of which are related to squalor, have also been shown to be linked to deprivation. Locations where cases of AH were found were more likely to have high levels of deprivation (Wilkinson et al., 2022) and SN cases were more common in communities or locations that had higher rates of deprivation

(Day, Mulcahy, et al., 2016; Lauder & Roxburgh, 2012). Therefore, it is unsurprising that squalor appears to also be related to deprivation. However, this is the first time that this has been confirmed in the literature and has been done so at both the individual and population levels. Research into squalor and squalor-related conditions has not investigated why deprivation is a factor in these disorders. However, the relationship between deprivation and more general mental health problems has been shown to be moderated by social cohesion (Fone et al., 2007, 2014). Social isolation and withdrawal are common features of several squalor-related conditions, such as DS, SDS, SN, HD and AH (Arluke et al., 2017; S. M. S. Chan et al., 2007; Snowdon et al., 2007; Thomas et al., 2017; Yu et al., 2022), and reducing social isolation has been stated in research reports as an important step to treatment of hoarding and squalor disorders (Abreu & Marques, 2022; Day et al., 2013; Frost et al., 2011). Furthermore, the professionals interviewed in chapter 6 suggested that once a relationship had been formed with an individual living in a squalid residence, that it became very important to the resident. Therefore, increased social cohesion may play a significant role in the treatment and reduction of squalor and squalor-related conditions and may be most effective in deprived areas, where squalor is most common. There is a need for testing interventions at a community level to address deprivation in comparison to interventions that target changing individual factors. Similarly, researching also the efficacy of prevention strategies in at-risk-of-squalor communities.

Household variables

In the panel study in chapter 5, several variables in addition to deprivation were measured at the population level and these were also considered at the individual level in post-hoc tests in chapter 4. Household income, home ownership and household size were all found to predict whether a household was squalid. Higher income and owning the home reduced the risk of squalor, whereas households of two or three people had the lowest squalor prevalence. Post-hoc tests in chapter 4 agreed with these findings, with income and home ownership rates both being significantly higher in individuals who did not live in squalor. These findings agreed with SN, AH and HD research

studies regarding the effect of household income (Abrams et al., 2002; Abreu & Marques, 2022; X.-Q. Dong et al., 2010; Samuels et al., 2008). However, no significant evidence could be found for the role of home ownership or household size in these conditions. Living alone was also considered in this thesis, but there was little support for its role as a predicting factor, either at the population or individual level. These findings contradict previous research, which suggests that individuals living in squalor are more likely to be living alone (A. Clark et al., 1975; Ito et al., 2022; Snowdon & Halliday, 2011; Wrigley & Cooney, 1992). These studies all used samples of older adults. However, the high ratio of living alone was also present in Halliday et al (2000) who studied a variety of ages. This discrepancy suggests that the individuals from the EHS who were identified as living in squalor have a different household structure to those in previous research. Given that this was a sample generated randomly from the general population and not a sample of referred cases, differences are likely. Further research into squalor in the general population is necessary to investigate whether squalor is equally present in multi-person households, or whether this result was an anomaly.

Research summary

The research conducted in this thesis demonstrates three main findings. Firstly, that there are elements of the squalor research base that may need to be reconsidered. The quantitative research has used a novel methodology to calculate a squalor prevalence rate, suggesting a higher estimate than those calculated in previous studies from referred cases. It has also provided more detailed information on the role of psychological distress and well-being and demonstrated that this appears to be contradictory to similar conditions. Furthermore, the qualitative data has suggested that the insight of an individual living in squalor may be more complicated than saying that they do or do not have insight. Professionals suggested that individuals living in squalor appear to have a variety of levels of understanding of the cleanliness of their dwelling and mixed levels of concern over whether it matters to them.

The second element demonstrated by this thesis is the importance of using novel research methods. Studies have generally investigated the characteristics of a group of individuals living in squalor. However, although informative, the samples are commonly limited to participants who are identified by services, usually older adults, and findings are rarely compared to a control group or analysed using reliable methods. This thesis has used a variety of methodologies which have rarely, or never been used in squalor research. These included quantitative studies using data from a general population, comparisons with a control group, robust measures of prevalence, and reliable statistical techniques. Furthermore, novel methods have also been employed with qualitative research, using multi-perspective IPA research with professionals who work with squalor. Each of these approaches contributed new information to the understanding of squalor and suggested important new directions in the field. This introduction of new methodology should now be continued, with future research ensuring that it is adding to, not just reproducing what has gone before.

The final main finding relates to the multilevel approach taken by this thesis. The research has demonstrated the importance of considering squalor both at the levels of individuals who live in these conditions and also population level where rates of squalor can be established aggregated across households. For instance, in the case of deprivation, the studies have shown that not only are individuals living in squalor more likely to reside in areas of high deprivation, but that nationally, squalor is related to local deprivation, such that it is more prevalent when the deprivation of a neighbourhood is more significant. Demonstrating this at multiple levels emphasises the need to consider this as not just an individual problem with individual treatments and solutions, but a more significant national problem, related to societal inequalities and risk factors.

Definitions, criteria and a "place" for squalor

As demonstrated by the scoping review, squalor is usually referred to as DS in the research, but this term has never been fully defined and does not seem appropriate particularly given that

Diogenes himself did not live this way. Clark et al. (1975) suggested that individuals with DS were older adults, commonly living alone and had previously been professionally successful. However, these have not consistently been shown to be the case (S. M. S. Chan et al., 2007; Finney & Mendez, 2017; Monfort et al., 2017; Wrigley & Cooney, 1992). Furthermore, Clark and colleagues suggested that hoarding of rubbish was present in some cases, which has also become an assumed element of DS, being included even when the items being hoarded are not limited to rubbish (Browne & Hegde, 2015; Finney & Mendez, 2017; Monfort et al., 2017). However, it is unsurprising that the understanding of hoarding and squalor overlap, as many individuals with HD may be living in squalor, purely because they can not access areas of their house to be able to clean them. Similarly, people who live in squalor may be considered hoarders due to the build-up of clutter, even though the accumulation is not intentional. Used much less often is the term SDS, which describes a squalid home and has a clear definition and method of measurement. However, the definition relates to household conditions only, when personal characteristics such as insight, isolation and co-morbid conditions are also key aspects of squalor. The scoping review proposed a definition for individuals living in squalor, suggesting it should be described as:

> *An individual living in a filthy and cluttered house, commonly showing evidence of infestation. The individual will be demonstrating significant self-neglect and likely to be hoarding objects or animals. Individuals have poor insight and may demonstrate executive function deficits.*

There is also a significant question regarding whether living in squalor is a unique disorder, or simply a consequence of other conditions, such as dementia, psychosis or alcohol abuse. The scoping review suggested that around 20% of individuals living in squalor did not have another mental health disorder. If confirmed, this could suggest that it is a disorder in its own right. However, more reliable measures of the mental health status of individuals living in squalor are required to confirm whether

this is the case, or whether co-morbid disorders were not assessed in sufficient detail in previous research.

This research confusion regarding the terms used to describe squalor is also seen professionally. Interviews with professionals who work with squalor show that the term “squalor” was avoided due to the negative and judgemental connotations to their clients. Similarly, most professionals had not encountered the terms DS or SDS. Professionals commonly had phrases unique to their field, such as ‘filthy and verminous’, used by environmental health, or SN, used by social workers. Squalor houses were often also referred to as hoarded, though some professionals only used this to refer to an active build-up of items, whereas others would use this even when the clutter was solely due to a passive inactivity on the part of the resident. This lack of consistency within and between professionals and researchers creates and maintains confusion and furthermore, it makes it hard for researchers to identify the most appropriate professionals and participants to work with to investigate this phenomenon further.

Issues with definitions and their use across fields has meant that the condition of squalor is lacking a “place”, both professionally and in research. This has become evident during the research process, initially at the scoping review stage. Terms such as DS, SN and hoarding overlapped when discussed in the literature. However, SN appeared to refer to a broader condition, not limited to squalor, and hoarding was present in squalor, but also a separate condition with unique features. This uncertainty is also seen in the squalor evidence base. The most common location for articles referring to DS and SDS is journals focused on aging and older adults, in particular *International Psychogeriatrics* and *Journal of Geriatric Psychiatry* (Fond et al., 2011; Gregory et al., 2011; Lee et al., 2017; Snowdon et al., 2013). However, squalor is not limited to older adults and therefore, general studies on squalor do not fit in this category. Similarly, studies focusing on the cognitive aspects of squalor have commonly published in journals dealing with neuroscience or neuropsychology (Ashworth et al., 2018; Browne & Hegde, 2015; Cipriani et al., 2022). No other journal, or journal field has consistently considered squalor in its publications. Individuals living in squalor are

commonly encountered by environmental health and social workers, yet journals specialising in these fields do not publish articles on squalor. *Journal of Environmental Health* has previously published articles on hoarding (Castrodale et al., 2010) and social work journals have featured the larger topic of SN (Manthorpe et al., 2022; May-Chahal & Antrobus, 2012; Orr, 2019), but specific research on squalor has not been included. The 'neglect of squalor' in terms of research means that the expansion in evidence that was stimulated by HD being in DSM-5 has not occurred in the squalor field.

In professional services, the condition of squalor also appears to have no clear position. Organisations may include it within the field of hoarding, even though it can have quite different aetiology. Furthermore, different professionals within a single profession may mean different things when they refer to squalor and there may also be differences between professional groups. Finally, individuals may refer to squalor as 'self-neglect', even though this is usually a broader term including hoarding and other forms of neglect that do not necessarily involve household squalor. This means that services may not have processes or protocols in place to deal with squalor cases, treating them as hoarding or SN. This is an issue when attempting to access participants for squalor research, as it is difficult to target the individuals of interest, because they are not considered to be a group by themselves, but part of larger, more general issues that are encountered. Even in the interviews with professionals in chapter 6, where the area of interest was discussed and clarified, it was necessary to regularly emphasise that squalor was the focus of interest as many professionals did not separate this issue from more traditional hoarding cases. Though, as has been discussed, this is understandable when there is such ambiguity between the understanding of the two conditions. This thesis has thrown light on the parallel process of people neglecting themselves and their physical environment and professionals and researchers neglecting these people as a group.

Implications

The research conducted in this thesis has implications for squalor research, but also for treatment and prevention of squalor in the community. Academically, the scoping review highlighted several key areas that should be considered for future research, including studies using a measure of squalor, studies assessing co-morbidities using validated methods, intervention studies, using mixed methods and also long-term follow-up studies. The thesis used the scoping review to guide the research direction and completed studies on prevalence, squalor in the general population, squalor compared to a control group and qualitative research. Nonetheless, each of these areas would still benefit from additional investigation to confirm or refute the findings. This is particularly relevant with squalor in the general population, as the studies in chapters 4 and 5 represent the first occasion in which squalor has been assessed across a whole population.

Another key research implication is that the field is in need of more in-depth person-centred research. Recruitment of individuals living in squalor was not possible with the resources available to the researcher and in the literature, it is often limited to case studies, with only a small number of studies assessing a group of individuals directly. This lack of primary research means that aspects such as insight, co-morbidities and risk factors are limited in scope. We also know relatively little about the lived experience of squalor, what makes people vulnerable to squalor, how they see squalor and how they experience interventions for squalor. Furthermore, the lack of any qualitative research with the individual themselves means that their perspectives, concerns and wishes are not highlighted or documented, leaving a large gap in the understanding. Primary research on squalor and squalor individuals is difficult due to issues with recruitment, negative responses of the residents and high risk of cognitive deficits. Nonetheless, a new approach is required, whereby researchers work more hand in hand with professionals in the field. Shaghaghi et al. (2011) reviewed recruiting methods with hard-to-reach populations and referred to ‘Indigenous field worker sampling’, in which individuals who already have access to the target population are trained in the requisite data collection methods, so they can conduct the process themselves. This approach has been used with a

number of hard-to-reach groups, including drug users, individuals with psychotic disorders and torture survivors (Dehghan & Osella, 2022; H. Luo et al., 2018; Platt et al., 2006). It could be particularly successful in squalor research, as those living in squalor will commonly interact with a limited number of trusted individuals, making them unlikely to work with an external researcher.

The research conducted in the thesis also has implications for professionals who work with squalor and for the national approach to squalor treatment. The findings on prevalence suggest that squalor is present in nearly 1% of dwellings, which is higher than previous estimates that were based on cases presenting to services. This discrepancy implies that there may be more people that are struggling with, or in the early stages of squalor that are not being identified by services and therefore, are unlikely to be receiving support. This thesis has begun to identify issues such as high deprivation, low household income and reliance on rented properties that are risk factors for squalor. These elements may be a consequence of, or associated with, the mental health conditions that have been shown to be present with individuals living in squalor. However, these may also refer to a subset of individuals who live in squalor due to social or economic reasons. In both instances, identifying local areas where deprivation is high or households who are struggling economically, could help direct services towards those that are most at risk of developing problems with their environments. Furthermore, if these variables are shown to support services in identifying individuals living in squalor, then it may be possible to take a more proactive approach, focusing on prevention, intervening with households earlier and reducing the likelihood of the squalor becoming severe. However, improved identification and an increase in a proactive approach would both require a multi-disciplinary approach supported by environmental and mental and physical health services.

The second implication is primarily based on the findings from the qualitative interviews in chapter 6. When discussing individuals who live in squalor, professionals had different views on several aspects. The awareness and concern of the individual, the role of hoarding and the language used with clients were just a few of the areas where opinions and approaches varied. Even

something as simple as the terms used to describe cases differed. SN, 'filthy and verminous' and hoarding were all used to describe these kinds of dwellings and some professionals did not use specific terms, preferring to describe the environment. Such variety amongst services that are required to work closely together is likely to have a negative effect, with each professional having their own goals and expectations as to how to achieve them. This could be improved by a consensus across groups as to how to differentiate between types of cases, agreed aims for the individual and the property, and an opportunity to discuss the level of insight and awareness that they encounter and how this can be incorporated into treatment and support. Furthermore, services should reach an agreement about the most appropriate terminology to use with the client. However, as shown by work with other marginalised groups (de Freitas & Martin, 2015; Weger et al., 2022), this should be developed in accordance with individuals that live in squalor. This will ensure that it is language that they do not find judgemental or offensive and language that engages them. A starting point for improving continuity and coordination across services could be research incorporating academics and professional viewpoints, which could ultimately lead to the development of a training programme on squalor and related conditions to provide services with the knowledge and understanding that they require to support individuals living in squalor, but also, to focus more attention on preventative and proactive approaches.

Conclusions

This thesis has summarised and critiqued the present research base and used this to highlight key priorities to improve the understanding of squalor. Furthermore, it has demonstrated the importance of research using unique study designs and a multi-level approach by completing studies using novel methodologies and statistical analyses, leading to findings that contradict the present understanding of squalor and introduce new directions of focus. Fundamentally, the field needs an agreed term, and a clear definition and set of criteria, supported by research, to describe

individuals who live in squalor. From this, the perspectives of the residents can be explored and risk factors can be assessed. Furthermore, it needs to consider how research findings can be used to drive preventative approaches, incorporated into professional services, to reduce the present, reactive approach to squalor treatment. However, for these steps to be achieved, a closer working relationship between academics and professionals is required, to increase access and recruitment of individuals living in squalor, and to support the dissemination and implementation of treatment and prevention strategies.

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Appendices

Appendix 2.1:

Complete Database of Squalor Studies

Item	Author	Year	Title	Term used to describe squalor	Methodological approach	Squalor measurement used	Sample size/characteristics	Mental co-morbidities	Location of study	Summary of findings	Insight	Outcome/follow-up
1	Aamodt et al.	(2015)	Cognitive Profiles of Elder Adult Protective Services Clients Living in Squalor	Squalor-dwelling	Case-control study	Description only	n = 230 adult protective services clients. n = 50 squalor-dwelling (41% male, mean age 75), n = 180 non-squalor-dwelling (40% male, mean age 79)	Dementia diagnosis in 76% of squalor-dwelling group	USA	Squalor-dwelling group significantly younger, but no difference on other demographics. Squalor-dwelling group demonstrated better memory and MMSE scores, but no significant difference on other measures, including executive function (EXIT25 = 24 v 25, both averages suggest impairment)	Not reported	Not reported
2	Ashworth et al.	(2018)	TD: The case of Diogenes Syndrome-deficit or denial?	Diogenes Syndrome	Case report	Description only	n = 1, 53-year-old male, living with brother	No dementia but exec func difficulties, no other mental co-morbids. Hoarding present.	UK	Lack of concern, executive function difficulties, impaired smell, impaired identifying disgust in others but can identify squalor in others. Low shame response.	Poor/none	Outcome: Hospitalised for pneumonia, then moved to rehabilitation when well. Follow-up: Not reported
3	Badr et al.	(2005)	Diogenes syndrome: When self-neglect is nearly life threatening	Diogenes Syndrome	Case report	Description only	n = 1, 72-year-old female	None diagnosed, potential personality disorder	Unclear	Admitted but little evidence of therapeutic impact	Not reported	Outcome: Discharged and returned home. Follow-up - Not reported
4	Batool & Hussain	(2015)	Diogenes syndrome in a patient suffering from neurodegenerative disease	Diogenes Syndrome	Case study	Not stated	n = 1, 20-year-old female	Neurodegeneration, depression	Pakistan	Individual presented with significant skin problems and severe depression. Tests showed neurodegeneration. Treatment for skin condition showed satisfactory improvement.	Not reported	Not reported

5	Biswas et al.	(2013)	Diogenes syndrome: a case report	Diogenes Syndrome	Case study	Description only	n = 1, 34-year-old male, living alone	Appeared to be depressed, diagnosed with schizophrenia	India	Presented with severe skin problems. Socially isolated. Appeared to be suffering from severe depression. Diagnosed with schizophrenia. Antipsychotics and antibiotics improved symptoms to a satisfactory level.	Not reported	Outcome - Symptoms improved. Follow-up: Not reported
6	Blagodatny et al.	(2007)	Management of Diogenes syndrome: behavioral disorder of self-neglect	Diogenes Syndrome	Case report	Not stated	n = 1, 82-year-old male, living alone	Depression	USA	Individual hospitalised due to self-neglect. MMSE 25/27 (Unable to complete some visual tasks). Geriatric depression score 12/15. Treatment with antidepressants.	Not reported	Outcome: Moved to rehabilitation facility for treatment. Follow-up: Not reported
7	Bonci et al.	(2012)	A case of Diogenes syndrome: Clinical and ethical challenges	Diogenes Syndrome	Case report	Description only	n = 1, 80-year-old female, living alone	No history of substance abuse or other psychiatric history	USA	Impairment in abstract reasoning may suggest exec dys, but no other evidence to suggest this. Risperidone helped improve paranoia and mood, but DS symptoms continued.	Not reported	Outcome: Moved to a nursing home. Follow-up: Not reported
8	Boyd & Alexander	(2010)	Diogenes' syndrome and intellectual disability: An uncommon association or under diagnosed?	Diogenes Syndrome	Case study	Description only	n = 1, 55-year-old female	Intellectual disability only presentation, but history of Schizophrenia, OCD and FTD diagnosis	Australia	Suggests professionals check for Diogenes Syndrome in intellectually disabled groups	Not reported	Not reported
9	Boynton	(2014)	Indicators of diogenes syndrome in community dwelling elderly	Diogenes Syndrome	Case-control study	Identified as living in hoarded and dirty homes	n = 67224 on database. n = 510 with Diogenes Syndrome (53% male, Mean age 67)	510 Diogenes Syndrome individuals: 54% dementia, 11% alc/subs abuse, 32% paranoid/bizarre behaviour, 2% suicide/self-harm thoughts	USA	Diogenes Syndrome profile older male living alone with cognitive impairment. Sample refuse help, are abusing alcohol and are associated with bizarre/paranoid behavioural features. Unlikely to pose risk to themselves or others.	Not reported	Not reported
10	Browne & Hegde	(2015)	Diogenes syndrome: Patients living with hoarding and squalor	Diogenes Syndrome	Case reports x 3	Description only	n = 3, 80-year-old female, live with daughter; 75-year-old male; 90-year-old male, living alone	80f - History of hoarding, no history of psychiatric illness, 75m - Frontal lobe stroke, post-stroke mania. 90m - suspected FTD	UK	80f - Hoarding. Moved to sheltered housing, no recurrence. 75m - Squalor only, occurred post-stroke and when mania symptoms present. Treated with risperidone, no future clutter or self-neglect. 90m - Refused help. Condition deteriorated until death due to cardiac arrest.	80f - Not reported, 75m and 90m - poor/none	Follow-up: 80f - Still at home, 75m - still at home, 90m - Died shortly after (No time scales given)

11	Campbell et al.	(2005)	Diogenes syndrome: frontal lobe dysfunction or multi-factorial disorder?	Diogenes Syndrome	Case report	Description only	n = 1, 66-year-old female, living alone	Potential dementia	UK	Referred due to personality and behaviour changes, frontal lobe dysfunction and executive function impairment but no memory impairment.	Partial	Outcome: Moved in with daughter. Follow-up: Move to nursing home (18 months).
12	Camps & Le Bigot	(2019)	A psychoanalytical approach to Diogenes syndrome	Diogenes Syndrome	Case study	Description only	n = 1, 65-year-old female, living alone	No dementia or neurological pathology. Lack of information regarding other conditions.	France	Hospitalized following anxiety and suicidal threats over removal of her items or the state of her home being discovered. Psychoanalytic explanation of case.	Partial	Not reported
13	Chan et al.	(2007)	Late-onset Diogenes syndrome in Chinese - an elderly case series in Hong Kong	Diogenes Syndrome	Case series - Observational	Description only	n = 18 all 65+ years old (39% male, mean age 76, 61% female, mean age 77). 39% living alone.	Dementia - 11/18 dementia, 2/18 early dementia. Psychiatric - 2 alcohol dependent, 1 history of alcohol dependence, 1 antisocial personality disorder. No mood disorders or OCD. 15/18 some form of hoarding present	Hong Kong	Study focuses on demographics, co-morbid conditions and outcomes. All individuals managed at outpatients initially.	Not reported	Follow-up: 2 died, 3 lost contact (Within 1 year), 3 remained at home with support (No timescale), 10 were relocated to nursing homes (Within 2 years).
14	Cherian et al.	(2021)	Assessment of squalor in migrant colonies of Thiruvalla Province of Kerala, India using rapid survey technique	Domestic Squalor	Cross-sectional observational	ECCS	14 participants from each of 15 colonies = n = 210, gender or age data not included	N/A	India	2/15 colonies squalor free (Less than 12/14 cases of squalor in a colony equals squalor free. 27/210 cases squalor free (ECCS <12).	Not reported	Not reported
15	Clark	(1999)	Senile squalor syndrome: two unusual cases	Senile Squalor Syndrome	Case report x 2	Description only	n = 2, 84-year-old female; 76-year-old female, both living alone	84f - No formal diagnosis, 76f - Dementia diagnosed, with frontal lobe involvement	UK	84f - MMSE 28/30, suspected remission of personality or schizophrenic disorder; 76f - MMSE = 21/30 initially, improving to 25/30	Not reported	Outcome: 84f - Moved to nursing home; 76f - Remained at home. Follow-up: Not reported
16	Clark et al.	(1975)	DIOGENES SYNDROME - CLINICAL-STUDY OF GROSS NEGLECT IN OLD-AGE	Diogenes Syndrome	Case series	Description only	n = 30 (47% male 53% female), mean age 79, 93% lived alone	Hoarding of rubbish "sometimes seen".	UK	All known to social services, high IQ, previously successful. Tend to refuse help and are aloof and distant	Not reported	Follow-up: 14 died, 5 at home, 8 in nursing home, 3 in hospital (No timescale)

17	Cole et al.	(1992)	A CASE OF SENILE SELF-NEGLECT IN A MARRIED COUPLE - DIOGENES-A-DEUX	Diogenes Syndrome	Case report	Description only	Married couple, late 60s	Alcohol abuse	UK	Admission and assessment	Not reported	Outcome: Female died, male admitted to nursing home
18	Cooper et al.	(1992)	Diogenes Syndrome	Diogenes Syndrome	Case report	Description only	n = 1, 62-year-old male	Frontal lobe dysfunction	UK	Individual presented with hypothermia. Refused access to his house for cleaning. Detailed neuropsychological testing showed frontal lobe function deficits and cortical atrophy	Not reported	Not reported
19	Darke & Duflou	(2017)	Characteristics, circumstances and pathology of sudden or unnatural deaths of cases with evidence of pathological hoarding	Severe squalor	Case series - retrospective analysis	Not stated	n = 61 (62% male, mean age 66), 95% living alone	7% schizophrenia, no further details reported	Australia	Study investigated characteristics and causes of death in 61 individuals who lived in severe squalor with extensive hoarding. Individuals commonly socially isolated. 75% of deaths were from natural causes. 44% due to heart disease. In 13% of cases, hypothermia was a significant contributory factor.	Not reported	Dead at first contact
20	Donnelly et al	(2008)	Comorbid Diogenes and Capgras syndromes	Diogenes Syndrome	Case report	Personal hygiene issues and animal hoarding effects	n = 1, 51-year-old female, married	Capgras syndrome, frontal lobe impairment (Exec dys). Diagnosed as schizoaffective	USA	Treated with mood stabiliser (divalproex) and risperidone, symptoms of both DS and Capgras improved.	Poor/none (At presentation)	Outcome/Follow-up: At home (4 weeks)
21	Drummond et al.	(1997)	Diogenes' syndrome - a load of old rubbish?	Diogenes Syndrome	Case series	Description only	n = 50 OCD patients (44% male, mean age 36), 17 lived alone. Diogenes sample n = 4, all male, mean age 36.	OCD	UK	From 50 OCD cases, 12 had at least one symptom of Diogenes Syndrome (Self-neglect, hoarding, squalor). 4 classified as Diogenes (All symptoms), all male, 3/4 lived alone. In each case, squalor and self-neglect seemed to be direct result of OCD symptoms. In all 4, treatment showed little or no improvement.	Not reported	Not reported
22	Eren et al.	(2015)	Medicolegal Approach to Diogenes Syndrome: a Case Report	Diogenes Syndrome	Case study	None	n = 1, 62-year-old male, living alone	Patient found dead, no psychological information included	Turkey	Significant number of physical issues which led to his death.	Not reported	Dead at first contact
23	Esposito et al.	(2003)	Diogenes syndrome in a pair of siblings	Diogenes Syndrome	Case report	Description only	n = 2 (one case), sister and brother, 61-year-old female and 58-year-old male (handicapped)	None discovered for either individual	France	Both denied any issue with their dwelling and refused assistance, both hospitalised. Diagnosed as primary DS.	Poor/none	Outcome: Hospitalisation (Psychiatric).

												Follow-up: Not reported
24	Ferreira et al.	(2021)	Diogenes Syndrome: A late-onset case in Frontotemporal dementia	Diogenes Syndrome	Case report	Description only	n = 1, 90 year old male,	bvFTD suspected diagnosis given	Portugal/ Spain	Presented with personality changes, memory problems and lack of social insight. Self-neglect and dwelling hoarded with garbage. MMSE 19/30. Deficits in executive tasks.	Poor/none	Outcome: Moved to nursing home, some improvement.
25	Finney & Mendez	(2017)	Diogenes Syndrome in Frontotemporal Dementia	Diogenes Syndrome	Case series	Description only	n = 5, 48m 57m 52m 68f 41m, all with bvFTD, all some form of collecting behaviour	All with behavioural variant Frontal Temporal Dementia (Including personality changes). No other conditions recorded.	USA	48m - MMSE = 21, exec dys, hoarding; 57m - MMSE = 29, exec dys, hoarding and hygiene problems; 52m - MMSE = 22, exec dys, hoarding self-care environment issues; 68f - MMSE = 21, exec dys, hoarding hygiene environment issues; 41m - MMSE = 28, exec dys, wife stopped environment issues	4/5 insight poor/none, 1/5 not reported	Outcome: 3/5 died, 2/5 not reported. Follow-up: Not reported.
26	Flood et al.	(2017)	Recognising Diogenes Syndrome: A Case Report	Diogenes Syndrome	Case report	Description only	n = 1, 82-year-old male	None reported	Ireland	Individual presented with significant physical ill-health. Self-neglect behaviours had been continuing for 10 years. Refused help from family and would always return to living in poor conditions when at home.	Not reported	Not reported
27	Fond et al.	(2011)	The need to consider mood disorders, and especially chronic mania, in cases of Diogenes syndrome (squalor syndrome)	Diogenes Syndrome/ Squalor syndrome	Case report	Description only	n = 1, 69-year-old female	History of depression. Presented with manic mood. Tests found no other issues.	France	Individual refused cleaning help. Patient diagnosed with manic episode in bipolar I. Drug treatment (Olanzapine & Lithium) improved all symptoms.	Poor/none	Outcome: Returned home. Follow-up: At home (2 years).
28	Fontenelle	(2008)	Diogenes syndrome in a patient with obsessive-compulsive disorder without hoarding	Diogenes Syndrome	Case study	Description of personal neglect only	n = 1, 79-year-old male, living alone	OCD	Brazil	Presented with intrusive thoughts and long history of OCD, with symptoms worsening recently. Refused cognitive testing and hesitant about home visit. Denied hoarding or clutter.	Not reported	Outcome Returned home. Follow-up: Not reported

29	Freeman & Byard	(2014)	Fatal hemorrhage from an undiagnosed rectal carcinoma in a case of Diogenes syndrome	Diogenes Syndrome	Case report	Limited description	n = 1, 61-year-old male	None known	Australia	Individual dead when found	Not reported	Dead at first contact
30	Fry	(2000)	Non-senile squalor	Senile/non-senile squalor	Case studies x 2	Description only	Two cases, Middle-aged couple, Middle-aged woman and daughter	Not enough information given	Australia	Cases used as an example of non-senile squalor in reply to a journal article discussing senile squalor	Not reported	Not reported
31	Funayama et al.	(2010)	Squalor syndrome after focal orbitofrontal damage	Squalor Syndrome	Case report	ECCS	n = 1, 49-year-old female, living with husband and children	None apparent	Japan	Individual had orbitofrontal aneurysm at age 40 leading to development of severe squalor symptoms. Had no shame and was happy to receive assistance. ECCS = 26/30, but no significant cognitive impairment. Investigations demonstrated an orbitofrontal lesion, which was causing inappropriate decision making and abnormal impulsivity.	Partial	Not reported
32	Galvez-Andres et al.	(2007)	Secondary bipolar disorder and Diogenes syndrome in frontotemporal dementia - Behavioral improvement with quetiapine and sodium valproate	Diogenes Syndrome	Case report	Description only	n = 1, 59-year-old female	Kluver-Bucy, bipolar secondary to FTD	Spain	Pharmacological intervention had positive effect on the Diogenes Syndrome	Not reported	Outcome: Returned home. Follow-up: Not reported
33	Gleason et al.	(2015)	A preliminary investigation of domestic squalor in people with a history of alcohol misuse: Neuropsychological profile and hoarding behavior - An opportunistic observational study	(Severe) Domestic Squalor	Observational & Cross-sectional	Identified as living in squalor	Reported elsewhere (Lee et al., 2014)	Reported elsewhere (Lee et al., 2014)	Australia	Alcohol misuse reported in 25 out of 69 participants (36%). Alcohol misusers more likely to be younger, male and living in squalor without hoarding rather than squalor with hoarding	Impaired insight in 64/69 participants	Not reported

34	Gregory et al.	(2011)	Living in squalor: Neuropsychological function, emotional processing and squalor perception in patients found living in squalor	Refers to SDS, but only uses "Living in squalor" in the text	Case series	LCRS	n = 6, 76f 75m 81f 77m 77f 67m, all living alone	Dementia x 2, Alcohol abuse x 2, No diagnosis x 2. All MMSE>24	Australia	All some form of executive dysfunction, 2/6 impaired detection of social faux pas, 4/6 some form of memory impairment, 1/6 emotional processing impaired, None disgust impaired, 3/5 said home clean, 5/5 identified squalor from pictures - 4/5 concerned for the individual living there.	3/5 insight poor/none, 2/5 insight normal	Not reported
35	Greve et al.	(2004)	Personality disorder masquerading as dementia: a case of apparent Diogenes syndrome	Diogenes Syndrome	Case report	Description only	n = 1, 80-year-old female	None reported	USA	Presented with functional decline. No dementia or Axis I disorder. Personality disorder proposed.	Poor/none	Follow-up: At home (2 years)
36	Greve et al.	(2007)	Diogenes Syndrome: a five-year follow-up	Diogenes Syndrome	Case report	Description only	n = 1, 85-year-old female	None reported	USA	5 year follow up to Greve et al. (2004). Symptoms continued. Still no Axis I disorder. Executive function mild/none. Personality issues increased.	Poor/none	Follow-up: At home (5 years)
37	Grignon et al.	(1999)	Association of Diogenes syndrome with a compulsive disorder	Diogenes Syndrome	Case report	Description only	n = 1, 48-year-old female	History of depression, compulsions	France	Referred to psychiatric ward. Social. Initially opposed hospitalisation, though this improved. No initial evidence to suggest affective or psychotic disorders, or dementia. Later admitted to history of depression and demonstrated compulsive behaviours.	Not reported	Not reported
38	Guinane et al.	(2019)	Analysis of patients referred for aged care assessment with concerns related to hoarding or squalor	Squalor	Case series - Retrospective analysis	Description only	n = 120, (49 % Male, age not stated)	105 completed cognitive testing - 31 mild cog impairment, 26 no impairment, 18 psychiatric disorder, 7 executive dysfunction, 7 Alzheimer's, 4 Frontotemporal dementia. 64/82 squalor also hoarded.	Australia	Of 120 investigated, 32 hoarding only, 18 squalor only, 64 hoarding and squalor (6 not classified). 55 completed MMSE, Mean average 24/30	Not reported	Not reported

39	Gupta et al.	(2017)	Neurobiological Mediators of Squalor-dwelling Behavior	Squalor-dwelling behaviour	Case report	Description only	n = 1, 70-year-old male, living alone	History of depression	USA	Socially isolated individual. MMSE = 25/30. Executive functions tests suggested borderline impairment. Investigations demonstrated specific cognitive impairments, suspected to be brought about by stroke.	Poor/none	Not reported
40	Halliday & Snowdon	(2009)	The environmental cleanliness and clutter scale (ECCS)	Severe Domestic Squalor	Observational & Cross-sectional	ECCS	n = 55 dwellings (Varying levels of squalor) with 65 people; 82% lived alone. Referent always 65+, 58% occupants male,	Dementia/frontal lobe impairment in 27 (8 due to alcohol), psychotic disorder 16, other 6, no psychiatric diagnosis 6	Australia	Cronbach's alpha 0.94 for ECCS. A score >12 suggests moderate or severe squalor.	Not reported	Not reported
41	Halliday et al.	(2000)	Community study of people who live in squalor	People who live in squalor	Case series	LCRS	n = 81 from 76 households, 72% male, mean age 63 years old, 84% living alone	70% co-occurring mental disorder (Organic mental disorders 22%, psychotic disorders 21%, alcohol abuse 27%, Affective disorders 5%, anxiety disorders 6%). Hoarding seen in 40/76 households.	UK	Mean LCRS interior score 17/39, mean LCRS personal score 5/12. Hoarding present in 51%. 28% regarded their home as clean/very clean, 17% thought their home was as clean or cleaner than others of similar age. 85% had at least 1 chronic illness. Gender, age, attitude to cleaning and mental illness not associated with squalor severity	23/69 insight poor/none, 46/69 insight normal	Not reported
42	Herran & Vazquez-Barquero	(1999)	Treatment of Diogenes syndrome with risperidone	Diogenes Syndrome	Case report	Description only	n = 1, 77-year-old female	Alzheimer's verified later	Spain	Unsuccessful behaviour intervention. Some pharmacological success. Alzheimer's eventual diagnosis.	Poor/none	Outcome: Remained at home. Follow-up: Not reported
43	Hurley et al.	(2000)	Adult service refusers in the greater Dublin area	Diogenes Syndrome	Observational and cross-sectional	Not stated	n = 233 service refusers (45% male, mean age 68 years), 74% living alone	79/110 with DS also hoarded.	Ireland	From 233 service refusers, 110 met criteria for Diogenes Syndrome. Diogenes Syndrome group 48% male, mean age 70 years, 73% lived alone. Under 65 Diogenes individuals more likely to have psychiatric illness than 65+ .	Not reported	Not reported
44	Iqbal et al.	(2010)	A look at Diogenes syndrome	Diogenes Syndrome	Case studies x 3	Description only	n = 3, 78-year-old female, 92-year-old male, 70-year-old female	None reported	USA	All individuals admitted to psychiatric hospital. 78f and 92m resentful and hostile about involvement, 70f ambivalent to involvement.	Not reported	Outcome: 78f - Returned home, 92m - Moved in with sibling, 70F - Not reported. Follow-up: Not reported

45	Irvine & Nwachukwu	(2014)	Recognizing Diogenes syndrome: A case report	Diogenes Syndrome	Case report	Description only	n = 1, 61-year-old female, obese, living alone	Bipolar 1	Canada	Refused treatment and support initially. Eventually accepted cleaning and bipolar medication reinstatement.	Poor/none	Outcome: Returned home. Follow-up: Not reported
46	Ito et al.	(2022)	Diogenes syndrome in a 10-year retrospective observational study: An elderly case series in Tokyo	Diogenes Syndrome	Case-control study	ECCS	n = 61 squalor, (46% male, 59% 75 years or older)	61% dementia (2% FTD), 28% other psychiatric, 5% no disorder	Japan	DS v non-DS significantly different in several ways - Age, marital status, living arrangement, source of income, dementia severity, assistance requirements. Not different - Gender, type of psychiatric conditions, education, service use, relationship with family, outcome. DS predicted by living alone, dementia severity & assistance requirements	Not reported	10-year follow-up: 44% dead, 25% home, 31% moved (NS from non-DS). 1-year mortality sig higher for DS.
47	Jackson	(1997)	Diogenes Syndrome - How should we manage it?	Diogenes Syndrome	Case study	Description only	n = 1, 68-year-old male, living alone	Nothing to suggest any co-morbidities, but no indication from study if any investigation took place	UK	Individual refused help and takes a while to get used to new people. General discussion on management of DS included.	Not reported	Outcome: Remained at home. Follow-up: Not reported
48	Kafetz & Cox	(1982)	ALCOHOL EXCESS AND THE SENILE SQUALOR SYNDROME	Senile Squalor Syndrome	Case study x 2	Description only	n = 2-, 84- and 73-year-old females	Alcohol abuse	UK	Squalor description in heavy drinkers	Not reported	Not reported
49	Karlsson & Gunnarsson	(2018)	Squalor, chaos and feelings of disgust: Care workers talk about older people with alcohol problems	Squalor	Phenomenological - focus groups	Description only	n = 18 focus group participants who work with older adults with alcohol problems	None reported	Sweden	Squalor was one of the main factors. Entry refusal not uncommon	Not applicable	Not reported
50	Khan	(2017)	Diogenes syndrome: a Special manifestation of hoarding disorder	Diogenes Syndrome/ Severe Domestic Squalor	Case report	Description only	n = 1, 78-year-old male, living alone	Nicotine use disorder	USA	Individual demonstrating hoarding and squalor for last month following cancer diagnosis. Pleasant demeanour. Extensive testing showed no cognitive impairment, including executive functioning, and no co-occurring psychiatric conditions.	Poor/none	Not reported
51	Lacombe & Cossette	(2018)	The Role of Public Health in the Development of a Collaborative Agreement with Rural and Semi-	Severe Domestic Squalor	Intervention strategy development	Not stated	N/A	N/A	Canada	Multi-agency intervention agreement reached between municipalities, focusing on the processes of assessment and intervention.	Not applicable	Not applicable

			urban Partners in Cases of Severe Domestic Squalor and Hoarding									
52	Lebert	(2005)	Diogene syndrome, a clinical presentation of fronto-temporal dementia or not?	Diogenes Syndrome	Case series	Caregiver questionnaire	n = 30 (19 male 11 female) Mean age 59, None living alone	All FTD. Alcoholism, non-FTD dementia, neuroleptics (anti-psychotics) excluded. Hoarding in 15/30.	France	Mean MMSE 24.5. At least one DS symptom in 28/30 individuals (Self-neglect and domestic squalor), 11/30 fulfilled criteria for DS. DS symptoms began with FTD in 21/30. Social withdrawal 18/30. Help refused 21/30. Distrust 6/30. Differs from Clark's DS as suspicion, hostility and distrust rare. Need to consider FTD in cases of DS.	30/30 insight poor/none (Lack of concern)	Not reported
53	Lee & LoGiudice	(2012)	Phenomenology of squalor, hoarding and self-neglect: an Australian aged care perspective	Diogenes Syndrome/ Squalor	Case study x 3	Description only	n = 3, 79-year-old female, living alone; 87 year old male, living alone; Husband and wife, no ages given	79f - Chronic Schizophrenia; 87m - Alcohol related dementia, frontal lobe dysfunction; Husband and wife - No mental co-morbidities	Australia	79f - Presented with self-neglect and squalor, socially isolated, lack of shame; 87m - Presented with self-neglect, squalor and hoarding; Husband and wife - Presented with hoarding and squalor due to hoarding, showed shame in state of dwelling. Three cases that could be classified as Diogenes Syndrome, but with different symptoms and co-morbidities.	2/3 insight not reported, 1/3 at least partial insight	Outcome: 79f - Died, 87m - Remained at home; Husband and wife - Remained at home. Follow-up: Not reported.
54	Lee et al.	(2014)	Neuropsychological characteristics of people living in squalor	Squalor	Case series - Retrospective analysis	Description only	n = 69, 48% male, mean age 72 years old (14/69 under 65), 71% lived alone.	History - Affective disorder 36%, anxiety disorder 7%, Schizophrenia 12%, personality disorder 20%, psychological trauma 23%. 28/69 hoarding present before squalor.	Australia	Mean MMSE = 25/30 but 93% had executive dysfunction (45% significant), 73% didn't understand need for assessment and 78% not agreeable to intervention. Where reported 71% showed alcohol abuse and 31% substance abuse. Opinion of aetiology - Vascular cause 44%, alcohol related 23%, psychiatric 15%, non-vascular dementia 15%.	64/69 insight poor/none, 5/69 presumed normal	Not reported
55	Lee et al.	(2017)	A comparison of the neuropsychological profiles of people living in squalor without hoarding to those living in squalor associated with hoarding	Squalor	Case-control study	Description only	Reported elsewhere (Lee et al., 2014)	Reported elsewhere	Australia	Comparison of squalor-only group (n = 41, 51% male) with a squalor + hoarding group (n = 28, 43% male). Demographics similar. The squalor + hoarding group were significantly older, less likely to have alcohol related problems and more likely to have vascular and Alzheimer's type neurodegeneration. Impaired mental flexibility was the only	Reported elsewhere (Lee et al. 2014)	Not reported

										significant neuropsychological predictor that a person was in the squalor-only group.		
56	Luu et al.	(2018)	Squalor in community-referred hoarded homes	Squalor	Case series - retrospective analysis	Varied by site	n = 381 hoarders, site 1 and 2 approximately 40% male, site 3 53% male. Approximately 75% lived alone.	None stated	USA	Presence of squalor varied across sites (72%, 50%, 35%). In all sites, poor access to kitchen and bathroom predicted squalor. Clutter volume and level of insight also predicted squalor at various sites.	Site 1: 52/115 poor/none, Site 2: 68/137 poor/none, Site 3: Av. Score 2.74/4	Not reported
57	Macmillan & Shaw	(1966)	Senile breakdown in standards of personal and environmental cleanliness	Senile breakdown	Case series	Grading system	n = 72 (17% male, 93% 70+ years old), 69% living alone	53% considered to be psychotic, 47% non-psychotic. 3/72 chronic alcoholism, 20 heavy drinkers, 5 alcohol a suspected factor.	UK	Incidence estimated to be 0.5/1000 cases per annum. Individuals socially isolated. Death of a relative who lived with them the most important precipitating factor. Pre-syndrome personality appeared to be domineering, quarrelsome and independent.	Not reported	Follow-up: 36/72 died, 3 lost contact, 5 long-term psychiatric in-patients, 10 in other hospitals, 18 still at home. (1 year)
58	Matsuoka et al.	(2020)	Importance of long-term involvement for older people living in severe squalor: A case report	Diogenes Syndrome	Case report	Description only	n = 1, 88-year-old female	None reported	Japan	Individual initially presented with no mood, psychotic or obsession symptoms and refused help. MMSE = 27/30. Individual followed for approximately 5 years. MMSE scores deteriorated to 21/30 at latest measure. EXIT25 suggested mild executive function impairment.	Not reported	Outcome: Moved into nursing home. Follow-up: Not reported
59	McDermott	(2011)	Ethical decision making in situations of self-neglect and squalor among older people	Squalor	Phenomenological - Observations and interviews	N/A	n = 24 professionals working with individuals living in squalor	N/A	Australia	6 individuals observed and interviewed, 18 more interviewed. Ethical dilemmas commonly revolved around the issue of protection versus autonomy. Due to time limitations, some had a more detached approach. Others took a slower, hands-on approach, feeling that they had a responsibility to act.	Not applicable	Not applicable
60	McDermott & Gleeson	(2009)	Evaluation of the severe domestic squalor project	Severe Domestic Squalor	Observational and cross-sectional	ECCS	n = 218 referrals, 56% male, average age 62, 58% under 65, 85% lived alone), n = 110 accepted onto program.	73% of those accepted onto the program believed to have poor/very poor mental health	Australia	Key indicators available for 57 clients. Clients' living condition improved, they saw a decrease in the number of squalor-related consequences, they were less likely to experience health and safety risks, their social contact improved	Not reported	Not reported

										and employment and volunteering increased.		
61	McDermott et al.	(2009)	Older people living in squalor: Ethical and practical dilemmas	Squalor	Case study x 2	Description only	n = 2, Husband and wife early 80s, female early 60s	Husband and wife - none reported; female had dementia and symptoms of depression, paranoia and anxiety	Australia	Husband and wife - severe clutter and reluctant to accept clean-up due to potential psychological effects. Female - Reluctant to accept help. Slow process has led to her accepting services and becoming more sociable. Process has taken 7 years. Article also documents community program to address squalor. Clients remain with program on average 15 months.	Not reported	Outcome: 2/2 remained at home
62	Monfort et al.	(2017)	Diogenes syndrome: A prospective observational study	Diogenes Syndrome	Case series - Prospective observational	Description only	n = 50, (48% male, mean age 78), 90% living alone	24% psychotic disorder, 40% dementia (26% FTD), 46% no associated disease. Hoarding in 45/50.	France	Mean MMSE = 23/30 , low previous unemployment, traumatic life event in 31/37 life histories collected. Diogenes with associated disease no different on sociodemographic, but more low MMSE scores and worse cognition	Not reported	Not reported
63	Montero-Odasso et al.	(2005)	Is collectionism a diagnostic clue for Diogenes syndrome?	Diogenes Syndrome	Case report	Description only	n = 1, 77-year-old male, lived alone.	None reported	Unclear	Individual presented with social and personal hygiene decline. MMSE = 28/30. Some cognitive impairments, but executive functions normal.	Poor/none (No concern)	Outcome: Remained at home. Follow-up: Not reported
64	Moore	(1989)	Diogenes syndrome	Diogenes Syndrome	Case report	Description only	n = 1, 80-year-old female, living alone	Potential alcohol abuse, personality disorder symptoms	UK	Individual supported at a day clinic, enabling her to continue living at home.	Not reported	Outcome: Remained at home. Follow-up: Not reported
65	Moro et al.	(2013)	Delusional misidentification syndrome and other unusual delusions in advanced Parkinson's disease	Diogenes Syndrome	Case report	No details of squalor given	Case series of 7, one presented with Diogenes - 76-year-old female	Parkinson's disease	Brazil	DS and similar conditions under-reported in Parkinson's disease in elderly.	Not reported	Not reported
66	Nayak et al.	(2015)	Unmasking Diogenes syndrome	Diogenes Syndrome	Case report	Description only	n = 1, 55-year-old female	None reported	India	Presented with skin condition and a breast lump, the appearance of which had led to onset of Diogenes symptoms. Counselling and breast lump (benign) removed.	Not reported	Not reported

67	Ngeh	(2000)	Diogenes syndrome presenting with a stroke in an elderly, bereaved woman	Diogenes Syndrome	Case report	Description only	n = 1, 79-year-old female, living alone	Dementia exacerbated by stroke	UK	Individual socially withdrawn and refused help. Admitted to hospital. No mental disorder but MMSE = 21/30.	Not reported	Outcome: Moved into nursing home. Follow-up: Not reported
68	Norberg & Snowdon	(2014)	Severe domestic squalor	Severe Domestic Squalor	Case report x 2	ECCS	n = 2, 80-year-old female and 67 year old male, both living alone	80f - mild dementia, 67m - alcohol abuse	Unclear	80f - Hoarder, ECCS 24/30, socially isolated, refused house move, mild dementia but not the cause of hoarding/squalor. 67m - No hoarding, ECCS 23/30, alcohol abuse, no objection to cleaning and removal of items.	1/2 insight poor/none, 1/2 insight not reported	Outcome: 80f - Moved into nursing home, 67m - Not reported. Follow-up: Not reported
69	O'Mahony & Evans	(1994)	Diogenes syndrome by proxy	Diogenes Syndrome	Case study	Limited description	n = 1, female, 48yo	None reported	UK	Study focuses on individual who was living in squalor due to the behaviour of their co-habiting daughter. Daughter suffered from hoarding problems for 20 years.	Poor/none (Daughter)	Not reported
70	O'Shea & Falvey	(1997)	Diogenes' syndrome: Review and case history	Diogenes Syndrome	Case report	Description only	n = 1, single, female, 67-year-old	History of schizophrenia, no formal cog dysfunction, but confused. Further psych testing not undertaken	Ireland	Treated with trifluoperazine, mental state improved, but no improvement in insight. 20 months in hospital followed by nursing home. Lack of insight still present at 31-month follow-up.	Poor/none	Outcome: 20 months in hospital. Follow-up: Nursing home (31 months).
71	Padovan et al.	(2018)	From Diogenes syndrome to Asperger's syndrome?	Diogenes Syndrome	Case study	Description only	n = 1, female, 68-year-old	Possible Asperger's syndrome. Some cog deficits, but no neurodegeneration or brain abnormalities	France	DS could be a manifestation of undiagnosed Asperger's. No concern for state of house, thought it was normal. Didn't understand the worries of others.	Poor/none	Not reported
72	Paysant et al.	(2003)	Diogenes syndrome in a family and forensic observations	Diogenes Syndrome	Case study	Description only	One case - Wife (60), husband (?) and daughter (38) living together	None reported	France	Wife's death given medical cause.	Not reported	Wife dead at first contact. No information on other occupants of home.
73	Proctor & Rahman	(2021)	Diogenes Syndrome: Identification and Distinction from Hoarding Disorder	Diogenes Syndrome	Case report	Description only	51 year old male, living alone	Severe depression, no cognitive impairment	UK	Individual found at home in severe squalor. Tests suggested severe depression but no other psychiatric conditions.	Not reported	Outcome: Released to home following significant improvement

74	Raeburn et al.	(2015)	Supporting recovery from hoarding and squalor: Insights from a community case study	Squalor	Case report	ECCS	n = 1, 33-year-old male, living alone	Developmental delay	Australia	Individual presented with low mood and paranoia. Heavy smoker, but no other substance abuse. His levels of squalor appeared to follow his mood. Treated with anti-depressants and anti-psychotics. These eventually led to improvement in all symptoms.	Not reported	Outcome: Remained at home. Follow-up: Not reported.
75	Rasmussen et al.	(2014)	Assessing squalor in hoarding: The home environment index	Squalor	Cross-sectional / Scale development	HEI	n = 793 self-reported hoarders (6% male, mean age 49)	None reported	USA	Mean HEI score = 12.96, HEI has moderate correlation with hoarding levels, but weak/no correlation with elements of DASS. Older hoarders showed less squalor. No difference in HEI scores for gender. Single hoarders have higher HEI scores.	Not applicable	Not applicable
76	Reyes-Ortiz & Mulligan	(1996)	A case of Diogenes syndrome	Diogenes Syndrome	Case report	Limited description	n = 1, 77-year-old male, lived with wife and son	None, though required help with complex skills (IADLs)	USA	Individual refused to communicate or accept professional help. Deteriorated over a period of 3 years before dying following a fall and pneumonia	Not reported	Follow-up: Died (Within 3 years)
77	Rosenthal et al.	(1999)	Diogenes syndrome and hoarding in the elderly	Diogenes Syndrome	Case report x 2	Description only	n = 2, 86-year-old male, 80 year old female, both living alone	Personality disorders	Israel	86m - History of solitary behaviour, hoarding, compulsions, refused help. No cognitive impairment. Diagnosed with schizotypal personality disorder and OCD. 80f - History of solitary behaviour, refused help and initially refused diagnostic tests. Diagnosed with schizoid personality disorder.	Not reported	Outcome: 86m - Discharged to nursing home, 80f - Returned home. Follow-up: 86m - At home (2 years), 80f - At home (5 years).
78	Sacchi et al.	(2021)	Diogenes syndrome in dementia: a case report	Diogenes Syndrome	Case report	Description only	n = 1, 77-year-old male	High alcohol consumption and bvFTD diagnosed	Italy	Individual hospitalised with confusion, behavioural changes and delusions. MMSE = 26/30. In depth testing led to diagnosis of behavioural variant fronto-temporal dementia.	Not reported	Outcome: Moved into nursing home. Follow-up: Not reported
79	Sadlier et al.	(2011)	Diogenes syndrome and autistic spectrum disorder	Diogenes Syndrome	Case report	Description only	n = 1, 72-year-old male living alone	ASD	Ireland	Hospitalised following assault. MMSE normal, no psychosis. Significant executive dysfunction and suspected underlying autistic spectrum disorder.	Poor/none	Not reported
80	Sami et al.	(2014)	Diogenes syndrome causing life-threatening complications of paget's disease	Diogenes Syndrome	Case report	Description of personal neglect only	n = 1, 83-year-old female	Early dementia	UK	History of social isolation becoming more severe. MMSE 24/30. Diagnosed with early mixed dementia.	Not reported	Outcome: Moved into nursing home. Follow-up: Not reported

81	Shaw & Shah	(1996)	Squalor syndrome and psychogeriatric admissions	Squalor Syndrome	Case-control study	Presence of key features	n = 16 squalor (55% male), n = 17 no squalor (41% male)	Squalor group - 50% dementia, 25% depression, 6 % psychotic disorder. No squalor group - 29% dementia, 52% depression, 18% psychotic disorders.	UK	Demographic data showed no differences between the squalor group and the no squalor group. Squalor individuals were significant less likely to present on psychotropic drugs and likely to be receiving more services, have longer admissions and be discharged to more dependent accommodation.	Not reported	Not reported
82	Sheehan & Geddes	(1998)	Re: Diogenes syndrome: Review and case history [3]	Diogenes Syndrome	Case report	Limited description	n = 1, 50-year-old female	History of depression, frontal deficits due to tumour	UK	Tumour removed, discharged home after two months. Another self-neglect incident later in association with psychosis. Lack of concern for her situation throughout.	Poor/none	Outcome: Returned home. Follow-up: Not reported
83	Sheridan & Jamieson	(2015)	Life-threatening Folic Acid Deficiency: Diogenes Syndrome in a Young Woman?	Diogenes Syndrome	Case report	Description of personal neglect only	n = 1, 28-year-old female, living with partner	History of opioid abuse	UK	Presented withdrawn and uncommunicative. Found to have a folic acid deficiency.	Not reported	Outcome: Returned home. Follow-up: Not reported.
84	Sikdar	(1999)	Diogenes syndrome: a case report	Diogenes Syndrome	Case report	Description only	n = 1, 72-year-old male, living alone	Alcohol-related problems	UK	Individual led a solitary existence. MMSE = 28/30. Tests showed frontal lobe dysfunction.	Poor/none	Outcome: Moved into nursing home. Follow-up: Not reported
85	Smith	(2001)	Shit is good: mental health social work with lives of squalor	Squalor	Case study x 3	Description only	n = 3, 55-year-old male, 70-80 year old male, 60 year old female, all living alone	55m - Personality disorder, obsessions. 70-80m - Schizophrenia. 60f - None reported	UK	55m - Rituals and obsessions, isolation, feeling of hopelessness. 70-80m - Anger, paranoia, isolation and refusal of services. 60f - Extreme clutter, sociable, significant loss.	Not reported	Not reported
86	Snowdon & Halliday	(2011)	A study of severe domestic squalor: 173 cases referred to an old age psychiatry service	Severe Domestic Squalor	Observational and cross-sectional	LCRS	n = 173 (64% male, all 65+, mean age 76 years old). 120/173 moderate or severe squalor. Mod/Sev squalor 81% lived alone (Mild 75%)	Mod/Sev - 35% dementia, 24% substance abuse, 15% psychotic disorder, 9% personality disorder, 3% depression, 5% no diagnosis (Mild around the same). 76/115 mod/sev squalor also hoarded.	Australia	Mod/sev squalor - Around 1/3 major hoarding, 1/3 moderate hoarding, 1/3 mild/no hoarding. Hoarding less likely in dementia and substance abuse groups than in personality or no diagnosis groups	Not reported	Follow-up: 74/156 at home, 19 moved, 50 in nursing home, 13 died (1 year). 12/19 at home, 6 in nursing home, 1 died (2 years)

87	Snowdon et al.	(2013)	Two types of squalor: Findings from a factor analysis of the Environmental Cleanliness and Clutter Scale (ECCS)	Squalor	Observational and cross-sectional	ECCS	n = 203 (53% male, mean age 62 years old). 82% live alone.	None reported	Australia	Mean ECCS score 18.5/30. ECCS Cronbach's Alpha = 0.72. Two-factor solution - "Squalor" and "Hoarding". Out of 186 completed ECCS, 56% high on squalor and/or hoarding, 34% high hoarding, 38% high squalor, 15% high both hoarding and squalor.	Not reported	Not reported
88	Tesauro et al.	(2021)	The Environmental Cleanliness and Clutter Scale (ECCS) in the management of sanitary risks in dwellings of hoarders in North Italy	Domestic squalor	Cross-sectional / Scale assessment	ECCS	First stage, n = 20 hoarders, 30% male (Mean age 64), 70% female (Mean age 56), 60% living alone. Second stage, n = 20 hoarders, no data.	None reported	Italy	First stage - 20 home visits, 4 mild squalor, 6 moderate, 10 severe. Second stage - 15 dwellings rated by experienced worker and novice. Scores rarely matched but overall rating (Mild, moderate, severe) the same in 14/15 cases. ECCS a reliable and valid method of assessing squalor/hoarding.	Not applicable	Not reported
89	Tiffon & Fernandez	(2021)	Sexual sadism towards a minor and Diogenes Syndrome with the hiding of a cadaver	Diogenes Syndrome	Case study	Description only	Middle-aged male	Possible schizotypal personality disorder	Spain	DS symptoms began following individual's murder of a child at their home.	Not reported	Jailed
90	Ungvari & Hantz	(1991)	SOCIAL BREAKDOWN IN THE ELDERLY .1. CASE-STUDIES AND MANAGEMENT	Social breakdown in the elderly	Case reports x 2	Description only	n = 2, 84-year-old male, 68-year-old male, both living alone	None reported	New Zealand	Both individuals admitted to hospital. Both showed evasive and detached behaviours and little shame. Both individuals treated successfully with pharmacotherapy and behavioural programs.	Not reported	Outcome: 2/2 moved to nursing home. Follow-up: 1/2 nursing home (1 year), 1/2 died (8 months).
91	Vostanis & Dean	(1992)	SELF-NEGLECT IN ADULT LIFE	Diogenes Syndrome	Case report x 2	Description only	n = 2, 35-year-old female, living with partner, 38-year-old female, living alone	None in one case, non-reported in the second	UK	Both individuals showed some awareness of their surroundings, but not the severity, describing themselves as lazy. Neither was diagnosed with a psychiatric condition, however both showed some of the criteria for schizoid or paranoid personality disorder. Both refused help.	2/2 partial insight	Outcome: 35f - Moved to a supervised hostel, 38f - Still at home.
92	Waserman et al.	(2014)	Harnessing neuroplasticity in Diogenes syndrome: A proposed mechanism to explain clinical improvement	Diogenes Syndrome	Case report	Description only	n = 1, 76-year-old male, living alone	History of alcohol abuse	Canada	Hospitalised. Lack of insight and opposed treatment. Multidisciplinary approach led to improvement.	Poor/none	Outcome: Moved to nursing home. Follow-up: Returned home (6 months)

93	Williams et al.	(1998)	Diogenes' syndrome in patients with intellectual disability: 'A rose by any other name'?	Diogenes Syndrome	Case study x 2	Description only	n = 2, 53-year-old female, 50-year-old female, neither living alone	Both have intellectual disabilities	UK	Both individuals socially withdrawn. 53f moved in with mother and symptoms improves. 50f pharmacotherapy improved some obsessive symptoms but Diogenes symptoms remain	Not reported	Outcome: 53f - moved in with mother, 50f - continued living with sister. Follow-up: Not reported.
94	Wrigley & Cooney	(1992)	DIOGENES SYNDROME - AN IRISH SERIES	Diogenes Syndrome	Case series	Description only	n = 29 (31% male, mean age 78), 72% living alone	13 dementia, 3 alcohol dependence, 3 schizophrenia, 10 no psychiatric diagnosis	Ireland	Incidence approximately 0.5/1000. 29 individuals assessed. MMSE scores suggest 15 impaired, 8 no impairment, 6 unknown.	Not reported	Outcomes/follow -up: 12 remained at home, 5 died, 9 in nursing home, 2 moved in with relatives, 1 in psychiatric care (No indication of time scale).
95	Zivkovic & Nikolic	(2014)	Philemon and Baucis, Diogenes and syllogomania, Wischnewski and hypothermia - Gastric mucosal lesions in partially mummified bodies	Diogenes Syndrome	Case report	Description only	n = 2, brothers, 65 and 63 years old, living together	Chronic alcoholism	Serbia	Brothers isolated, with mobility problems, poor socioeconomic conditions, found dead. Cause of death uncertain but homicide and suicide largely ruled out.	Not reported	Dead at first contact
96	Zuliani et al.	(2012)	Diogenes syndrome associated with hyperostosis frontalis interna: A possible role for frontal dysfunction?	Diogenes Syndrome	Case report	Description only	n = 1, 78-year-old female, living alone	None reported	Italy	Admitted to hospital due to fall, MMSE normal, found to have hyperostosis frontalis interna, a frontal lobe dysfunction, which may explain Diogenes symptoms	Not reported	Outcome: Died
97	Zuliani et al.	(2013)	Diogenes syndrome or isolated syllogomania? Four heterogeneous clinical cases	Diogenes Syndrome	Case report x 4	Description only	n = 4, 74-year-old male, living alone; 43-year-old male, living alone; 78-year-old female (Detailed in Zuliani et al., 2012); 67-year-old female, living with husband	74m - Alcoholism; 43m - psychosis & Low IQ, 78f - none; 67f - potential Alzheimer's	Italy	74m - Cognitive impairment identified - MMSE 19/30; 43m - Had lived with parents before their death, all with Diogenes symptoms; 67f - MMSE 23/30, probable Alzheimer's	Not reported	Outcome: 74m - Moved to nursing home, 67f - Returned home. Follow-up: 67f - Still at home (28 months and 34 months). Not reported for other cases.

98	North Tyneside Safeguarding Adults Board	2016	Self-neglect guidance	Diogenes Syndrome	Case report	Description only	n = 1, 92-year-old female, living alone	Personality disorder	UK	Individual isolated and reluctant to accept support. Improvement a slow process. Received long term support.	Not reported	Outcome: Remained at home until died (9 years)

Appendix 2.2

Complete Database of AH Studies

Item	Author	Year	Title	Term used to describe squalor	Methodological approach	Squalor measurement used	Sample size/characteristics	Mental co-morbidities	Location of study	Summary of findings	Insight	Outcome/follow-up
1	Arluke et al.	(2002)	Press reports of animal hoarding	None	Content analysis	N/A	100 animal hoarding articles	N/A	USA + UK	Five themes identified in the way the press characterised animal hoarding and hoarders - Drama (treat as a crime story), revulsion (Focus on living conditions), sympathy (For the hoarder), indignation (Focus on unexpected individuals or aspects) and humour (Highlighting comic weirdness).	N/A	N/A
2	Arluke et al.	(2002)	Health implications of animal hoarding	None	Case series - retrospective analysis	Key sanitary activities rated	n = 71 animal hoarding cases (17% male). Median age 53 for males and 55 for females. 10/66 (No age rating for 5 individuals) were 65 or older. 46% lived alone.	Object hoarding in all cases	USA + Canada	Activities for maintaining a sanitary household (Eg. Use of bath/shower, maintaining personal hygiene, using toilet) impaired in 50-75% of cases. Greater impairment was seen in those living alone. Residence unsanitary in 93% of cases and 17% deemed unfit for human habitation and condemned.	Not reported	None reported
3	Berry et al.	(2005)	Long-term outcomes in animal hoarding cases	None	Case series - retrospective analysis	None	n = 56 cases of animal hoarding where charges were filed, 27% of primary offenders were male. 33% of males and 55% of females were between 50-59 years old.	None reported	USA	Charges of animal cruelty were as follows: 5 cases misdemeanour & felony, 36 cases misdemeanour, 4 cases felony, 3 cases summary animal cruelty violation, 8 cases no animal cruelty charge. Additional charges included failure to licence, failure to vaccinate and failure to maintain sanitary conditions. In 26% of cases, the individual was ordered to attend pretrial psychological assessment. In 48% of cases, the individual was found guilty. In 27%, a plea deal was agreed.	Not reported	None reported
4	Brown	(2011)	Theoretical concepts from self-psychology applied to animal hoarding	None	Theoretical analysis	N/A	N/A	N/A	USA	Article discusses self-psychology as an explanation of animal hoarding, using the following themes: Animals performing an important function, as the person believes that he or she feels love from them; Animal hoarders see animals as an extension of themselves and not as independent others, leading to a lack of empathy; Animal hoarders project their own emotions on to the animal to support their sense of self; Hoarders have two opposing parts of themselves to take the true nature of their situation out of their day-to-day thinking.	N/A	N/A

5	Burniston	(2016)	Professional perspectives on Animal Hoarding	None	Qualitative - Inductive thematic analysis	Description only	Interviews with 12 individuals who have professional experience with animal hoarding.	N/A	UK	Common themes amongst animal hoarding professionals: Animal hoarding considered to be multiple animal households, but also requires neglect or suffering of the animals. Forms of animal hoarding usually classified as commercial or overwhelmed rescuer. Overwhelmed rescuers - animal suffering unintentional, denial common. Often accompanied by personal neglect and suffering including squalid living and object hoarding. Animals commonly replacements for people. Repetition and maintenance of issues - recidivism common. Needs to be considered an animal AND human problem.	Not reported	N/A
6	Calvo et al.	(2014)	Characteristics of 24 cases of animal hoarding in Spain	None	Case series and case report x 2	Description only	24 residences with n= 27 animal hoarders (48% male). 63% of individuals were over 65 years old. 83% lived alone.	Object hoarding in 44% of cases	Spain	The sanitary conditions of the dwelling was only reported in 11/24 cases. In 7/11, conditions were described as very untidy, unsanitary, accumulated garbage and animal faeces/urine. Insight appeared to be poor - Only 3/24 cases admitted that they were living in compromised conditions.	21/24 poor/none, 3/24 at least partial	3/24 cases were described as recidivist
7	Campos-Lima et al.	(2015)	Hoarding pet animals in obsessive-compulsive disorder	None	Health and Safety Guidelines	Description only	n = 420 diagnosed with OCD (45% male, mean age 36 years old). n = 2 animal hoarding cases, 35-year-old female and 59 year old male.	35f - OCD, major depressive disorder, hoarding disorder. 59m - OCD, hoarding disorder, ADHD	Brazil	Animal hoarding only present in 2/420 OCD cases suggesting there is little or no relationship between the two conditions. The two animal hoarding individuals both showed household squalor.	2/2 poor/none	Outcome: 35f - Prescribed SSRI and referred for therapy. 59m - treatment ineffective.
8	Castrodale et al.	(2010)	General public health considerations for responding to animal hoarding cases	None	Case studies	N/A	N/A	N/A	USA	Animal hoarding cases are complex, require prolonged response and multiple agencies. The before, during and after of each case should be considered and key factors such as disease exposure, air quality, potential injuries and PPE should all be considered.	N/A	N/A
9	Crawford	(2020)	Animal hoarding and its effects on children: Observations from a humane law enforcement professional	None	Cross-sectional	Description only	n = 5 case studies, all involving children	None reported	Unclear	Case studies highlight the extreme conditions that children may be inhabiting due to animal hoarding and neglect. In each case, child protective services brought in. Common for children to form a strong bond with the animals. Observations regarding the children in these cases suggest: Children believe the outside world cares more about the animals than them and that they won't be believed. Children are in physical and emotional danger and that there is little interagency collaboration.	Not reported	Children removed, but often only temporarily
10	da Cunha et al.	(2017)	Frequency and spatial distribution of animal and	None	Case study	None	113 cases of hoarding, 65 cases of animal hoarding	Of 65 animal hoarders, 24 (37%) also hoarded objects	Brazil	65 cases of animal hoarding in a population of approximately 1,750,000, suggests 1 case of animal hoarding per 100,000 inhabitants.	Not reported	None reported

			object hoarders behaviour in Curitiba, Parana									
11	da Cunha et al.	(2020)	Spatial serosurvey of anti-Toxoplasma gondii antibodies in individuals with animal hoarding disorder and their dogs in Southern Brazil	None	Cross-sectional	Key squalor elements assessed	n = 19 individuals in 11 households (+ 264 dogs)	None reported	Brazil	7/19 individuals tested positive for anti-T. Gondii antibodies (21/264 dogs). There appeared to be no relationship between positivity in dogs and positivity in humans. This suggests presence of dogs in animal hoarding does not increase risk of T. Gondii seroprevalence. Furthermore, there appeared to be no relationship between T. Gondii seroprevalence and variables related to unsanitary living conditions. No squalor data included.	Not reported	None reported
12	Da Cunha et al.	(2021)	Sociodemographic, income, and environmental characteristics of individuals displaying animal and object hoarding behavior in a major city in South Brazil: A cross-sectional study	None	Cross-sectional	None	Sample was a sub-sample of that used in Da Cunha et al., 2017. n = 39 cases of AH, 10 male, variety of ages, mean 62 years old	Of 39 animal hoarders, 14 (36%) also hoarded objects	Brazil	Both AH and OH significant for odour. OH significant risk of fire and risk of landslip.	Not reported	Not reported
13	da Cunha et al.	(2022)	Serological survey of anti-Leptospira spp. antibodies in individuals with animal hoarding disorder and their dogs in a major city of Southern Brazil	None	Cross-sectional	Key squalor elements assessed	Reported elsewhere (Da Cunha et al., 2020)	None reported	Brazil	No individuals tested positive for anti-Leptospira spp. antibodies (16/264 dogs). Seropositivity in dogs related to cat hoarding and flood occurrence.	Not reported	None reported
14	d'Angelo et al.	(2020)	Human-Animal Relationship Dysfunction: A Case Study of Animal Hoarding in Italy	None	Case series - retrospective analysis	Description only	n = 1 (Mrs P.), no age reported	None reported	Italy	Finding focus on health of animals, which was severely neglected. Hygiene of living environment was poor. Judicial proceedings against individual were numerous and continuing. Despite interventions, animal hoarding problems continued.	Not reported	None reported

15	Dozier et al.	(2019)	A description of 17 animal hoarding case files from animal control and a humane society	None	Observational and cross-sectional	None	n = 17 animal hoarding cases	Object hoarding in 53% of cases	USA	Average cost of the case was $20,000 and in 23% of cases, the individual was jailed. In only 2 cases, the individual was referred to mental health services.	12/ 17 poor/none, 5/17 not reported	None reported
16	Elliott et al.	(2019)	Characteristics of animal hoarding cases referred to the RSPCA in New South Wales, Australia	Squalor	Cross-sectional	ECCS	n = 50 individuals in 48 dwellings (22% male, 63% age 50 or over), 40% lived alone.	Object hoarding in 46%	Australia	ECCS was completed to the minimum level (7 of 10 items completed) in 29 properties. 51% of these showed severe squalor and 21% showed moderate squalor. Mean ECCS score was 18. This was lower in rural properties than in urban dwellings.	Not reported	None reported
17	Ferreira et al.	(2017)	Animal Hoarding Disorder: A new psychopathology ?	None	Cross-sectional	None	n = 33 animal hoarders (27% male, Mean age 61), 52% live alone, 64% of individuals 60 years old or over	Object hoarding in 57% of cases	Brazil	Evidence to suggest Animal Hoarding as a separate category to Hoarding Disorder. Suggests areas where this sample contradicts the DSM-5 criteria for Animal Hoarding (Insight, presence of object hoarding).	24/33 insight poor/none, 9/33 insight normal	None reported
18	Ferreira et al.	(2020)	Psychopathological Comorbid Symptoms in Animal Hoarding Disorder	None	Phenomenological - Interviews and text analysis	None	Reported elsewhere (Ferreira et al., 2017)	Reported elsewhere (Ferreira et al., 2017)	Brazil	Nine key domains for diagnosis of psychopathology evaluated. From clinical interview, 36% depressive symptomology, 21% mania symptoms, 18% OCD symptoms, 27% memory deficits, some distinct anxiety disorder symptoms. MMSE average score 24/30.	Reported elsewhere (Ferreira et al., 2017)	None reported
19	Holmberg	(2014)	Sensuous Governance: Assessing Urban Animal Hoarding	None	Cross-sectional	Description only	n = 21 interviews with animal hoarding professionals and animal hoarders themselves	None reported	Sweden	Article discusses sensuous governance and the ways in which authorities use and record their senses to make a judgement. Article discusses the "First glance", the "Recording numbers and/or individuals" and the role of "Smelling odour, seeing dirt, hearing noise".	N/A	None reported
20	Joffe et al.	(2014)	Characteristics of persons convicted for offences relating to animal hoarding in New South Wales	None	Case studies	None	n = 29 individuals convicted for animal hoarding offences (24 dwellings, 28% male, Mean age 55 years old)	None reported	Australia	Animal hoarders in this sample were significantly more likely to be female and middle age (40-64). All animal living areas were considered to be unsanitary. 31% of the entire premises were considered to be unsanitary, but unclear whether rest were fine, or not assessed. Mean cost per case - $26,000.	Not reported	Recidivism occurred in 24% of the cases
21	Lawrie	(2005)	Animal hoarders in Australia: Shining light through dark shades	None	Case report x 3	Description only	n = 10 individuals in 9 dwellings. 50% male, ages varied but mostly in 50s or 60s. 8/10 lived alone.	One diagnosed paranoid schizophrenic. None reported for other cases.	Australia	More detailed information presented for 7 out of 9 cases. Condition of dwelling severely neglected in 4/7 cases. Individuals were difficult to manage in 4/7 cases. Hoarding or collecting found in 5/7 dwellings.	Not reported	None reported
22	Mielke	(2015)	A pilot study of potential public health hazards in the animal	None	Case series - retrospective analysis	Several environmental measures taken	Four homes. 2 animal hoarder and 2 controls.	None reported	USA	Regarding structure and safety, health, and obstacles, the number of issues increased as the number of pets increased. Faeces, urine, dampness and ants were present at both animal hoarding sites, whereas only ants were present at one of the	N/A	None reported

			hoarding environment							control sites and none at the other. Animal hoarding dwellings described as showing deterioration, disrepair and lack of hygiene.		
23	Ockenden et al.	(2014)	Animal hoarding in Victoria, Australia: An exploratory study	None	Observational and cross-sectional	Description only	n = 22 animal hoarders (37% male, mostly middle-age - 45% in their 50s), 46% lived alone	27% had a diagnosed mental condition. A condition was suspected in a further 41%. 45% also hoarded objects.	Australia	In all cases, animal hoarding was suspected to be due to a traumatic life event. 68% of dwellings were considered to be very unhygienic, 9% not clean and in 23% condition was not recorded. Key theme was the need for involvement of mental health services.	Not reported	Outcome/follow-up: Recidivism in 41%, no recidivism 23%, unknown 36%.
24	Paloski et al.	(2020)	Cognitive performance of individuals with animal hoarding	None	Case series - retrospective analysis	None	Reported elsewhere (Ferreira et al., 2017)	Reported elsewhere (Ferreira et al., 2017)	Brazil	MMSE average score 24/30 - 27% of sample considered substandard. Verbal fluency test - 9% considered substandard. Rey Complex Figure - 40% substandard. WASI Similarities test - 73% substandard.	Reported elsewhere (Ferreira et al., 2017)	None reported
25	Patronek	(1999)	Hoarding of animals: an under-recognized public health problem in a difficult-to-study population	None	Case-control study	Rating scale (1-5)	n = 54 animal hoarding cases (24% male, 37% age 40-59, 46% age 60 or over), 56% living alone.	Object hoarding as follows: 26% newspapers, 39% trash, 17% pet food, 9% human food. Other items also hoarded.	USA	Prevalence estimates for animal hoarding 0.8 cases per 100,000, equates to 700-2000 cases in the USA per year. Living areas of animal hoarders inspected in 49 cases, 78% of which were described as cluttered and unsanitary. In 38 cases, conditions were rated from 1-5, with 5 being the most unsanitary. 41% of those rated scored 5/5 with another 22% scoring 4/5. Unsanitary condition of home acknowledged by 10 out of 38. Home condemned in 11% of cases.	28/38 poor/none, 10/38 at least partial insight	26% of cases led to some form of supervision.
26	Ramos et al.	(2013)	Early-stage animal hoarders: are these owners of large numbers of adequately cared for cats?	None	Case study x 6 (A-F)	None	n = 60 cat owners. 30 with 1-2 cats and 30 with 20+ cats. None were animal hoarders.	4 in each group identified as clinically anxious. 1 in '1-2 cats' group and 4 in '20+ cats' identified as clinically depressed.	Brazil	No animal hoarders involved in the study. Comparison of individuals who have 20+ cats with those who have 1-2 cats. '20+ cats' group found to be older and show a stronger attachment to their cats, but not more likely to have anxiety, depression, or hoarding tendencies. A significant correlation was found between attachment to pets and depression scores, but only in the '1-2 cats' group.	N/A	None reported
27	Reinisch	(2009)	Characteristics of six recent animal hoarding cases in Manitoba	None	Observational and cross-sectional	Description only	1/6 male. Specific ages not recorded. 1 middle age, 2 elderly.	Object hoarding reported in 2/6. Suspected mental illness in 1/6.	Canada	Awareness of situation/co-operation with authorities: A - Some awareness, B - Initially uncooperative, eventually agreed on euthanasia of animals. C - Good awareness and co-operative, D - Individual moved to nursing home, remaining dwellers co-operative, E - No co-operation, F - Poor awareness. B and D probably squalor, A and E probably just object hoarding, C and F no information on personal environment.	1/6 poor/none, 1/6 partial, 1/6 normal, 3/6 unclear	A - Animals removed, not returned, no follow-up. B - 1 year follow-up showed improvement. C - Admitted to psychiatric facility, no

												follow-up. D - Hoarder moved into nursing home, 1 year follow-up individual died, E - Refused 1 year follow-up. F - several follow-ups. Animal numbers increased, conditions variable.
28	Slyne et al.	(2013)	Characteristics of animal owners among individuals with object hoarding	None	Cross-sectional	None	Sample 1 - n = 550 object hoarders (5% male, mean age 52 years old). 14 individuals owned >10 animals. Sample 2 - n = 494 family and friends of hoarders. 25 suggested loved ones owned >10 animals.	None reported	USA	Individuals with high animal ownership did not differ significantly from low ownership in terms of severity of object hoarding, depression levels or schizotypy. High animal ownership was more likely to make sacrifices involving money, social life and cleanliness of home (Though actual condition of home was not significantly different). Family and friends (Sample 2) suggested high animal ownership had more problems with cleanliness and condition of their home and experienced more impact on social life.	Not reported	None reported
29	Snowdon et al.	(2019)	Mental health of animal hoarders: a study of consecutive cases in New South Wales	Squalor	Mixed methods and exploratory	ECCS	Reported elsewhere (Elliott, Snowdon, Halliday, Hunt & Coleman, 2019)	Mental health services involved with 22% of cases. Belief that mental health and/or substance abuse contributed to hoarding behaviours in 58% of cases.	Australia	ECCS scores not associated with number of animals. Severe squalor identified in 51% of rated cases, moderate squalor in 21% of rated cases. ECCS scores associated with perceived mental health problems - ECCS in perceived mental health homes = 24, ECCS in non-mental health homes = 11.	Not reported	None reported
30	Steketee et al.	(2011)	Characteristics and Antecedents of People Who Hoard Animals: An Exploratory Comparative Interview Study	None	Case series	None	n = 16 animal hoarders and n = 11 controls. Animal hoarders - 6% male, Mean age 50, 56% living alone.	Object hoarding in 31% of animal hoarders.	USA	Demographics of animal hoarders did not differ significantly from controls. Qualitative and quantitative analysis suggests that animal hoarders and non-hoarding animal owners differ in several ways - Children who become animal hoarders show a greater attachment to pets, attachment to parents issues, more negative life events, more social isolation and more household obligations. Animal	Not reported	None reported

										hoarding adults have stronger emotional reactions to animals, fewer restrictions on animal behaviour, more life stress, smaller social networks, more dysfunctional relationships with others, more mental health problems.		
31	Strong et al.	(2019)	A Collaborative Model for Managing Animal Hoarding Cases	None	Case study	None	n = 6 animal hoarders	None reported	USA	Development of a multi-agency collaborative model for managing animal hoarding cases. Approach increased live release rate from approximately 75% to 92% in these 6 cases. 4 of the individuals were receptive to help, 1 was in extreme denial, 1 was passed onto Child Protective Services as children were involved.	1/6 poor/none, 1/6 not reported, 4/6 at least partial	Follow up: 4/6 symptoms improved, 1/6 some improvement due to supervision, 1/6 lost to follow-up (Follow-up ranged from 1-18 months)
32	Svanberg & Arluke	(2016)	The Swedish swan lady: Reaction to an apparent animal hoarding case	None	Cross-sectional	Description only	n = 1, 68-year-old female	None reported	Sweden	Unique case of swan collecting/hoarding. Small apartment was found covered in swan faeces. Media portrayed the 'Swan Lady' either as an "Animal lover" or as a "Criminal". The case was not considered as animal hoarding and no mental health investigation was suggested.	Not reported	Individual died 3 years later.
33	Ung et al.	(2017)	An Exploratory Investigation of Animal Hoarding Symptoms in a Sample of Adults Diagnosed with Hoarding Disorder	None	Content analysis	None	n = 65 individuals with hoarding disorder (30% male, mean age 58)	None reported	USA	54% of the sample owned pets. Average number of pets owned was 2. The number of pets owned was not associated with hoarding severity. 27% of the pet owners sacrificed cleanliness of their home and 30% sacrificed the condition of their home for their pets. Maximum number of pets as a child (Under 18) correlated significantly with hoarding severity.	Not reported	None reported
34	Vaca-Guzman & Arluke	(2005)	Normalizing passive cruelty: The excuses and justifications of animal hoarders	None	Case study	N/A	n = 116 animal hoarding cases from 163 articles analysed	None reported	USA	Animal hoarding individuals either justified their hoarding, or made excuses for it. Justifications included denial, being a good Samaritan, or being a victim of the system. Excuses included difficulty of the task, defeasibility, scapegoating, lack of intentionality, self-handicapping and appealing to accidents. Most common were denial (15%), Good Samaritan (16%) and Appealing to accidents (17%).	N/A	None reported
35	Volkan	(2021)	Hoarding and Animal Hoarding: Psychodynamic and Transitional Aspects	None	Content analysis and intervention analysis	Description only	n = 1, middle-aged female, living with two daughters	None reported	USA	The individual showed awareness of her environment. The dwelling was relatively neat but showed signs of the excessive number of cats, including fur, some dried faeces and a strong odour. Had split up with husband due to refusal to stop taking in cats.	At least partial	None reported

36	Vucinic & Dimitrijevic	(2007)	Body condition and physical care scales in three cases of dog hoarding from Belgrade	None	Pilot study - case-control	Description only	n = 3 animal hoarding cases. 70-year-old female; Three females living together; Middle-aged female.	None reported	Serbia	In all cases, there were symptoms of object hoarding. In the first case, the dwelling was described as very unsanitary. No rating of the individual's living condition was given in the other two cases.	Not reported	None reported
37	Williams et al	(2020)	What is equine hoarding and can 'motivational interviewing' training be implemented to help enable behavioural change in animal owners?	None	Intervention strategy development	N/A	Study 1 - 6 interviews, 1 focus group. Study 2 - Training delivered to 26 individuals. All participants worked with World Horse Welfare	None reported	UK	Study 1 - Interviews and focus groups suggested that equine hoarding met the characteristics of animal hoarding, including the key types of animal hoarders. Study 2 - Motivational Interviewing skills and theory training showed an increase in confidence, knowledge and skills of the participants.	N/A	None reported
38	Wootten	(2017)	Rethinking legal regulation of animal hoarding	None	Intervention strategy development	N/A	N/A	N/A	Australia	Article considers present strategies for animal hoarding management and how these may be improved. Suggests that the problem revolves around a focus on legislation and acts of cruelty. This approach does not reduce animal hoarding and stretches RSPCA resources. Also, the orders which prohibit animal ownership are difficult to monitor. Finally, the care of seized animals is a concern and the underlying psychology of the individual not addressed. Author proposes reforms including animal hoarding having specific legislation and processes which trigger therapeutic involvement in cases.	N/A	N/A

Appendix 2.3

Risk of Bias table

Item	Author	Year	Title	MMAT 2011				MMAT 2018				
				1	2	3	4	1	2	3	4	5
1	Aamodt et al.	2015	Cognitive Profiles of Elder Adult Protective Services Clients Living in Squalor	3.1 Y	3.2 Y	3.3 Y	3.4 Y	3.1 Y	3.2 Y	3.3 Y	3.4 N	3.5 N/A
2	Ashworth et al.	2018	TD: The case of Diogenes Syndrome-deficit or denial?	4.1 N	4.2 Y	4.3 Y	4.4 N/A	4.1 Y	4.2 Y	4.3 Y	4.4 N/A	4.5 N/A
3	Badr et al.	2005	Diogenes syndrome: When self-neglect is nearly life threatening	No research question or objective				No research question or objective				
4	Batool & Hussain	2015	Diogenes syndrome in a patient suffering from neurodegenerative disease	1.1 N	1.2 N/A	1.3 N	1.4 N	1.1 Y	1.2 Y	1.3 N/A	1.4 N	1.5 N
5	Biswas et al.	2013	Diogenes syndrome: a case report	1.1 N	1.2 N/A	1.3 N	1.4 N	1.1 Y	1.2 Y	1.3 N/A	1.4 N/A	1.5 N
6	Blagodatny et al.	2007	Management of Diogenes syndrome: behavioral disorder of self-neglect	No research question or objective				No research question or objective				
7	Bonci et al.	2012	A case of diogenes syndrome: Clinical and ethical challenges	4.1 N	4.2 Y	4.3 N	4.4 N/A	4.1 Y	4.2 Y	4.3 N	4.4 N/A	4.5 N/A
8	Boyd & Alexander	2010	Diogenes' syndrome and intellectual disability: An uncommon association or under diagnosed?	1.1 N	1.2 N/A	1.3 N	1.4 N	1.1 Y	1.2 Y	1.3 N/A	1.4 Y	1.5 Y
9	Boynton	2014	Indicators of diogenes syndrome in community dwelling elderly	3.1 Y	3.2 N	3.3 Y	3.4 Y	3.1 Y	3.2 N	3.3 Y	3.4 N	3.5 N/A
10	Browne & Hegde	2015	Diogenes syndrome: Patients living with hoarding and squalor	4.1 N	4.2 Y	4.3 N	4.4 N/A	4.1 Y	4.2 Y	4.3 N	4.4 N/A	4.5 N/A
11	Campbell et al.	2005	Diogenes syndrome: frontal lobe dysfunction or multi-factorial disorder?	4.1 N	4.2 Y	4.3 Y	4.4 N/A	4.1 Y	4.2 Y	4.3 Y	4.4 N/A	4.5 N/A
12	Camps & Bigot	2019	A psychoanalytical approach to diogenes syndrome	1.1 Y	1.2 N/A	1.3 Y	1.4 N	1.1 Y	1.2 N	1.3 N/A	1.4 Y	1.5 N
13	Chan et al.	2007	Late-onset Diogenes syndrome in Chinese - an elderly case series in Hong Kong	4.1 Y	4.2 Y	4.3 Y	4.4 N/A	4.1 Y	4.2 Y	4.3 Y	4.4 Y	4.5 N/A
14	Cherian et al.	2021	Assessment of squalor in migrant colonies of Thiruvalla Province of Kerala, India using rapid survey technique	3.1 Y	3.2 Y	3.3 N	3.4 Y	3.1 Y	3.2 Y	3.3 Y	3.4 N	3.5 N/A

15	Clark	1999	Senile squalor syndrome: two unusual cases	No research question or objective				No research question or objective					
16	Clark et al.	1975	DIOGENES SYNDROME - CLINICAL-STUDY OF GROSS NEGLECT IN OLD-AGE	4.1 Y	4.2 N	4.3 Y	4.4 N/A	4.1 Y	4.2 Y	4.3 N	4.4 Y	4.5 N/A	
17	Cole et al.	1992	A CASE OF SENILE SELF-NEGLECT IN A MARRIED COUPLE - DIOGENES-A-DEUX	4.1 N	4.2 Y	4.3 N	4.4 N/A	4.1 Y	4.2 Y	4.3 N	4.4 N/A	4.5 N/A	
18	Cooper et al.	1992	Diogenes Syndrome	No research question or objective				No research question or objective					
19	Darke & Duflou	2017	Characteristics, circumstances and pathology of sudden or unnatural deaths of cases with evidence of pathological hoarding	4.1 Y	4.2 Y	4.3 Y	4.4 N/A	4.1 Y	4.2 Y	4.3 Y	4.4 Y	4.5 Y	
20	Donnelly et al	2008	Comorbid diogenes and capgras syndromes	4.1 N	4.2 Y	4.3 N	4.4 N/A	4.1 Y	4.2 Y	4.3 Y	4.4 N/A	4.5 N/A	
21	Drummond et al.	1997	Diogenes' syndrome - a load of old rubbish?	4.1 Y	4.2 Y	4.3 N	4.4 N/A	4.1 Y	4.2 Y	4.3 N	4.4 Y	4.5 N	
22	Eren et al.	2015	Medicolegal Approach to Diogenes Syndrome: a Case Report	1.1 Y	1.2 N/A	1.3 N	1.4 N	1.1 Y	1.2 N	1.3 N/A	1.4 N/A	1.5 N/A	
23	Esposito et al.	2003	Diogenes syndrome in a pair of siblings	4.1 N	4.2 Y	4.3 N	4.4 N/A	4.1 Y	4.2 Y	4.3 N	4.4 N/A	4.5 N/A	
24	Ferreira et al.	2021	Diogenes Syndrome: A late-onset case in Frontotemporal dementia	4.1 N	4.2 Y	4.3 Y	4.4 N/A	4.1 Y	4.2 Y	4.3 Y	4.4 N/A	4.5 N/A	
25	Finney & Mendez	2017	Diogenes Syndrome in Frontotemporal Dementia	4.1 N	4.2 Y	4.3 Y	4.4 N/A	4.1 N/A	4.2 Y	4.3 N/A	4.4 Y	4.5 N/A	
26	Flood et al.	2017	Recognising Diogenes Syndrome: A Case Report	No research question or objective				No research question or objective					
27	Fond et al.	2011	The need to consider mood disorders, and especially chronic mania, in cases of Diogenes syndrome (squalor syndrome)	4.1 N	4.2 Y	4.3 N	4.4 N/A	4.1 Y	4.2 Y	4.3 Y	4.4 N/A	4.5 N/A	
28	Fontenelle	2008	Diogenes syndrome in a patient with obsessive-compulsive disorder without hoarding	1.1 Y	1.2 N/A	1.3 Y	1.4 N	1.1 Y	1.2 Y	1.3 N/A	1.4 N	1.5 Y	
29	Freeman & Byard	2014	Fatal hemorrhage from an undiagnosed rectal carcinoma in a case of Diogenes syndrome	No research question or objective				No research question or objective					
30	Fry	2000	Non-senile squalor	1.1 N	1.2 N/A	1.3 N	1.4 N	1.1 Y	1.2 N	1.3 N/A	1.4 N/A	1.5 N/A	
31	Funayama et al.	2010	Squalor syndrome after focal orbitofrontal damage	4.1 N	4.2 Y	4.3 N	4.4 N/A	4.1 Y	4.2 Y	4.3 Y	4.4 N/A	4.5 N/A	

32	Galvez-Andres et al.	2007	Secondary bipolar disorder and diogenes syndrome in frontotemporal dementia - Behavioral improvement with quetiapine and sodium valproate	No research question or objective				No research question or objective				
33	Gleason et al.	2015	A preliminary investigation of domestic squalor in people with a history of alcohol misuse: Neuropsychological profile and hoarding behavior - An opportunistic observational study	3.1 N	3.2 N	3.3 Y	3.4 N	3.1 N	3.2 N	3.3 N	3.4 N	3.5 N/A
34	Gregory et al.	2011	Living in squalor: Neuropsychological function, emotional processing and squalor perception in patients found living in squalor	4.1 Y	4.2 Y	4.3 Y	4.4 N/A	4.1 Y	4.2 N	4.3 Y	4.4 N	4.5 N/A
35	Greve et al.	2004	Personality disorder masquerading as dementia: a case of apparent Diogenes syndrome	4.1 N	4.2 Y	4.3 N	4.4 N/A	4.1 Y	4.2 Y	4.3 N	4.4 N/A	4.5 N/A
36	Greve et al.	2007	Diogenes Syndrome: a five-year follow-up	4.1 N	4.2 Y	4.3 N	4.4 N/A	4.1 Y	4.2 Y	4.3 N	4.4 N/A	4.5 N/A
37	Grignon et al.	1999	Association of Diogenes syndrome with a compulsive disorder	4.1 N	4.2 Y	4.3 N	4.4 N/A	4.1 Y	4.2 N	4.3 N	4.4 N/A	4.5 N/A
38	Guinane et al.	2019	Analysis of patients referred for aged care assessment with concerns related to hoarding or squalor	4.1 Y	4.2 Y	4.3 Y	4.4 N/A	4.1 Y	4.2 Y	4.3 N	4.4 N	4.5 N
39	Gupta et al.	2017	Neurobiological Mediators of Squalor-dwelling Behavior	4.1 N	4.2 Y	4.3 Y	4.4 N/A	4.1 Y	4.2 Y	4.3 Y	4.4 N/A	4.5 N/A
40	Halliday & Snowdon	2009	The environmental cleanliness and clutter scale (ECCS)	3.1 Y	3.2 Y	3.3 Y	3.4 Y	3.1 Y	3.2 Y	3.3 Y	3.4 Y	3.5 N/A
41	Halliday et al.	2000	Community study of people who live in squalor	3.1 Y	3.2 Y	3.3 Y	3.4 Y	3.1 Y	3.2 Y	3.3 Y	3.4 Y	3.5 N/A
42	Herran & Vazquez-Banquero	1999	Treatment of Diogenes syndrome with risperidone	4.1 N	4.2 Y	4.3 N	4.4 N/A	4.1 Y	4.2 Y	4.3 N	4.4 N/A	4.5 N/A
43	Hurley et al.	2000	Adult service refusers in the greater Dublin area	3.1 N	3.2 N	3.3 N	3.4 Y	3.1 Y	3.2 N	3.3 Y	3.4 N	3.5 N/A
44	Iqbal et al.	2010	A look at diogenes syndrome	1.1 N	1.2 N/A	1.3 N	1.4 N	1.1 Y	1.2 N	1.3 N/A	1.4 N/A	1.5 N
45	Irvine & Nwachukwu	2014	Recognizing Diogenes syndrome: A case report	4.1 N	4.2 Y	4.3 N	4.4 N/A	4.1 Y	4.2 Y	4.3 N	4.4 N/A	4.5 N/A
46	Ito et al.	2022	Diogenes syndrome in a 10-year retrospective observational study: An elderly case series in Tokyo	3.1 Y	3.2 Y	3.3 Y	3.4 Y	3.1 Y	3.2 Y	3.3 Y	3.4 N	3.5 N/A
47	Jackson	1997	Diogenes Syndrome - How should we manage it?	1.1 N	1.2 N/A	1.3 N	1.4 Y	1.1 Y	1.2 N	1.3 N/A	1.4 Y	1.5 Y
48	Kafetz & Cox	1982	ALCOHOL EXCESS AND THE SENILE SQUALOR SYNDROME	1.1 Y	1.2 N/A	1.3 N	1.4 N	1.1 Y	1.2 N	1.3 N/A	1.4 N/A	1.5 N

49	Karlsson & Gunnarsson	2018	Squalor, chaos and feelings of disgust: Care workers talk about older people with alcohol problems	1.1 Y	1.2 Y	1.3 Y	1.4 N	1.1 Y	1.2 Y	1.3 Y	1.4 Y	1.5 Y
50	Khan	2017	Diogenes syndrome: a Special manifestation of hoarding disorder	4.1 N	4.2 Y	4.3 N	4.4 N/A	4.1 Y	4.2 Y	4.3 N	4.4 N/A	4.5 N/A
51	Lacombe & Cossette	2018	The Role of Public Health in the Development of a Collaborative Agreement with Rural and Semi-urban Partners in Cases of Severe Domestic Squalor and Hoarding	Not appropriate for assessment				Not appropriate for assessment				
52	Lebert	2005	Diogene syndrome, a clinical presentation of fronto-temporal dementia or not?	3.1 N	3.2 N	3.3 Y	3.4 Y	3.1 Y	3.2 Y	3.3 Y	3.4 Y	3.5 N/A
53	Lee & LoGiudice	2012	Phenomenology of squalor, hoarding and self-neglect: an Australian aged care perspective	1.1 Y	1.2 N/A	1.3 Y	1.4 N	1.1 Y	1.2 Y	1.3 N/A	1.4 Y	1.5 Y
54	Lee et al.	2014	Neuropsychological characteristics of people living in squalor	3.1 N	3.2 Y	3.3 Y	3.4 Y	3.1 N	3.2 N	3.3 N	3.4 N	3.5 N/A
55	Lee et al.	2016	A comparison of the neuropsychological profiles of people living in squalor without hoarding to those living in squalor associated with hoarding	3.1 N	3.2 Y	3.3 Y	3.4 Y	3.1 N	3.2 N	3.3 Y	3.4 Y	3.5 N/A
56	Luu et al.	2018	Squalor in community-referred hoarded homes	3.1 Y	3.2 N	3.3 Y	3.4 Y	3.1 Y	3.2 Y	3.3 N	3.4 N	3.5 N/A
57	Macmillan & Shaw	1966	Senile breakdown in standards of personal and environmental cleanliness	4.1 Y	4.2 Y	4.3 N	4.4 N/A	4.1 N	4.2 Y	4.3 N	4.4 Y	4.5 N
58	Matsuoka et al.	2020	Importance of long-term involvement for older people living in severe squalor: A case report	4.1 N	4.2 Y	4.3 Y	4.4 N/A	4.1 Y	4.2 Y	4.3 Y	4.4 N/A	4.5 N/A
59	McDermott	2011	Ethical decision making in situations of self-neglect and squalor among older people	1.1 Y	1.2 N	1.3 Y	1.4 N	1.1 Y	1.2 Y	1.3 Y	1.4 Y	1.5 Y
60	McDermott & Gleeson	2009	Evaluation of the severe domestic squalor project	4.1 N	4.2 Y	4.3 N	4.4 N/A	4.1 N	4.2 N	4.3 Y	4.4 N	4.5 N
61	McDermott et al.	2009	Older people living in squalor: Ethical and practical dilemmas	1.1 Y	1.2 N/A	1.3 Y	1.4 N	1.1 Y	1.2 N	1.3 N/A	1.4 Y	1.5 Y
62	Monfort et al.	2017	Diogenes syndrome: A prospective observational study	3.1 N	3.2 Y	3.3 Y	3.4 Y	3.1 N	3.2 N	3.3 Y	3.4 N	3.5 N/A
63	Montero-Odasso et al.	2005	Is collectionism a diagnostic clue for Diogenes syndrome?	4.1 N	4.2 N	4.3 Y	4.4 N/A	4.1 Y	4.2 N	4.3 Y	4.4 N/A	4.5 N/A
64	Moore	1989	Diogenes syndrome	No research question or objective				No research question or objective				
65	Moro et al.	2013	Delusional misidentification syndrome and other unusual delusions in advanced Parkinson's disease	4.1 N	4.2 N	4.3 Y	4.4 N/A	4.1 Y	4.2 N	4.3 N	4.4 N/A	4.5 N/A

66	Nayak et al.	2015	Unmasking diogenes syndrome	4.1 N	4.2 N	4.3 N	4.4 N/A	4.1 Y	4.2 N	4.3 N	4.4 N/A	4.5 N/A
67	Ngeh	2000	Diogenes syndrome presenting with a stroke in an elderly, bereaved woman	No research question or objective				No research question or objective				
68	Norberg & Snowdon	2014	Severe domestic squalor	4.1 N	4.2 Y	4.3 N	4.4 N/A	4.1 Y	4.2 Y	4.3 N	4.4 N/A	4.5 N/A
69	O'Mahony & Evans	1994	Diogenes syndrome by proxy	1.1 N	1.2 N/A	1.3 N	1.4 N	1.1 Y	1.2 N	1.3 N/A	1.4 N/A	1.5 N/A
70	O'Shea & Falvey	1997	Diogenes' syndrome: Review and case history	4.1 N	4.2 Y	4.3 N	4.4 N/A	4.1 Y	4.2 Y	4.3 N	4.4 N/A	4.5 N/A
71	Padovan et al.	2018	From Diogenes syndrome to Asperger's syndrome?	1.1 Y	1.2 N/A	1.3 N	1.4 N	1.1 Y	1.2 N	1.3 N/A	1.4 N	1.5 N/A
72	Paysant et al.	2003	Diogenes syndrome in a family and forensic observations	No research question or objective				No research question or objective				
73	Proctor & Rahman	2021	Diogenes Syndrome: Identification and Distinction from Hoarding Disorder	4.1 N	4.2 Y	4.3 Y	4.4 N/A	4.1 Y	4.2 Y	4.3 Y	4.4 N/A	4.5 N/A
74	Raeburn et al.	2015	Supporting recovery from hoarding and squalor: Insights from a community case study	4.1 N	4.2 Y	4.3 N	4.4 N/A	4.1 Y	4.2 Y	4.3 N	4.4 N/A	4.5 N/A
75	Rasmussen et al.	2014	Assessing squalor in hoarding: The home environment index	3.1 N	3.2 Y	3.3 Y	3.4 Y	3.1 N	3.2 Y	3.3 Y	3.4 N	3.5 N/A
76	Reyes-Ortiz & Mulligan	1996	A case of diogenes syndrome	4.1 N	4.2 N	4.3 N	4.4 N/A	4.1 Y	4.2 N	4.3 N	4.4 N/A	4.5 N/A
77	Rosenthal et al.	1999	Diogenes syndrome and hoarding in the elderly	4.1 N	4.2 Y	4.3 N	4.4 N/A	4.1 Y	4.2 Y	4.3 N	4.4 N/A	4.5 N/A
78	Sacchi et al.	2021	Diogenes syndrome in dementia: a case report	4.1 N	4.2 N	4.3 Y	4.4 N/A	4.1 Y	4.2 N	4.3 Y	4.4 N/A	4.5 N/A
79	Sadlier et al.	2011	Diogenes syndrome and autistic spectrum disorder	4.1 N	4.2 Y	4.3 Y	4.4 N/A	4.1 Y	4.2 Y	4.3 N	4.4 N/A	4.5 N/A
80	Sami et al.	2014	Diogenes syndrome causing life-threatening complications of paget's disease	4.1 N	4.2 N	4.3 Y	4.4 N/A	4.1 Y	4.2 N	4.3 Y	4.4 N/A	4.5 N/A
81	Shaw & Shah	1996	Squalor syndrome and psychogeriatric admissions	3.1 Y	3.2 N	3.3 Y	3.4 Y	3.1 Y	3.2 N/A	3.3 Y	3.4 N	3.5 N/A
82	Sheehan & Geddes	1998	Re: Diogenes syndrome: Review and case history [3]	4.1 N	4.2 Y	4.3 N	4.4 N/A	4.1 Y	4.2 N	4.3 N	4.4 N/A	4.5 N/A

83	Sheridan & Jamieson	2015	Life-threatening Folic Acid Deficiency: Diogenes Syndrome in a Young Woman?	4.1 N	4.2 N	4.3 Y	4.4 N/A	4.1 Y	4.2 N	4.3 N	4.4 N/A	4.5 N/A
84	Sikdar	1999	Diogenes syndrome: a case report	4.1 N	4.2 Y	4.3 N	4.4 N/A	4.1 Y	4.2 Y	4.3 N	4.4 N/A	4.5 N/A
85	Smith	2001	Shit is good: mental health social work with lives of squalor	1.1 Y	1.2 N/A	1.3 Y	1.4 N	1.1 Y	1.2 Y	1.3 N/A	1.4 Y	1.5 Y
86	Snowdon & Halliday	2011	A study of severe domestic squalor: 173 cases referred to an old age psychiatry service	3.1 Y	3.2 Y	3.3 Y	3.4 Y	3.1 Y	3.2 Y	3.3 Y	3.4 N	3.5 N/A
87	Snowdon et al.	2013	Two types of squalor: Findings from a factor analysis of the Environmental Cleanliness and Clutter Scale (ECCS)	3.1 N	3.2 Y	3.3 Y	3.4 Y	3.1 N	3.2 Y	3.3 Y	3.4 N	3.5 N/A
88	Tesauro et al.	2021	The Environmental Cleanliness and Clutter Scale (ECCS) in the management of sanitary risks in dwellings of hoarders in North Italy	3.1 N	3.2 Y	3.3 Y	3.4 Y	3.1 N	3.2 Y	3.3 Y	3.4 N	3.5 N/A
89	Tiffon & Fernandez	2021	Sexual sadism towards a minor and Diogenes Syndrome with the hiding of a cadaver	1.1 N	1.2 N/A	1.3 N	1.4 N	1.1 Y	1.2 N	1.3 N/A	1.4 N/A	1.5 N/A
90	Ungvari & Hantz	1991	SOCIAL BREAKDOWN IN THE ELDERLY .1. CASE-STUDIES AND MANAGEMENT	4.1 N	4.2 Y	4.3 N	4.4 N/A	4.1 Y	4.2 Y	4.3 N	4.4 N/A	4.5 N/A
91	Vostanis & Dean	1992	SELF-NEGLECT IN ADULT LIFE	4.1 N	4.2 Y	4.3 N	4.4 N/A	4.1 Y	4.2 Y	4.3 N	4.4 N/A	4.5 N/A
92	Waserman et al.	2014	Harnessing neuroplasticity in Diogenes syndrome: A proposed mechanism to explain clinical improvement	4.1 N	4.2 Y	4.3 N	4.4 N/A	4.1 Y	4.2 Y	4.3 N	4.4 N/A	4.5 N/A
93	Williams et al.	1998	Diogenes' syndrome in patients with intellectual disability: 'A rose by any other name'?	1.1 Y	1.2 N/A	1.3 N	1.4 N	1.1 Y	1.2 Y	1.3 N/A	1.4 Y	1.5 Y
94	Wrigley & Cooney	1992	DIOGENES SYNDROME - AN IRISH SERIES	4.1 Y	4.2 Y	4.3 N	4.4 N/A	4.1 Y	4.2 Y	4.3 N	4.4 Y	4.5 N
95	Zivkovic & Nikolic	2014	Philemon and Baucis, Diogenes and syllogomania, Wischnewski and hypothermia - Gastric mucosal lesions in partially mummified bodies	4.1 N	4.2 Y	4.3 N	4.4 N/A	4.1 Y	4.2 Y	4.3 N	4.4 N/A	4.5 N/A
96	Zuliani et al.	2012	Diogenes syndrome associated with hyperostosis frontalis interna: A possible role for frontal dysfunction?	4.1 N	4.2 Y	4.3 N	4.4 N/A	4.1 Y	4.2 Y	4.3 N	4.4 N/A	4.5 N/A
97	Zuliani et al.	2013	Diogenes syndrome or isolated syllogomania? Four heterogeneous clinical cases	4.1 N	4.2 Y	4.3 Y	4.4 N/A	4.1 Y	4.2 Y	4.3 Y	4.4 N/A	4.5 N/A
98	North Tyneside Safeguarding Adults Board	2016	Self-neglect guidance	Not appropriate for assessment				Not appropriate for assessment				

1	Arluke et al.	2002	Press reports of animal hoarding	1.1 Y	1.2 Y	1.3 Y	1.4 N	1.1 Y	1.2 Y	1.3 Y	1.4 Y	1.5 Y
2	Arluke et al.	2002	Health implications of animal hoarding	4.1 Y	4.2 N	4.3 N	4.4 N/A	4.1 Y	4.2 N	4.3 N	4.4 Y	4.5 N
3	Berry et al.	2005	Long-term outcomes in animal hoarding cases	4.1 Y	4.2 Y	4.3 Y	4.4 N/A	4.1 Y	4.2 N	4.3 N/A	4.4 N/A	4.5 N
4	Brown	2011	Theoretical concepts from self psychology applied to animal hoarding	Not appropriate for assessment				Not appropriate for assessment				
5	Burniston	2016	Professional perspectives on Animal Hoarding	1.1 Y	1.2 Y	1.3 Y	1.4 N	1.1 Y	1.2 N	1.3 Y	1.4 Y	1.5 Y
6	Calvo et al.	2014	Characteristics of 24 cases of animal hoarding in Spain	4.1 Y	4.2 Y	4.3 Y	4.4 N/A	4.1 Y	4.2 Y	4.3 N	4.4 N/A	4.5 N
7	Campos-Lima et al.	2014	Hoarding pet animals in obsessive-compulsive disorder	4.1 Y	4.2 N	4.3 N	4.4 N/A	4.1 Y	4.2 Y	4.3 N	4.4 Y	4.5 N/A
8	Castrodale et al.	2010	General public health considerations for responding to animal hoarding cases	Not appropriate for assessment				Not appropriate for assessment				
9	Crawford	2020	Animal hoarding and its effects on children: Observations from a humane law enforcement professional	1.1 N	1.2 N/A	1.3 Y	1.4 N	1.1 Y	1.2 Y	1.3 N/A	1.4 Y	1.5 Y
10	da Cunha et al.	2017	Frequency and spatial distribution of animal and object hoarders behaviour in Curitiba, Parana	3.1 Y	3.2 N	3.3 Y	3.4 N	3.1 N	3.2 Y	3.3 Y	3.4 Y	3.5 N/A
11	da Cunha et al.	2020	Spatial serosurvey of anti-Toxoplasma gondii antibodies in individuals with animal hoarding disorder and their dogs in Southern Brazil	3.1 N	3.2 Y	3.3 Y	3.4 N	3.1 Y	3.2 N	3.3 N	3.4 N	3.5 N/A
12	da Cunha et al.	2021	Sociodemographic, income, and environmental characteristics of individuals displaying animal and object hoarding behavior in a major city in South Brazil: A cross-sectional study	3.1 Y	3.2 Y	3.3 Y	3.4 N	3.1 Y	3.2 Y	3.3 Y	3.4 N	3.5 N/A
13	da Cunha et al.	2022	Serological survey of anti-Leptospira spp. antibodies in individuals with animal hoarding disorder and their dogs in a major city of Southern Brazil	3.1 N	3.2 Y	3.3 Y	3.4 N	3.1 Y	3.2 N	3.3 N	3.4 N	3.5 N/A
14	d'Angelo et al.	2020	Human-Animal Relationship Dysfunction: A Case Study of Animal Hoarding in Italy	1.1 N	1.2 N/A	1.3 Y	1.4 N	1.1 Y	1.2 Y	1.3 N/A	1.4 Y	1.5 Y
15	Dozier et al.	2019	A description of 17 animal hoarding case files from animal control and a humane society	4.1 N	4.2 Y	4.3 N	4.4 N/A	4.1 Y	4.2 N	4.3 N	4.4 Y	4.5 N
16	Elliott et al.	2019	Characteristics of animal hoarding cases referred to the RSPCA in New South Wales, Australia	3.1 Y	3.2 Y	3.3 Y	3.4 N	3.1 Y	3.2 Y	3.3 Y	3.4 N	3.5 N/A
17	Ferreira et al.	2017	Animal Hoarding Disorder: A new psychopathology?	3.1 N	3.2 Y	3.3 Y	3.4 N	3.1 N	3.2 N/A	3.3 Y	3.4 Y	3.5 N/A

18	Ferreira et al.	2020	Psychopathological Comorbid Symptoms in Animal Hoarding Disorder	3.1 N	3.2 Y	3.3 Y	3.4 N	3.1 N	3.2 Y	3.3 Y	3.4 Y	3.5 N/A
19	Holmberg	2014	Sensuous Governance: Assessing Urban Animal Hoarding	1.1 Y	1.2 Y	1.3 Y	1.4 N	1.1 Y	1.2 Y	1.3 Y	1.4 Y	1.5 Y
20	Joffe et al.	2014	Characteristics of persons convicted for offences relating to animal hoarding in New South Wales	3.1 Y	3.2 N	3.3 N	3.4 N	3.1 Y	3.2 N	3.3 Y	3.4 N	3.5 N/A
21	Lawrie	2005	Animal hoarders in Australia: Shining light through dark shades	1.1 N	1.2 N/A	1.3 Y	1.4 N	1.1 Y	1.2 N	1.3 N/A	1.4 N	1.5 N
22	Marijana & Dimitrijevic	2007	Body condition and physical care scales in three cases of dog hoarding from Belgrade	4.1 N	4.2 Y	4.3 Y	4.4 N/A	4.1 Y	4.2 Y	4.3 Y	4.4 Y	4.5 N
23	Mielke	2015	A pilot study of potential public health hazards in the animal hoarding environment	3.1 N	3.2 N	3.3 N	3.4 Y	3.1 N/A	3.2 Y	3.3 Y	3.4 N	3.5 N/A
24	Ockenden et al.	2014	Animal hoarding in Victoria, Australia: An exploratory study	4.1 N	4.2 Y	4.3 N	4.4 N/A	4.1 Y	4.2 N	4.3 N/A	4.4 Y	4.5 N
25	Paloski et al.	2020	Cognitive performance of individuals with animal hoarding	3.1 N	3.2 Y	3.3 Y	3.4 N	3.1 N	3.2 Y	3.3 Y	3.4 Y	3.5 N/A
26	Patronek	1999	Hoarding of animals: an under-recognized public health problem in a difficult-to-study population	4.1 N	4.2 Y	4.3 N	4.4 N/A	4.1 Y	4.2 N	4.3 N/A	4.4 Y	4.5 N
27	Ramos et al.	2013	Early stage animal hoarders: are these owners of large numbers of adequately cared for cats?	3.1 N	3.2 Y	3.3 Y	3.4 Y	3.1 N/A	3.2 Y	3.3 Y	3.4 Y	3.5 N/A
28	Reinisch	2009	Characteristics of six recent animal hoarding cases in Manitoba	1.1 Y	1.2 N/A	1.3 N	1.4 N	1.1 Y	1.2 Y	1.3 N/A	1.4 Y	1.5 Y
29	Slyne et al.	2013	Characteristics of animal owners among individuals with object hoarding	3.1 Y	3.2 Y	3.3 N	3.4 Y	3.1 Y	3.2 Y	3.3 Y	3.4 N	3.5 N/A
30	Snowdon et al.	2020	Mental health of animal hoarders: a study of consecutive cases in New South Wales	3.1 Y	3.2 N	3.3 Y	3.4 N	3.1 Y	3.2 Y	3.3 Y	3.4 N	3.5 N/A
31	Steketee et al.	2011	Characteristics and Antecedents of People Who Hoard Animals: An Exploratory Comparative Interview Study	5.1 Y	5.2 Y	5.3 Y		5.1 Y	5.2 Y	5.3 Y	5.4 N/A	5.5 N
32	Strong et al.	2019	A Collaborative Model for Managing Animal Hoarding Cases	4.1 N	4.2 Y	4.3 Y	4.4 N/A	4.1 N	4.2 Y	4.3 N/A	4.4 N	4.5 N/A
33	Svanberg & Arluke	2016	The Swedish swan lady: Reaction to an apparent animal hoarding case	1.1 N	1.2 N/A	1.3 Y	1.4 N/A	1.1 Y	1.2 Y	1.3 N/A	1.4 N	1.5 N
34	Ung et al.	2017	An Exploratory Investigation of Animal Hoarding Symptoms in a Sample of Adults Diagnosed With Hoarding Disorder	3.1 N	3.2 Y	3.3 Y	3.4 Y	3.1 N	3.2 Y	3.3 Y	3.4 N	3.5 N/A

35	Vaca-Guzman & Arluke	2005	Normalizing passive cruelty: The excuses and justifications of animal hoarders	1.1 N	1.2 Y	1.3 N	1.4 N/A	1.1 Y	1.2 N	1.3 Y	1.4 Y	1.5 Y
36	Volkan	2021	Hoarding and Animal Hoarding: Psychodynamic and Transitional Aspects	1.1 Y	1.2 N/A	1.3 N	1.4 N	1.1 Y	1.2 Y	1.3 N/A	1.4 N	1.5 N
37	Williams et al.	2020	What is equine hoarding and can 'motivational interviewing' training be implemented to help enable behavioural change in animal owners?	3.1 N	3.2 N	3.3 Y	3.4 Y	3.1 N	3.2 Y	3.3 Y	3.4 N	3.5 N/A
38	Wootten	2017	Rethinking legal regulation of animal hoarding	Not appropriate for assessment				Not appropriate for assessment				

Appendix 3.1

Online survey – Including study information and consent processes

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Start of Block: Eligibility check

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Q95
Research Project Title: Factors that influence the cleanliness and organisation of the home environment

Before continuing, please confirm that you are over 18 years of age and that you do not presently live in a dwelling belonging to your parent(s)/guardian(s) or live in University Halls of Residence.

- ☐ I am over 18 years of age (1)
- ☐ I do not live in a house belonging to a parent or guardian (2)
- ☐ I do not live in University halls of residence (3)

End of Block: Eligibility check

Start of Block: Information sheet

Q82
Research Project Title: Factors that influence the cleanliness and organisation of a student dwelling: A longitudinal study

You are being invited to take part in an online research study collecting information on the cleanliness and organisation of your student house or flat. The following information will explain why the research is being conducted and what it will Involve. It is important that you read the information sheet carefully and ensure that you fully understand what you will be expected to do during the study. If there is anything that is unclear, please discuss it with others, or contact the research organisers for more information.

What is the project's purpose?
The aim of this study is to investigate the cleanliness and organisation of an individual's house or flat,

the amount of effort made by different individuals, beliefs about social roles, mental health and alcohol/substance use.
The study is being conducted as part of a PhD Investigating individuals' living environments.

Why have I been chosen?
This research is investigating a student population and has contacted you due to your status as a student of the University of Sheffield. In addition to being a student at the University of Sheffield, eligible participants must be at least 18 years old. Also, potential participants must not be living in a house owned by a parent or guardian and must not be living in halls of residence. Any student who is willing to complete the necessary questions and fulfils these minimum requirements of age and home living circumstances can be included.

Do I have to take part?
It is completely your choice whether you wish to take part or not. There will be no negative consequences if you choose not to take part, or if you begin the study, but decide not to complete it. If at any point during the completion of the questionnaire you wish to stop participating, then you are free to do so by closing your browser window. Incomplete survey data will be deleted and not used in the analysis process. Also, if on completion of the study you wish to remove your data from the research, you can do so up to two weeks later by contacting the lead researcher listed below. After this time, all data will be anonymised and withdrawal will not be possible. If you do decide to stop your participation at any point, it will not have any impact on you academically, as completion is not a requirement for any module or course.
Please note that that by choosing to participate in this research, this will not create a legally binding agreement, nor is it intended to create an employment relationship between you and the University of Sheffield.

What will happen to me if I take part? What do I have to do?
All participants will be required to complete 7 sets of questions on two occasions. These will Include questions about yourself and your living arrangements, your alcohol and substance use, your mental health and your views on effort and social roles. You will be required to complete all questions, which is expected to take 10-15 minutes. You will then be contacted by email at the beginning of December to complete the same set of questions again. The data collection dates are as follows:

Stage 1: 22/11/21 - 28/11/21
Stage 2 - 21/03/22 - 27/03/22

The analysis of the data relies on completion at both time points. If you are not willing to participate on both occasions, then please do not continue. All materials that you are required to complete are based online, meaning the only requirement is a device which has internet access.
For the data to be reliable, it is important that your responses are as accurate as possible. Some of the questions may ask you sensitive information regarding alcohol, drugs, mental health, or your cleaning habits. If you feel uncomfortable or unwilling to answer any of the questions, then you are free to stop participating at any point. However, if you are content to answer all the questions, please

do so accurately and to the best of your ability. Any responses that you provide will be kept confidential.

What are the possible disadvantages and risks of taking part?
There are no significant risks to taking part in this study. However, the questions are investigating a number of sensitive topics. It is possible that by answering these questions, you experience some distress, or it may lead to concerns about your mental health, substance use or other situation. In many of these cases, an initial step will be to see your GP to discuss your concerns. However, other options are available. The NHS website suggests a number of different ways of getting advice:
Mental health - https://www.nhs.uk/mental-health/
Alcohol - https://www.nhs.uk/live-well/alcohol-support/
Drugs - https://www.nhs.uk/live-well/healthy-body/drug-addiction-getting-help/

Alternatively, if you have any concerns related to the research itself, please contact the lead researcher via the contact details below.

What are the possible benefits of taking part?
Although there are no direct benefits to the individual taking part in this study, research of this kind will help improve the understanding of why individuals live in extreme conditions and what can be done to help them.

Will my taking part in this project be kept confidential?
All the Information that is collected during the course of the research will be kept strictly confidential and will only be accessible to members of the research team. You will also not be identified in any reports or publications that arise from the data collected. You will be asked to enter your email address which will allow us to contact you for the second stage of data collection and will identify your responses if you wish to withdraw your data following completion. However, no other information that could lead to identification of the participant will be stored.
Following completion of the study, data will be made available to the UK Data Service to be used in future research projects. However, this will not include your email address or any other identifiable information. If you would prefer for your answers to not be made available to a data archive then this can be indicated in the consent process.

What is the legal basis for processing my personal data?
According to data protection legislation, we are required to inform you that the legal basis we are applying in order to process your personal data is that ‘processing is necessary for the performance of a task carried out in the public interest’ (Article 6(1)(e)). Further information can be found in the University’s Privacy Notice https://www.sheffield.ac.uk/govern/data-protection/privacy/general.
As we will be collecting some data that is defined in the legislation as more sensitive (information about mental health and substance use) we also need to let you know that we are applying the following condition in law: that the use of your data is necessary ‘for archiving purposes in the public interest, scientific research purposes or statistical purposes' (9(2)(j)).

What will happen to the data collected, and the results of the research project?
Following completion of data collection, you will have up to two weeks to withdraw your data if for any reason you wish to do so. After this date your email address will be deleted, anonymising the data for analysis. Your email address will be stored during the period between data collections and in the two weeks following completion. In this time, only the lead researcher will have access to your data and it will be stored on a password protected, secure server. Following this date, the data will still be stored securely. However, it may also be made available to the supervisors of the project. Please also note, you will not be identified in any publication or report of the findings from this research.
Following completion of the project, of which this study is only a small part, all data will be uploaded onto the UK Data Service in an anonymised form to be accessed by other researchers who may find the data useful in answering future research questions. During the consent process, we will ask for your permission for the data to be shared in this way.

Who is organising and funding the research?
The project Is being organised in accordance with the University of Sheffield. The organiser and lead research Is Mike Norton, a second year PhD student, who receives funding from the Economic and Social Research Council (ESRC), and he is supported in the research process by his supervisors.

Who is the Data Controller?
The University of Sheffield will act as the Data Controller for this study. This means that the University is responsible for looking after your information and using it properly.

Who has ethically reviewed the project?
This project has been ethically approved via the University of Sheffield's Ethics Review Procedure, as administered by the psychology department.

What if something goes wrong and I wish to complain about the research or report a concern or incident?
If you are dissatisfied with any aspect of the research and wish to make a complaint, please contact lead researcher Mike Norton on mjnorton1@sheffield.ac.uk in the first instance. If you feel your complaint has not been handled in a satisfactory way you can contact supervisors Dr Stephen Kellett (s.kellett@sheffield.ac.uk) or Dr Vyv Huddy (v.huddy@sheffield.ac.uk) or the Head of the Department of Psychology (psy-hod@sheffield.ac.uk). If the complaint relates to how your personal data has been handled, you can find information about how to raise a complaint in the University's Privacy Notice: https://www.sheffield.ac.uk/govern/data-protection/privacy/general.
If you wish to make a report of a concern or incident relating to potential exploitation, abuse or harm resulting from your involvement in this project, please contact the project's Designated Safeguarding Contact (Mike Norton - mjnorton@sheffield.ac.uk). If the concern or incident relates to the Designated Safeguarding Contact, or if you feel a report you have made to this Contact has not been handled in a satisfactory way, please contact the Head of the Department of psychology (psy-hod@sheffield.ac.uk) and/or the University's Research Ethics & Integrity Manager (Lindsay Unwin - l.v.unwin@sheffield.ac.uk).

Contact for further information

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Thank you for agreeing to take part in this study. Your participation is appreciated and valuable.

End of Block: Information sheet

Start of Block: Consent form

*

Q83
I have read and understood the project information sheet and I understand that I will be required to complete the survey questions on two occasions.

- Yes (1)
- No (2)

Q84 I have been given the opportunity to ask questions about the project through the provision of an email address of the lead researcher.

- Yes (1)
- No (2)

Q89 I understand that taking part in the project will involve completing a number of questions regarding my student house or flat, my mental health, my substance use and other potentially sensitive topics.

- Yes (1)
- No (2)

Q88 I understand that my answers will be confidential throughout the data collection process and fully anonymised two weeks after the end of the study.

- Yes (1)
- No (2)

*

Q87 I understand that by choosing to participate as a volunteer in this research, this does not create a legally binding agreement nor is it intended to create an employment relationship with the University of Sheffield.

- Yes (1)
- No (2)

*

Q86 I understand that my taking part is voluntary and that I can withdraw from the study at any time up to two weeks after completion of the survey. I do not have to give any reasons for why I no longer want to take part and there will be no adverse consequences if I choose to withdraw.

- Yes (1)
- No (2)

*

Q85 I agree to take part in this study

- Yes (1)
- No (2)

*

Q90 How my information will be used

I understand and agree that other authorised researchers will have access to this data only if they

agree to preserve the confidentiality of the information as requested in this form.

- ○ Yes (1)
- ○ No (2)

Q91 I understand and agree that other authorised researchers may use my data in publications, reports, web pages, and other research outputs, only if they agree to preserve the confidentiality of the information as requested in this form.

- ○ Yes (1)
- ○ No (2)

Q92 I give permission for the answers that I provide to be deposited in the UK Data Service so it can be used for future research and learning

- ○ Yes (1)
- ○ No (2)

Q93
This question allows the information you provide to be used legally by the researchers

I agree to assign the copyright I hold in any materials generated as part of this project to The University of Sheffield.

- ○ Yes (1)
- ○ No (2)

Q94 Please enter your University email address (Do not use a personal email address).

This will be used to contact you for the second round of data collection in December.

_____

End of Block: Consent form

Start of Block: About you

Q1 What is your age?

_____

Q2 To what gender identity do you most identify?

- ○ Male (1)
- ○ Female (2)
- ○ Non-binary / third gender (3)
- ○ Prefer not to say (4)

Q6 In total, how many adults (Over 18 years) live in your house, including yourself?

_____

Q7 How many adults in your household would identify as male (If you do not wish to answer this question, please leave blank)?

_____

Q8 How many adults in your household would identify as female (If you do not wish to answer this question, please leave blank)?

_____

End of Block: About you

Start of Block: Your student house or flat

Q56
The following questions assess the present conditions in your dwelling.

Please select the answer that best fits the current situation in your house or flat.

To what extent are the following situations present in the home?

Q57 1. Fire hazard

- ○ No fire hazard (1)
- ○ Some risk of fire (for example, lots of flammable material) (2)
- ○ Moderate risk of fire (for example, flammable materials near heat source) (3)
- ○ High risk of fire (for example, flammable materials near heat source; electrical hazards, etc.) (4)

Q58 2. Mouldy or rotten food

- ○ None (1)
- ○ A few pieces of mouldy or rotten food in the kitchen (2)
- ○ Some mouldy or rotten food throughout the kitchen (3)
- ○ Large quantity of mouldy or rotten food in kitchen and elsewhere (4)

Q59 3. Dirty or clogged sink

- ○ Sink empty and clean (1)
- ○ A few dirty dishes with water in sink (2)
- ○ Sink full of water, possibly clogged (3)
- ○ Sink clogged, with evidence that it has overflowed onto counters, etc (4)

Q60 4. Standing water (In sink, tub, other container, basement, etc)

- ○ No standing water (1)
- ○ Some water in sink/tub (2)
- ○ Water in several places, especially if dirty (3)
- ○ Water in numerous places, especially if dirty (4)

Q61 5. Human/animal waste/vomit

- ○ No human waste, animal waste or vomit visible (1)
- ○ No human waste or vomit; no animal waste or vomit outside cage or box (2)
- ○ Some animal or human waste or vomit visible (for example, in unflushed toilet) (3)
- ○ Animal or human waste or vomit on floors or other surfaces (4)

Q62 6. Mildew or mould

- ○ No mildew or mould detectable (1)
- ○ Small amount of mildew or mould in limited amounts and expected places (for example, on edge of shower curtain or refrigerator seal) (2)
- ○ Considerable, noticeable mildew or mould (3)
- ○ Widespread mildew or mould on most surfaces (4)

Q63 7. Dirty food containers

- ○ All dishes washed and put away (1)
- ○ A few unwashed dishes (2)
- ○ Many unwashed dishes (3)
- ○ Almost all dishes are unwashed (4)

Q64 8. Dirty surfaces (Floor, walls, furniture, etc)

- ○ Surfaces completely clean (1)
- ○ A few spills, some dirt or grime (2)
- ○ More than a few spills, may be a thin covering of dirt or grime in living areas (3)
- ○ No surface is clean; dirt or grime covers everything (4)

Q65 9. Piles of dirty or contaminated objects (bathroom tissue, hair, toilet paper, sanitary products, etc)

- ○ No dirty or contaminated objects on floors, surfaces, etc (1)
- ○ Some dirty or contaminated objects present around trash cans or toilets (2)
- ○ Many dirty or contaminated objects fill bathroom or areas around trash cans (3)
- ○ Dirty or contaminated objects cover the floors and surfaces in most rooms (4)

Q66 10. Insects

- ○ No insects are visible (1)
- ○ A few insects visible; cobwebs and/or insect droppings present (2)
- ○ Many insects and droppings are visible; cobwebs in corners (3)
- ○ Swarms of insects; high volume of droppings; many cobwebs on household items (4)

Q67 11. Dirty clothes

- ○ Dirty clothes placed in hamper; none are lying around (1)
- ○ Hamper is full; a few dirty clothes lying around (2)
- ○ Hamper is overflowing; many dirty clothes lying around (3)
- ○ Clothes cover the floor and many other surfaces (bed, chairs, etc) (4)

Q68 12. Dirty bed sheets/linens

- ○ Bed coverings very clean (1)
- ○ Bed coverings relatively clean (2)
- ○ Bed coverings dirty and in need of washing (3)
- ○ Bed coverings very dirty and soiled (4)

Q69 13. Odour of house

- ○ No odour (1)
- ○ Slight odour (2)
- ○ Moderate odour; may be strong in some parts of the house (3)
- ○ Strong odour throughout house (4)

Q71 During the last month, how often did you (or someone in your home) do each of the following activities?

Q72 14. Do the dishes

- ○ Daily or every 2 days; 15 to 30 times per month (1)
- ○ 1 or 2 times a week; 4 to 10 times per month (2)
- ○ Every other week; 2 to 3 times per month (3)
- ○ Rarely; 0 times per month (4)

Q73 15. Clean the bathroom

- ○ Daily or every 2 days; more than 10 times per month (1)
- ○ 1 or 2 times a week; 4 to 10 times per month (2)
- ○ Every other week; 2 to 3 times per month (3)
- ○ Never; 0 times per month (4)

End of Block: Your student house or flat

Start of Block: Alcohol

Q34
The following questions are about your use of alcohol.

The questions refer to units of alcohol. Please use the following as a guide:
Pint of beer or lager (~3.5%) - 2 units
175ml glass of wine (~12%) - 2 units
Single 25ml shot of standard spirits (~40%) - 1 unit

Please select the option that best describes your answer to each question

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Q35 1. How often do you have a drink containing alcohol?

- ○ Never (1)
- ○ Monthly or less (2)
- ○ 2-4 times a month (3)
- ○ 2-3 times a week (4)
- ○ 4 or more times a week (5)

Q36 2. How many drinks containing alcohol do you have on a typical day when you are drinking?

- ○ 1 or 2 (1)
- ○ 3 or 4 (2)
- ○ 5 or 6 (3)
- ○ 7 to 9 (4)
- ○ 10 or more (5)

Q38 3. How often have you had 6 or more units if female, or 8 or more if male, on a single occasion in the last year?

- ○ Never (1)
- ○ Less than monthly (2)
- ○ Monthly (3)
- ○ Weekly (4)
- ○ Daily or almost daily (5)

Q39 4. How often during the last year have you found that you were not able to stop drinking once you had started?

- ○ Never (1)
- ○ Less than monthly (2)
- ○ Monthly (3)
- ○ Weekly (4)
- ○ Daily or almost daily (5)

Q40 5. How often during the last year have you failed to do what was normally expected from you because of your drinking?

- ○ Never (1)
- ○ Less than monthly (2)
- ○ Monthly (3)
- ○ Weekly (4)
- ○ Daily or almost daily (5)

Q41 6. How often during the last year have you needed an alcoholic drink in the morning to get yourself going after a heavy drinking session?

- ○ Never (1)
- ○ Less than monthly (2)
- ○ Monthly (3)
- ○ Weekly (4)
- ○ Daily or almost daily (5)

Q42 7. How often during the last year have you had a feeling of guilt or remorse after drinking?

- ○ Never (1)
- ○ Less than monthly (2)
- ○ Monthly (3)
- ○ Weekly (4)
- ○ Daily or almost daily (5)

Q43 8. How often during the last year have you been unable to remember what happened the night before because you had been drinking?

- ○ Never (1)
- ○ Less than monthly (2)
- ○ Monthly (3)
- ○ Weekly (4)
- ○ Daily or almost daily (5)

Q44 9. Have you or somebody else been injured as a result of your drinking?

- ○ No (1)
- ○ Yes, but not in the last year (2)
- ○ Yes, during the last year (3)

Q45 10. Has a relative or friend, doctor or other health worker been concerned about your drinking or suggested that you cut down?

- ○ No (1)
- ○ Yes, but not in the last year (2)
- ○ Yes, during the last year (3)

End of Block: Alcohol

Start of Block: Drugs

Q46 The following questions are about your use of drugs (Not alcohol).

A full list of drugs which are relevant to these questions is included at the bottom of this page.

Please select the option that best describes your answer to each question

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Q47 1. How often do you use drugs other than alcohol (See list of drugs at the bottom of the page)?

- ○ Never (1)
- ○ Once a month or less often (2)
- ○ 2-4 times a month (3)
- ○ 2-3 times a week (4)
- ○ 4 times a week or less often (5)

Q49 2. Do you use more than one type of drug on the same occasion?

- ○ Never (1)
- ○ Once a month or less often (2)
- ○ 2-4 times a month (3)
- ○ 2-3 times a week (4)
- ○ 4 times a week or less often (5)

Q50 3. How many times do you take drugs on a typical day when you use drugs?

- ○ 0 (1)
- ○ 1-2 (2)
- ○ 3-4 (3)
- ○ 5-6 (4)
- ○ 7 or more (5)

Q51 4. How often are you influenced heavily by drugs?

- ○ Never (1)
- ○ Less often than once a month (2)
- ○ Every month (3)
- ○ Every week (4)
- ○ Daily or almost every day (5)

Q52 5. Over the past year, have you felt that your longing for drugs was so strong that you could not resist it?

- ○ Never (1)
- ○ Less often than once a month (2)
- ○ Every month (3)
- ○ Every week (4)
- ○ Daily or almost every day (5)

Q53 6. Has it happened, over the past year, that you have not been able to stop taking drugs once you started?

- ○ Never (1)
- ○ Less often than once a month (2)
- ○ Every month (3)
- ○ Every week (4)
- ○ Daily or almost every day (5)

Q54 7. How often over the past year have you taken drugs and then neglected to do something you should have done?

- ○ Never (1)
- ○ Less often than once a month (2)
- ○ Every month (3)
- ○ Every week (4)
- ○ Daily or almost every day (5)

Q55 8. How often over the past year have you needed to take a drug the morning after heavy drug use the day before?

- ○ Never (1)
- ○ Less often than once a month (2)
- ○ Every month (3)
- ○ Every week (4)
- ○ Daily or almost every day (5)

Q56 9. How often over the past year have you had guilt feelings or a bad conscience because you used drugs?

- ○ Never (1)
- ○ Less often than once a month (2)
- ○ Every month (3)
- ○ Every week (4)
- ○ Daily or almost every day (5)

Q57 10. Have you or anyone else been hurt (mentally or physically) because you used drugs?

- ○ No (1)
- ○ Yes, but not over the past year (2)
- ○ Yes, over the past year (3)

Q58 11. Has a relative or a friend, a doctor or a nurse, or anyone else, been worried about your drug use or said to you that you should stop using drugs?

- ○ No (1)
- ○ Yes, but not over the past year (2)
- ○ Yes, over the past year (3)

Q48
List of drugs included in this study:
Cannabis - Marijuana, Hash, Hash oil

Amphetamines - Methamphetamine, Phenmetraline, Khat, Betel nut, Ritaline (Methylphenidate)
Cocaine - Crack, Freebase, Coca leaves
Opiates - Smoked heroin, Heroin, Opium
Hallucinogens - Ecstasy, LSD (Lisergic acid), Mescaline, Peyote, PCP/angel dust (Phencyclidine), Psilocybin, DMT (Dimethyltryptamine)
Solvents/inhalants - Thinner, Trichlorethylene, Gasoline/petrol, Gas, Solution, Glue
GHB and others - GHB, Anabolic steroids, Laughing gas (Halothane), Amyl nitrate (Poppers), Anticholinergic compounds
Pills - Pills count as drugs when you take:
• more of them or take them more often than the doctor has prescribed for you
• pills because you want to have fun, feel good, get ”high”, or wonder what sort of effect they have on you
• pills that you have received from a relative or a friend
• pills that you have bought on the ”black market” or stolen

End of Block: Drugs

Start of Block: How are you feeling?

Q23 These questions concern how you have been feeling over the past 30 days.

Tick a box below each question that best represents how you have been

---

Q24 1. During the last 30 days, about how often did you feel tired out for no good reason?

- ○ None of the time (1)
- ○ A little of the time (2)
- ○ Some of the time (3)
- ○ Most of the time (4)
- ○ All of the time (5)

Q25 2. During the last 30 days, about how often did you feel nervous?

- ○ None of the time (1)
- ○ A little of the time (2)
- ○ Some of the time (3)
- ○ Most of the time (4)
- ○ All of the time (5)

Q27 3. During the last 30 days, about how often did you feel so nervous that nothing could calm you down?

- ○ None of the time (1)
- ○ A little of the time (2)
- ○ Some of the time (3)
- ○ Most of the time (4)
- ○ All of the time (5)

Q28 4. During the last 30 days, about how often did you feel hopeless?

- ○ None of the time (1)
- ○ A little of the time (2)
- ○ Some of the time (3)
- ○ Most of the time (4)
- ○ All of the time (5)

Q26 5. During the last 30 days, about how often did you feel restless or fidgety?

- ○ None of the time (1)
- ○ A little of the time (2)
- ○ Some of the time (3)
- ○ Most of the time (4)
- ○ All of the time (5)

Q29 6. During the last 30 days, about how often did you feel so restless you could not sit still?

- ○ None of the time (1)
- ○ A little of the time (2)
- ○ Some of the time (3)
- ○ Most of the time (4)
- ○ All of the time (5)

Q30 7. During the last 30 days, about how often did you feel depressed?

- ○ None of the time (1)
- ○ A little of the time (2)
- ○ Some of the time (3)
- ○ Most of the time (4)
- ○ All of the time (5)

Q31 8. During the last 30 days, about how often did you feel that everything was an effort?

- ○ None of the time (1)
- ○ A little of the time (2)
- ○ Some of the time (3)
- ○ Most of the time (4)
- ○ All of the time (5)

Q32 9. During the last 30 days, about how often did you feel so sad that nothing could cheer you up?

- ○ None of the time (1)
- ○ A little of the time (2)
- ○ Some of the time (3)
- ○ Most of the time (4)
- ○ All of the time (5)

Q33 10. During the last 30 days, about how often did you feel worthless?

- None of the time (1)
- A little of the time (2)
- Some of the time (3)
- Most of the time (4)
- All of the time (5)

End of Block: How are you feeling?

Start of Block: Team work

Q75 The following questions ask about your behaviour and views when working as part of a team.

Please indicate to what level you agree with each statement

Q75 1. In a team, I am not indispensable

- Strongly disagree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

Q76 2. In a team, I will try as hard as I can

- ○ Strongly disagree (1)
- ○ Somewhat disagree (2)
- ○ Neither agree nor disagree (3)
- ○ Somewhat agree (4)
- ○ Strongly agree (5)

Q77 3. In a team, I will contribute less than I should

- ○ Strongly disagree (1)
- ○ Somewhat disagree (2)
- ○ Neither agree nor disagree (3)
- ○ Somewhat agree (4)
- ○ Strongly agree (5)

Q78 4. In a team, I will actively participate in the discussion and contribute ideas

- ○ Strongly disagree (1)
- ○ Somewhat disagree (2)
- ○ Neither agree nor disagree (3)
- ○ Somewhat agree (4)
- ○ Strongly agree (5)

Q79 5. In a team, it is okay even if I do not do my share

- ○ Strongly disagree (1)
- ○ Somewhat disagree (2)
- ○ Neither agree nor disagree (3)
- ○ Somewhat agree (4)
- ○ Strongly agree (5)

Q80 6. In a team, it does not matter whether or not I try my best

- Strongly disagree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

Q81 7. In a team, given my abilities, I will do the best I can

- Strongly disagree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

End of Block: Team work

Start of Block: Men and women

Q22 Please indicate to what level you agree with the following statements:

Q1 1. Women are generally not as smart as men

- ○ Strongly disagree (1)
- ○ Somewhat disagree (2)
- ○ Neither agree nor disagree (3)
- ○ Somewhat agree (4)
- ○ Strongly agree (5)

Q2 2. I would be equally as comfortable having a woman or a man as a boss

- ○ Strongly disagree (1)
- ○ Somewhat disagree (2)
- ○ Neither agree nor disagree (3)
- ○ Somewhat agree (4)
- ○ Strongly agree (5)

Q3 3. It is more important to encourage boys than to encourage girls to participate in athletics

- ○ Strongly disagree (1)
- ○ Somewhat disagree (2)
- ○ Neither agree nor disagree (3)
- ○ Somewhat agree (4)
- ○ Strongly agree (5)

Q4 4. Women are just as capable of thinking logically as men

- ○ Strongly disagree (1)
- ○ Somewhat disagree (2)
- ○ Neither agree nor disagree (3)
- ○ Somewhat agree (4)
- ○ Strongly agree (5)

Q5 5. When both parents are employed and their child gets sick at school, the school should call the mother rather than the father

- ○ Strongly disagree (1)
- ○ Somewhat disagree (2)
- ○ Neither agree nor disagree (3)
- ○ Somewhat agree (4)
- ○ Strongly agree (5)

Q6 6. Women often miss out on good jobs due to sexual discrimination

- ○ Strongly disagree (1)
- ○ Somewhat disagree (2)
- ○ Neither agree nor disagree (3)
- ○ Somewhat agree (4)
- ○ Strongly agree (5)

Q7 7. It is rare to see women treated in a sexist manner on television

- ○ Strongly disagree (1)
- ○ Somewhat disagree (2)
- ○ Neither agree nor disagree (3)
- ○ Somewhat agree (4)
- ○ Strongly agree (5)

Q8 8. Society has reached the point where women and men have equal opportunities for achievement

- ○ Strongly disagree (1)
- ○ Somewhat disagree (2)
- ○ Neither agree nor disagree (3)
- ○ Somewhat agree (4)
- ○ Strongly agree (5)

Q9 9. It is easy to understand the anger of women's groups in the UK

- ○ Strongly disagree (1)
- ○ Somewhat disagree (2)
- ○ Neither agree nor disagree (3)
- ○ Somewhat agree (4)
- ○ Strongly agree (5)

Q10 10. Over the past few years, the government and news media have been showing more concern about the treatment of women than is warranted by women's actual experiences

- ○ Strongly disagree (1)
- ○ Somewhat disagree (2)
- ○ Neither agree nor disagree (3)
- ○ Somewhat agree (4)
- ○ Strongly agree (5)

Q11 11. Discrimination of women is no longer a problem in the UK

- ○ Strongly disagree (1)
- ○ Somewhat disagree (2)
- ○ Neither agree nor disagree (3)
- ○ Somewhat agree (4)
- ○ Strongly agree (5)

Q12 12. On average, people in our society treat husbands and wives equally

- ○ Strongly disagree (1)
- ○ Somewhat disagree (2)
- ○ Neither agree nor disagree (3)
- ○ Somewhat agree (4)
- ○ Strongly agree (5)

Q13 13. It is easy to understand why women's groups are still concerned about societal limitations of women's opportunities

- Strongly disagree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

End of Block: Men and women

Start of Block: Thank you

Q74 Thank you for taking the time to complete this survey. As this is a longitudinal study we would like for you to complete this survey again later this year. Please expect a link to be sent to the email address that you have provided in March 2022.

When you are ready, please click below to complete the study and send the results to the researcher.

If you have concerns about your mental health or substance use, you may wish to book an appointment with your GP. However, the NHS website also offers further information:
Mental health - https://www.nhs.uk/mental-health/
Alcohol - https://www.nhs.uk/live-well/alcohol-support/
Drugs - https://www.nhs.uk/live-well/healthy-body/drug-addiction-getting-help/

If participation in the survey has caused you distress, there are also resources available:
Samaritans - www.samaritans.org - 116243 (From any phone)
NHS urgent mental health helpline - https://www.nhs.uk/service-search/mental-health/find-an-urgent-mental-health-helpline
SHOUT - www.giveusashout.org - Text SHOUT to 85258

If you are dissatisfied with any aspect of the research and wish to make a complaint, please contact lead researcher Mike Norton on mjnorton1@sheffield.ac.uk in the first instance. If you feel your complaint has not been handled in a satisfactory way you can contact supervisors Dr Stephen Kellett (s.kellett@sheffield.ac.uk) or Dr Vyv Huddy (v.huddy@sheffield.ac.uk) or the Head of the Department

of Psychology (psy-hod@sheffield.ac.uk). If the complaint relates to how your personal data has been handled, you can find information about how to raise a complaint in the University's Privacy Notice: https://www.sheffield.ac.uk/govern/data-protection/privacy/general.

If you wish to make a report of a concern or incident relating to potential exploitation, abuse or harm resulting from your involvement in this project, please contact the project's Designated Safeguarding Contact (Mike Norton - mjnorton@sheffield.ac.uk). If the concern or incident relates to the Designated Safeguarding Contact, or if you feel a report you have made to this Contact has not been handled in a satisfactory way, please contact the Head of the Department of psychology (psy-hod@sheffield.ac.uk) and/or the University's Research Ethics & Integrity Manager (Lindsay Unwin - l.v.unwin@sheffield.ac.uk).

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Appendix 3.2

Recruitment email sent to students

Hello.

My name is Mike Norton and I am a PhD student in the Psychology department.

You are being invited to take part in a research project investigating the cleanliness and organisation of student houses and flats.

The study requires you to complete a 10-15 minutes online survey on two occasions, once now and once in Spring 2022. If you are interested in taking part, the first survey needs to be completed within one week of receiving this email. The second data collection period will be 21/03/22-27/03/22. You must be a student who is over 18 years old and not living in halls of residence or with your parent or guardian.

The study has received ethical approval from the Department of Psychology Ethics Subcommittee. It will ask questions about a number of topics, including the cleanliness of your student dwelling, your mental health, your alcohol and drug use and your views on gender roles. If you have any concerns about answering questions on these areas then please do not complete the survey. However, if you do choose to complete the research, please answer as honestly as you can.

Further information and access to the survey can be found at the following address:

Thank you for taking the time to read this email and for those of you who choose to complete the research. Your participation is appreciated and valuable.

Mike Norton

Department of Psychology

Appendix 3.3

R code for analysis

Cross-sectional data analysis

```
## Import data



squalor <- read.csv("Data final edit.csv")
View(squalor)
head(squalor)
summary(squalor)
sd(squalor$House.total)
sd(squalor$HEI)
sd(squalor$AUDIT)
sd(squalor$DUDIT)
sd(squalor$K10)
sd(squalor$SLTQ)
sd(squalor$MSS)

## Create variable for whether individual has children in the house

squalor$Children <- NA
squalor$Children <- ifelse(squalor$Who.lives.with.you == "3", 1,ifelse(squalor$Who.lives.with.you ==
"2,3",1,ifelse(squalor$Who.lives.with.you == "2,3,5",1,0)))

## Descriptives focusing on dependent variable (HEI)

tapply(squalor$HEI, squalor$Age, mean)
tapply(squalor$HEI, squalor$Age, sd)

tapply(squalor$HEI, squalor$Gender, mean)
tapply(squalor$HEI, squalor$Gender, sd)

tapply(squalor$HEI, squalor$House.gender, mean)
tapply(squalor$HEI, squalor$House.gender, sd)

tapply(squalor$HEI, squalor$Children, mean)
tapply(squalor$HEI, squalor$Children, sd)

## Rescale numerical variables to between 0 and 1

rescale01 <- function(x){(x-min(x))/(max(x)-min(x))}

squalor$HEI.new <- rescale01(squalor$HEI)
squalor$AUDIT.new <- rescale01(squalor$AUDIT)
squalor$DUDIT.new <- rescale01(squalor$DUDIT)
squalor$K10.new <- rescale01(squalor$K10)
```

```
squalor$SLTQ.new <- rescale01(squalor$SLTQ)
squalor$MSS.new <- rescale01(squalor$MSS)

## Dummy variables to change from categorical to numeric for regression

squalor$Age.new <- NA
squalor$Age.new <- ifelse(squalor$Age == "18-24", 1,ifelse(squalor$Age == "25-
34",2,ifelse(squalor$Age == "35-44",3,ifelse(squalor$Age == "45-54", 4, ifelse(squalor$Age == "55-
64",5,6)))))

squalor$Gender.new <- NA
squalor$Gender.new <- ifelse(squalor$Gender == "Male", 1,ifelse(squalor$Gender == "Female", 2, 3))

squalor$House.gender.new <- NA
squalor$House.gender.new <- ifelse(squalor$House.gender == "Mostly male",
1,ifelse(squalor$House.gender == "Equal", 2, ifelse(squalor$House.gender == "Mostly female", 3, 4)))


## Correlation matrix

cor(squalor[c("HEI.new", "AUDIT.new", "DUDIT.new", "K10.new", "SLTQ.new", "MSS.new",
"Age.new", "House.total",  "Gender.new", "House.gender.new", "Children")])


## Database with non-male/female individuals removed (Participants 26 & 68)

squalor1 <- squalor[-c(26, 68), ]

## repeat correlation matrix in case of significant differences

cor(squalor1[c("HEI.new", "AUDIT.new", "DUDIT.new", "K10.new", "SLTQ.new", "MSS.new",
"Age.new", "House.total",  "Gender.new", "House.gender.new", "Children")])

## Regression models

## All variables (Both with and without participants 26 and 68)

model1 <- lm(HEI.new ~ AUDIT.new + DUDIT.new + K10.new + SLTQ.new + MSS.new +
House.gender.new + Gender.new + Children + Age.new, data = squalor)
summary(model1)

model2 <- lm(HEI.new ~ AUDIT.new + DUDIT.new + K10.new + SLTQ.new + MSS.new +
House.gender.new + Gender.new + Children + Age.new, data = squalor1)
summary(model2)


## House.total, DUDIT, SLTQ, House.gender.new, Gender.new, Age.new removed (Gender variables
now no longer included, so full dataset can be used)

model3 <- lm(HEI.new ~ AUDIT.new + K10.new + Children, data = squalor)
summary(model3)
```

```
## When gender categories removed, MSS has little effect. Remove MSS.

model4 <- lm(HEI.new ~ AUDIT.new + K10.new + Children, data = squalor)
summary(model4)

## How is the model affected by removing Children variable

model5 <- lm(HEI.new ~ AUDIT.new + K10.new, data = squalor)
summary(model5)

## Children variable remains


## Is their an interaction between gender and MSS, house gender and MSS or AUDIT and K10 that
contributes to HEI

model6 <- lm(HEI.new ~ AUDIT.new + K10.new + Children + Gender.new*MSS.new +
House.gender.new*MSS.new+ AUDIT.new*K10.new, data = squalor)
summary(model6)

## Household gender and MSS interaction appears significant. Remove others.

model6b <- lm(HEI.new ~ AUDIT.new + K10.new + Children + House.gender.new*MSS.new, data =
squalor)
summary(model6b)

# Without AUDIT variable as no longer significant

model6c <- lm(HEI.new ~ K10.new + Children + House.gender.new*MSS.new, data = squalor)
summary(model6c)


## Calculating Cronbach's Alpha for scales

install.packages("psych")
library(psych)

HEIraw <- read.csv("HEI data.csv")

alpha(HEIraw)

AUDITraw <- read.csv("AUDIT data.csv")

alpha(AUDITraw)

DUDITraw <- read.csv("DUDIT data.csv")

alpha(DUDITraw)

SLTQraw <- read.csv("SLTQ data.csv")
```

```
alpha(SLTQraw)

K10raw <- read.csv("K10 data.csv")

alpha(K10raw)

MSSraw <- read.csv("MSS data.csv")

alpha(MSSraw)


## Calculating descriptives for all measures

table (squalor1$Gender)

tapply(squalor1$HEI, squalor1$Gender, mean)
tapply(squalor1$HEI, squalor1$Gender, sd)

tapply(squalor1$AUDIT, squalor1$Gender, mean)
tapply(squalor1$AUDIT, squalor1$Gender, sd)

tapply(squalor1$DUDIT, squalor1$Gender, mean)
tapply(squalor1$DUDIT, squalor1$Gender, sd)

tapply(squalor1$K10, squalor1$Gender, mean)
tapply(squalor1$K10, squalor1$Gender, sd)

tapply(squalor1$MSS, squalor1$Gender, mean)
tapply(squalor1$MSS, squalor1$Gender, sd)

tapply(squalor1$SLTQ, squalor1$Gender, mean)
tapply(squalor1$SLTQ, squalor1$Gender, sd)



table (squalor$Age)

tapply(squalor$HEI, squalor$Age, mean)
tapply(squalor$HEI, squalor$Age, sd)

tapply(squalor$AUDIT, squalor$Age, mean)
tapply(squalor$AUDIT, squalor$Age, sd)

tapply(squalor$DUDIT, squalor$Age, mean)
tapply(squalor$DUDIT, squalor$Age, sd)

tapply(squalor$K10, squalor$Age, mean)
tapply(squalor$K10, squalor$Age, sd)

tapply(squalor$MSS, squalor$Age, mean)
```

```
tapply(squalor$MSS, squalor$Age, sd)

tapply(squalor$SLTQ, squalor$Age, mean)
tapply(squalor$SLTQ, squalor$Age, sd)



table (squalor$Children)

tapply(squalor$HEI, squalor$Children, mean)
tapply(squalor$HEI, squalor$Children, sd)

tapply(squalor$AUDIT, squalor$Children, mean)
tapply(squalor$AUDIT, squalor$Children, sd)

tapply(squalor$DUDIT, squalor$Children, mean)
tapply(squalor$DUDIT, squalor$Children, sd)

tapply(squalor$K10, squalor$Children, mean)
tapply(squalor$K10, squalor$Children, sd)

tapply(squalor$MSS, squalor$Children, mean)
tapply(squalor$MSS, squalor$Children, sd)

tapply(squalor$SLTQ, squalor$Children, mean)
tapply(squalor$SLTQ, squalor$Children, sd)



table (squalor1$House.gender)

tapply(squalor1$HEI, squalor1$House.gender, mean)
tapply(squalor1$HEI, squalor1$House.gender, sd)

tapply(squalor1$AUDIT, squalor1$House.gender, mean)
tapply(squalor1$AUDIT, squalor1$House.gender, sd)

tapply(squalor1$DUDIT, squalor1$House.gender, mean)
tapply(squalor1$DUDIT, squalor1$House.gender, sd)

tapply(squalor1$K10, squalor1$House.gender, mean)
tapply(squalor1$K10, squalor1$House.gender, sd)

tapply(squalor1$MSS, squalor1$House.gender, mean)
tapply(squalor1$MSS, squalor1$House.gender, sd)

tapply(squalor1$SLTQ, squalor1$House.gender, mean)
tapply(squalor1$SLTQ, squalor1$House.gender, sd)
```

```
## Testing for homogeneity of variance with gender

var.test(HEI ~ Gender, data = squalor1)

var.test(AUDIT ~ Gender, data = squalor1)

var.test(DUDIT ~ Gender, data = squalor1)

var.test(K10 ~ Gender, data = squalor1)

var.test(MSS ~ Gender, data = squalor1)

var.test(SLTQ ~ Gender, data = squalor1)

## Homogeneity of variance not consistent, use Welch's t-test

## Welch's t-test with gender

t.test(HEI ~ Gender, data = squalor1, var.equal = FALSE)

t.test(AUDIT ~ Gender, data = squalor1, var.equal = FALSE)

t.test(DUDIT ~ Gender, data = squalor1, var.equal = FALSE)

t.test(K10 ~ Gender, data = squalor1, var.equal = FALSE)

t.test(MSS ~ Gender, data = squalor1, var.equal = FALSE)

t.test(SLTQ ~ Gender, data = squalor1, var.equal = FALSE)

## Testing for homogeneity of variance with children

var.test(HEI ~ Children, data = squalor)

var.test(AUDIT ~ Children, data = squalor)

var.test(DUDIT ~ Children, data = squalor)

var.test(K10 ~ Children, data = squalor)

var.test(MSS ~ Children, data = squalor)

var.test(SLTQ ~ Children, data = squalor)

## Homogeneity of variance consistent, use t-test

## t-test with gender
```

```
t.test(HEI ~ Children, data = squalor, var.equal = TRUE)

t.test(AUDIT ~ Children, data = squalor, var.equal = TRUE)

t.test(DUDIT ~ Children, data = squalor, var.equal = TRUE)

t.test(K10 ~ Children, data = squalor, var.equal = TRUE)

t.test(MSS ~ Children, data = squalor, var.equal = TRUE)

t.test(SLTQ ~ Children, data = squalor, var.equal = TRUE)

## Testing for homogeneity of variance with age

library(car)

leveneTest(HEI ~ Age, data = squalor)

leveneTest(AUDIT ~ Age, data = squalor)

leveneTest(DUDIT ~ Age, data = squalor)

leveneTest(K10 ~ Age, data = squalor)

leveneTest(MSS ~ Age, data = squalor)

leveneTest(SLTQ ~ Age, data = squalor)

## Homogeneity of variance not consistent, use Kruskal Wallis rank sum test

## Kruskal Wallis with age

kruskal.test(HEI ~ Age, data = squalor)

kruskal.test(AUDIT ~ Age, data = squalor)

kruskal.test(DUDIT ~ Age, data = squalor)

kruskal.test(K10 ~ Age, data = squalor)

kruskal.test(MSS ~ Age, data = squalor)

kruskal.test(SLTQ ~ Age, data = squalor)

## Testing for homogeneity of variance with gender of house

leveneTest(HEI ~ House.gender, data = squalor)
```

```
leveneTest(AUDIT ~ House.gender, data = squalor)

leveneTest(DUDIT ~ House.gender, data = squalor)

leveneTest(K10 ~ House.gender, data = squalor)

leveneTest(MSS ~ House.gender, data = squalor)

leveneTest(SLTQ ~ House.gender, data = squalor)


## Homogeneity of variance consistent, use one-way ANOVA

## One-way ANOVA with gender of house


HEI.House.gender <- aov(HEI ~ House.gender, data = squalor)
summary(HEI.House.gender)

AUDIT.House.gender <- aov(AUDIT ~ House.gender, data = squalor)
summary(AUDIT.House.gender)

DUDIT.House.gender <- aov(DUDIT ~ House.gender, data = squalor)
summary(DUDIT.House.gender)

K10.House.gender <- aov(K10 ~ House.gender, data = squalor)
summary(K10.House.gender)

MSS.House.gender <- aov(MSS ~ House.gender, data = squalor)
summary(MSS.House.gender)

SLTQ.House.gender <- aov(SLTQ ~ House.gender, data = squalor)
summary(SLTQ.House.gender)


## Individual variables regression with HEI

model7 <- lm(HEI.new ~ House.total, data = squalor)
summary(model7)

model8 <- lm(HEI.new ~ AUDIT.new, data = squalor)
summary(model8)

model9 <- lm(HEI.new ~ DUDIT.new, data = squalor)
summary(model9)

model10 <- lm(HEI.new ~ K10.new, data = squalor)
summary(model10)

model11 <- lm(HEI.new ~ SLTQ.new, data = squalor)
summary(model11)
```

```
model12 <- lm(HEI.new ~ MSS.new, data = squalor)
summary(model12)

model13 <- lm(HEI.new ~ House.gender.new, data = squalor)
summary(model13)

model14 <- lm(HEI.new ~ Gender.new, data = squalor)
summary(model14)

model15 <- lm(HEI.new ~ MSS.new*Gender.new, data = squalor)
summary(model15)

model16 <- lm(HEI.new ~ MSS.new*House.gender.new, data = squalor)
summary(model16)


model17 <- lm(AUDIT.new ~ MSS.new, data = squalor)
summary(model17)

model18 <- lm(DUDIT.new ~ MSS.new, data = squalor)
summary(model18)

model19 <- lm(K10.new ~ MSS.new, data = squalor)
summary(model19)

model20 <- lm(SLTQ.new ~ MSS.new, data = squalor)
summary(model20)

model21<- lm(HEI.new ~ Children, data = squalor)
summary(model21)

model22 <- lm(HEI.new ~ MSS.new, data = squalor)
summary(model22)
```

Longitudinal study analysis code

```
set1 <- Final_edit_fully_completed_anonymous
summary(set1)

sd(set1$`Age at start of study`)
sd(set1$'HEI 1')
sd(set1$'HEI 2')
sd(set1$'AUDIT 1')
sd(set1$'AUDIT 2')
sd(set1$'DUDIT 1')
sd(set1$'DUDIT 2')
sd(set1$'K10 1')
sd(set1$'K10 2')
sd(set1$'SLTQ 1')
```

```
sd(set1$'SLTQ 2')
sd(set1$'MSS 1')
sd(set1$'MSS 2')

HEI_t <- t.test(set1$`HEI 1`, set1$`HEI 2`, paired = TRUE, alternative = "two.sided")
HEI_t
AUDIT_t <- t.test(set1$`AUDIT 1`, set1$`AUDIT 2`, paired = TRUE, alternative = "two.sided")
AUDIT_t
DUDIT_t <- t.test(set1$`DUDIT 1`, set1$`DUDIT 2`, paired = TRUE, alternative = "two.sided")
DUDIT_t
K10_t <- t.test(set1$`K10 1`, set1$`K10 2`, paired = TRUE, alternative = "two.sided")
K10_t
SLTQ_t <- t.test(set1$`SLTQ 1`, set1$`SLTQ 2`, paired = TRUE, alternative = "two.sided")
SLTQ_t
MSS_t <- t.test(set1$`MSS 1`, set1$`MSS 2`, paired = TRUE, alternative = "two.sided")
MSS_t


tapply(set1$'HEI 1', set1$Gender, mean)
tapply(set1$'HEI 2', set1$Gender, mean)

tapply(set1$'AUDIT 1', set1$Gender, mean)
tapply(set1$'AUDIT 2', set1$Gender, mean)

HEI_d <- (set1$`HEI 1` - set1$`HEI 2`)
shapiro.test(HEI_d)
AUDIT_d <- (set1$`AUDIT 1` - set1$`AUDIT 2`)
shapiro.test(AUDIT_d)


set1$HEI_d <- HEI_d
tapply(set1$HEI_d, set1$Gender, mean)
t.test(HEI_d~Gender, data = set1, var.equal = FALSE)


# Import rearranged data set

# Calculating repeated measures correlations

install.packages("rmcorr")
library(rmcorr)

all.corr <- rmcorr_mat(participant, variables = c("HEI", "MSS", "AUDIT","DUDIT", "K10", "SLTQ",
"gender", "hgender"), dataset = editedforR)
all.corr

all.corr$summary
all.corr$summary$p.vals#
p.vals <- all.corr$summary$p.vals
p.vals.bonferroni <- p.adjust(p.vals, method = "bonferroni",  n = length(p.vals))
p.vals.fdr <- p.adjust(p.vals, method = "fdr", n = length(p.vals))
```

```
all.pvals <- cbind(p.vals, p.vals.bonferroni, p.vals.fdr)
colnames(all.pvals) <- c("Unadjusted", "Bonferroni", "fdr")
round(all.pvals, digits = 5)


HEI.MSS <- rmcorr(participant, HEI, MSS, editedforR)
HEI.MSS
HEI.AUDIT <- rmcorr(participant, HEI, AUDIT, editedforR)
HEI.AUDIT
HEI.DUDIT <- rmcorr(participant, HEI, DUDIT, editedforR)
HEI.DUDIT
HEI.K10 <- rmcorr(participant, HEI, K10, editedforR)
HEI.K10
HEI.SLTQ <- rmcorr(participant, HEI, SLTQ, editedforR)
HEI.SLTQ
MSS.AUDIT <- rmcorr(participant, MSS, AUDIT, editedforR)
MSS.AUDIT
MSS.DUDIT <- rmcorr(participant, MSS, DUDIT, editedforR)
MSS.DUDIT
MSS.K10 <- rmcorr(participant, MSS, K10, editedforR)
MSS.K10
MSS.SLTQ <- rmcorr(participant, MSS, SLTQ, editedforR)
MSS.SLTQ
AUDIT.DUDIT <- rmcorr(participant,AUDIT,DUDIT,editedforR)
AUDIT.DUDIT
AUDIT.K10 <- rmcorr(participant,AUDIT,K10,editedforR)
AUDIT.K10
AUDIT.SLTQ <- rmcorr(participant,AUDIT,SLTQ,editedforR)
AUDIT.SLTQ
DUDIT.K10 <- rmcorr(participant,DUDIT,K10,editedforR)
DUDIT.K10
DUDIT.SLTQ <- rmcorr(participant,DUDIT,SLTQ,editedforR)
DUDIT.SLTQ
K10.SLTQ <- rmcorr(participant,K10,SLTQ,editedforR)
K10.SLTQ

# Checking correlation values with differences between time 1 and time 2

cor(editedforR2$HEId, editedforR2$MSSd)
cor(editedforR2$HEId, editedforR2$AUDITd)
cor(editedforR2$HEId, editedforR2$DUDITd)
cor(editedforR2$HEId, editedforR2$K10d)
cor(editedforR2$HEId, editedforR2$SLTQd)
cor(editedforR2$MSSd, editedforR2$AUDITd)
cor(editedforR2$MSSd, editedforR2$DUDITd)
cor(editedforR2$MSSd, editedforR2$K10d)
cor(editedforR2$MSSd, editedforR2$SLTQd)


# Checking moderation
```

```
maleonly <- subset(editedforR, gender==1)
femaleonly <- subset(editedforR, gender==2)

HEI.MSS.M <- rmcorr(participant, HEI, MSS, maleonly)
HEI.MSS.M
HEI.MSS.F <- rmcorr(participant, HEI, MSS, femaleonly)
HEI.MSS.F

mostlymale <- subset(editedforR, hgender==1)
even <- subset(editedforR, hgender==2)
mostlyfemale <- subset(editedforR, hgender==3)

HEI.MSS.MM <- rmcorr(participant, HEI, MSS, mostlymale)
HEI.MSS.MM
HEI.MSS.E <- rmcorr(participant, HEI, MSS, even)
HEI.MSS.E
HEI.MSS.MF <- rmcorr(participant, HEI, MSS, mostlyfemale)
HEI.MSS.MF
```

Appendix 3.4

Significance values for repeated measures correlations, unadjusted and with multiple comparisons correction

Variable 1	Variable 2	Unadjusted p-value	Bonferroni Correction	False Discovery Rate
HEI	MSS	0.425844187	1	0.90575
HEI	AUDIT	0.478889507	1	0.90575
HEI	DUDIT	0.213434848	1	0.65329
HEI	K10	0.754339189	1	0.94681
HEI	SLTQ	0.468514563	1	0.90575
HEI	gender	0.084757025	1	0.56133
HEI	hgender	0.7777404	1	0.94681
MSS	AUDIT	0.642958239	1	0.9292
MSS	DUDIT	0.879972358	1	1
MSS	K10	0.160380582	1	0.56133
MSS	SLTQ	0.651635387	1	0.9292
MSS	gender	1	1	1
MSS	hgender	0.950524726	1	1
AUDIT	DUDIT	0.016244639	0.45485	0.22742
AUDIT	K10	0.146401037	1	0.56133
AUDIT	SLTQ	0.147334547	1	0.56133
AUDIT	gender	0.660523568	1	0.9292
AUDIT	hgender	0.656011349	1	0.9292
DUDIT	K10	0.150197131	1	0.56133
DUDIT	SLTQ	0.001985451	0.05559	0.05559
DUDIT	gender	0.48522248	1	0.90575
DUDIT	hgender	1	1	1
K10	SLTQ	0.47704796	1	0.90575
K10	gender	0.233316603	1	0.65329
K10	hgender	0.743030528	1	0.94681
SLTQ	gender	0.059915819	1	0.55921
SLTQ	hgender	0.663714025	1	0.9292
gender	hgender	NA	NA	NA

Appendix 4.1

English Housing Survey Physical Inspection Form

EHS 2018/19

Ministry of Housing, Communities & Local Government

bre

ENGLISH HOUSING SURVEY

2018/19

Digital pen procedure

1. Surveyor name

1) Write surveyor name

2. Edit form

2) Mark the 'Edit form' box

3) Write unique survey number (01-99)

Survey Code

3.

4) Code unique survey number

4.

0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9

SPSS FIRSTIMP

1. Survey record

		FRECL1... Visit 1		FRECL2... Visit 2		FRECL3... Visit 3		FRECL4... Visit 4		FRECL5... Visit 5	
Visit / telephone call made	...VM	Y	N	Y	N	Y	N	Y	N	Y	N
Was this a booked appointment?	...AP	Y	N	Y	N	Y	N	Y	N	Y	N
		Day	Month	Day	Month	Day	Month	Day	Month	Day	Month
Record date of this call		...DY	...MT								
(24 hour clock)		Hr	mm	Hr	mm	Hr	mm	Hr	mm	Hr	mm
Start time		...SH	...SM								
Finish time		...FH	...FM								
Outcome	...CO										
Full/completed survey		1		1		1		1		1	
Partial survey/considered to finish		2		2		2		2		2	
Partial survey then refusal		3		3		3		3		3	
Refusal on doorstep		4		4		4		4		4	
HH refusal after surveyor visit				5		5		5		5	
Household missed appointment - no / unproductive contact		6		6		6		6		6	
Household missed appointment - rescheduled		7		7		7		7		7	
Surveyor missed appointment - no contact		8		8		8		8		8	
Surveyor missed appointment - rescheduled		9		9		9		9		9	
Speculative call - no / unproductive contact		10		10		10		10		10	
Speculative call - appointment scheduled		11		11		11		11		11	
Address untraceable		13		13		13		13		13	
Dwelling derelict		14		14		14		14		14	
Dwelling demolished		15		15		15		15		15	
No longer usable as dwelling		16		16		16		16		16	
Other reason for non-survey		17		17		17		17		17	

Reason for non survey:

FRENOSV

SPSS FIRSTIMP

2. Dwelling identification

Is the dwelling address passed on to you by the interviewer a single dwelling?

Y | N

FADINTA

Is address:

Part of dwelling 1	More than one dwelling 2	Dwelling with non-residential 3	FADSAM
Number of addresses at dwelling FADSAMA	Number of dwellings at address FADSAMB	Number of dwellings at address FADSAMC	

Address surveyed same as that passed on by interviewer: Y | N FADINTV

Go to Section 3

Go to Section 3

Notify your HH of amended address

3. Dwelling description and occupancy SPSS FIRSTIMP

Type of occupancy *(clarify with household)* FODISHMO

Single family dwelling	Shared house	Household with lodgers	Bedsits or flatlets	Purpose built with shared amenities	Hostel/ B&B
1	2	3	4	5	6

HMO provisions: discuss with HH & if necessary complete questions on page 8

Dwelling type *(clarify with household)* FODDTYPE

House/bungalow					Flat		
End terrace	Mid terrace	Semi detached	Detached	Temporary	Purpose built	Converted	Non residential plus flat
1	2	3	4	5	6	7	8

Tenure *(clarify with household)* FODTENUR

Owner occupied	Private rented	Local authority	Housing association (RSL)
1	2	3	4

Construction date *(clarify with household)* FODCONST

Estimate actual construction date FODCONAC

Pre 1850	1850-1899	1900-1918	1919-1944	1945-1964	1965-1974	1975-1980	1981-1990	1991-1995	1996-2002	Post 2002
1	2	3	4	5	6	7	8	9	10	11

Occupancy *(ask where possible)* FODOCCUP

Occupied	Vacant						
	Awaiting another owner	Awaiting another tenant	Awaiting demolition	Being modernised	New never occupied	Being used for other purpose	Other (specify)
1	2	3	4	5	6	7	8

FODOCOTH

If occupied: how long have the current occupants lived here? Years FODLIVEY Months FODLIVEM

If vacant: how long has the dwelling been vacant? Years FODVACNY Months FODVACNM

If occupants have moved in within the last 6 months, ask for date:
Day FODEXDAY Month FODEXMON Year FODEXYRS

Source of information on tenure and occupancy FODSORCE

Occupant	Neighbour	Caretaker/ warden/agent	Estimate/ appearance	Other (specify): FODSOTH
1	2	3	4	5

IDENTIFY MODULE NOW SPSS FIRSTIMP

4. Module associated with the address surveyed

House (single unit)	Converted building (multiple units)	Purpose built flats (multiple units)
1	2	3

FMODULE

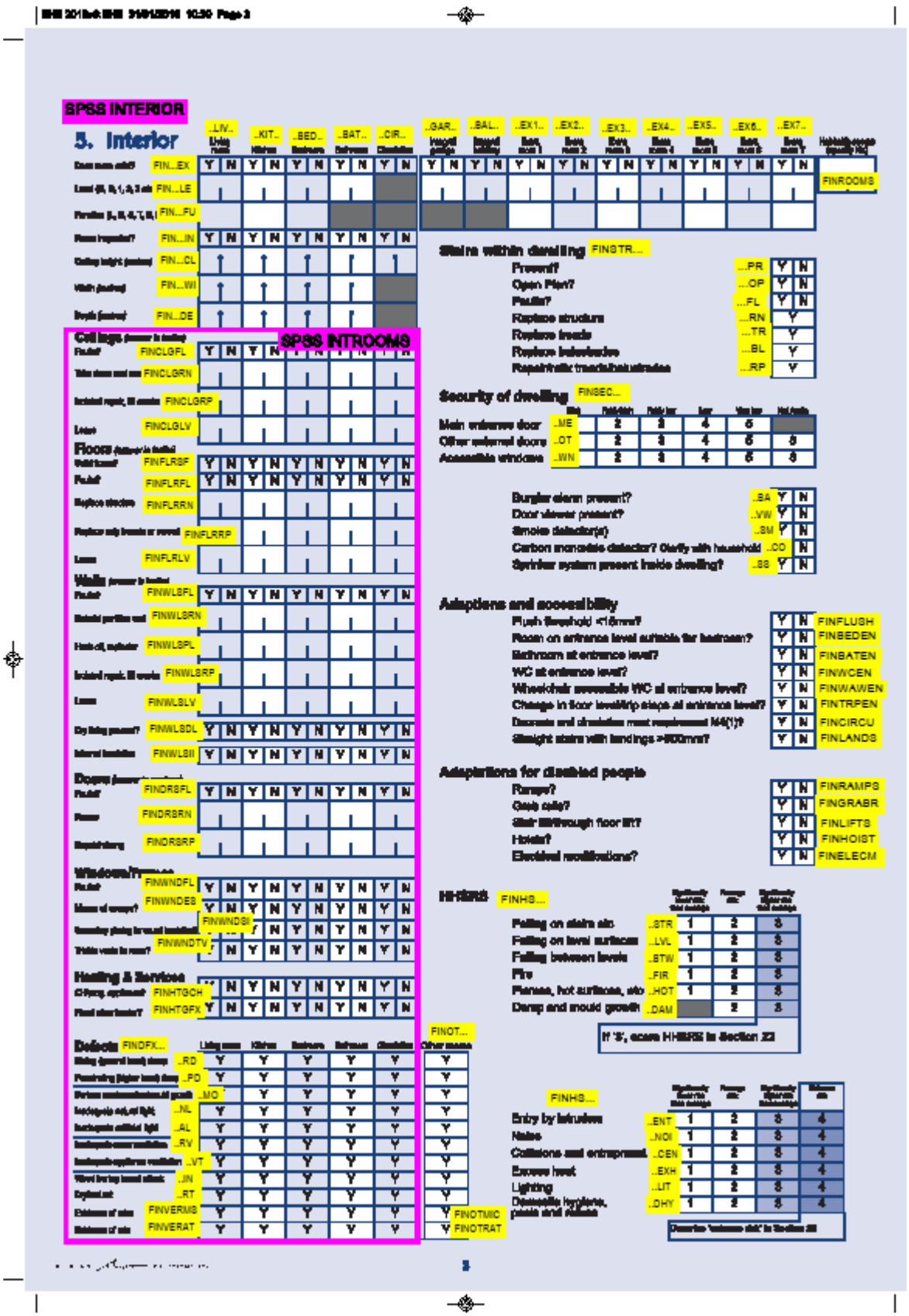
House (single unit) 1 → Go to Section 5

Have all the accommodation units exclusive use of key amenities? FMODISSC

Yes - sole use	Mix (e.g. some sole use, some shared amenities)	No (all units share at least one amenity)
1	2	3

Yes - sole use 1 → Go to Section 5

Number of units with exclusive use of amenities	FMODSC
Number of units which share amenities	FMODNON


SPSS INTERIOR
5. Interior
SPSS INROOMS
FINROOMS
Stairs within dwelling FINSTR...
Security of dwelling FINSEC...
Adaptions and accessibility
Adaptations for disabled people
H-HSRS FINHS...
Defects FINDFX...
FINOT...

SPSS AMENITY

5. Interior – amenities

Kitchen amenities

		..PR Present		..WK Working		..AC Action None	Minor repair	Major repair	Replace	Install
Cold water drinking supply?	FINCLD...			Y	N	1	2	3	4	5
Hot water?	FINHOT...	Y	N	Y	N	1	2	3	4	5
Sink?	FINSNK...	Y	N	Y	N	1	2		4	5
Food waste?	FINWST...	Y	N	Y	N	1	2		4	5
Cooking provision?	FINCOK...	Y	N	Y	N	1	2	3	4	5
Cupboards?	FINCUP...	Y	N	Y	N	1	2	3	4	5
Worktop	FINWRK...	Y	N	Y	N	1	2	3	4	5
Extractor fan?	FINKXT...	Y	N	Y	N					

Y	N	Adequate cooker space? FINCOOKR
Y	N	Adequate cupboard units? FINCUPUN

Under 1.0m	1.0 – 2m	Over 2m	Worktop (m/area) FINWORKT
1	2	3	

Drinking water supply pipework

	Pipework seen	Lead present	Mains
Before stopcock?	FINPIPEB	FINLEADB	FINMAINS
After stopcock?	FINPIPEA	FINLEADA	

Are there significant problems with: Space FINKDFSP; Layout FINKDFLA; Operability FINKDFOB

Kitchen adapted for disabled use? FINKITDU

FINKITLR

	Original	Pre 1960	1960's	1970's	1980's	1990's	2000s	2010s	In progress
Kitchen amenities last refurbished	0	1	2	3	4	5	6	7	8

Actual date of kitchen refurbishment (if known) FINKITRE

Bathroom amenities

		..PR Present		..WK Working		..HC Hot & cold water		..AC Action None	Minor repair	Major repair	Replace	Install	Basement	Floor ..FL Ground	Specify
Bath/shower?	FINBAT...		N	Y	N	Y	N	1	2		4	5	BB	GG	
Wash hand basin?	FINWHB...			Y	N	Y	N	1	2		4	5	BB	GG	
W.C.?	FINLOO...	Y	N	Y	N			1	2	3	4	5	BB	GG	
Extractor fan in bathroom?	FINBXT...		N	Y	N										

Easily accessible? FINBADLO

No. of external entrances FINSURFA

Internal? ..IN; Close to WC? ..WH; In bathroom? ..BA; (WC) ...external? ..EX

Are there significant problems with: Space FINBDFSP; Layout FINBDFLA; Operability FINBDFOB; Location FINBDFLO

Is any bathroom adapted for disabled use? FINBATDU

Is any bathroom wheelchair accessible? FINBATWA

FINBATLR

	Original	Pre 1960	1960's	1970's	1980's	1990's	2000s	2010s	In progress
Bath/shower last refurbished	0	1	2	3	4	5	6	7	8

Actual date of bath/shower refurbishment (if known) FINBATRE

Does any shower have level access?		Basement	Floor Ground	Specify
	Y	FINSWRLA	GG	FINSWRLF

Secondary amenities

		..PR Present		..WK Working		..HC Hot & cold water		Basement	..FL Floor Ground	Specify	..ES In bathroom/en-suite	
Second kitchen?	FIN2KI...	Y	N			Y	N	BB	GG			
Second bath/shower?	FIN2BT...	Y	N	Y	N	Y	N	BB	GG		Y	N
Second wash hand basin?	FIN2WH...		N	Y	N	Y	N	BB	GG		Y	N
Second W.C.?	FIN2LO...	Y	N	Y	N			BB	GG		Y	N

..IN Internal? (Second W.C.): Y N

HHSRS - hazards relating to whole dwelling interior

Hazards that may pose an extreme risk

		Significantly lower risk than average	Average risk	Significantly higher risk than average	Extreme risk
Falls associated with baths etc.	FINHSFBA	1	2	3	4
Water Supply	FINHSWAT	1	2	3	4
Food Safety	FINHSFOD	1	2	3	4
Personal hygiene, sanitation and drainage	FINHSPHY		2	3	4
Position and operability of amenities	FINHSPOA	1	2	3	4

Describe 'extreme risk' in Section 13

SPSS SERVICES

5. Interior - Primary services

Gas system

Present? FINGASPR Mains supply? FINGASMS

FINGASAC

Action	None	Minor Repair	Major Repair	Replace
	1	2	3	4

Smart meter? FINGASTM

Housing Health and Safety Rating System (HHSRS)

	Significantly lower than average	Average risk	Significantly higher than average	Extreme risk
Unventilated fuel gas FINHSUNG		2	3	4
Explosions FINHSEXP	1	2	3	4

Describe 'extreme risk' in Section 32

Electrical system

Present? FINELEPR Normal mains supply? FINELEMS Smart meter? FINELETM Off-peak supply? FINOPELE

Location of meters FINELEDC	Under stairs or on wall 1	Special cupboard 2	External access to meter 3	Mixture 4	Unknown 5
Type of wiring FINELEWI	Lead or rubber covered 1	PVC sheathed 2		Mixture 4	Unknown 5
Earthing wires FINELEEA	Unsheathed or green cover 1	Yellow and green sheath 2		Mixture 4	Unknown 5
Consumer unit arrangement FINELECU	Separate fuse boxes for each circuit 1	One or two 'screwed boxes' 2	One or two "accessible boxes" 3	Mixture 4	Unknown 5
Overload protection FINELEOP	Wire fuses 1	Cartridge fuses 2	MCB's 3	Mixture 4	Unknown 5
Personal protection FINELEPP	No RCD's 1	RCD in consumer unit 2	Separate RCD's 3	Mixture 4	Unknown 5
Type of Consumer unit FINELETC	Metal 1	Plastic 2			Unknown 5
Is there room to add additional circuits within the Consumer unit? FINELEAD	Yes 1	No 2			Unknown 5

	None	Minor Repair	Major Repair	Replace	Install
Action FINELEAC	1	2	3	4	5

Housing Health and Safety Rating System (HHSRS) FINHSELS

	Significantly lower than average	Average risk	Significantly higher than average	Extreme risk
Electrical safety	1	2	3	4

Describe 'extreme risk' in Section 32

% of fixed lighting that is low energy FINLOWLI

00	10	20	30	40	50	60	70	80	90	100

Cavity wall insulation

Is there any evidence of cavity wall insulation in/around the electricity or gas meters? FINCWIME

Whole House Ventilation FINWHVEN

None / Windows	Intermittent fans	Continuous individual fans	Passive Stack	Centralised Distribution Systems: Without Heat Recovery	Centralised Distribution Systems: With Heat Recovery (MVHR)
1	2	3	4	5	6

Total number of open fireplaces FINNOFIR

SPSS SERVICES

5. Interior – space heating

Primary heating

FINCHLOC
Location of system

Individual	Communal system			If communal, number of dwellings served
	Estate	Block	Group of dwellings	
1	2	3	4	FINCHNOD

Present? FINCHEAT present: Main heat source in winter? (ask household) FINCHPHS

FINCHTYP

If present: Primary heating group

Central heating (wet)	Storage heaters	Warm air	Communal/CHP	Electric ceiling/underfloor	Room heaters
1	2	3	4	5	6

Distribution type FINDISTY

Radiators	Underfloor
1	2

Primary heating fuel FINMHFUE

Gas			Oil	Solid fuel			Biomass	Electricity				Communal		
Mains	Bulk LPG	Bottled		Coal	Smokeless fuel	Anthracite		Standard	7 hr tariff	10 hr tariff	24 hr tariff	CHP/Waste heat	From boiler not biomass	From boiler biomass
01	02	03	04	05	06	07	08	09	10	11	12	13	14	15

FINMHBIT Biomass type

Wood chips	Wood logs	Wood pellets	Grass	Oil
1	2	3	4	5

Primary heating type FINMHBOI

Standard (non condensing)	Back boiler	Combination (non condensing)	Condensing	Condensing Combi	Combined primary storage unit	No boiler	Heat pump	Unknown
1	2	3	4	5	6	7	8	9

passive flue gas heat recovery FINPHHRD Y N

CRITICAL INFORMATION FROM TABLE

Primary heating appliance
First digit should match code for primary heating group

Code FINCHBCD

Clarify with household
Primary heating system working? FINCHWRK

	Action				Age (Clarify with household)
	None	Minor repair	Major repair	Replace	
Primary heating appliance	FINCHBAC	2	3	4	FINCHBAG
Primary heating distribution	FINCHDAC	2	3	4	FINCHDAG

If boiler (or heat pump) system:

Manufacturer name: FINCHBMA

Model name/number: FINCHBMO

Primary heating controls (non storage heaters)

	Present?		
Overall switch FINCHOFF	Y	N	U
Boiler thermostat FINCHTHE	Y	N	U
Mechanical time control FINCHMTC		N	U
Digital time control FINCHDTC	Y	N	U
Weather compensator FINCHWCM		N	U
Time and temperature zone control FINCHTZC			
Radiator controls (manual) FINCHCON			U

	Present?		
TRV / appliance thermostat FINCHTRV			U
Mechanical room thermostat FINCHMRC			U
Digital room thermostat FINCHDRT		N	U
Smart room thermostat FINCHSRT		N	U
TPI Thermostat FINCHTPI	Y	N	U
Programmable thermostat FINCHPTT		N	U
Modulating thermostat FINCHMTT		N	U

No: FINCHMNO, FINCHDNO, FINCHSNO, FINCHTNO

Primary heating controls (storage heaters)

	Present?			
Manual charge control	Y	N	U	FINCHMCC
Automatic charge control	Y	N	U	FINCHACC
Celect type control	Y	N	U	FINCHCTC

Other heating

Present? FINOHEAT Main heat source in winter? (ask household) FINOPHS

FINOHTYP
Type of system

Mains gas fires									LPG	Electric heaters			Solid fuel heaters		Heat pumps	Other
Open flue	Balanced flue	Fan assisted	Condensing	Live effect – sealed to chimney	Live effect fan assisted flue	Decorative open to chimney	Flueless	Unknown	Fixed heaters	Panel, convector or radiant	Portable	Individual storage heater	Open fire	Stove/open heater	Heat pumps	
01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17

Action				Age
None	Minor repair	Major repair	Replace	
FINOHACT	2	3	4	FINOHAGE

HHSRS FINHSCO
Carbon monoxide and fuel combustion products

Significantly better than average	Average risk	Significantly higher than average	Extreme risk
1	2	3	4

Describe 'extreme risk' in deficiency list

SPSS SERVICES

Hot water system Present? FINWHEAT

If present indicate all systems ...MH ...PR ...TY ...AC ...AG

	Present? (...PR)		Main water heating system (...MH)	Fuel (...TY)								Action (...AC): None	Minor repair	Major repair	Replace	Age (...AG)
Boiler with central heating FINWHC...		N	Y													
Boiler (water heating only) FINWHO...		N	Y	Mains gas 01	Bulk LPG 02	Bottled gas 03	Oil 04	Coal 05	Smokeless 06	Anthracite 07	Biomass 08	1	2	3	4	
Back boiler (water heating only) FINWHX...			Y	Mains gas 01	Bulk LPG 02	Bottled gas 03	Oil 04	Coal 05	Smokeless 06	Anthracite 07	Biomass 08	1	2	3	4	
Single immersion heater FINWSI...	Y	N	Y	Standard 09	7 hr tariff 10	10 hr tariff 11	24 hr tariff 12					1	2	3	4	
Dual immersion heater FINWDI...	Y	N	Y	Standard 09	7 hr tariff 10	10 hr tariff 11	24 hr tariff 12					1	2	3	4	
Separate instantaneous heater: Single Point FINWSP..			Y	Mains gas 01	Bulk LPG 02	Bottled gas 03	Oil 04	Standard 09				1	2	3	4	
Separate instantaneous heater: Multi Point FINWMP..			Y	Mains gas 01	Bulk LPG 02	Bottled gas 03	Oil 04	Standard 09				1	2	3	4	
Communal FINWHL...	Y	N	Y	CHP/waste 13	From boiler 14											
Other FINWOT...	Y	N	Y	Specify:					Fuel from fuel page FINWOTFU							

Cylinder present? FINWHCYL

Cylinder seen? FINWHCSN

If cylinder seen:

Size/volume	450 x 900mm (110 l) 1	450 x 1050mm (140 l) 2	450 x 1200mm (160 l) 3	450 x 1500mm (210 l) 4					FINWHSIZ
Cylinder insulation	Foam / Factory insulated 1	Jacket / Loose jacket 2	Other 3	None 4					FINWHINS
Cylinder insulation thickness	0 1	12.5mm 2	25mm 3	38mm 4	50mm 5	80mm 6	100mm 7	150mm 8	FINWHMMS

Water heating controls? Present?

Separate time control for water heating	Y	N	U	FINWHCEN
Cylinder thermostat	Y	N	U	FINWHTHE

6. Loft inspection

SPSS SERVICES

Inspect all houses and top floor flats

FINLOPOS

House/ Bungalow	Top floor flat	Mid floor flat	Ground floor flat	Basement flat
1	2	3	4	5
		GO TO SECTION 7		

Loft information from: FLIINFOR

Inspection	Occupant	No loft (flat or very shallow pitched roof)	no information
1	2	5	6
		GO TO SECTION 7	

Type of loft FLITYPES

Fully boarded	No boarding or partial boarding	Room(s) with permanent stairs	Don't know
1	2	3	9

Roof insulation above living space? FLIINSUL

Yes	No	Don't know
1	2	9

Type of loft insulation FININTYP

Mineral wool/ fibre glass	Vermiculite beads	High performance quilt	Rigid foam board	Not applicable	Don't know
1	2	3	4	5	8

Approximate thickness of loft insulation FLITHICK

No insulation	25mm	50mm	75mm	100mm	125mm	150mm	200mm	250mm	300mm	+300mm	Don't know thickness
00	01	02	03	04	05	06	07	08	09	10	88

Any roof structure problems seen? FLIPROBS

Is there any evidence of cavity wall insulation in the loft? FLICWIEV

If yes, describe and transfer to Section 21 FLIDESC

SPSS HQ

7. Household questionnaire

Questions asked? Y | N — FHQASKED

1. Do you have cavity wall insulation? Y | N | U — FHQCAVIT
   Record in elevation features (section 10) if seen and complete wall insulation summary (section 10)

2. Do you have internal wall insulation? Y | N | U — FHQINSWI
   Record in walls (section 6) if seen and complete wall insulation summary (section 10)

3. Do you have external wall insulation? Y | N | U — FHQEXTWI
   Record in elevation features (section 10) if seen and complete wall insulation summary (section 10)

4a. Are any of your floors in contact with the ground insulated? Y | N | U — FHQFLINS

4b. Percentage of floors in contact with the ground with insulation present

25%	50%	75%	100%	
1	2	3	4	FHQPERCE

5. Do you have a working smoke detector on every floor of the dwelling? Y | N | U — FHQSMOKE

6. Do you have access to a garage/private parking space? Y | N | U — FHQGARAG

7. Do you have a water meter? Y | N | U — FHQWAMET

8. If yes, are you charged according to the amount you use? Y | N | U — FHQWMCH

9. Are you directly connected to mains drainage operated by a water/sewage company? Y | N | U — FHQWASTE

10. Does any part of your home get uncomfortably hot? Y | N | U — FHQOHANY
    (even when your heating is off and the windows are open)

11. If yes, which rooms are particularly affected.

Bedrooms	Living rooms	Attic room	Conservatory
FHQOHBED	FHQOHLIV	FHQOHATT	FHQOHCON

COMPLETE FOR HMO USE ONLY

Number of accommodation units in dwelling	FMONUMAC	Number of shared kitchens	FMOSHKIT
Number of households in dwelling/occupied units	FMONUMHH	Total number of WC's	FMOTOTWC
Total number of occupants in dwelling	FMONUMOC	Number of shared WC's	FMOSHWC

8. Details of flat

SPSS FLATDETS

Plan of flat Draw plan of module and locate flat within it. Show if measurements have been rectangularised

Back

Left | Right

Front

Tenths of wall exposed (Columns add up to 10)

	Front wall	Fenestration area m^2	Back wall	Fenestration area m^2	Left wall	Fenestration area m^2	Right wall	Fenestration area m^2
To outside air	FDFFROOA	FDFFROFA	FDFBCKOA	FDFBCKFA	FDFLFTOA	FDFLFTFA	FDFRIGOA	FDFRIGFA
To internal accessways	FDFFROIA		FDFBCKIA		FDFLFTIA		FDFRIGIA	
To other flats	FDFFROOF		FDFBCKOF		FDFLFTOF		FDFRIGOF	

(For Fenestration area use whole numbers only)

FDFENTRY

Entry floor to dwelling proper (level of first actual accommodation)

Basement	Ground	Specify	Unknown
BB	GG	FDFENTYN	99

Dimensions of flat (internal and rectangularised)

No. of floors in flat: FDFFLOOR

Level (B, G, 1, 2 etc)

Main floor: FDFMAINL | GG | FDFMAINN

Next floor: FDFNEXTL | NN | BB | GG | FDFNEXTN

External dimensions same as module: FDFSAMED

Width (metres): Main floor FDFMAINW; Next floor: Same as above 555 FDFNEXTW

Depth (metres): Main floor FDFMAIND; Next floor: Same as above 555 FDFNEXTD

If yes, record at section 13

SPSS COMMAC

9. Common parts of module.

Common parts exist — Accessway — Lift

FCPPRES NO. GO TO SECTION 10

	Accessway			Lift
Does accessway exist? FCPEXIST	Y N	Y N	Y N	FCPLFTEX
FCPTYPES				
FCPSIZES				FCPLFTSZ
Enclosed? FCPENCLO	Y N	Y N	Y N	
In module? FCPINMOD	Y N	Y N	Y N	FCPLFTIN
Working?				FCPLFTWK
				FCPLFTWU
				FCPLFTVP

Floors/ treads

Faults?	FCPFLRFL	Y N	Y N	Y N
Modify structure	FCPFLRMO			
Renew surface	FCPFLRRN			
Repair surface	FCPFLRRP			

Walls

Faults?	FCPWLSFL	Y N	Y N	Y N
Modify structure	FCPWLSMO			
Renew surface	FCPWLSRN			
Repair surface	FCPWLSRP			
Repaint surface	FCPWLSPA			

Ceilings/soffits

Faults?	FCPCLNFL	Y N	Y N	Y N
Modify structure	FCPCLNMO			
Renew surface	FCPCLNRN			
Repair surface	FCPCLNRP			
Repaint surface	FCPCLNPA			

Access doors/screens

Faults?	FCPAXDFL	Y N	Y N	Y N
Replace	FCPAXDRN			
Repair/rehang	FCPAXDRP			
Repaint	FCPAXDPA			

Accessway windows

Faults?	FCPAXWFL	Y N	Y N	Y N
Replace	FCPAXWRN			
Repair	FCPAXWRP			
Repaint	FCPAXWPA			

Accessway lighting

Faults?	FCPAXLFL	Y N	Y N	Y N
Replace light fittings	FCPAXLFT			
Replace light switches	FCPAXLSW			

Balustrades

Faults?	FCPBALFL	Y N	Y N	Y N
Replace	FCPBALRN			
Repair	FCPBALRP			

SPSS COMMON

Security of module

		1	2	3
FCPACCES	Type of access	1	2	3
		...PR	...WK	...IN
FCPCON...	Concierge system	Y N	Y N	Y N
FCPENT...	Door entry system	Y N	Y N	Y N

Fire safety of flat surveyed

FCPESCAP	1	2	3	4

Fire precautions

	...PR	...AC			
FCPPRO...	Y N	1	2	3	4
FCPCLO...	Y N	1	2	3	4
FCPEXT	Y N	1	2	3	4
FCPEML...	Y N	1	2	3	4
FCPSGN...	Y N	1			4
FCPSAF...	Y N				
FCPALT...	Y N				
FCPALM...	Y N	1	2	3	4
FCPSPR...	Y N				

Contribution to problems (within survey module)

Vandalism	FCPVANDA	1	2	3
Graffiti	FCPGRAFF	1	2	3
Litter/rubbish	FCPLITTR	1	2	3

HHSRS - common areas (affecting flat surveyed)

FCPHSSTR	Falling on stairs etc	1	2	3
FCPHSLVL	Falling on level surfaces	1	2	3
FCPHSBTW	Falling between levels	1	2	3
FCPHSFIR	Fire	1	2	3
FCPHSHOT	Flames, hot surfaces, etc	1	2	3
FCPHSDAM	Damp and mould growth		2	3

If '3', score HHSRS in Section 22

SPSS NUMFLATS

10. Number of flats in module

This section is critical. Make every attempt to record correct number of flats in module

Number of flats in module

Specify	Unknown
FNOFLATS	999

DOUBLE CHECK the number of flats against what you have defined as your module in Section 8 before continuing

Level of lowest flat FNOLOWES

Basement	Ground floor	Floor	Unknown
B	G		9

Use of ground floor FNOGRUSE

Dwelling only	Dwelling and services	Services only	Dwelling and non residential	Non residential only	Dwelling and void	Other
1	2	3	4	5	6	7

Use of basement FNOBSUSE

No basement	Dwelling only	Dwelling and services	Services only	Dwelling and non residential	Non residential only	Dwelling and void	Other
8	1	2	3	4	5	6	7

Non residential use

If any non residential use, % total floor area of module in non residential use FNORESAR

No non residential	Specify %	Unknown
88		99

If dwelling with non residential: non residential use FNOREUSE

Not 'dwelling with non residential'	Shop/ business	Office	Industrial/ Institutional	Surgery	Public House	Hotel	Other
8	1	2	3	4	5	6	7 FNOREOTH

If dwelling with non residential:
Does the non-residential use include the handling/processing of food for commercial purposes? FNORESFD

Other flats in module

Are they? FNOOTHER

Survey flat is only one in module	Mostly same as survey dwelling	Mostly small flats	Mostly large flats	Mixture of small/large flats	Mixture of flats/ maisonettes	Unknown
8	1	2	3	4	5	9

Approximate number of vacant flats in module FNOVACNT

Survey flat is only one in module	Specify
888	

11. Shared facilities and services *(within 100m of survey dwelling)*

Do shared facilities/services exist? FFCSHARE * NO, GO TO SECTION 12

Stores and common rooms	...PR Present?		Location ...LO Integral?	Not integral?	Action ...AC None	Minor	Major
Tenant stores	FFCTEN...	Y N	1	2	1	2	3
Bin stores	FFCBIN...	Y N	1	2	1	2	3
Pram/bike stores	FFCPAL...	Y N	1	2	1	2	3
Laundry	FFCLAU...	Y N	1	2	1	2	3
Drying room	FFCDRY...	Y N	1	2	1	2	3
Community room	FFCCOM...	Y N	1	2	1	2	3
Warden/caretaker office	FFCWAR...		1	2	1	2	3

Common/electrical services	...PR Present?		Action ...AC None	Minor	Major
CCTV	FFCCCT..	Y N	1	2	3
TV reception	FFCTVR...	Y N	1	2	3
Lightning conductors	FFCHTG..		1	2	3
Communal heating	FFCHEA..	N	1	2	3
Burglar alarm system	FFCBUR...		1	2	3
External lighting	FFCLIT...	Y N	1	2	3

Communal parking facilities	...PR Present?		Location ...LO Integral?	Not integral?	Action ...AC None	Minor	Major
Garages	FFCGAR...	Y N	1	2	1	2	3
Multi storey parking	FFCMUL...	N	1	2	1	2	3
Underground parking	FFCUND...		1	2	1	2	3
Roof parking	FFCROO...	Y N	1	2	1	2	3
Other covered parking	FFCCOV..		1	2	1	2	3
Open air parking bays	FFCAIR...				1	2	3

If communal spaces are present how many are there? FFCSPACE	1-9	10 or more
	1	2

Surfaces and fences	...PR Present?		Action ...AC None	Minor	Major
Drying areas	FFCDAR..	Y N	1	2	3
Children's play areas	FFCPLA...		1	2	3
Unadopted estate roads	FFCRDS..		1	2	3

Landscaping	...PR Present?		Action ...AC None	Minor	Major
Paths	FFCPAT..	Y N	1	2	3
Walls/fences	FFCWAL..	Y N	1	2	3
Hard landscaping	FFCHRD..	N	1	2	3
Grass/planting	FFCGRA..	Y N	1	2	3

Contribution to problems in condition (outside survey module)

		None	Minor	Major
Vandalism	FFCVAND	1	2	3
Graffiti	FFCGRAFF	1	2	3
Litter/rubbish	FFCLITTR	1	2	3

Design of paths

ANSWER IF PATHS PRESENT ('Y' IN BOX ABOVE)

Paths		Yes	No	Not applicable
At least 900mm wide?	FFCPAT90	1	2	3
Gradient greater than 1 in 12?	FFCPATGR		2	3
Protected from adjacent drops?	FFCPATAD		2	3

Accessibility

Number of steps from pavement to entrance of module FFCASTEP

Level Access	No step but slope > 1:20	1 step	2 step	3 or more steps
0	7	1	2	3
Space for ramp				
Not applicable 8		Yes 1	No 2	FFCARAMP

Is path firm and even?	Y N	FFCAFIRM
Is entrance adequately lit?	Y N	FFCALIT
Is entrance covered?	Y N	FFCACOVR

HHSRS - shared areas

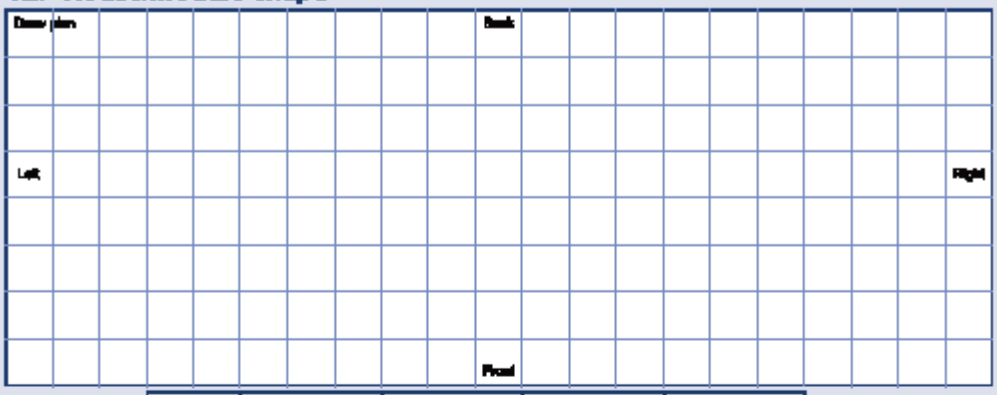
(affecting dwelling surveyed)

	Significantly lower risk than average	Average risk	Significantly higher risk than average	
Falling on stairs etc	1	2	3	FFCHSSTR
Falling on level surfaces	1	2	3	FFCHSLVL
Falling between levels	1	2	3	FFCHSBTW

If '3', score HHSRS in Section 23

SPSS SHAPE

12. House/module shape



Location of additional part FSHADDIT

No additional part 77	Front elevation			Back elevation			Left elevation			Right elevation		
	Left 01	Middle 02	Right 03	Left 04	Centre 05	Right 06	Front 07	Middle 08	Back 09	Front 10	Centre 11	Back 12

Attic/basement in house/module FSHATTIC

Attic only 1	Basement only 2	Both 3	Neither 4

Entry floor in house/module FSHENTR

Basement 8	Ground 0	Floor

13. External dimensions of house/module

	No. of floors	Levels (0, 0 1, 2 etc)			Width (metres)	Depth (metres)
Main structure	FDHMFLRS	FDHMLEV1	Basement 88	Ground 00	FDHMWID1	FDHMDEP1
		FDHMLEV2	None within NN	Basement 88	Ground 00	FDHMWID2	FDHMDEP2
		FDHMLEV3	None within NN	Basement 88	Ground 00	FDHMWID3	FDHMDEP3
Additional part	No. of floors FDHAFLRS	FDHALEV1	Basement 88	Ground 00	FDHAWID1	FDHADEP1
		FDHALEV2	None within NN	Basement 88	Ground 00	FDHAWID2	FDHADEP2
		FDHALEV3	None within NN	Basement 88	Ground 00	FDHAWID3	FDHADEP3

14. Material and construction of house/module (code one type only)

FMTCONST

Code	Material	Construction	Type
01	Masonry	Solid wall	Solid
02	Masonry	Solid wall	Cavity
03	Masonry	Cruck frame	
04	Concrete	Solid wall	In-situ
05	Concrete	Solid wall	Precast panel <1m wide
06	Concrete	Solid wall	Precast panel >1m wide
07	Concrete	Cruck frame	In-situ
08	Concrete	Cruck frame	Precast panel
09	Concrete	Frame	In-situ
10	Concrete	Frame	Precast
11	Timber	Frame	Pre 1919
12	Timber	Frame	Post 1918
13	Metal	Frame	
14	Other, please specify if known		

FMTCOOTH

If external wall is stone, what is the proportion (tenths) of wall that is stone?

N/A	1	2	3	4	5	6	7	8	9	10

FMTPROST

Proprietary system? FMTPROPS

If 'Yes, name:

FMTDESCR

Type of stone? FMTTYPST

Granite 1	sandstone 2	limestone 3
slate 4	other 5	unknown 9

If other, specify:

FMTOTHST

SPSS SHAPE

15. Improvements/alterations

(to the household's dwelling since original construction)
Code most recent (or most significant)

Clarify with Household

		None	Pre 1964	1965-1984	1985-1994	1995-2002	2003-2011	2012 onwards	In progress
Conversion to more than one dwelling	FALMORED	1	2	3	4	5	6	7	8
Conversion to HMO use	FALHMOED	1	2	3	4	5	6	7	8
Conversion from non-residential use	FALNORES	1	2	3	4	5	6	7	8
Two or more dwellings combined	FALCOMBI	1	2	3	4	5	6	7	8
Complete refurbishment/modernisation	FALREFUR	1	2	3	4	5	6	7	8
Rearrangement of internal space	FALSPACE	1	2	3	4	5	6	7	8
Extension added for amenities	FALEXTAM	1	2	3	4	5	6	7	8
Extension added for living space	FALEXLIV	1	2	3	4	5	6	7	8
Alteration of external appearance	FALAPEAR	1	2	3	4	5	6	7	8
Over-cladding	FALOCLAD	1	2	3	4	5	6	7	8
Loft conversion	FALLOFTS	1	2	3	4	5	6	7	8
Radon remedial works (check postcode)	FALLRAD	1	2	3	4	5	6	7	8

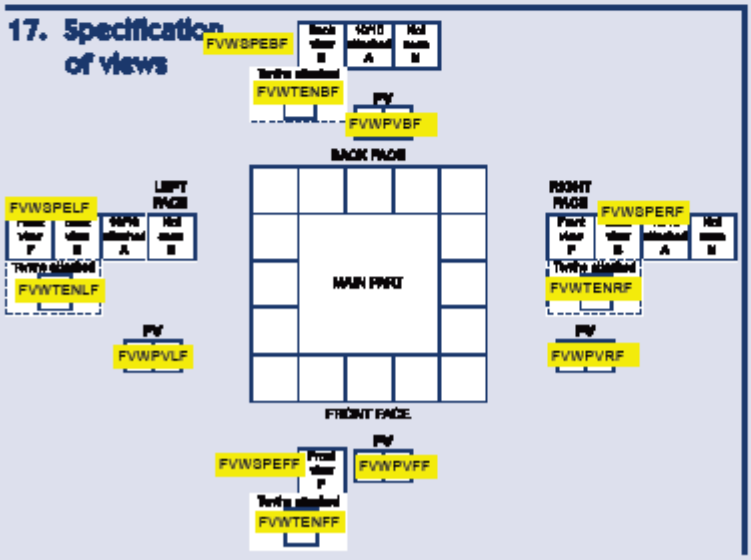
ASK HOUSEHOLD
Broad year of loft conversion
FALYELCO

16. Elevation features

SPSS ELEVATE

		...FF Front face	...LF Left face		...RF Right face	...BF Back face
		Y N	Y N		Y N	Y N
Must add up to 10				FELEXP.. Is part of face unattached?		Must add up to 10
				FELGAB.. Gables (facing)		
				FELPAR.. Parapets (facing)		
				FELSUP.. Mono supporting walls (facing)		
				FELBAS.. Base walls (facing)		
				FELMAW.. Main walls (facing)		
				FELGUT.. Valley gutters (number)		
		Y N PV m²	FELSOL.. PV m²	FELSOL.. Solar water heating panels?	Y N PV m²	Y N PV m²
		Y N	FELPV..	FELPVM.. Solar photovoltaic (PV)?	Y N	Y N
		Y N	FELCAV..	Evidence of cavity wall insulation?	Y N	Y N
		Y N	FELEXT..	External insulation?	Y N	Y N
		...FW ...FV ...FN	...LW ...LV ...LN	FELFEN.. Fenestration (facing)	...RW ...RV ...RN	...BW ...BV ...BN

17. Specification of views



Is there any evidence from the air brisk of cavity wall insulation? FELCWIAB

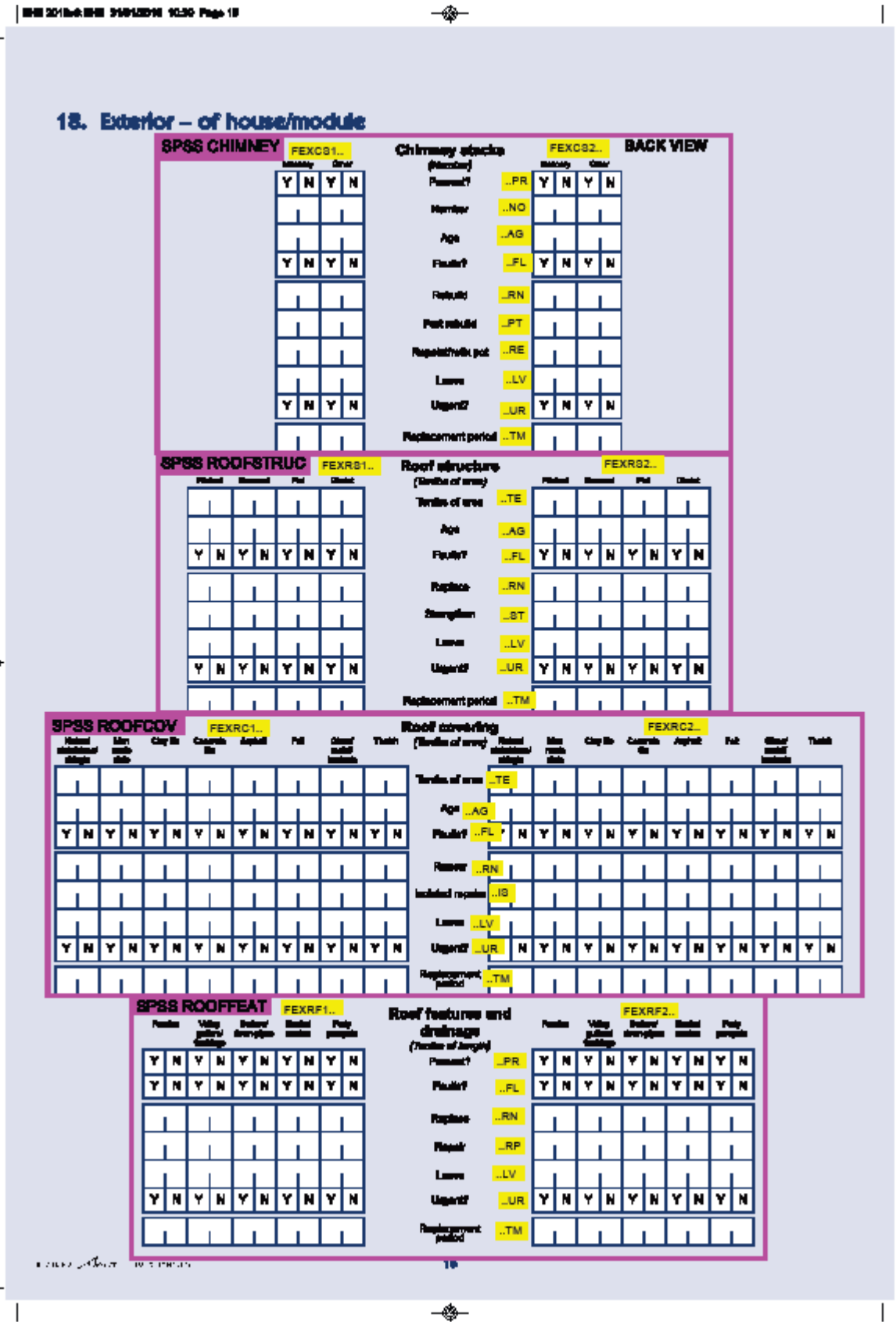
West turbine present? FELWTUR

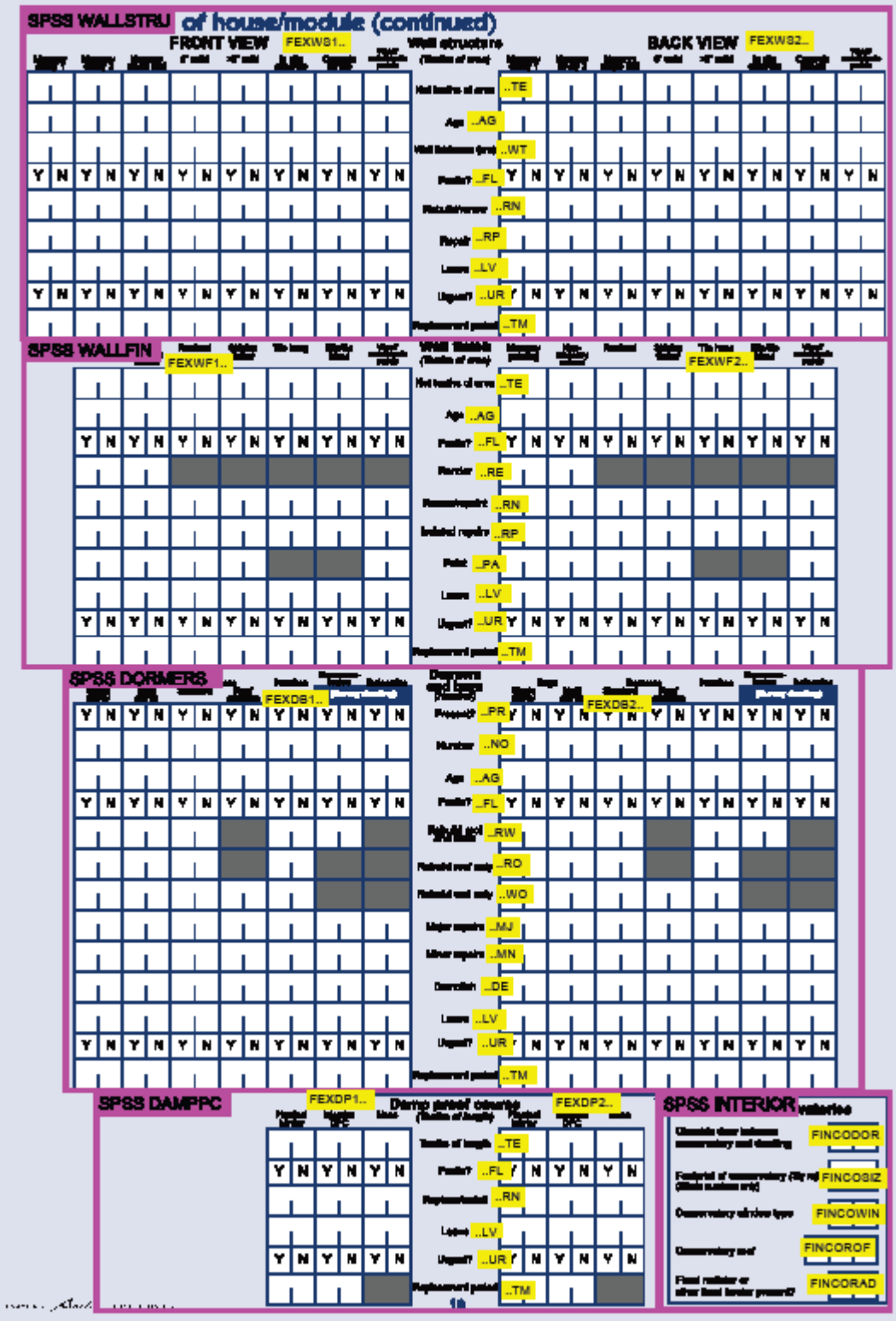
Roof Pitch (deg.) FELROOFP

Flat - 15	15 - 25	27 - 35	40 - 50	60+
1	2	3	4	5

Orientation of Front Face FELORIEN

NW	N	NE
W		E
SW	S	SE


18. Exterior – of house/module
SPSS CHIMNEY
FEXC81..
Chimney stacks
FEXC82..
BACK VIEW
..PR
..NO
..AG
..FL
..RN
..PT
..RE
..LV
..UR
..TM
SPSS ROOFSTRUC
FEXR81..
Roof structure
FEXR82..
..TE
..AG
..FL
..RN
..ST
..LV
..UR
..TM
SPSS ROOFCOV
FEXRC1..
Roof covering
FEXRC2..
..TE
..AG
..FL
..RN
..IS
..LV
..UR
..TM
SPSS ROOFFEAT
FEXRF1..
Roof features and drainage
FEXRF2..
..PR
..FL
..RN
..RP
..LV
..UR
..TM


SPSS WALLSTRU of house/module (continued)
FRONT VIEW FEXWS1..
BACK VIEW FEXWS2..
Wall structure
..TE
..AG
..WT
..FL
..RN
..RP
..LV
..UR
..TM
SPSS WALLFIN
FEXWF1..
FEXWF2..
..RE
..PA
SPSS DORMERS
FEXDS1..
FEXDS2..
..PR
..NO
..RW
..RO
..WO
..MJ
..MN
..DE
SPSS DAMPPC
FEXDP1..
FEXDP2..
SPSS INTERIOR
FINCODOR
FINCOSIZ
FINCOWIN
FINCOROF
FINCORAD

SPSS WINDOWS of survey dwelling

FRONT VIEW FEXWN1..

Windows/frames to survey dwelling (Number)

BACK VIEW FEXWN2..

Windows/frames to survey dwelling	Variable	Front view	Back view
Number	..NO		
Age	..AG		
Faulty?	..FL	Y N Y N Y N Y N Y N Y N Y N	Y N Y N Y N Y N Y N Y N Y N
Replace	..RN		
Repair/replace sash/casement	..RP		
Ease/adjust/replace	..EA		
Repaint/putty	..PA		
Leave	..LV		
Urgent?	..UR	Y N Y N Y N Y N Y N Y N Y N	Y N Y N Y N Y N Y N Y N Y N
Replacement period	..TM		

SPSS DOORS

FEXDF1.. FEXDF2..

Doors/frames to survey dwelling (Number)

Doors/frames to survey dwelling	Variable	Wood	UPVC	Metal	Composite	Wood	UPVC	Metal	Composite
Number	..NO								
Age	..AG								
Faulty?	..FL	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
Replace	..RN								
Repair/glaze	..RP								
Ease/adjust/replace ironmongery	..EA								
Paint	..PA								
Leave	..LV								
Urgent?	..UR	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
Replacement period	..TM								

18. Exterior – plot of survey dwelling (Not shared plots)

SPSS AROUND

Private plot exists Complete all this section	No private or shared plot Complete accessibility + HHSRS	Shared plot / facilities only Complete section 11 only
1	FEXPLTYP	3

Front plot: Exists FEXPLOTF; Depth (m) FEXP1FDP

Width of plot: FEXWIDTH

Rear plot: FEXPLOTR Exists; FEXP2FDP Depth (m)

Accessibility FEXD...

Number of steps from gate/pavement to entrance [illegible] ..STEP

Level Access	No step but slope > 1:20	1 step	2 step	3 or more steps
8	7	1	2	3

Space for ramp ..RAMP — Not applicable 8; Yes 1; No 2

Is path firm and even?	Y	N	..FIRM
Is path at least 900mm wide?	Y	N	..ESWI
Is gradient less than 1:12?	Y	N	..ESGR
Is entrance adequately lit?	Y	N	..ESFE
Is entrance covered?	Y	N	..COVR

FEXPF.. ..TH Terrace **SPSS PLOTLVL**

Front	Variable	Item	Rear
	..TS	Terrace exit	
Y N	..FL	Faulty?	Y N
Y	..BD	Bridged DPC	Y
Y	..IN	Inadequate/reverse falls	Y
	..EX	Excavation (m^3)	
	..TA	Internal tanking (m^2)	
	..RN	Repair/renew paving (m^2)	
	..RW	Repair/renew retaining wall (m)	
	..RP	Repair/renew steps (no.)	
Y N	..GU	Install gully?	Y N

HHSRS – of plot

note: include front and rear plots

FEXHS...

		Significantly lower risk than average	Average risk	Significantly higher risk than average
Falling on stairs etc	..STR	1	2	3
Falling on level	..LVL	1	2	3
Falling between levels	..BTW	1	2	3
Damp and mould growth	..DAM		2	3

If '3', score HHSRS in Section 22

SPSS AROUND

19. Around the house/module

Underground drainage

Mains drainage present: Y N FCUDRAIN

Faults to drains: Y N FCUFAUL

HHSRS FEXH3PHY Personal hygiene sanitation and drainage: 1 2 3 4

Rats and mice outside house/module FCU...

Evidence of mice? ..VERMC

Evidence of rats? ..VERAT

Pets/livestock kept outside? ..PETSL

Type of evidence: ..TRAPS ..CHEMS ..VISUA

Litter/rubbish around house/module: None 1 Minor 2 Major 3 ..LITTR

HHSRS FEXH3DHY Domestic hygiene pests and refuse: 1 2 3 4

Parking provision of survey dwelling

	..PR Present?		..LO On plot?		Car spaces ..SP
Integral garage FCUINT...	Y	N	Y	N	
Attached garage FCUATT...	Y	N	Y	N	
Detached garage FCUDET...	Y	N	Y	N	
Car port FCUPOR...	Y	N	Y	N	
Designated parking space(s) FCUSPA..	Y	N	Y	N	

Street parking FCUSTR: Adequate 1 | Inadequate 2 | None 3

Is there any off-plot parking located within 30 metres of the entrance to dwelling/module, with an even access route of less than 1:12 gradient? FCUOPP

Cavity wall insulation summary

Evidence of cavity wall insulation: FCWICH...

..ME Area around meters (P8)

..LS Loft space (P7)

..OR Occupant response (P6)

..EF Elevation features (P14)

..AB Air bricks (P14)

FCWIPROP — % of cavity walls with CWI present: 0% 0 | 25% 1 | 50% 2 | 75% 3 | 100% 4

Internal / external insulation summary

Evidence of internal / external insulation:

FSWIIWINT Internal wall insulation (P5)

FSWIIOCCR Occupant response (P6)

FSWIIWEXT External wall insulation (P14)

FSWIPROP — % of walls with internal / external insulation present: 0% 0 | 25% 1 | 50% 2 | 75% 3 | 100% 4

Exposure

Is the dwelling in an exposed position? FCUEXPOS: Not exposed 1 | Slightly exposed 2 | Exposed 3 | Very exposed 4

What is the average level of overshading of the dwelling windows? FCUOSDW: None or very little 1 | Modest 2 | Significant 3 | Heavy 4

What is the level of overshading to the module roof? FCUOSMR: None or very little 1 | Modest 2 | Significant 3 | Heavy 4

20. Block SPSS AROUND

Number of houses/modules in block: Detached house/module 01 | Specify number | More than 99 75 — FBLBLOCK

Approximate number of houses/modules in disrepair in block: Specify number — FBLDEFEC

SPSS STRUCTURE

21. Structural defects

Any structural defects present? FSTPRES

IF YES, DESCRIBE BELOW
IF YES OR NO, COMPLETE HHSRS ASSESSMENT AT BOTTOM OF PAGE

FST...	Defect ..DE	Action required? ..AC		Monitor/ examine further? ..MN		Action described elsewhere on form? ..EL		Action required on assumption problem is progressive – Any additional action required that is not accounted for elsewhere: Treatment?			Extent		
Roof sagging ..SAG..	Y	Y	N	Y	N	Y	N						
Roof humping ..HUM..	Y	Y	N	Y	N	Y	N						
Roof spreading ..SPR..	Y	Y	N	Y	N	Y	N	Tie-ing ..TI	Y	N	Number:	..NO	
								Other ..OT	Y	N	Specify	..SP	
Sulphate attack ..SUL..	Y	Y	N	Y	N	Y	N	Chimney-liner ..CL	Y	N	Linear metres	..LM	m
								Other ..OT	Y	N	Specify	..SP	
Unstable parapets ..PAR..	Y	Y	N	Y	N	Y	N						
Wall bulging ..BUL..	Y	Y	N	Y	N	Y	N	Tie rods ..TR	Y	N	Number:	..TN	
								Strapping ..ST	Y	N	Number:	..SN	
								Other ..OT	Y	N	Specify	..SP	
Differential movement ..MOV..		Y	N	Y	N	Y	N	Movement-joint ..MJ		N	Linear metres	..LM	m
								Other ..OT	Y	N	Specify	..SP	
Lintel failure ..LIN..	Y	Y	N	Y	N	Y	N	Replace lintels ..RN	Y	N	Number:	..NO	
Wall tie failure ..TIE..	Y	Y	N	Y	N	Y	N	Insert wall ties ..IN	Y	N	Wall area:	..WA	m²
Unstable floors, stairs or ceilings ..UNS..	Y	Y	N	Y	N	Y	N						
Dry rot/Wet rot ..ROT..	Y	Y	N	Y	N	Y	N	Wall & timber treatment ..TR	Y	N	Basement 1 / Grd storey 2 / Oth floor 3 ..EX / Loft 4 / Most of building 5		
Wood-borer infestation ..BOR..	Y	Y	N	Y	N	Y	N	Timber treatment ..TR	Y	N	Basement 1 / Grd storey 2 / Oth floor 3 ..EX / Loft 4 / Most of building 5		
Adequacy of balconies / projections ..BAL..	Y	Y	N	Y	N	Y	N	Replace fixings ..RN		N	Total number:	..NO	
								Other ..OT	Y	N	Specify	..SP	
Foundation settlement ..FOU..	Y	Y	N	Y	N	Y	N	Underpin ..UN	Y	N	Linear metres	..LM	m
								Other ..OT	Y	N	Specify	..SP	
Integrity of structural frame ..ISF..	Y	Y	N	Y	N	Y	N	Making-good ..MG	Y	N	Wall area	..WA	m²
								Replace frame ..RN	Y	N			
Integrity of wall panels ..IWP..	Y	Y	N	Y	N	Y	N	Replace fixings ..RN		N	Total number:	..NO	
								Other ..OT	Y	N	Specify	..SP	
Boundary wall – unsafe height ..BWH..	Y	Y	N	Y	N		N	Replace FSTBWRE			Wall area	FSTBWREA	m²
Boundary wall – out of plumb ..BWP..	Y	Y	N	Y	N		N	Repair FSTBWRP			Wall area	FSTBWRPA	m²
Boundary wall – horizontal cracking ..BWC..		Y	N	Y	N		N	Demolish FSTBWDM			Wall area	FSTBWDMA	m²
Unstable retaining wall ..RET..	Y	Y	N	Y	N	Y	N						
Any other problems ..OTH..		Y	N	Y	N	Y	N	Specify ..ST			Specify	..SE	

HHSRS

	Significantly lower risk than average	Average risk	Significantly higher risk than average	Extreme risk
FSTHSSCO Structural collapse and falling elements	1	2	3	4

Describe 'extreme risk' in Section 22

22. Housing Health and Safety Rating System

SPSS HHSRS

Refer back to all the HHSRS flags. Consider each of the following hazards in turn in relation to the dwelling as a whole. Decide whether any hazards are significantly worse than average and need to be scored individually on pages 21 - 22. Decide if there are any other hazards listed below which represent an extreme risk. If yes, indicate below and describe risk. If there are no hazards to score move to the Local Area section on page 23.

HAZARDS WHICH MAY REQUIRE SCORING

Hazard FHS...	Review whole survey form, especially:	Significantly lower risk than average	Average risk	Significantly higher risk than average
Falling on stairs etc ..STAIR	Check flags on pages 3, 10, 12, 17	1	2	3
Falling on level surfaces ..ONLEV	Check flags on pages 3, 10, 12, 17	1	2	3
Falling between levels ..BTLEV	Check flags on pages 3, 10, 12, 17	1	2	3
Fire ..FIRE	Check flags on pages 3, 10	1	2	3
Flames, hot surfaces, etc ..HOTSF	Check flags on pages 3, 10	1	2	3
Damp and mould growth ..DAMP	Check flags on pages 3, 10, 17		2	3

Are any hazards significantly higher than average (code 3)? FHSAHWA
If Yes, describe below and score hazard on pages 21-22

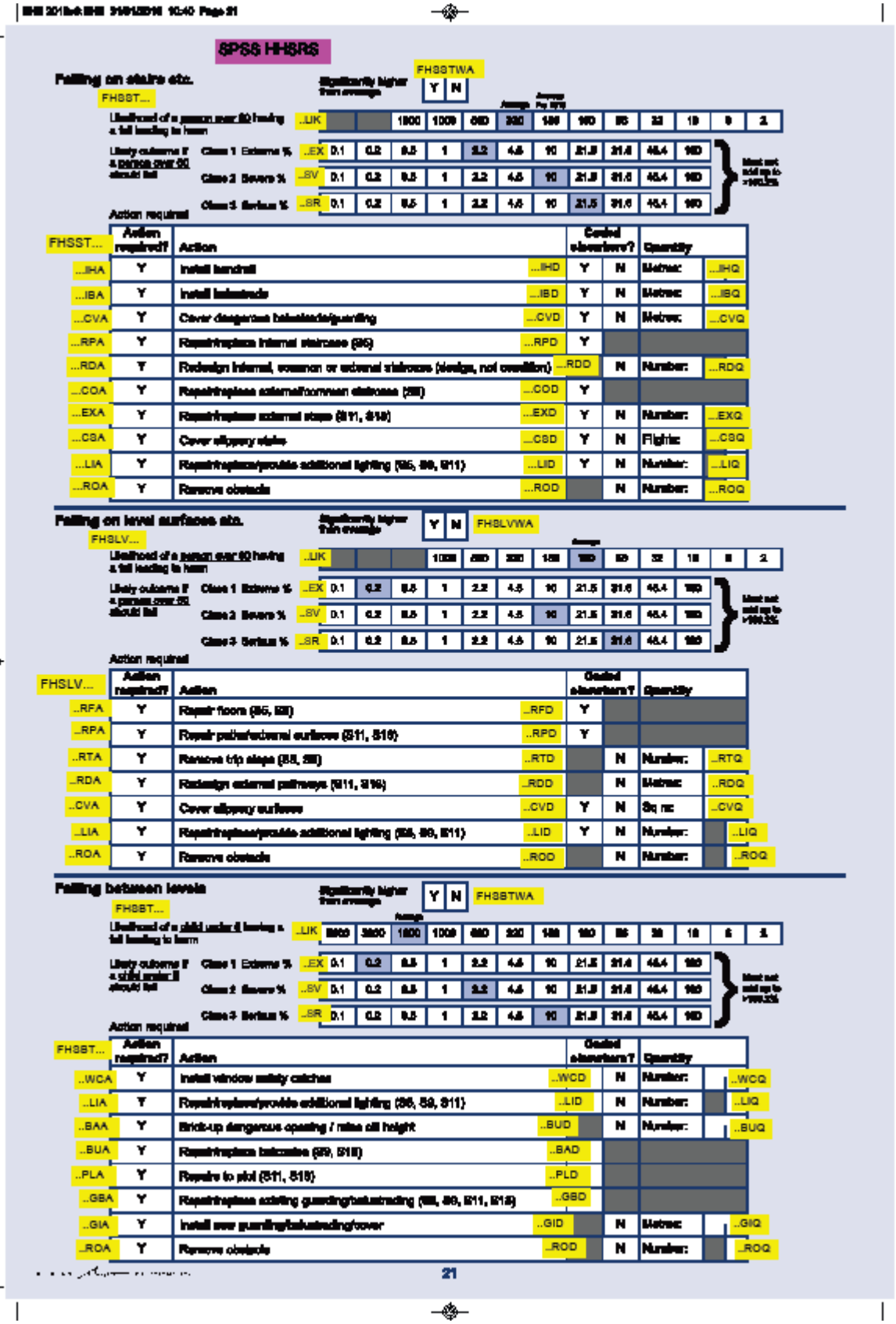
FHSMEAS

OTHER HAZARDS IDENTIFIED AS POSING AN EXTREME RISK

Hazard		Review whole survey form, especially:	Extreme risk?
Falls associated with baths etc	FHSFBATH	Check flag on page 4	Y
Entry by intruders	FHSENTRY	Check flag on page 3	Y
Noise	FHSNOISE	Check flag on page 3	Y
Collision and entrapment	FHSCENT	Check flag on page 3	Y
Excess heat	FHSEXHT	Check flag on page 3	Y
Lighting	FHSLIGHT	Check flag on page 3	Y
Water supply for domestic purposes	FHSWATER	Check flag on page 4	Y
Food safety	FHSFOOD	Check flag on page 4	Y
Personal hygiene, sanitation and drainage	FHSPHYG	Check flags on pages 4, 16	Y
Position and operability of amenities	FHSPOA	Check flag on page 4	Y
Uncombusted fuel gas	FHSUNGAS	Check flag on page 5	Y
Explosions	FHSEXPLO	Check flag on page 5	Y
Electrical safety	FHSELS	Check flag on page 5	Y
Carbon monoxide and fuel combustion products	FHSCO	Check flag on page 6	Y
Domestic hygiene, pests and refuse	FHSDHYG	Check flags on pages 3, 16	Y
Structural collapse and falling elements	FHSSCOLL	Check flag on page 19	Y

If Yes, to any of the above, describe extreme risk below and specify treatment

FHSXRISK


SPSS HHSRS
Falling on stairs etc.
FHSST...
FHSSTWA
Y
N
Likelihood of a person over 60 having a fall leading to harm
..LIK
Likely outcome if a person over 60 should fall
Class 1 Extreme % ..EX
Class 2 Severe % ..SV
Class 3 Serious % ..SR
Most not sold up to >100.0%
Action required
FHSST...
Action required?
Action
Costed elsewhere?
Quantity
...IHA Y Install handrail ...IHD Y N Metres: ...IHQ
...IBA Y Install balustrade ...IBD Y N Metres: ...IBQ
...CVA Y Cover dangerous balusters/guarding ...CVD Y N Metres: ...CVQ
...RPA Y Repair/replace internal staircase (95) ...RPD Y
...RDA Y Redesign internal, common or external staircase (design, not condition) ...RDD N Number: ...RDQ
...COA Y Repair/replace external/common staircase (98) ...COD Y
...EXA Y Repair/replace external steps (811, 816) ...EXD Y N Number: ...EXQ
...CSA Y Cover slippery stairs ...CSD Y N Flights: ...CSQ
...LIA Y Repair/replace/provide additional lighting (86, 89, 811) ...LID Y N Number: ...LIQ
...ROA Y Remove obstacle ...ROD N Number: ...ROQ
Falling on level surfaces etc.
FHSLV...
FHSLVWA
Y
N
Likelihood of a person over 60 having a fall leading to harm
..LIK
Likely outcome if a person over 60 should fall
Class 1 Extreme % ..EX
Class 2 Severe % ..SV
Class 3 Serious % ..SR
Most not sold up to >100.0%
Action required
FHSLV...
Action required?
Action
Costed elsewhere?
Quantity
..RFA Y Repair floors (85, 88) ..RFD Y
..RPA Y Repair paths/external surfaces (811, 816) ..RPD Y
..RTA Y Remove trip steps (88, 89) ..RTD N Number: ..RTQ
..RDA Y Redesign external pathways (811, 816) ..RDD N Metres: ..RDQ
..CVA Y Cover slippery surfaces ..CVD Y N Sq m: ..CVQ
..LIA Y Repair/replace/provide additional lighting (86, 89, 811) ..LID Y N Number: ..LIQ
..ROA Y Remove obstacle ..ROD N Number: ..ROQ
Falling between levels
FHSBT...
FHSBTWA
Y
N
Likelihood of a child under 5 having a fall leading to harm
..LIK
Likely outcome if a child under 5 should fall
Class 1 Extreme % ..EX
Class 2 Severe % ..SV
Class 3 Serious % ..SR
Most not sold up to >100.0%
Action required
FHSST...
Action required?
Action
Costed elsewhere?
Quantity
..WCA Y Install window safety catches ..WCD N Number: ..WCQ
..LIA Y Repair/replace/provide additional lighting (86, 89, 811) ..LID N Number: ..LIQ
..BAA Y Brick up dangerous opening / raise sill height ..BUD N Number: ..BUQ
..BUA Y Repair/replace balconies (89, 816) ..BAD
..PLA Y Repair to plot (811, 816) ..PLD
..GBA Y Repair/replace existing guarding/balustrading (88, 89, 811, 816) ..GBD
..GIA Y Install new guarding/balustrading/cover ..GID N Metres: ..GIQ
..ROA Y Remove obstacle ..ROD N Number: ..ROQ
21

SPSS HHSRS

Fire

Significantly higher than average: Y / N — FHSFRWA

Likelihood of a fire causing loading to harm if occupied by a person over 60

Average: 2569 | Actual: 3250 | 1800 | 1000 | 560 | 320 | 180 | 100 | 56 | 32 | 18 | 10 | 6 | 3

Likely outcome if occupied by a person over 60:

Class 1 Extreme %	..EX	0.1	0.2	0.5	1	2.2	4.5	10	21.5	31.6	46.4	100	Must not add up to 100.1%
Class 2 Severe %	..SV	0.1	0.2	0.5	1	2.2	4.5	10	21.5	31.6	46.4	100	
Class 3 Serious %	..SR	0.1	0.2	0.5	1	2.2	4.5	10	21.5	31.6	46.4	100	

Action required

FHSFR...	Action required?	Action		Capital allowance?		Quantity	
..ELA	Y	Repair/replace electrical system (26)	..ELD	Y			
..SOA	Y	Provide additional sockets	..SOD		N	Number:	..SOQ
..HTA	Y	Repair/replace or reposition heater (26)	..HTD	Y	N	Number:	..HTQ
..RCA	Y	Relocate cooker	..RCD		N	Number:	..RCQ
..RKA	Y	Re-fit, extend, re-site kitchen (32)	..RKD	Y	N	Number:	..RKQ
..CAA	Y	Repair/install precautions to common areas (30)	..CAD	Y	N	Sq m:	..CAQ
..PSA	Y	Replace non fire resistant/smoke permeable structure/poly. fire	..PSD	Y	N	Sq m:	..PSQ
..USA	Y	Upgrade stairway to protected route	..USD	Y	N	Flights:	..USQ
..HSA	Y	Replace inadequate heating system	..HSD		N		
..FWA	Y	Provide fire stop wall to loft space	..FWD		N	Number:	..FWQ
..SCA	Y	Provide self-closing doors	..SCD	Y	N	Number:	..SCQ
..IDA	Y	Install smoke detection measures	..IDD	Y	N	Number:	..IDQ
..OWA	Y	Provide suitable openable windows/alternative for MOE (28, 29)	..OWD		N	Number:	..OWQ
..FEA	Y	Provide fire escape	..FED		N	Flights:	..FEQ
..ROA	Y	Remove obstacle	..ROD		N	Number:	..ROQ

Flames, hot surfaces etc.

Significantly higher than average: Y / N — FHSHSWA

FHSHS...

Likelihood of a child under 5 being burn/scalded — ..LIK

Average: 1000 | 560 | 320 | 180 | 100 | 56 | 32 | 18 | 10 | 6 | 3

Likely outcome if a child under 5 is burn/scalded:

Class 1 Extreme %	..EX	0.1	0.2	0.5	1	2.2	4.5	10	21.5	31.6	46.4	100	Must not add up to 100.1%
Class 2 Severe %	..SV	0.1	0.2	0.5	1	2.2	4.5	10	21.5	31.6	46.4	100	
Class 3 Serious %	..SR	0.1	0.2	0.5	1	2.2	4.5	10	21.5	31.6	46.4	100	

Action required

FHSHS...	Action required?	Action		Capital allowance?		Quantity	
..RHA	Y	Repair, replace or reposition heater, heating or hot water pipes, or cover (26)	..RHD		N	Number:	..RHQ
..RCA	Y	Relocate cooker	..RCD		N	Number:	..RCQ
..RKA	Y	Re-fit, extend, re-site kitchen (26)	..RKD	Y	N	Number:	..RKQ
..ROA	Y	Remove obstacle	..ROD		N	Number:	..ROQ

Damp and Mould Growth

Significantly higher than average: Y / N — FHSDAWA

FHSDA...

Likelihood of a person under 12 suffering illness — ..LIK

Average: 560 | 320 | 180 | 100 | 56 | 32 | 18 | 10 | 6 | 3

Action required

FHSDA...	Action required?	Action		Capital allowance?		Quantity	
..RDA	Y	Treat rising damp (36, 016)	..RDD	Y			
..PDA	Y	Treat penetrating damp, leaking pipes and sanitaire (36, 016)	..PDD	Y	N	Number:	..PDQ
..EXA	Y	Condensation – extractor fans to install/repair (35)	..EXD		N	Number:	..EXQ
..WIA	Y	Condensation – repair/provide opening window (33, 016)	..WID	Y	N	Number:	..WIQ
..HTA	Y	Repair/replace/improve heating system (32)	..HTD	Y	N	Number:	..HTQ
..INA	Y	Improve insulation (35, 33, 010, 016)	..IND	Y			

24. Local area SPSS AROUND

Clearly define an area of manageable size before completing this page.

Nature of area FARNATUR

Urban			Rural		
Commercial /City/town centre 1	Urban 2	Suburban residential 3	Rural residential 4	Village centre 5	Rural 6

Number of dwellings in area FARDWELL

Under 25	25-49	50-99	100-299	300-499	500+	Isolated	If isolated go to visual quality
1	2	3	4	5	6	7	

Predominant age FARPRAGE

Pre 1919	1919-1944	1945-1964	1965-1980	Post 1980	None
1	2	3	4	5	6

Predominant residential building type FARTYPES

Houses				Flats				Mixed houses and flats
Terraced 1	Semi-detached 2	Detached 3	Mixed houses 4	Converted flats 5	Low rise flats 6	High rise flats 7	Mixed flats 8	9

Predominant tenure on built FARTENUR

Privately built	Local authority built	Housing association built	Mixed tenure	Impossible to ascertain
1	2	3	4	5

Estate

Number of dwellings on estate FARESTAT

Not on estate 0	Same as area 1	Under 25 2	25-49 3	50-99 4	100-299 5	300-499 6	500+ 7

If area is L.A. estate, % of RTB dwellings FARRTB

Not an L.A. estate 0	None (0%) 1	1-10% 2	11-20% 3	21-50% 4	51-70% 5	71-90% 6	100% 7

Visual quality of local area FARQUALI

Best						Worst
1	2	3	4	5	6	7

Problems in local area

		No problems				Major problems
Litter/rubbish/dumping	FARLITTR	1	2	3	4	5
Graffiti	FARGRAFF	1	2	3	4	5
Vandalism	FARVANDA	1	2	3	4	5
Dog/other excrement	FAREXCRE	1	2	3	4	5
Condition of dwellings	FARCOND	1	2	3	4	5
Vacant sites	FARSITES	1	2	3	4	5
Intrusive industry	FARINDUS	1	2	3	4	5
Non-conforming uses	FARNOCON	1	2	3	4	5
Vacant/boarded-up buildings	FARVACNT	1	2	3	4	5
Ambient air quality	FARAIRQU	1	2	3	4	5
Heavy traffic	FARTRAFF	1	2	3	4	5
Intrusion from motorways/main roads	FARMOTOR	1	2	3	4	5
Railway/aircraft noise	FARRAILS	1	2	3	4	5
Nuisance from street parking	FARPARKS	1	2	3	4	5
Scruffy gardens/untidyness	FARGRDNS	1	2	3	4	5
Scruffy/neglected buildings	FARBLDGS	1	2	3	4	5
Condition of road, pavements and street furniture	FARROADS	2	3	4	5	

Notes:

Appendix 4.2

Post-hoc analysis

Analysis when groups matched by household data – tenure, household type, household size, income, deprivation

Variable	Living in squalor N = 298	No squalor N = 596	Significance	Effect size (Cohen's)
Well-being – Satisfaction	6.99 (2.43)	7.30 (2.10)	n.s.	*d = 0.14*
Well-being – Worthwhile	7.43 (2.11)	7.79 (1.95)	n.s.	*d = 0.18*
Well-being – Happy	6.96 (2.44)	7.28 (2.63)	n.s.	*d = 0.13*
Well-being – Anxious	3.52 (3.25)	3.07 (3.17)	n.s.	*d = 0.14*
Age	46.03 (17.89)	48.38 (18.33)	n.s.	*d = 0.13*
General Health	3.72 (1.12)	3.72 (1.10)	n.s.	*d = 0.01*
Sex (% male)	53.0	44.8	P < .0001	*d = 0.16*
Age (%)				
18-19	4.7	4.4	n.s.	*v* = 0.09
20-29	18.8	16.9		
30-39	16.4	17.3		
40-49	17.8	14.1		
50-59	17.8	16.6		
60-69	12.4	17.3		
70-79	9.7	9.2		
80-	2.3	4.2		
Ethnicity (%) –				
White	85.2	85.4	n.s.	*v = 0.00*
BAME	14.8	14.6		
Illness (% with illness)	40.9	41.3	n.s.	*v = 0.00*
Limitations due to illness (%) -				
Not at all	20.7	17.1	n.s.	*v = 0.05*
A little	35.5	38.6		
A lot	43.8	44.3		
Type of limitations (% of ill with this limitation) -				
Vision	14.9	13.0	n.s.	*v = 0.02*
Hearing	15.7	12.2	n.s.	*v = 0.04*
Mobility	47.9	55.7	n.s.	*v = 0.07*
Dexterity	26.4	30.1	n.s.	*v = 0.03*
Learning Difficulties	9.9	11.0	n.s.	*v = 0.01*
Memory	16.5	19.1	n.s.	*v = 0.02*
Mental Health	33.1	24.8	n.s.	*v = 0.08*
Stamina	32.2	44.7	p < .05	*v = 0.11*
Social	8.3	5.7	n.s	*v = 0.04*
Other	7.4	4.5	n.s	*v = 0.05*

None	18.2	12.6	n.s	*v = 0.07*

Regressions

Model 1 – Well-being measures
Intercept -0.32 (0.48)
Satisfaction -0.00 (0.06)
Worthwhile -0.07 (0.06)
Happy -0.00 (0.05)
Anxious 0.03 (0.03)

Model 2 – Age, sex, general health
Intercept 0.5 (0.45)
Age -0.01 (0.00)*
General Health -0.06 (0.07)
Sex -0.36 (0.14)*

Model 3 – Age, sex, illness, ethnicity
Intercept 0.24 (0.39)
Age -0.01 (0.00)*
Sex -0.37 (0.15)*
Illness 0.11 (0.16)
Ethnicity 0.02 (0.21)
(AIC = 1130)

Model 4 – Age, sex, presence of a stamina-related illness
Intercept 0.58 (0.55)
Age -0.01 (0.01)
Sex -0.45 (0.23)*
Stamina -0.51 (0.24)*
(AIC = 463)

Model 5 – Sex, presence of a stamina-related illness
Intercept 0.14 (0.37)
Sex -0.42 (0.23)
Stamina -0.54 (0.23)*
(AIC = 463)

Model 6 – Presence of a stamina-related illness
Intercept 0.51 (0.14)***
Stamina -0.53 (0.23)*
(AIC = 464)

Analysis when groups matched by individual data – age, sex, general health, ethnicity, illness (Can't match by well-being measures as too much missing data. Also, three members of squalor group removed due to missing data).

Variable	Living in squalor N = 295	No squalor N = 590	Significance	Effect size (Cohen's)
Deprivation	3.66 (2.36)	4.65 (2.78)	p < .0001	*d* = 0.37
Well-being – Satisfaction	7.01 (2.37)	7.25 (2.20)	n.s.	*d* = 0.11
Well-being – Worthwhile	7.44 (2.07)	7.54 (2.12)	n.s.	*d* = 0.05
Well-being – Happy	6.98 (2.39)	7.14 (2.40)	n.s.	*d* = 0.07
Well-being – Anxious	3.52 (3.24)	3.15 (3.06)	n.s.	*d* = 0.12
Income	25617 (17001)	31751 (20216)	p < .0001	d = 0.32
Household Size	2.90 (1.57)	2.94 (1.62)	n.s.	d = 0.02
Household Type (%) –				
Couple with no children	24.4	33.0	p < .0001	*v = 0.21*
Couple with children	18.6	28.6		
Lone parent	17.6	6.8		
Other multi-person household	19.0	13.9		
One person less than 60+	9.8	9.5		
One person 60+	10.5	8.0		
Living alone	20.3	17.5	n.s.	*v = 0.03*
Living with others	79.7	82.5		
Tenure				
Owner-occupier	26.8	36.4	p < .05	*v = 0.10*
Private rented	22.7	21.0		
Local authority rented	20.0	17.3		
Housing association rented	30.5	25.3		
Owned	26.8	36.4	p < .01	*v = 0.09*
Rented	73.2	63.6		

Regressions

Model 1 – Deprivation
Intercept -0.09 (0.13)
Deprivation -0.14 (0.03)***
(AIC = 1103)

Model 2 – Deprivation, income
Intercept 0.13 (0.16)
Deprivation -0.11 (0.03)***
Income -0.00 (0.00)**
(AIC = 1097)

Model 3 – Deprivation, income, household size, household type, tenure
Intercept 0.21 (0.52)
Deprivation -0.11 (0.03)***
Income -0.00 (0.00)*
Household size -0.01 (0.6)
Household type 0.03 (0.23)

Tenure	0.00 (0.18)
(AIC = 1103)	

Appendix 4.3

R code for analysis

```
# Convert all missing values to NA

complete[complete == -9] <- NA

# Descriptives for full dataset

summary(complete)

# Add variable for completion of the physical survey

complete$physicalsurvey <- NA
complete$physicalsurvey <- ifelse(is.na(complete$squalor), 0, 1)


# Add ethnicity variable for white v non-white
# Add hhtype variable to live alone v not alone
# Add tenure variable to home owner v rented/housing association
# Reverse code general health variable to show a lower number representing worse mental health

complete$hhtype2 <- NA
complete$hhtype2 <- ifelse(complete$hhtype >= "5", 1, 2)

complete$tenure2 <- NA
complete$tenure2 <- ifelse(complete$tenure == "1", 1, 2)

complete$ethnicity2 <- NA
complete$ethnicity2 <- ifelse(complete$ethnicity == "1", 1, 2)

complete$genhealth2 <- NA
complete$genhealth2 <- ifelse(complete$genhealth == "1", 5, ifelse(complete$genhealth == "2", 4,
ifelse(complete$genhealth == "3", 3, ifelse(complete$genhealth == "4", 2, ifelse(complete$genhealth
== "5", 1, NA)))))

# Frequency tables for discrete variables

table(complete$ethnicity)
prop.table(table(complete$ethnicity))

table(complete$sex)
prop.table(table(complete$sex))

table(complete$genhealth2)
prop.table(table(complete$genhealth2))
```

```
table(complete$illness)
prop.table(table(complete$illness))

table(complete$limitations)
prop.table(table(complete$limitations))

table(complete$tenure)
prop.table(table(complete$tenure))

table(complete$hhtype)
prop.table(table(complete$hhtype))

complete$age2 <- NA
complete[complete$age <= 19, "age2"] <- "18-19"
complete[complete$age >= 20 & complete$age <= 29, "age2"] <- "20-29"
complete[complete$age >= 30 & complete$age <= 39, "age2"] <- "30-39"
complete[complete$age >= 40 & complete$age <= 49, "age2"] <- "40-49"
complete[complete$age >= 50 & complete$age <= 59, "age2"] <- "50-59"
complete[complete$age >= 60 & complete$age <= 69, "age2"] <- "60-69"
complete[complete$age >= 70 & complete$age <= 79, "age2"] <- "70-79"
complete[complete$age >= 80, "age2"] <- "80+"

table(complete$age2)

complete$age3 <- NA
complete[complete$age <= 19, "age3"] <- "1"
complete[complete$age >= 20 & complete$age <= 29, "age3"] <- "2"
complete[complete$age >= 30 & complete$age <= 39, "age3"] <- "3"
complete[complete$age >= 40 & complete$age <= 49, "age3"] <- "4"
complete[complete$age >= 50 & complete$age <= 59, "age3"] <- "5"
complete[complete$age >= 60 & complete$age <= 69, "age3"] <- "6"
complete[complete$age >= 70 & complete$age <= 79, "age3"] <- "7"
complete[complete$age >= 80, "age3"] <- "8"

# Create new datasets - Those that completed the physical survey and those that didn't, those living
in squalor and those that aren't

physical <- subset(complete, squalor == 0 | squalor == 1)

nophysical <- subset(complete, is.na(complete$squalor))

squalor <- subset(complete, squalor == 1)
nosqualor <- subset(complete, squalor == 0)

install.packages("plotrix")
library(plotrix)

# Compare those who completed the physical survey against those who did not

summary(physical)
summary(nophysical)
```

```
sd(physical$deprivation, na.rm = TRUE)
sd(physical$satisfaction, na.rm = TRUE)
sd(physical$worthwhile, na.rm = TRUE)
sd(physical$happy, na.rm = TRUE)
sd(physical$anxious, na.rm = TRUE)
sd(physical$age, na.rm = TRUE)
sd(physical$hhsize, na.rm = TRUE)
sd(physical$income, na.rm = TRUE)
sd(physical$genhealth2, na.rm = TRUE)

sd(nophysical$deprivation, na.rm = TRUE)
sd(nophysical$satisfaction, na.rm = TRUE)
sd(nophysical$worthwhile, na.rm = TRUE)
sd(nophysical$happy, na.rm = TRUE)
sd(nophysical$anxious, na.rm = TRUE)
sd(nophysical$age, na.rm = TRUE)
sd(nophysical$hhsize, na.rm = TRUE)
sd(nophysical$income, na.rm = TRUE)
sd(nophysical$genhealth2, na.rm = TRUE)


prop.table(table(physical$ethnicity))
prop.table(table(nophysical$ethnicity))

prop.table(table(physical$ethnicity2))
prop.table(table(nophysical$ethnicity2))

prop.table(table(physical$sex))
prop.table(table(nophysical$sex))

prop.table(table(physical$tenure))
prop.table(table(nophysical$tenure))

prop.table(table(physical$tenure2))
prop.table(table(nophysical$tenure2))

prop.table(table(physical$hhtype))
prop.table(table(nophysical$hhtype))

prop.table(table(physical$hhtype2))
prop.table(table(nophysical$hhtype2))

prop.table(table(physical$illness))
prop.table(table(nophysical$illness))

prop.table(table(physical$limitations))
prop.table(table(nophysical$limitations))

prop.table(table(physical$vision))
```

```
prop.table(table(nophysical$vision))
prop.table(table(physical$hearing))
prop.table(table(nophysical$hearing))
prop.table(table(physical$mobility))
prop.table(table(nophysical$mobility))
prop.table(table(physical$dexterity))
prop.table(table(nophysical$dexterity))
prop.table(table(physical$learningdiff))
prop.table(table(nophysical$learningdiff))
prop.table(table(physical$memory))
prop.table(table(nophysical$memory))
prop.table(table(physical$mentalhealth))
prop.table(table(nophysical$mentalhealth))
prop.table(table(physical$stamina))
prop.table(table(nophysical$stamina))
prop.table(table(physical$social))
prop.table(table(nophysical$social))
prop.table(table(physical$other))
prop.table(table(nophysical$other))
prop.table(table(physical$none))
prop.table(table(nophysical$none))

table(physical$age2)
prop.table(table(physical$age2))

table(nophysical$age2)
prop.table(table(nophysical$age2))

# F-test homogeneity of variance + t-tests

var.test(deprivation ~ physicalsurvey, data = complete)
t.test(physical$deprivation, nophysical$deprivation, var.equal = TRUE)

var.test(satisfaction ~ physicalsurvey, data = complete)
t.test(physical$satisfaction, nophysical$satisfaction, var.equal = FALSE)

var.test(worthwhile ~ physicalsurvey, data = complete)
t.test(physical$worthwhile, nophysical$worthwhile, var.equal = FALSE)

var.test(happy ~ physicalsurvey, data = complete)
t.test(physical$happy, nophysical$happy, var.equal = FALSE)

var.test(anxious ~ physicalsurvey, data = complete)
t.test(physical$anxious, nophysical$anxious, var.equal = FALSE)

var.test(age ~ physicalsurvey, data = complete)
t.test(physical$age, nophysical$age, var.equal = TRUE)

var.test(hhsize ~ physicalsurvey, data = complete)
t.test(physical$hhsize, nophysical$hhsize, var.equal = FALSE)
```

```
var.test(income ~ physicalsurvey, data = complete)
t.test(physical$income, nophysical$income, var.equal = FALSE)

var.test(genhealth2 ~ physicalsurvey, data = complete)
t.test(physical$genhealth2, nophysical$genhealth2, var.equal = FALSE)

p.unadj <- c(2.2e-16, 1.425e-05, .000194, .01693, .0006676, 8.749e-13, .06876, 2.2e-16, 2.2e-16)
p.adjust(p.unadj, method = "bonferroni")

# Calculate Cohen's d for t-tests

install.packages("lsr")
library(lsr)

cohensD(physical$deprivation, nophysical$deprivation)
cohensD(physical$satisfaction, nophysical$satisfaction)
cohensD(physical$worthwhile, nophysical$worthwhile)
cohensD(physical$happy, nophysical$happy)
cohensD(physical$anxious, nophysical$anxious)
cohensD(physical$age, nophysical$age)
cohensD(physical$hhsize, nophysical$hhsize)
cohensD(physical$income, nophysical$income)
cohensD(physical$genhealth2, nophysical$genhealth2)

chisq.test(table(complete$age3, complete$physicalsurvey))
chisq.test(table(complete$ethnicity, complete$physicalsurvey))
chisq.test(table(complete$ethnicity2, complete$physicalsurvey))
chisq.test(table(complete$sex, complete$physicalsurvey))
chisq.test(table(complete$tenure, complete$physicalsurvey))
chisq.test(table(complete$tenure2, complete$physicalsurvey))
chisq.test(table(complete$hhtype, complete$physicalsurvey))
chisq.test(table(complete$hhtype2, complete$physicalsurvey))
chisq.test(table(complete$illness, complete$physicalsurvey))
chisq.test(table(complete$limitations, complete$physicalsurvey))

chisq.test(table(complete$vision, complete$physicalsurvey))
chisq.test(table(complete$hearing, complete$physicalsurvey))
chisq.test(table(complete$mobility, complete$physicalsurvey))
chisq.test(table(complete$dexterity, complete$physicalsurvey))
chisq.test(table(complete$learningdiff, complete$physicalsurvey))
chisq.test(table(complete$memory, complete$physicalsurvey))
chisq.test(table(complete$mentalhealth, complete$physicalsurvey))
chisq.test(table(complete$stamina, complete$physicalsurvey))
chisq.test(table(complete$social, complete$physicalsurvey))
chisq.test(table(complete$other, complete$physicalsurvey))
chisq.test(table(complete$none, complete$physicalsurvey))

# Calculate Cramer's V for chi-squared tests

cramersV(table(complete$age3, complete$physicalsurvey))
cramersV(table(complete$ethnicity, complete$physicalsurvey))
```

```
cramersV(table(complete$ethnicity2, complete$physicalsurvey))
cramersV(table(complete$sex, complete$physicalsurvey))
cramersV(table(complete$tenure, complete$physicalsurvey))
cramersV(table(complete$tenure2, complete$physicalsurvey))
cramersV(table(complete$hhtype, complete$physicalsurvey))
cramersV(table(complete$hhtype2, complete$physicalsurvey))
cramersV(table(complete$illness, complete$physicalsurvey))
cramersV(table(complete$limitations, complete$physicalsurvey))

cramersV(table(complete$vision, complete$physicalsurvey))
cramersV(table(complete$hearing, complete$physicalsurvey))
cramersV(table(complete$mobility, complete$physicalsurvey))
cramersV(table(complete$dexterity, complete$physicalsurvey))
cramersV(table(complete$learningdiff, complete$physicalsurvey))
cramersV(table(complete$memory, complete$physicalsurvey))
cramersV(table(complete$mentalhealth, complete$physicalsurvey))
cramersV(table(complete$stamina, complete$physicalsurvey))
cramersV(table(complete$social, complete$physicalsurvey))
cramersV(table(complete$other, complete$physicalsurvey))
cramersV(table(complete$none, complete$physicalsurvey))


# Convert ethnicity variable to white v non-white
# Convert hhtype to live alone v not alone
# Convert tenure to home owner v rented/housing association

physical$hhtype2 <- NA
physical$hhtype2 <- ifelse(physical$hhtype >= "5", 1, 2)

physical$tenure2 <- NA
physical$tenure2 <- ifelse(physical$tenure == "1", 1, 2)

physical$ethnicity2 <- NA
physical$ethnicity2 <- ifelse(physical$ethnicity == "1", 1, 2)


# Compare those living in squalor with those who aren't

summary(squalor)
summary(nosqualor)

sd(squalor$deprivation, na.rm = TRUE)
sd(squalor$satisfaction, na.rm = TRUE)
sd(squalor$worthwhile, na.rm = TRUE)
sd(squalor$happy, na.rm = TRUE)
sd(squalor$anxious, na.rm = TRUE)
sd(squalor$age, na.rm = TRUE)
sd(squalor$hhsize, na.rm = TRUE)
sd(squalor$income, na.rm = TRUE)
sd(squalor$genhealth2, na.rm = TRUE)
```

```
sd(nosqualor$deprivation, na.rm = TRUE)
sd(nosqualor$satisfaction, na.rm = TRUE)
sd(nosqualor$worthwhile, na.rm = TRUE)
sd(nosqualor$happy, na.rm = TRUE)
sd(nosqualor$anxious, na.rm = TRUE)
sd(nosqualor$age, na.rm = TRUE)
sd(nosqualor$hhsize, na.rm = TRUE)
sd(nosqualor$income, na.rm = TRUE)
sd(nosqualor$genhealth2, na.rm = TRUE)

prop.table(table(squalor$ethnicity))
prop.table(table(nosqualor$ethnicity))

prop.table(table(squalor$ethnicity2))
prop.table(table(nosqualor$ethnicity2))

prop.table(table(squalor$sex))
prop.table(table(nosqualor$sex))

prop.table(table(squalor$tenure))
prop.table(table(nosqualor$tenure))

prop.table(table(squalor$tenure2))
prop.table(table(nosqualor$tenure2))

prop.table(table(squalor$hhtype))
prop.table(table(nosqualor$hhtype))

prop.table(table(squalor$hhtype2))
prop.table(table(nosqualor$hhtype2))

prop.table(table(squalor$illness))
prop.table(table(nosqualor$illness))

prop.table(table(squalor$limitations))
prop.table(table(nosqualor$limitations))

prop.table(table(squalor$vision))
prop.table(table(nosqualor$vision))
prop.table(table(squalor$hearing))
prop.table(table(nosqualor$hearing))
prop.table(table(squalor$mobility))
prop.table(table(nosqualor$mobility))
prop.table(table(squalor$dexterity))
prop.table(table(nosqualor$dexterity))
prop.table(table(squalor$learningdiff))
prop.table(table(nosqualor$learningdiff))
prop.table(table(squalor$memory))
prop.table(table(nosqualor$memory))
prop.table(table(squalor$mentalhealth))
prop.table(table(nosqualor$mentalhealth))
```

```
prop.table(table(squalor$stamina))
prop.table(table(nosqualor$stamina))
prop.table(table(squalor$social))
prop.table(table(nosqualor$social))
prop.table(table(squalor$other))
prop.table(table(nosqualor$other))
prop.table(table(squalor$none))
prop.table(table(nosqualor$none))

table(squalor$age2)
prop.table(table(squalor$age2))

table(nosqualor$age2)
prop.table(table(nosqualor$age2))

# F-test homogeneity of variance + t-tests

var.test(deprivation ~ squalor, data = physical)
t.test(squalor$deprivation, nosqualor$deprivation, var.equal = FALSE)

var.test(satisfaction ~ squalor, data = physical)
t.test(squalor$satisfaction, nosqualor$satisfaction, var.equal = FALSE)

var.test(worthwhile ~ squalor, data = physical)
t.test(squalor$worthwhile, nosqualor$worthwhile, var.equal = FALSE)

var.test(happy ~ squalor, data = physical)
t.test(squalor$happy, nosqualor$happy, var.equal = TRUE)

var.test(anxious ~ squalor, data = physical)
t.test(squalor$anxious, nosqualor$anxious, var.equal = TRUE)

var.test(age ~ squalor, data = physical)
t.test(squalor$age, nosqualor$age, var.equal = TRUE)

var.test(hhsize ~ squalor, data = physical)
t.test(squalor$hhsize, nosqualor$hhsize, var.equal = FALSE)

var.test(income ~ squalor, data = physical)
t.test(squalor$income, nosqualor$income, var.equal = FALSE)

var.test(genhealth2 ~ squalor, data = physical)
t.test(squalor$genhealth2, nosqualor$genhealth2, var.equal = FALSE)

p.unadj2 <- c(2.2e-16, .003955, .02034, .003696, .004342, .0348, .202, 2.2e-16, .0009018)
p.adjust(p.unadj2, method = "bonferroni")

# Calculate Cohen's d for t-tests

cohensD(squalor$deprivation, nosqualor$deprivation)
cohensD(squalor$satisfaction, nosqualor$satisfaction)
```

```
cohensD(squalor$worthwhile, nosqualor$worthwhile)
cohensD(squalor$happy, nosqualor$happy)
cohensD(squalor$anxious, nosqualor$anxious)
cohensD(squalor$age, nosqualor$age)
cohensD(squalor$hhsize, nosqualor$hhsize)
cohensD(squalor$income, nosqualor$income)
cohensD(squalor$genhealth2, nosqualor$genhealth2)

# Chi-squared tests

chisq.test(table(physical$age3, physical$squalor))
chisq.test(table(physical$ethnicity, physical$squalor))
chisq.test(table(physical$ethnicity2, physical$squalor))
chisq.test(table(physical$sex, physical$squalor))
chisq.test(table(physical$tenure, physical$squalor))
chisq.test(table(physical$tenure2, physical$squalor))
chisq.test(table(physical$hhtype, physical$squalor))
chisq.test(table(physical$hhtype2, physical$squalor))
chisq.test(table(physical$illness, physical$squalor))
chisq.test(table(physical$limitations, physical$squalor))

chisq.test(table(physical$vision, physical$squalor))
chisq.test(table(physical$hearing, physical$squalor))
chisq.test(table(physical$mobility, physical$squalor))
chisq.test(table(physical$dexterity, physical$squalor))
chisq.test(table(physical$learningdiff, physical$squalor))
chisq.test(table(physical$memory, physical$squalor))
chisq.test(table(physical$mentalhealth, physical$squalor))
chisq.test(table(physical$stamina, physical$squalor))
chisq.test(table(physical$social, physical$squalor))
chisq.test(table(physical$other, physical$squalor))
chisq.test(table(physical$none, physical$squalor))

# Calculate Cramer's V for chi-squared

cramersV(table(physical$age3, physical$squalor))
cramersV(table(physical$ethnicity, physical$squalor))
cramersV(table(physical$ethnicity2, physical$squalor))
cramersV(table(physical$sex, physical$squalor))
cramersV(table(physical$tenure, physical$squalor))
cramersV(table(physical$tenure2, physical$squalor))
cramersV(table(physical$hhtype, physical$squalor))
cramersV(table(physical$hhtype2, physical$squalor))
cramersV(table(physical$illness, physical$squalor))
cramersV(table(physical$limitations, physical$squalor))

cramersV(table(physical$vision, physical$squalor))
cramersV(table(physical$hearing, physical$squalor))
cramersV(table(physical$mobility, physical$squalor))
cramersV(table(physical$dexterity, physical$squalor))
cramersV(table(physical$learningdiff, physical$squalor))
```

```
cramersV(table(physical$memory, physical$squalor))
cramersV(table(physical$mentalhealth, physical$squalor))
cramersV(table(physical$stamina, physical$squalor))
cramersV(table(physical$social, physical$squalor))
cramersV(table(physical$other, physical$squalor))
cramersV(table(physical$none, physical$squalor))

install.packages(DescTools)
library(DescTools)



# Creating matched groups

install.packages("MatchIt")
library (MatchIt)

summary(squalor)
summary(physical)

physical.edit <- physical[!is.na(physical$genhealth), ]

# Creating matched group on all possible variables, ratio 1:1

matchedall <- matchit(squalor ~ age + database + sex + genhealth2 + hhtype2 + hhsize +income +
tenure2, data=physical.edit, method = "nearest", distance = "logit", replace = FALSE, ratio = 1)
matchedalldf <- match.data(matchedall)

summary(matchedall, standardize = TRUE)
plot (matchedall)

# Split matched dataframe into squalor and nosqualor

matchedallsqualor <- subset(matchedalldf, squalor == 1)
matchedallnosqualor <- subset(matchedalldf, squalor == 0)

# Compare those living in squalor with matched individuals from no squalor group

summary(matchedallsqualor)
summary(matchedallnosqualor)

# Check for balance in the matched data. SMD and VR checks.

install.packages("cli")

install.packages("cobalt")
library("cobalt")
install.packages("rlang")
library("rlang")

bal.tab(matchedall, m.threshold = 0.1, un = TRUE)
```

```
bal.tab(matchedall, v.threshold = 2)

# Create new matched group with 2:1 ratio

matchedall2 <- matchit(squalor ~ age + database + sex + genhealth2 + hhtype2 + hhsize +income +
tenure2, data=physical.edit, method = "nearest", distance = "logit", replace = FALSE, ratio = 2)
matchedall2df <- match.data(matchedall2)

matchedall2df$age3 <- NA
matchedall2df[matchedall2df$age <= 19, "age3"] <- "1"
matchedall2df[matchedall2df$age >= 20 & matchedall2df$age <= 29, "age3"] <- "2"
matchedall2df[matchedall2df$age >= 30 & matchedall2df$age <= 39, "age3"] <- "3"
matchedall2df[matchedall2df$age >= 40 & matchedall2df$age <= 49, "age3"] <- "4"
matchedall2df[matchedall2df$age >= 50 & matchedall2df$age <= 59, "age3"] <- "5"
matchedall2df[matchedall2df$age >= 60 & matchedall2df$age <= 69, "age3"] <- "6"
matchedall2df[matchedall2df$age >= 70 & matchedall2df$age <= 79, "age3"] <- "7"
matchedall2df[matchedall2df$age >= 80, "age3"] <- "8"

summary(matchedall2, standardize = TRUE)
plot (matchedall2)

# Split matched dataframe into squalor and nosqualor

matchedallsqualor2 <- subset(matchedall2df, squalor == 1)
matchedallnosqualor2 <- subset(matchedall2df, squalor == 0)

# Check for balance in the matched data. SMD and VR checks.

bal.tab(matchedall2, m.threshold = 0.1, un = TRUE)
bal.tab(matchedall2, v.threshold = 2)


# Compare those living in squalor with matched individuals from no squalor group

summary(matchedallsqualor2)
summary(matchedallnosqualor2)

sd(matchedallsqualor2$deprivation, na.rm = TRUE)
sd(matchedallsqualor2$satisfaction, na.rm = TRUE)
sd(matchedallsqualor2$worthwhile, na.rm = TRUE)
sd(matchedallsqualor2$happy, na.rm = TRUE)
sd(matchedallsqualor2$anxious, na.rm = TRUE)


sd(matchedallnosqualor2$deprivation, na.rm = TRUE)
sd(matchedallnosqualor2$satisfaction, na.rm = TRUE)
sd(matchedallnosqualor2$worthwhile, na.rm = TRUE)
sd(matchedallnosqualor2$happy, na.rm = TRUE)
sd(matchedallnosqualor2$anxious, na.rm = TRUE)

std.error(matchedallsqualor2$deprivation, na.rm = TRUE)
```

```
std.error(matchedallnosqualor2$deprivation, na.rm = TRUE)

prop.table(table(matchedallsqualor2$age3))
prop.table(table(matchedallnosqualor2$age3))

prop.table(table(matchedallsqualor2$ethnicity))
prop.table(table(matchedallnosqualor2$ethnicity))

prop.table(table(matchedallsqualor2$ethnicity2))
prop.table(table(matchedallnosqualor2$ethnicity2))

prop.table(table(matchedallsqualor2$illness))
prop.table(table(matchedallnosqualor2$illness))

prop.table(table(matchedallsqualor2$limitations))
prop.table(table(matchedallnosqualor2$limitations))

prop.table(table(matchedallsqualor2$vision))
prop.table(table(matchedallnosqualor2$vision))
prop.table(table(matchedallsqualor2$hearing))
prop.table(table(matchedallnosqualor2$hearing))
prop.table(table(matchedallsqualor2$mobility))
prop.table(table(matchedallnosqualor2$mobility))
prop.table(table(matchedallsqualor2$dexterity))
prop.table(table(matchedallnosqualor2$dexterity))
prop.table(table(matchedallsqualor2$learningdiff))
prop.table(table(matchedallnosqualor2$learningdiff))
prop.table(table(matchedallsqualor2$memory))
prop.table(table(matchedallnosqualor2$memory))
prop.table(table(matchedallsqualor2$mentalhealth))
prop.table(table(matchedallnosqualor2$mentalhealth))
prop.table(table(matchedallsqualor2$stamina))
prop.table(table(matchedallnosqualor2$stamina))
prop.table(table(matchedallsqualor2$social))
prop.table(table(matchedallnosqualor2$social))
prop.table(table(matchedallsqualor2$other))
prop.table(table(matchedallnosqualor2$other))
prop.table(table(matchedallsqualor2$none))
prop.table(table(matchedallnosqualor2$none))

prop.table(table(matchedallsqualor2$sex))
prop.table(table(matchedallnosqualor2$sex))

prop.table(table(matchedallsqualor2$hhtype2))
prop.table(table(matchedallnosqualor2$hhtype2))

prop.table(table(matchedallsqualor2$tenure2))
prop.table(table(matchedallnosqualor2$tenure2))

prop.table(table(matchedallsqualor2$database))
prop.table(table(matchedallnosqualor2$database))
```

```
# F-test homogeneity of variance + t-tests

var.test(deprivation ~ squalor, data = matchedall2df)
t.test(matchedallsqualor2$deprivation, matchedallnosqualor2$deprivation, var.equal = FALSE)

var.test(satisfaction ~ squalor, data = matchedall2df)
t.test(matchedallsqualor2$satisfaction, matchedallnosqualor2$satisfaction, var.equal = TRUE)

var.test(worthwhile ~ squalor, data = matchedall2df)
t.test(matchedallsqualor2$worthwhile, matchedallnosqualor2$worthwhile, var.equal = TRUE)

var.test(happy ~ squalor, data = matchedall2df)
t.test(matchedallsqualor2$happy, matchedallnosqualor2$happy, var.equal = TRUE)

var.test(anxious ~ squalor, data = matchedall2df)
t.test(matchedallsqualor2$anxious, matchedallnosqualor2$anxious, var.equal = TRUE)



# Calculate Cohen's d for t-tests

cohensD(matchedallsqualor2$deprivation, matchedallnosqualor2$deprivation)
cohensD(matchedallsqualor2$satisfaction, matchedallnosqualor2$satisfaction)
cohensD(matchedallsqualor2$worthwhile, matchedallnosqualor2$worthwhile)
cohensD(matchedallsqualor2$happy, matchedallnosqualor2$happy)
cohensD(matchedallsqualor2$anxious, matchedallnosqualor2$anxious)

# Chi-squared tests

chisq.test(table(matchedall2df$age3, matchedall2df$squalor))
chisq.test(table(matchedall2df$ethnicity, matchedall2df$squalor))
chisq.test(table(matchedall2df$ethnicity2, matchedall2df$squalor))
chisq.test(table(matchedall2df$illness, matchedall2df$squalor))
chisq.test(table(matchedall2df$limitations, matchedall2df$squalor))

chisq.test(table(matchedall2df$vision, matchedall2df$squalor))
chisq.test(table(matchedall2df$hearing, matchedall2df$squalor))
chisq.test(table(matchedall2df$mobility, matchedall2df$squalor))
chisq.test(table(matchedall2df$dexterity, matchedall2df$squalor))
chisq.test(table(matchedall2df$learningdiff, matchedall2df$squalor))
chisq.test(table(matchedall2df$memory, matchedall2df$squalor))
chisq.test(table(matchedall2df$mentalhealth, matchedall2df$squalor))
chisq.test(table(matchedall2df$stamina, matchedall2df$squalor))
chisq.test(table(matchedall2df$social, matchedall2df$squalor))
chisq.test(table(matchedall2df$other, matchedall2df$squalor))
chisq.test(table(matchedall2df$none, matchedall2df$squalor))


# Calculate Cramer's V for chi-squared
```

```
cramersV(table(matchedall2df$age3, matchedall2df$squalor))
cramersV(table(matchedall2df$ethnicity, matchedall2df$squalor))
cramersV(table(matchedall2df$ethnicity2, matchedall2df$squalor))
cramersV(table(matchedall2df$illness, matchedall2df$squalor))
cramersV(table(matchedall2df$limitations, matchedall2df$squalor))

cramersV(table(matchedall2df$vision, matchedall2df$squalor))
cramersV(table(matchedall2df$hearing, matchedall2df$squalor))
cramersV(table(matchedall2df$mobility, matchedall2df$squalor))
cramersV(table(matchedall2df$dexterity, matchedall2df$squalor))
cramersV(table(matchedall2df$learningdiff, matchedall2df$squalor))
cramersV(table(matchedall2df$memory, matchedall2df$squalor))
cramersV(table(matchedall2df$mentalhealth, matchedall2df$squalor))
cramersV(table(matchedall2df$stamina, matchedall2df$squalor))
cramersV(table(matchedall2df$social, matchedall2df$squalor))
cramersV(table(matchedall2df$other, matchedall2df$squalor))
cramersV(table(matchedall2df$none, matchedall2df$squalor))



# Logistic Regressions

model1 <- glm(squalor ~ deprivation, data = matchedall2df, family = binomial)
summary(model1)

model2 <- glm(squalor ~ satisfaction + worthwhile + happy + anxious, data = matchedall2df, family =
binomial)
summary(model2)

model3 <- glm(squalor ~ deprivation + satisfaction + worthwhile + happy + anxious, data =
matchedall2df, family = binomial)
summary(model3)

model4 <- glm(squalor ~ ethnicity2 + illness + deprivation + satisfaction + worthwhile + happy +
anxious, data = matchedall2df, family = binomial)
summary(model4)



# Post-Hoc

# Create new matched group matched by all household measures

matchedall3 <- matchit(squalor ~ database + hhtype2 + hhsize + income + tenure2 + deprivation,
data=physical.edit, method = "nearest", distance = "logit", replace = FALSE, ratio = 2)
matchedall3df <- match.data(matchedall3)

summary(matchedall3, standardize = TRUE)
plot (matchedall3)
```

```
# Split matched dataframe into squalor and nosqualor

matchedallsqualor3 <- subset(matchedall3df, squalor == 1)
matchedallnosqualor3 <- subset(matchedall3df, squalor == 0)

# Check for balance in the matched data. SMD and VR checks.

bal.tab(matchedall3, m.threshold = 0.1, un = TRUE)
bal.tab(matchedall3, v.threshold = 2)

# Compare those living in squalor with matched individuals from no squalor group

summary(matchedallsqualor3)
summary(matchedallnosqualor3)

sd(matchedallsqualor3$satisfaction, na.rm = TRUE)
sd(matchedallsqualor3$worthwhile, na.rm = TRUE)
sd(matchedallsqualor3$happy, na.rm = TRUE)
sd(matchedallsqualor3$anxious, na.rm = TRUE)
sd(matchedallsqualor3$age, na.rm = TRUE)
sd(matchedallsqualor3$genhealth2, na.rm = TRUE)


sd(matchedallnosqualor3$satisfaction, na.rm = TRUE)
sd(matchedallnosqualor3$worthwhile, na.rm = TRUE)
sd(matchedallnosqualor3$happy, na.rm = TRUE)
sd(matchedallnosqualor3$anxious, na.rm = TRUE)
sd(matchedallnosqualor3$age, na.rm = TRUE)
sd(matchedallnosqualor3$genhealth2, na.rm = TRUE)


prop.table(table(matchedallsqualor3$ethnicity))
prop.table(table(matchedallnosqualor3$ethnicity))

prop.table(table(matchedallsqualor3$ethnicity2))
prop.table(table(matchedallnosqualor3$ethnicity2))

prop.table(table(matchedallsqualor3$illness))
prop.table(table(matchedallnosqualor3$illness))

prop.table(table(matchedallsqualor3$sex))
prop.table(table(matchedallnosqualor3$sex))

prop.table(table(matchedallsqualor3$limitations))
prop.table(table(matchedallnosqualor3$limitations))

prop.table(table(matchedallsqualor3$vision))
prop.table(table(matchedallnosqualor3$vision))
prop.table(table(matchedallsqualor3$hearing))
prop.table(table(matchedallnosqualor3$hearing))
prop.table(table(matchedallsqualor3$mobility))
```

```
prop.table(table(matchedallnosqualor3$mobility))
prop.table(table(matchedallsqualor3$dexterity))
prop.table(table(matchedallnosqualor3$dexterity))
prop.table(table(matchedallsqualor3$learningdiff))
prop.table(table(matchedallnosqualor3$learningdiff))
prop.table(table(matchedallsqualor3$memory))
prop.table(table(matchedallnosqualor3$memory))
prop.table(table(matchedallsqualor3$mentalhealth))
prop.table(table(matchedallnosqualor3$mentalhealth))
prop.table(table(matchedallsqualor3$stamina))
prop.table(table(matchedallnosqualor3$stamina))
prop.table(table(matchedallsqualor3$social))
prop.table(table(matchedallnosqualor3$social))
prop.table(table(matchedallsqualor3$other))
prop.table(table(matchedallnosqualor3$other))
prop.table(table(matchedallsqualor3$none))
prop.table(table(matchedallnosqualor3$none))


# F-test homogeneity of variance + t-tests

var.test(satisfaction ~ squalor, data = matchedall3df)
t.test(matchedallsqualor3$satisfaction, matchedallnosqualor3$satisfaction, var.equal = FALSE)

var.test(worthwhile ~ squalor, data = matchedall3df)
t.test(matchedallsqualor3$worthwhile, matchedallnosqualor3$worthwhile, var.equal = TRUE)

var.test(happy ~ squalor, data = matchedall3df)
t.test(matchedallsqualor3$happy, matchedallnosqualor3$happy, var.equal = TRUE)

var.test(anxious ~ squalor, data = matchedall3df)
t.test(matchedallsqualor3$anxious, matchedallnosqualor3$anxious, var.equal = TRUE)

var.test(age ~ squalor, data = matchedall3df)
t.test(matchedallsqualor3$age, matchedallnosqualor3$age, var.equal = TRUE)

var.test(genhealth2 ~ squalor, data = matchedall3df)
t.test(matchedallsqualor3$genhealth2, matchedallnosqualor3$genhealth2, var.equal = TRUE)


# Ch-squared tests

chisq.test(table(matchedall3df$ethnicity, matchedall3df$squalor))
chisq.test(table(matchedall3df$ethnicity2, matchedall3df$squalor))
chisq.test(table(matchedall3df$illness, matchedall3df$squalor))
chisq.test(table(matchedall3df$limitations, matchedall3df$squalor))
chisq.test(table(matchedall3df$sex, matchedall3df$sex))

chisq.test(table(matchedall3df$vision, matchedall3df$squalor))
chisq.test(table(matchedall3df$hearing, matchedall3df$squalor))
chisq.test(table(matchedall3df$mobility, matchedall3df$squalor))
```

```
chisq.test(table(matchedall3df$dexterity, matchedall3df$squalor))
chisq.test(table(matchedall3df$learningdiff, matchedall3df$squalor))
chisq.test(table(matchedall3df$memory, matchedall3df$squalor))
chisq.test(table(matchedall3df$mentalhealth, matchedall3df$squalor))
chisq.test(table(matchedall3df$stamina, matchedall3df$squalor))
chisq.test(table(matchedall3df$social, matchedall3df$squalor))
chisq.test(table(matchedall3df$other, matchedall3df$squalor))
chisq.test(table(matchedall3df$none, matchedall3df$squalor))


# Calculate Cohen's d for t-tests

cohensD(matchedallsqualor3$satisfaction, matchedallnosqualor3$satisfaction)
cohensD(matchedallsqualor3$worthwhile, matchedallnosqualor3$worthwhile)
cohensD(matchedallsqualor3$happy, matchedallnosqualor3$happy)
cohensD(matchedallsqualor3$anxious, matchedallnosqualor3$anxious)
cohensD(matchedallsqualor3$age, matchedallnosqualor3$age)
cohensD(matchedallsqualor3$genhealth2, matchedallnosqualor3$genhealth2)
cohensD(matchedallsqualor3$sex, matchedallnosqualor3$sex)

# Calculate Cramer's V for chi-squared

cramersV(table(matchedall3df$ethnicity, matchedall3df$squalor))
cramersV(table(matchedall3df$ethnicity2, matchedall3df$squalor))
cramersV(table(matchedall3df$illness, matchedall3df$squalor))
cramersV(table(matchedall3df$limitations, matchedall3df$squalor))

cramersV(table(matchedall3df$vision, matchedall3df$squalor))
cramersV(table(matchedall3df$hearing, matchedall3df$squalor))
cramersV(table(matchedall3df$mobility, matchedall3df$squalor))
cramersV(table(matchedall3df$dexterity, matchedall3df$squalor))
cramersV(table(matchedall3df$learningdiff, matchedall3df$squalor))
cramersV(table(matchedall3df$memory, matchedall3df$squalor))
cramersV(table(matchedall3df$mentalhealth, matchedall3df$squalor))
cramersV(table(matchedall3df$stamina, matchedall3df$squalor))
cramersV(table(matchedall3df$social, matchedall3df$squalor))
cramersV(table(matchedall3df$other, matchedall3df$squalor))
cramersV(table(matchedall3df$none, matchedall3df$squalor))


# Logistic Regressions

model3.1 <- glm(squalor ~ satisfaction + worthwhile + happy + anxious, data = matchedall3df, family
= binomial)
summary(model3.1)

model3.2 <- glm(squalor ~ age + genhealth2 + sex, data = matchedall3df, family = binomial)
summary(model3.2)

model3.3 <- glm(squalor ~ age + sex + illness + ethnicity2, data = matchedall3df, family = binomial)
summary(model3.3)
```

```
model3.4 <- glm(squalor ~ age + sex + stamina, data = matchedall3df, family = binomial)
summary(model3.4)

model3.5 <- glm(squalor ~ sex + stamina, data = matchedall3df, family = binomial)
summary(model3.5)

model3.6 <- glm(squalor ~ stamina, data = matchedall3df, family = binomial)
summary(model3.6)

# Match by individual differences

physical.edit2 <- physical.edit[!is.na(physical.edit$ethnicity), ]
physical.edit3 <- physical.edit2[!is.na(physical.edit2$illness), ]

summary(physical.edit3)

matchedall4 <- matchit(squalor ~ database +age + sex + genhealth2 + ethnicity2 + illness,
data=physical.edit3, method = "nearest", distance = "logit", replace = FALSE, ratio = 2)
matchedall4df <- match.data(matchedall4)

summary(matchedall4, standardize = TRUE)
plot (matchedall4)

# Split matched dataframe into squalor and nosqualor

matchedallsqualor4 <- subset(matchedall4df, squalor == 1)
matchedallnosqualor4 <- subset(matchedall4df, squalor == 0)

# Check for balance in the matched data. SMD and VR checks.

bal.tab(matchedall4, m.threshold = 0.1, un = TRUE)
bal.tab(matchedall4, v.threshold = 2)


# Compare those living in squalor with matched individuals from no squalor group

summary(matchedallsqualor4)
summary(matchedallnosqualor4)

sd(matchedallsqualor4$deprivation, na.rm = TRUE)
sd(matchedallsqualor4$satisfaction, na.rm = TRUE)
sd(matchedallsqualor4$worthwhile, na.rm = TRUE)
sd(matchedallsqualor4$happy, na.rm = TRUE)
sd(matchedallsqualor4$anxious, na.rm = TRUE)
sd(matchedallsqualor4$income, na.rm = TRUE)
sd(matchedallsqualor4$hhsize, na.rm = TRUE)

sd(matchedallnosqualor4$deprivation, na.rm = TRUE)
sd(matchedallnosqualor4$satisfaction, na.rm = TRUE)
sd(matchedallnosqualor4$worthwhile, na.rm = TRUE)
```

```
sd(matchedallnosqualor4$happy, na.rm = TRUE)
sd(matchedallnosqualor4$anxious, na.rm = TRUE)
sd(matchedallnosqualor4$income, na.rm = TRUE)
sd(matchedallnosqualor4$hhsize, na.rm = TRUE)


prop.table(table(matchedallsqualor4$hhtype))
prop.table(table(matchedallnosqualor4$hhtype))


prop.table(table(matchedallsqualor4$hhtype2))
prop.table(table(matchedallnosqualor4$hhtype2))


prop.table(table(matchedallsqualor4$tenure))
prop.table(table(matchedallnosqualor4$tenure))


prop.table(table(matchedallsqualor4$tenure2))
prop.table(table(matchedallnosqualor4$tenure2))


# F-test homogeneity of variance + t-tests

var.test(satisfaction ~ squalor, data = matchedall4df)
t.test(matchedallsqualor4$satisfaction, matchedallnosqualor4$satisfaction, var.equal = TRUE)

var.test(worthwhile ~ squalor, data = matchedall4df)
t.test(matchedallsqualor4$worthwhile, matchedallnosqualor4$worthwhile, var.equal = TRUE)

var.test(happy ~ squalor, data = matchedall4df)
t.test(matchedallsqualor4$happy, matchedallnosqualor4$happy, var.equal = TRUE)

var.test(anxious ~ squalor, data = matchedall4df)
t.test(matchedallsqualor4$anxious, matchedallnosqualor4$anxious, var.equal = TRUE)

var.test(deprivation ~ squalor, data = matchedall4df)
t.test(matchedallsqualor4$deprivation, matchedallnosqualor4$deprivation, var.equal = FALSE)

var.test(hhsize ~ squalor, data = matchedall4df)
t.test(matchedallsqualor4$hhsize, matchedallnosqualor4$hhsize, var.equal = TRUE)

var.test(income ~ squalor, data = matchedall4df)
t.test(matchedallsqualor4$income, matchedallnosqualor4$income, var.equal = FALSE)


# Ch-squared tests

chisq.test(table(matchedall4df$hhtype, matchedall4df$squalor))
chisq.test(table(matchedall4df$hhtype2, matchedall4df$squalor))
chisq.test(table(matchedall4df$tenure, matchedall4df$squalor))
```

```
chisq.test(table(matchedall4df$tenure2, matchedall4df$squalor))


# Calculate Cohen's d for t-tests

cohensD(matchedallsqualor4$satisfaction, matchedallnosqualor4$satisfaction)
cohensD(matchedallsqualor4$worthwhile, matchedallnosqualor4$worthwhile)
cohensD(matchedallsqualor4$happy, matchedallnosqualor4$happy)
cohensD(matchedallsqualor4$anxious, matchedallnosqualor4$anxious)
cohensD(matchedallsqualor4$deprivation, matchedallnosqualor4$deprivation)
cohensD(matchedallsqualor4$hhsize, matchedallnosqualor4$hhsize)
cohensD(matchedallsqualor4$income, matchedallnosqualor4$income)


# Calculate Cramer's V for chi-squared

cramersV(table(matchedall4df$hhtype, matchedall4df$squalor))
cramersV(table(matchedall4df$hhtype2, matchedall4df$squalor))
cramersV(table(matchedall4df$tenure, matchedall4df$squalor))
cramersV(table(matchedall4df$tenure2, matchedall4df$squalor))

# Logistic Regressions

model4.1 <- glm(squalor ~ deprivation, data = matchedall4df, family = binomial)
summary(model4.1)

model4.2 <- glm(squalor ~ deprivation + income, data = matchedall4df, family = binomial)
summary(model4.2)

model4.3 <- glm(squalor ~ deprivation + income + hhsize + hhtype2 + tenure2, data = matchedall4df,
family = binomial)
summary(model4.3)


# Create a dataset for the wellbeing items only

dbwellbeing <- data.frame(complete$satisfaction, complete$worthwhile, complete$happy,
complete$anxiousR)
dbwellbeing <- na.omit(dbwellbeing)

# Calculate cronbach's alpha for wellbeing items

install.packages("psych")
library(psych)

alpha(dbwellbeing)

install.packages("ltm")
library(ltm)

cronbach.alpha(dbwellbeing)
```

```
dbwellbeing2 <- data.frame(physical$satisfaction, physical$worthwhile, physical$happy,
physical$anxiousR)
dbwellbeing2 <- na.omit(dbwellbeing2)

alpha(dbwellbeing2)
cronbach.alpha(dbwellbeing2)


dbwellbeing3 <- data.frame(matchedall2df$satisfaction, matchedall2df$worthwhile,
matchedall2df$happy, matchedall2df$anxiousR)
dbwellbeing3 <- na.omit(dbwellbeing3)

alpha(dbwellbeing3)
cronbach.alpha(dbwellbeing3)

install.packages("tidyverse")
library(tidyverse)


mean.dep <- mean(matchedall2df$deprivation)
mean.dep.sq <- mean(matchedallsqualor2$deprivation)
mean.dep.nosq <- mean(matchedallnosqualor2$deprivation)
sd.dep <- sd(matchedall2df$deprivation)
sd.dep.sq <- sd(matchedallsqualor2$deprivation)
sd.dep.nosq <- sd(matchedallnosqualor2$deprivation)
se.dep <- sd.dep/sqrt(894)
se.dep.sq <- sd.dep.sq/sqrt(298)
se.dep.nosq <- sd.dep.nosq/sqrt(596)

mean.sd.dep.df <- data.frame(squalor=c('yes', 'no'),
  mean.dep=c(3.7013423, 4.3473154),
  sd.dep=c(2.3941704, 2.74921095))

ggplot(mean.sd.dep.df) +
  geom_bar(aes(x=squalor, y=mean.dep), stat="identity") +
geom_errorbar( aes(x=squalor, ymin=mean.dep-sd.dep, ymax=mean.dep+sd.dep), width=0.4,
colour="orange", alpha=0.9, size=1.3)



mean.se.dep.df <- data.frame(squalor=c('No', 'Yes'),
                             mean.dep=c(mean.dep.nosq, mean.dep.sq),
                             se.dep=c(se.dep.nosq, se.dep.sq))
mean.dep.df <- data.frame(squalor=c('No', 'Yes'),
                             mean.dep=c(mean.dep.nosq, mean.dep.sq))

p.value <- data.frame(x = c("No", "No", "Yes", "Yes"), y = c(5,5.5,5.5,5))

ggplot(mean.se.dep.df) +
```

```
  geom_bar(aes(x=squalor, y=mean.dep), stat="identity", colour="black", size=1, fill="azure2", width
= 0.6) + xlab("Squalor Present") + ylab("Mean Deprivation") + ylim(0, 7) +
  geom_errorbar( aes(x=squalor, ymin=mean.dep-se.dep, ymax=mean.dep+se.dep), width=0.4,
colour="black", alpha=0.9, size=1) +
  geom_line(data = p.value, aes(x = x, y = y, group = 1), size = 1) +
  annotate("text", x = 1.5, y = 5.75, label = "***", size = 6, color = "#22292F")
```

Appendix 5.1

Additional calculations and R output

Calculations used to find a value of income proportional to the national average for each year.

Year	Sample Median income	National median income	Sample median / National Median
2008	16947.00	26165	0.673435327
2009	18413.00	25806	0.713516237
2010	19174.00	25882	0.740823739
2011	19400.00	26095	0.74343744
2012	18601.96	26472	0.702703234
2013	19190.60	27011	0.710473511
2014	19063.88	27215	0.700491641
2015	20348.72	27615	0.73687199
2016	20729.20	28195	0.73520837
2017	22256.70	28759	0.773903821
2018	22014.48	29559	0.744764031
2019	22791.46	30378	0.750262032
2020	23897.61	31487	0.75896751

Meta-regression of squalor prevalence and income as a proportion of national average

```
Mixed-Effects Model (k = 13; tau^2 estimator: REML)

tau^2 (estimated amount of residual heterogeneity):     0.0424 (SE =
0.0235)
tau (square root of estimated tau^2 value):             0.2060
I^2 (residual heterogeneity / unaccounted variability): 77.50%
H^2 (unaccounted variability / sampling variability):   4.44
R^2 (amount of heterogeneity accounted for):            26.13%

Test for Residual Heterogeneity:
QE(df = 11) = 46.6160, p-val < .0001

Test of Moderators (coefficient 2):
QM(df = 1) = 4.3318, p-val = 0.0374

Model Results:
```

```
         estimate      se     zval    pval    ci.lb    ci.ub
intrcpt    4.5964  1.7994   2.5545  0.0106   1.0697   8.1231  *
incprop   -5.1249  2.4623  -2.0813  0.0374  -9.9509  -0.2988  *
```

Meta-regression of squalor prevalence and both mean income and home ownership proportion

```
Mixed-Effects Model (k = 13; tau^2 estimator: REML)

tau^2 (estimated amount of residual heterogeneity):     0.0218 (SE = 0.015
4)
tau (square root of estimated tau^2 value):             0.1477
I^2 (residual heterogeneity / unaccounted variability): 63.70%
H^2 (unaccounted variability / sampling variability):   2.75
R^2 (amount of heterogeneity accounted for):            62.02%

Test for Residual Heterogeneity:
QE(df = 10) = 27.2274, p-val = 0.0024

Test of Moderators (coefficients 2:3):
QM(df = 2) = 14.2716, p-val = 0.0008

Model Results:

              estimate      se     zval    pval    ci.lb    ci.ub
intrcpt         1.5291  0.8914   1.7154  0.0863  -0.2180   3.2762   .
incav          -0.0001  0.0000  -2.6336  0.0084  -0.0001  -0.0000  **
ownedprop.pc    0.0224  0.0108   2.0656  0.0389   0.0011   0.0436   *
```

Appendix 5.2

R code for analysis

```
# Convert all missing values to NA


complete[complete == -8] <- NA

# Add variable for squalor (1) v no squalor (0)

complete$squalor2 <- NA
complete$squalor2 <- ifelse(complete$squalor >= "3", 1, 0)


# Add hhtype variable to live alone (1) v not alone (2)
# Add tenure variable to home owner (1) v rented/housing association (2)

complete$hhtype2 <- NA
complete$hhtype2 <- ifelse(complete$hhtype >= "5", 1, 2)

complete$tenure2 <- NA
complete$tenure2 <- ifelse(complete$tenure == "1", 1, 2)

# For simplicity, reduce deprivation to three categories, 1-3, 4-7, 8-10

complete$deprivation2 <- NA
complete$deprivation2 <- ifelse(complete$deprivation == "10", 3, ifelse(complete$deprivation >=
"8", 3, ifelse(complete$deprivation <= "3", 1, 2)))

# Add income variable for grouped incomes going up in quartiles

quantile(complete$hhinc, prob=c(.25,.5,.75), type=1)

complete$hhinc3 <- NA
complete[complete$hhinc <= 12204, "hhinc3"] <- "0-25%"
complete[complete$hhinc > 12204 & complete$hhinc <= 20011, "hhinc3"] <- "25-50%"
complete[complete$hhinc > 20011 & complete$hhinc <= 32113, "hhinc3"] <- "50%-75%"
complete[complete$hhinc > 32113, "hhinc3"] <- "75-100%"

# Add household size variable for with larger households grouped in 5+

table(complete$hhsize)

complete$hhsize2 <- NA
complete[complete$hhsize == 1, "hhsize2"] <- "1"
complete[complete$hhsize == 2, "hhsize2"] <- "2"
```

```
complete[complete$hhsize == 3, "hhsize2"] <- "3"
complete[complete$hhsize == 4, "hhsize2"] <- "4"
complete[complete$hhsize >= 5, "hhsize2"] <- "5+"


# Descriptives for full dataset

summary(complete)

# Frequency tables for discrete variables

table(complete$tenure)
prop.table(table(complete$tenure))

table(complete$tenure2)
prop.table(table(complete$tenure2))

table(complete$hhtype)
prop.table(table(complete$hhtype))

table(complete$hhtype2)
prop.table(table(complete$hhtype2))

table(complete$squalor)
prop.table(table(complete$squalor))

table(complete$squalor2)
prop.table(table(complete$squalor2))

table(complete$deprivation)
prop.table(table(complete$deprivation))

table(complete$deprivation2)
prop.table(table(complete$deprivation2))

table(complete$hhinc2)
prop.table(table(complete$hhinc2))

table(complete$hhinc3)
prop.table(table(complete$hhinc3))

# Start assessing year data

table(complete$year)

table(complete$squalor, complete$year)
table(complete$squalor2, complete$year)

prop.table(table(complete$squalor, complete$year), 2)
prop.table(table(complete$squalor2, complete$year), 2)
```

```
# Set up databases for each year group

db2008 <- subset(complete, year == 2008)
db2009 <- subset(complete, year == 2009)
db2010 <- subset(complete, year == 2010)
db2011 <- subset(complete, year == 2011)
db2012 <- subset(complete, year == 2012)
db2013 <- subset(complete, year == 2013)
db2014 <- subset(complete, year == 2014)
db2015 <- subset(complete, year == 2015)
db2016 <- subset(complete, year == 2016)
db2017 <- subset(complete, year == 2017)
db2018 <- subset(complete, year == 2018)
db2019 <- subset(complete, year == 2019)
db2020 <- subset(complete, year == 2020)


# Looking at squalor rates for each year depending on variables

table(complete$deprivation, complete$squalor2)
prop.table(table(complete$deprivation, complete$squalor2),1)

table(db2008$deprivation, db2008$squalor2)
prop.table(table(db2008$deprivation, db2008$squalor2),1)

table(db2009$deprivation, db2009$squalor2)
prop.table(table(db2009$deprivation, db2009$squalor2),1)

table(db2010$deprivation, db2010$squalor2)
prop.table(table(db2010$deprivation, db2010$squalor2),1)

table(db2011$deprivation, db2011$squalor2)
prop.table(table(db2011$deprivation, db2011$squalor2),1)

table(db2012$deprivation, db2012$squalor2)
prop.table(table(db2012$deprivation, db2012$squalor2),1)

table(db2013$deprivation, db2013$squalor2)
prop.table(table(db2013$deprivation, db2013$squalor2),1)

table(db2014$deprivation, db2014$squalor2)
prop.table(table(db2014$deprivation, db2014$squalor2),1)

table(db2015$deprivation, db2015$squalor2)
prop.table(table(db2015$deprivation, db2015$squalor2),1)

table(db2016$deprivation, db2016$squalor2)
prop.table(table(db2016$deprivation, db2016$squalor2),1)

table(db2017$deprivation, db2017$squalor2)
prop.table(table(db2017$deprivation, db2017$squalor2),1)
```

```
table(db2018$deprivation, db2018$squalor2)
prop.table(table(db2018$deprivation, db2018$squalor2),1)

table(db2019$deprivation, db2019$squalor2)
prop.table(table(db2019$deprivation, db2019$squalor2),1)

table(db2020$deprivation, db2020$squalor2)
prop.table(table(db2020$deprivation, db2020$squalor2),1)


# Now the same but with deprivation simplified

table(complete$deprivation2, complete$squalor2)
prop.table(table(complete$deprivation2, complete$squalor2),1)

table(db2008$deprivation2, db2008$squalor2)
prop.table(table(db2008$deprivation2, db2008$squalor2),1)

table(db2009$deprivation2, db2009$squalor2)
prop.table(table(db2009$deprivation2, db2009$squalor2),1)

table(db2010$deprivation2, db2010$squalor2)
prop.table(table(db2010$deprivation2, db2010$squalor2),1)

table(db2011$deprivation2, db2011$squalor2)
prop.table(table(db2011$deprivation2, db2011$squalor2),1)

table(db2012$deprivation2, db2012$squalor2)
prop.table(table(db2012$deprivation2, db2012$squalor2),1)

table(db2013$deprivation2, db2013$squalor2)
prop.table(table(db2013$deprivation2, db2013$squalor2),1)

table(db2014$deprivation2, db2014$squalor2)
prop.table(table(db2014$deprivation2, db2014$squalor2),1)

table(db2015$deprivation2, db2015$squalor2)
prop.table(table(db2015$deprivation2, db2015$squalor2),1)

table(db2016$deprivation2, db2016$squalor2)
prop.table(table(db2016$deprivation2, db2016$squalor2),1)

table(db2017$deprivation2, db2017$squalor2)
prop.table(table(db2017$deprivation2, db2017$squalor2),1)

table(db2018$deprivation2, db2018$squalor2)
prop.table(table(db2018$deprivation2, db2018$squalor2),1)

table(db2019$deprivation2, db2019$squalor2)
prop.table(table(db2019$deprivation2, db2019$squalor2),1)
```

```
table(db2020$deprivation2, db2020$squalor2)
prop.table(table(db2020$deprivation2, db2020$squalor2),1)


# Investigating prevalence according to tenure type

table(complete$tenure, complete$squalor2)
prop.table(table(complete$tenure, complete$squalor2),1)

table(db2008$tenure, db2008$squalor2)
prop.table(table(db2008$tenure, db2008$squalor2),1)

table(db2009$tenure, db2009$squalor2)
prop.table(table(db2009$tenure, db2009$squalor2),1)

table(db2010$tenure, db2010$squalor2)
prop.table(table(db2010$tenure, db2010$squalor2),1)

table(db2011$tenure, db2011$squalor2)
prop.table(table(db2011$tenure, db2011$squalor2),1)

table(db2012$tenure, db2012$squalor2)
prop.table(table(db2012$tenure, db2012$squalor2),1)

table(db2013$tenure, db2013$squalor2)
prop.table(table(db2013$tenure, db2013$squalor2),1)

table(db2014$tenure, db2014$squalor2)
prop.table(table(db2014$tenure, db2014$squalor2),1)

table(db2015$tenure, db2015$squalor2)
prop.table(table(db2015$tenure, db2015$squalor2),1)

table(db2016$tenure, db2016$squalor2)
prop.table(table(db2016$tenure, db2016$squalor2),1)

table(db2017$tenure, db2017$squalor2)
prop.table(table(db2017$tenure, db2017$squalor2),1)

table(db2018$tenure, db2018$squalor2)
prop.table(table(db2018$tenure, db2018$squalor2),1)

table(db2019$tenure, db2019$squalor2)
prop.table(table(db2019$tenure, db2019$squalor2),1)

table(db2020$tenure, db2020$squalor2)
prop.table(table(db2020$tenure, db2020$squalor2),1)
```

```
table(complete$tenure2, complete$squalor2)
prop.table(table(complete$tenure2, complete$squalor2),1)

table(db2008$tenure2, db2008$squalor2)
prop.table(table(db2008$tenure2, db2008$squalor2),1)

table(db2009$tenure2, db2009$squalor2)
prop.table(table(db2009$tenure2, db2009$squalor2),1)

table(db2010$tenure2, db2010$squalor2)
prop.table(table(db2010$tenure2, db2010$squalor2),1)

table(db2011$tenure2, db2011$squalor2)
prop.table(table(db2011$tenure2, db2011$squalor2),1)

table(db2012$tenure2, db2012$squalor2)
prop.table(table(db2012$tenure2, db2012$squalor2),1)

table(db2013$tenure2, db2013$squalor2)
prop.table(table(db2013$tenure2, db2013$squalor2),1)

table(db2014$tenure2, db2014$squalor2)
prop.table(table(db2014$tenure2, db2014$squalor2),1)

table(db2015$tenure2, db2015$squalor2)
prop.table(table(db2015$tenure2, db2015$squalor2),1)

table(db2016$tenure2, db2016$squalor2)
prop.table(table(db2016$tenure2, db2016$squalor2),1)

table(db2017$tenure2, db2017$squalor2)
prop.table(table(db2017$tenure2, db2017$squalor2),1)

table(db2018$tenure2, db2018$squalor2)
prop.table(table(db2018$tenure2, db2018$squalor2),1)

table(db2019$tenure2, db2019$squalor2)
prop.table(table(db2019$tenure2, db2019$squalor2),1)

table(db2020$tenure2, db2020$squalor2)
prop.table(table(db2020$tenure2, db2020$squalor2),1)


# Investigating prevalence according to household type

table(complete$hhtype, complete$squalor2)
prop.table(table(complete$hhtype, complete$squalor2),1)

table(db2008$hhtype, db2008$squalor2)
prop.table(table(db2008$hhtype, db2008$squalor2),1)
```

```
table(db2009$hhtype, db2009$squalor2)
prop.table(table(db2009$hhtype, db2009$squalor2),1)

table(db2010$hhtype, db2010$squalor2)
prop.table(table(db2010$hhtype, db2010$squalor2),1)

table(db2011$hhtype, db2011$squalor2)
prop.table(table(db2011$hhtype, db2011$squalor2),1)

table(db2012$hhtype, db2012$squalor2)
prop.table(table(db2012$hhtype, db2012$squalor2),1)

table(db2013$hhtype, db2013$squalor2)
prop.table(table(db2013$hhtype, db2013$squalor2),1)

table(db2014$hhtype, db2014$squalor2)
prop.table(table(db2014$hhtype, db2014$squalor2),1)

table(db2015$hhtype, db2015$squalor2)
prop.table(table(db2015$hhtype, db2015$squalor2),1)

table(db2016$hhtype, db2016$squalor2)
prop.table(table(db2016$hhtype, db2016$squalor2),1)

table(db2017$hhtype, db2017$squalor2)
prop.table(table(db2017$hhtype, db2017$squalor2),1)

table(db2018$hhtype, db2018$squalor2)
prop.table(table(db2018$hhtype, db2018$squalor2),1)

table(db2019$hhtype, db2019$squalor2)
prop.table(table(db2019$hhtype, db2019$squalor2),1)

table(db2020$hhtype, db2020$squalor2)
prop.table(table(db2020$hhtype, db2020$squalor2),1)


table(complete$hhtype2, complete$squalor2)
prop.table(table(complete$hhtype2, complete$squalor2),1)

table(db2008$hhtype2, db2008$squalor2)
prop.table(table(db2008$hhtype2, db2008$squalor2),1)

table(db2009$hhtype2, db2009$squalor2)
prop.table(table(db2009$hhtype2, db2009$squalor2),1)

table(db2010$hhtype2, db2010$squalor2)
prop.table(table(db2010$hhtype2, db2010$squalor2),1)

table(db2011$hhtype2, db2011$squalor2)
prop.table(table(db2011$hhtype2, db2011$squalor2),1)
```

```
table(db2012$hhtype2, db2012$squalor2)
prop.table(table(db2012$hhtype2, db2012$squalor2),1)

table(db2013$hhtype2, db2013$squalor2)
prop.table(table(db2013$hhtype2, db2013$squalor2),1)

table(db2014$hhtype2, db2014$squalor2)
prop.table(table(db2014$hhtype2, db2014$squalor2),1)

table(db2015$hhtype2, db2015$squalor2)
prop.table(table(db2015$hhtype2, db2015$squalor2),1)

table(db2016$hhtype2, db2016$squalor2)
prop.table(table(db2016$hhtype2, db2016$squalor2),1)

table(db2017$hhtype2, db2017$squalor2)
prop.table(table(db2017$hhtype2, db2017$squalor2),1)

table(db2018$hhtype2, db2018$squalor2)
prop.table(table(db2018$hhtype2, db2018$squalor2),1)

table(db2019$hhtype2, db2019$squalor2)
prop.table(table(db2019$hhtype2, db2019$squalor2),1)

table(db2020$hhtype2, db2020$squalor2)
prop.table(table(db2020$hhtype2, db2020$squalor2),1)


# Investigating prevalence according to income group

table(complete$hhinc3, complete$squalor2)
prop.table(table(complete$hhinc3, complete$squalor2),1)

table(db2008$hhinc3, db2008$squalor2)
prop.table(table(db2008$hhinc3, db2008$squalor2),1)

table(db2009$hhinc3, db2009$squalor2)
prop.table(table(db2009$hhinc3, db2009$squalor2),1)

table(db2010$hhinc3, db2010$squalor2)
prop.table(table(db2010$hhinc3, db2010$squalor2),1)

table(db2011$hhinc3, db2011$squalor2)
prop.table(table(db2011$hhinc3, db2011$squalor2),1)

table(db2012$hhinc3, db2012$squalor2)
prop.table(table(db2012$hhinc3, db2012$squalor2),1)

table(db2013$hhinc3, db2013$squalor2)
```

```
prop.table(table(db2013$hhinc3, db2013$squalor2),1)

table(db2014$hhinc3, db2014$squalor2)
prop.table(table(db2014$hhinc3, db2014$squalor2),1)

table(db2015$hhinc3, db2015$squalor2)
prop.table(table(db2015$hhinc3, db2015$squalor2),1)

table(db2016$hhinc3, db2016$squalor2)
prop.table(table(db2016$hhinc3, db2016$squalor2),1)

table(db2017$hhinc3, db2017$squalor2)
prop.table(table(db2017$hhinc3, db2017$squalor2),1)

table(db2018$hhinc3, db2018$squalor2)
prop.table(table(db2018$hhinc3, db2018$squalor2),1)

table(db2019$hhinc3, db2019$squalor2)
prop.table(table(db2019$hhinc3, db2019$squalor2),1)

table(db2020$hhinc3, db2020$squalor2)
prop.table(table(db2020$hhinc3, db2020$squalor2),1)


# Investigating prevalence according to household size

table(complete$hhsize2, complete$squalor2)
prop.table(table(complete$hhsize2, complete$squalor2),1)

table(db2008$hhsize2, db2008$squalor2)
prop.table(table(db2008$hhsize2, db2008$squalor2),1)

table(db2009$hhsize2, db2009$squalor2)
prop.table(table(db2009$hhsize2, db2009$squalor2),1)

table(db2010$hhsize2, db2010$squalor2)
prop.table(table(db2010$hhsize2, db2010$squalor2),1)

table(db2011$hhsize2, db2011$squalor2)
prop.table(table(db2011$hhsize2, db2011$squalor2),1)

table(db2012$hhsize2, db2012$squalor2)
prop.table(table(db2012$hhsize2, db2012$squalor2),1)

table(db2013$hhsize2, db2013$squalor2)
prop.table(table(db2013$hhsize2, db2013$squalor2),1)

table(db2014$hhsize2, db2014$squalor2)
prop.table(table(db2014$hhsize2, db2014$squalor2),1)

table(db2015$hhsize2, db2015$squalor2)
```

```
prop.table(table(db2015$hhsize2, db2015$squalor2),1)

table(db2016$hhsize2, db2016$squalor2)
prop.table(table(db2016$hhsize2, db2016$squalor2),1)

table(db2017$hhsize2, db2017$squalor2)
prop.table(table(db2017$hhsize2, db2017$squalor2),1)

table(db2018$hhsize2, db2018$squalor2)
prop.table(table(db2018$hhsize2, db2018$squalor2),1)

table(db2019$hhsize2, db2019$squalor2)
prop.table(table(db2019$hhsize2, db2019$squalor2),1)

table(db2020$hhsize2, db2020$squalor2)
prop.table(table(db2020$hhsize2, db2020$squalor2),1)


# Meta-analyses for prevalence

squalorstats.basic <- table(complete$year, complete$squalor2)
squalorstats.basic <- as.data.frame.matrix(squalorstats.basic)
colnames(squalorstats.basic) <- c("nosqualor", "squalor")
squalorstats.basic$year <- NA
squalorstats.basic$year <-
c(2008,2009,2010,2011,2012,2013,2014,2015,2016,2017,2018,2019,2020)
squalorstats.basic$total <- NA
squalorstats.basic$total <- squalorstats.basic$nosqualor + squalorstats.basic$squalor
squalorstats.basic$prev <- NA
squalorstats.basic$prev <- squalorstats.basic$squalor/squalorstats.basic$total
squalorstats.basic$se <- NA
squalorstats.basic$se <- sqrt(squalorstats.basic$prev*(1-
squalorstats.basic$prev)/squalorstats.basic$total)


library(meta)
metanalysqualor <- metaprop(event=squalor, n=total, data=squalorstats.basic, common=FALSE)
forest.meta(metanalysqualor,  colgap.forest.left = "25mm", print.tau2 = FALSE, print.Q = TRUE,
leftcols = c("year", "squalor", "total"), leftlabs = c("Year", "Cases", "Total"), rightlabs = c(
"Prevalence(%)", "95% CI"), pscale=100, test.overall.common = FALSE, print.I2.ci = TRUE)

# Same meta-analysis but with Freeman-Tukey adjustment (sm="PFT"). This is then used as standard.

metanalysqualorFT <- metaprop(event=squalor, n=total,  data=squalorstats.basic, sm="PFT",
common=FALSE)
forest.meta(metanalysqualorFT,  colgap.forest.left = "25mm", print.tau2 = FALSE, print.Q = TRUE,
leftcols = c("year", "squalor", "total"), leftlabs = c("Year", "Cases", "Total"), rightlabs = c(
"Prevalence(%)", "95% CI", "Weight"), pscale=100, test.overall.common = FALSE, print.I2.ci = TRUE)

update.meta(metanalysqualorFT)
```

```
# Subgroup analysis

# Tenure comparison

owned <- subset(complete, tenure == 1)
privrent <- subset(complete, tenure == 2)
LArent <- subset(complete, tenure == 3)
HArent <- subset(complete, tenure == 4)

squalorstats.tenureowned <- table(owned$year, owned$squalor2)
squalorstats.tenureowned <- as.data.frame.matrix(squalorstats.tenureowned)
colnames(squalorstats.tenureowned) <- c("nosqualor", "squalor")
squalorstats.tenureowned$year <- NA
squalorstats.tenureowned$year <-
c(2008,2009,2010,2011,2012,2013,2014,2015,2016,2017,2018,2019,2020)
squalorstats.tenureowned$total <- NA
squalorstats.tenureowned$total <- squalorstats.tenureowned$nosqualor +
squalorstats.tenureowned$squalor
squalorstats.tenureowned$prev <- NA
squalorstats.tenureowned$prev <-
squalorstats.tenureowned$squalor/squalorstats.tenureowned$total
squalorstats.tenureowned$tenure <- c("owned")


squalorstats.tenureprivrent <- table(privrent$year, privrent$squalor2)
squalorstats.tenureprivrent <- as.data.frame.matrix(squalorstats.tenureprivrent)
colnames(squalorstats.tenureprivrent) <- c("nosqualor", "squalor")
squalorstats.tenureprivrent$year <-
c(2008,2009,2010,2011,2012,2013,2014,2015,2016,2017,2018,2019,2020)
squalorstats.tenureprivrent$total <- squalorstats.tenureprivrent$nosqualor +
squalorstats.tenureprivrent$squalor
squalorstats.tenureprivrent$prev <-
squalorstats.tenureprivrent$squalor/squalorstats.tenureprivrent$total
squalorstats.tenureprivrent$tenure <- c("privrent")

squalorstats.tenureLArent <- table(LArent$year, LArent$squalor2)
squalorstats.tenureLArent <- as.data.frame.matrix(squalorstats.tenureLArent)
colnames(squalorstats.tenureLArent) <- c("nosqualor", "squalor")
squalorstats.tenureLArent$year <-
c(2008,2009,2010,2011,2012,2013,2014,2015,2016,2017,2018,2019,2020)
squalorstats.tenureLArent$total <- squalorstats.tenureLArent$nosqualor +
squalorstats.tenureLArent$squalor
squalorstats.tenureLArent$prev <-
squalorstats.tenureLArent$squalor/squalorstats.tenureLArent$total
squalorstats.tenureLArent$tenure <- c("LArent")

squalorstats.tenureHArent <- table(HArent$year, HArent$squalor2)
squalorstats.tenureHArent <- as.data.frame.matrix(squalorstats.tenureHArent)
colnames(squalorstats.tenureHArent) <- c("nosqualor", "squalor")
```

```
squalorstats.tenureHArent$year <-
c(2008,2009,2010,2011,2012,2013,2014,2015,2016,2017,2018,2019,2020)
squalorstats.tenureHArent$total <- squalorstats.tenureHArent$nosqualor +
squalorstats.tenureHArent$squalor
squalorstats.tenureHArent$prev <-
squalorstats.tenureHArent$squalor/squalorstats.tenureHArent$total
squalorstats.tenureHArent$tenure <- c("HArent")


# Merge four databases

squalorstats.tenureall <- rbind(squalorstats.tenureowned, squalorstats.tenureprivrent,
squalorstats.tenureLArent, squalorstats.tenureHArent)

metanalytenureowned <- metaprop(event=squalor, n=total, data=squalorstats.tenureowned,
sm="PFT")
metanalytenureprivrent <- metaprop(event=squalor, n=total, data=squalorstats.tenureprivrent,
sm="PFT")
metanalytenureLArent <- metaprop(event=squalor, n=total, data=squalorstats.tenureLArent,
sm="PFT")
metanalytenureHArent <- metaprop(event=squalor, n=total, data=squalorstats.tenureHArent,
sm="PFT")

metanalytenureall <- metaprop(event=squalor, n=total, data=squalorstats.tenureall, sm="PFT")
forest.meta(metanalytenureall, print.tau2 = FALSE, print.Q = TRUE, leftcols = c("year", "squalor",
"total"), leftlabs = c("Year", "Cases", "Total"), rightlabs = c("Prevalence(%)", "95% CI"), pscale=100,
test.overall.common = FALSE)

update.meta(metanalytenureowned)
update.meta(metanalytenureprivrent)
update.meta(metanalytenureLArent)
update.meta(metanalytenureHArent)
update.meta(metanalytenureall, subgroup = tenure)
update.meta(metanalytenureall, subgroup = tenure, tau.common = TRUE)


owned <- subset(complete, tenure2 == 1)
rent <- subset(complete, tenure2 == 2)

squalorstats.tenureowned <- table(owned$year, owned$squalor2)
squalorstats.tenureowned <- as.data.frame.matrix(squalorstats.tenureowned)
colnames(squalorstats.tenureowned) <- c("nosqualor", "squalor")
squalorstats.tenureowned$year <- NA
squalorstats.tenureowned$year <-
c(2008,2009,2010,2011,2012,2013,2014,2015,2016,2017,2018,2019,2020)
squalorstats.tenureowned$total <- NA
squalorstats.tenureowned$total <- squalorstats.tenureowned$nosqualor +
squalorstats.tenureowned$squalor
squalorstats.tenureowned$prev <- NA
squalorstats.tenureowned$prev <-
squalorstats.tenureowned$squalor/squalorstats.tenureowned$total
```

```
squalorstats.tenureowned$tenure <- c("owned")


squalorstats.tenurerent <- table(rent$year, rent$squalor2)
squalorstats.tenurerent <- as.data.frame.matrix(squalorstats.tenurerent)
colnames(squalorstats.tenurerent) <- c("nosqualor", "squalor")
squalorstats.tenurerent$year <- NA
squalorstats.tenurerent$year <-
c(2008,2009,2010,2011,2012,2013,2014,2015,2016,2017,2018,2019,2020)
squalorstats.tenurerent$total <- NA
squalorstats.tenurerent$total <- squalorstats.tenurerent$nosqualor +
squalorstats.tenurerent$squalor
squalorstats.tenurerent$prev <- NA
squalorstats.tenurerent$prev <- squalorstats.tenurerent$squalor/squalorstats.tenurerent$total
squalorstats.tenurerent$tenure <- c("rent")

# Merge two databases

squalorstats.tenure <- rbind(squalorstats.tenureowned, squalorstats.tenurerent)

metanalytenureowned <- metaprop(event=squalor, n=total, data=squalorstats.tenureowned,
sm="PFT")
forest.meta(metanalytenureowned, print.tau2 = FALSE, print.Q = TRUE, leftcols = c("year", "squalor",
"total"), leftlabs = c("Year", "Cases", "Total"), rightlabs = c("Prevalence(%)", "95% CI"), pscale=100,
test.overall.common = FALSE)

metanalytenurerent <- metaprop(event=squalor, n=total, data=squalorstats.tenurerent, sm="PFT")
forest.meta(metanalytenurerent, print.tau2 = FALSE, print.Q = TRUE, leftcols = c("year", "squalor",
"total"), leftlabs = c("Year", "Cases", "Total"), rightlabs = c("Prevalence(%)", "95% CI"), pscale=100,
test.overall.common = FALSE)

metanalytenure <- metaprop(event=squalor, n=total, data=squalorstats.tenure, sm="PFT")
forest.meta(metanalytenure, print.tau2 = FALSE, print.Q = TRUE, leftcols = c("year", "squalor",
"total"), leftlabs = c("Year", "Cases", "Total"), rightlabs = c("Prevalence(%)", "95% CI"), pscale=100,
test.overall.common = FALSE)

update.meta(metanalytenurerent)
update.meta(metanalytenureowned)
update.meta(metanalytenure, subgroup = tenure)
update.meta(metanalytenure, subgroup = tenure, tau.common = TRUE)


# Household Type comparison

alone <- subset(complete, hhtype2 == 1)
withothers <- subset(complete, hhtype2 == 2)

squalorstats.hhtypealone <- table(alone$year, alone$squalor2)
squalorstats.hhtypealone <- as.data.frame.matrix(squalorstats.hhtypealone)
colnames(squalorstats.hhtypealone) <- c("nosqualor", "squalor")
```

```
squalorstats.hhtypealone$year <-
c(2008,2009,2010,2011,2012,2013,2014,2015,2016,2017,2018,2019,2020)
squalorstats.hhtypealone$total <- squalorstats.hhtypealone$nosqualor +
squalorstats.hhtypealone$squalor
squalorstats.hhtypealone$prev <- squalorstats.hhtypealone$squalor/squalorstats.hhtypealone$total
squalorstats.hhtypealone$hhtype <- c("alone")


squalorstats.hhtypewithothers <- table(withothers$year, withothers$squalor2)
squalorstats.hhtypewithothers <- as.data.frame.matrix(squalorstats.hhtypewithothers)
colnames(squalorstats.hhtypewithothers) <- c("nosqualor", "squalor")
squalorstats.hhtypewithothers$year <-
c(2008,2009,2010,2011,2012,2013,2014,2015,2016,2017,2018,2019,2020)
squalorstats.hhtypewithothers$total <- squalorstats.hhtypewithothers$nosqualor +
squalorstats.hhtypewithothers$squalor
squalorstats.hhtypewithothers$prev <-
squalorstats.hhtypewithothers$squalor/squalorstats.hhtypewithothers$total
squalorstats.hhtypewithothers$hhtype <- c("withothers")

# Merge two databases

squalorstats.hhtype <- rbind(squalorstats.hhtypealone, squalorstats.hhtypewithothers)

metanalyhhtypealone <- metaprop(event=squalor, n=total, data=squalorstats.hhtypealone,
sm="PFT")
metanalyhhtypewithothers <- metaprop(event=squalor, n=total,
data=squalorstats.hhtypewithothers, sm="PFT")
metanalyhhtype <- metaprop(event=squalor, n=total, data=squalorstats.hhtype, sm="PFT")
forest.meta(metanalyhhtype, print.tau2 = FALSE, print.Q = TRUE, leftcols = c("year", "squalor",
"total"), leftlabs = c("Year", "Cases", "Total"), rightlabs = c("Prevalence(%)", "95% CI"), pscale=100,
test.overall.common = FALSE)

update.meta(metanalyhhtypealone)
update.meta(metanalyhhtypewithothers)
update.meta(metanalyhhtype, subgroup = hhtype)
update.meta(metanalyhhtype, subgroup = hhtype, tau.common = TRUE)

# Other household types

coupleno <- subset(complete, hhtype == 1)
couplewith <- subset(complete, hhtype == 2)
lonepar <- subset(complete, hhtype == 3)
multiperson <- subset(complete, hhtype == 4)
oneperless <- subset(complete, hhtype == 5)
oneperover <- subset(complete, hhtype == 6)

squalorstats.coupleno <- table(coupleno$year, coupleno$squalor2)
squalorstats.coupleno <- as.data.frame.matrix(squalorstats.coupleno)
colnames(squalorstats.coupleno) <- c("nosqualor", "squalor")
squalorstats.coupleno$year <-
c(2008,2009,2010,2011,2012,2013,2014,2015,2016,2017,2018,2019,2020)
```

```
squalorstats.coupleno$total <- squalorstats.coupleno$nosqualor + squalorstats.coupleno$squalor
squalorstats.coupleno$prev <- squalorstats.coupleno$squalor/squalorstats.coupleno$total
squalorstats.coupleno$hhtype <- c("couple no children")

squalorstats.couplewith <- table(couplewith$year, couplewith$squalor2)
squalorstats.couplewith <- as.data.frame.matrix(squalorstats.couplewith)
colnames(squalorstats.couplewith) <- c("nosqualor", "squalor")
squalorstats.couplewith$year <-
c(2008,2009,2010,2011,2012,2013,2014,2015,2016,2017,2018,2019,2020)
squalorstats.couplewith$total <- squalorstats.couplewith$nosqualor +
squalorstats.couplewith$squalor
squalorstats.couplewith$prev <- squalorstats.couplewith$squalor/squalorstats.couplewith$total
squalorstats.couplewith$hhtype <- c("couple with children")

squalorstats.lonepar <- table(lonepar$year, lonepar$squalor2)
squalorstats.lonepar <- as.data.frame.matrix(squalorstats.lonepar)
colnames(squalorstats.lonepar) <- c("nosqualor", "squalor")
squalorstats.lonepar$year <-
c(2008,2009,2010,2011,2012,2013,2014,2015,2016,2017,2018,2019,2020)
squalorstats.lonepar$total <- squalorstats.lonepar$nosqualor + squalorstats.lonepar$squalor
squalorstats.lonepar$prev <- squalorstats.lonepar$squalor/squalorstats.lonepar$total
squalorstats.lonepar$hhtype <- c("Lone parent")

squalorstats.multiperson <- table(multiperson$year, multiperson$squalor2)
squalorstats.multiperson <- as.data.frame.matrix(squalorstats.multiperson)
colnames(squalorstats.multiperson) <- c("nosqualor", "squalor")
squalorstats.multiperson$year <-
c(2008,2009,2010,2011,2012,2013,2014,2015,2016,2017,2018,2019,2020)
squalorstats.multiperson$total <- squalorstats.multiperson$nosqualor +
squalorstats.multiperson$squalor
squalorstats.multiperson$prev <- squalorstats.multiperson$squalor/squalorstats.multiperson$total
squalorstats.multiperson$hhtype <- c("Other multi-person")

squalorstats.oneperless <- table(oneperless$year, oneperless$squalor2)
squalorstats.oneperless <- as.data.frame.matrix(squalorstats.oneperless)
colnames(squalorstats.oneperless) <- c("nosqualor", "squalor")
squalorstats.oneperless$year <-
c(2008,2009,2010,2011,2012,2013,2014,2015,2016,2017,2018,2019,2020)
squalorstats.oneperless$total <- squalorstats.oneperless$nosqualor +
squalorstats.oneperless$squalor
squalorstats.oneperless$prev <- squalorstats.oneperless$squalor/squalorstats.oneperless$total
squalorstats.oneperless$hhtype <- c("One person under 60")

squalorstats.oneperover <- table(oneperover$year, oneperover$squalor2)
squalorstats.oneperover <- as.data.frame.matrix(squalorstats.oneperover)
colnames(squalorstats.oneperover) <- c("nosqualor", "squalor")
squalorstats.oneperover$year <-
c(2008,2009,2010,2011,2012,2013,2014,2015,2016,2017,2018,2019,2020)
squalorstats.oneperover$total <- squalorstats.oneperover$nosqualor +
squalorstats.oneperover$squalor
squalorstats.oneperover$prev <- squalorstats.oneperover$squalor/squalorstats.oneperover$total
```

```
squalorstats.oneperover$hhtype <- c("One person over 60")


# Basic deprivation comparison

most <- subset(complete, deprivation2 == 1)
average <- subset(complete, deprivation2 == 2)
least <- subset(complete, deprivation2 == 3)

squalorstats.deprivationmost <- table(most$year, most$squalor2)
squalorstats.deprivationmost <- as.data.frame.matrix(squalorstats.deprivationmost)
colnames(squalorstats.deprivationmost) <- c("nosqualor", "squalor")
squalorstats.deprivationmost$year <-
c(2008,2009,2010,2011,2012,2013,2014,2015,2016,2017,2018,2019,2020)
squalorstats.deprivationmost$total <- squalorstats.deprivationmost$nosqualor +
squalorstats.deprivationmost$squalor
squalorstats.deprivationmost$prev <-
squalorstats.deprivationmost$squalor/squalorstats.deprivationmost$total
squalorstats.deprivationmost$deprivation <- c("most")

squalorstats.deprivationaverage <- table(average$year, average$squalor2)
squalorstats.deprivationaverage <- as.data.frame.matrix(squalorstats.deprivationaverage)
colnames(squalorstats.deprivationaverage) <- c("nosqualor", "squalor")
squalorstats.deprivationaverage$year <-
c(2008,2009,2010,2011,2012,2013,2014,2015,2016,2017,2018,2019,2020)
squalorstats.deprivationaverage$total <- squalorstats.deprivationaverage$nosqualor +
squalorstats.deprivationaverage$squalor
squalorstats.deprivationaverage$prev <-
squalorstats.deprivationaverage$squalor/squalorstats.deprivationaverage$total
squalorstats.deprivationaverage$deprivation <- c("average")

squalorstats.deprivationleast <- table(least$year, least$squalor2)
squalorstats.deprivationleast <- as.data.frame.matrix(squalorstats.deprivationleast)
colnames(squalorstats.deprivationleast) <- c("nosqualor", "squalor")
squalorstats.deprivationleast$year <-
c(2008,2009,2010,2011,2012,2013,2014,2015,2016,2017,2018,2019,2020)
squalorstats.deprivationleast$total <- squalorstats.deprivationleast$nosqualor +
squalorstats.deprivationleast$squalor
squalorstats.deprivationleast$prev <-
squalorstats.deprivationleast$squalor/squalorstats.deprivationleast$total
squalorstats.deprivationleast$deprivation <- c("least")


# Merge three databases

squalorstats.deprivation <- rbind(squalorstats.deprivationmost, squalorstats.deprivationaverage,
squalorstats.deprivationleast)

metanalydeprivationmost <- metaprop(event=squalor, n=total, data=squalorstats.deprivationmost,
sm="PFT")
```

```
metanalydeprivationaverage <- metaprop(event=squalor, n=total,
data=squalorstats.deprivationaverage, sm="PFT")
metanalydeprivationleast <- metaprop(event=squalor, n=total, data=squalorstats.deprivationleast,
sm="PFT")
metanalydeprivation <- metaprop(event=squalor, n=total, data=squalorstats.deprivation, sm="PFT")
forest.meta(metanalydeprivation, print.tau2 = FALSE, print.Q = TRUE, leftcols = c("year", "squalor",
"total"), leftlabs = c("Year", "Cases", "Total"), rightlabs = c("Prevalence(%)", "95% CI"), pscale=100,
test.overall.common = FALSE)

update.meta(metanalydeprivationmost)
update.meta(metanalydeprivationaverage)
update.meta(metanalydeprivationleast)
update.meta(metanalydeprivation, subgroup = deprivation)
update.meta(metanalydeprivation, subgroup = deprivation, tau.common = TRUE)

# Basic income comparison

firstq <- subset(complete, hhinc3X == 1)
secondq <- subset(complete, hhinc3X == 2)
thirdq <- subset(complete, hhinc3X == 3)
fourthq <- subset(complete, hhinc3X == 4)

squalorstats.hhincfirstq <- table(firstq$year, firstq$squalor2)
squalorstats.hhincfirstq <- as.data.frame.matrix(squalorstats.hhincfirstq)
colnames(squalorstats.hhincfirstq) <- c("nosqualor", "squalor")
squalorstats.hhincfirstq$year <-
c(2008,2009,2010,2011,2012,2013,2014,2015,2016,2017,2018,2019,2020)
squalorstats.hhincfirstq$total <- squalorstats.hhincfirstq$nosqualor +
squalorstats.hhincfirstq$squalor
squalorstats.hhincfirstq$prev <- squalorstats.hhincfirstq$squalor/squalorstats.hhincfirstq$total
squalorstats.hhincfirstq$income <- c("firstq")

squalorstats.hhincsecondq <- table(secondq$year, secondq$squalor2)
squalorstats.hhincsecondq <- as.data.frame.matrix(squalorstats.hhincsecondq)
colnames(squalorstats.hhincsecondq) <- c("nosqualor", "squalor")
squalorstats.hhincsecondq$year <-
c(2008,2009,2010,2011,2012,2013,2014,2015,2016,2017,2018,2019,2020)
squalorstats.hhincsecondq$total <- squalorstats.hhincsecondq$nosqualor +
squalorstats.hhincsecondq$squalor
squalorstats.hhincsecondq$prev <-
squalorstats.hhincsecondq$squalor/squalorstats.hhincsecondq$total
squalorstats.hhincsecondq$income <- c("secondq")

squalorstats.hhincthirdq <- table(thirdq$year, thirdq$squalor2)
squalorstats.hhincthirdq <- as.data.frame.matrix(squalorstats.hhincthirdq)
colnames(squalorstats.hhincthirdq) <- c("nosqualor", "squalor")
squalorstats.hhincthirdq$year <-
c(2008,2009,2010,2011,2012,2013,2014,2015,2016,2017,2018,2019,2020)
squalorstats.hhincthirdq$total <- squalorstats.hhincthirdq$nosqualor +
squalorstats.hhincthirdq$squalor
squalorstats.hhincthirdq$prev <- squalorstats.hhincthirdq$squalor/squalorstats.hhincthirdq$total
```

```
squalorstats.hhincthirdq$income <- c("thirdq")

squalorstats.hhincfourthq <- table(fourthq$year, fourthq$squalor2)
squalorstats.hhincfourthq <- as.data.frame.matrix(squalorstats.hhincfourthq)
colnames(squalorstats.hhincfourthq) <- c("nosqualor", "squalor")
squalorstats.hhincfourthq$year <-
c(2008,2009,2010,2011,2012,2013,2014,2015,2016,2017,2018,2019,2020)
squalorstats.hhincfourthq$total <- squalorstats.hhincfourthq$nosqualor +
squalorstats.hhincfourthq$squalor
squalorstats.hhincfourthq$prev <-
squalorstats.hhincfourthq$squalor/squalorstats.hhincfourthq$total
squalorstats.hhincfourthq$income <- c("fourthq")

# Merge four databases

squalorstats.hhinc <- rbind(squalorstats.hhincfirstq, squalorstats.hhincsecondq,
squalorstats.hhincthirdq, squalorstats.hhincfourthq)

metanalyhhincfirstq <- metaprop(event=squalor, n=total, data=squalorstats.hhincfirstq, sm="PFT")
metanalyhhincsecondq <- metaprop(event=squalor, n=total, data=squalorstats.hhincsecondq,
sm="PFT")
metanalyhhincthirdq <- metaprop(event=squalor, n=total, data=squalorstats.hhincthirdq, sm="PFT")
metanalyhhincfourthq <- metaprop(event=squalor, n=total, data=squalorstats.hhincfourthq,
sm="PFT")
metanalyhhinc <- metaprop(event=squalor, n=total, data=squalorstats.hhinc, sm="PFT")
forest.meta(metanalyhhinc, print.tau2 = FALSE, print.Q = TRUE, leftcols = c("year", "squalor", "total"),
leftlabs = c("Year", "Cases", "Total"), rightlabs = c("Prevalence(%)", "95% CI"), pscale=100,
test.overall.common = FALSE)

update.meta(metanalyhhincfirstq)
update.meta(metanalyhhincsecondq)
update.meta(metanalyhhincthirdq)
update.meta(metanalyhhincfourthq)
update.meta(metanalyhhinc, subgroup = income)
update.meta(metanalyhhinc, subgroup = income, tau.common = TRUE)


# Household size comparison

hhsize1 <- subset(complete, hhsize2X == 1)
hhsize2 <- subset(complete, hhsize2X == 2)
hhsize3 <- subset(complete, hhsize2X == 3)
hhsize4 <- subset(complete, hhsize2X == 4)
hhsize5 <- subset(complete, hhsize2X == 5)


squalorstats.hhsize1 <- table(hhsize1$year, hhsize1$squalor2)
squalorstats.hhsize1 <- as.data.frame.matrix(squalorstats.hhsize1)
colnames(squalorstats.hhsize1) <- c("nosqualor", "squalor")
squalorstats.hhsize1$year <-
c(2008,2009,2010,2011,2012,2013,2014,2015,2016,2017,2018,2019,2020)
```

```
squalorstats.hhsize1$total <- squalorstats.hhsize1$nosqualor + squalorstats.hhsize1$squalor
squalorstats.hhsize1$prev <- squalorstats.hhsize1$squalor/squalorstats.hhsize1$total
squalorstats.hhsize1$hhsize <- c(1)

squalorstats.hhsize2 <- table(hhsize2$year, hhsize2$squalor2)
squalorstats.hhsize2 <- as.data.frame.matrix(squalorstats.hhsize2)
colnames(squalorstats.hhsize2) <- c("nosqualor", "squalor")
squalorstats.hhsize2$year <-
c(2008,2009,2010,2011,2012,2013,2014,2015,2016,2017,2018,2019,2020)
squalorstats.hhsize2$total <- squalorstats.hhsize2$nosqualor + squalorstats.hhsize2$squalor
squalorstats.hhsize2$prev <- squalorstats.hhsize2$squalor/squalorstats.hhsize2$total
squalorstats.hhsize2$hhsize <- c(2)

squalorstats.hhsize3 <- table(hhsize3$year, hhsize3$squalor2)
squalorstats.hhsize3 <- as.data.frame.matrix(squalorstats.hhsize3)
colnames(squalorstats.hhsize3) <- c("nosqualor", "squalor")
squalorstats.hhsize3$year <-
c(2008,2009,2010,2011,2012,2013,2014,2015,2016,2017,2018,2019,2020)
squalorstats.hhsize3$total <- squalorstats.hhsize3$nosqualor + squalorstats.hhsize3$squalor
squalorstats.hhsize3$prev <- squalorstats.hhsize3$squalor/squalorstats.hhsize3$total
squalorstats.hhsize3$hhsize <- c(3)


squalorstats.hhsize4 <- table(hhsize4$year, hhsize4$squalor2)
squalorstats.hhsize4 <- as.data.frame.matrix(squalorstats.hhsize4)
colnames(squalorstats.hhsize4) <- c("nosqualor", "squalor")
squalorstats.hhsize4$year <-
c(2008,2009,2010,2011,2012,2013,2014,2015,2016,2017,2018,2019,2020)
squalorstats.hhsize4$total <- squalorstats.hhsize4$nosqualor + squalorstats.hhsize4$squalor
squalorstats.hhsize4$prev <- squalorstats.hhsize4$squalor/squalorstats.hhsize4$total
squalorstats.hhsize4$hhsize <- c(4)


squalorstats.hhsize5 <- table(hhsize5$year, hhsize5$squalor2)
squalorstats.hhsize5 <- as.data.frame.matrix(squalorstats.hhsize5)
colnames(squalorstats.hhsize5) <- c("nosqualor", "squalor")
squalorstats.hhsize5$year <-
c(2008,2009,2010,2011,2012,2013,2014,2015,2016,2017,2018,2019,2020)
squalorstats.hhsize5$total <- squalorstats.hhsize5$nosqualor + squalorstats.hhsize5$squalor
squalorstats.hhsize5$prev <- squalorstats.hhsize5$squalor/squalorstats.hhsize5$total
squalorstats.hhsize5$hhsize <- c(5)

# Merge five databases

squalorstats.hhsize <- rbind(squalorstats.hhsize1, squalorstats.hhsize2, squalorstats.hhsize3,
squalorstats.hhsize4, squalorstats.hhsize5)

metanalyhhsize1 <- metaprop(event=squalor, n=total, data=squalorstats.hhsize1, sm="PFT")
metanalyhhsize2 <- metaprop(event=squalor, n=total, data=squalorstats.hhsize2, sm="PFT")
metanalyhhsize3 <- metaprop(event=squalor, n=total, data=squalorstats.hhsize3, sm="PFT")
metanalyhhsize4 <- metaprop(event=squalor, n=total, data=squalorstats.hhsize4, sm="PFT")
```

```
metanalyhhsize5 <- metaprop(event=squalor, n=total, data=squalorstats.hhsize5, sm="PFT")
metanalyhhsize <- metaprop(event=squalor, n=total, data=squalorstats.hhsize, sm="PFT")
forest.meta(metanalyhhsize, print.tau2 = FALSE, print.Q = TRUE, leftcols = c("year", "squalor",
"total"), leftlabs = c("Year", "Cases", "Total"), rightlabs = c("Prevalence(%)", "95% CI"), pscale=100,
test.overall.common = FALSE)

update.meta(metanalyhhsize1)
update.meta(metanalyhhsize2)
update.meta(metanalyhhsize3)
update.meta(metanalyhhsize4)
update.meta(metanalyhhsize5)
update.meta(metanalyhhsize, subgroup = hhsize)
update.meta(metanalyhhsize, subgroup = hhsize, tau.common = TRUE)


# Meta-regression tests over time

library(metafor)

squalorstats.basic$prev.percent <- squalorstats.basic$prev*100
squalorstats.basic$se.pc <- squalorstats.basic$se*100
metareg.year <- rma(yi = prev.percent, sei = se.pc, data = squalorstats.basic, mods = ~ year)
metareg.year

squalorstats.deprivationmost$prev.pc <- squalorstats.deprivationmost$prev*100
squalorstats.deprivationmost$se.pc <- sqrt(squalorstats.deprivationmost$prev.pc*(100-
squalorstats.deprivationmost$prev.pc)/squalorstats.deprivationmost$total)
metareg.year.deprivation.most <- rma(yi = prev.pc, sei = se.pc, data = squalorstats.deprivationmost,
mods = ~year)
metareg.year.deprivation.most

squalorstats.deprivationaverage$se <- sqrt(squalorstats.deprivationaverage$prev*(1-
squalorstats.deprivationaverage$prev)/squalorstats.deprivationaverage$total)
squalorstats.deprivationaverage$prev.pc <- squalorstats.deprivationaverage$prev*100
squalorstats.deprivationaverage$se.pc <- squalorstats.deprivationaverage$se*100
metareg.year.deprivation.average <- rma(yi = prev.pc, sei = se.pc, data =
squalorstats.deprivationaverage, mods = ~year)
metareg.year.deprivation.average

squalorstats.deprivationleast$se <- sqrt(squalorstats.deprivationleast$prev*(1-
squalorstats.deprivationleast$prev)/squalorstats.deprivationleast$total)
squalorstats.deprivationleast$prev.pc <- squalorstats.deprivationleast$prev*100
squalorstats.deprivationleast$se.pc <- squalorstats.deprivationleast$se*100
metareg.year.deprivation.least <- rma(yi = prev.pc, sei = se.pc, data = squalorstats.deprivationleast,
mods = ~year)
metareg.year.deprivation.least

squalorstats.hhincfirstq$se <- sqrt(squalorstats.hhincfirstq$prev*(1-
squalorstats.hhincfirstq$prev)/squalorstats.hhincfirstq$total)
squalorstats.hhincfirstq$prev.pc <- squalorstats.hhincfirstq$prev*100
squalorstats.hhincfirstq$se.pc <- squalorstats.hhincfirstq$se*100
```

```
metareg.year.hhincfirstq <- rma(yi = prev.pc, sei = se.pc, data = squalorstats.hhincfirstq, mods =
~year)
metareg.year.hhincfirstq

squalorstats.hhincsecondq$se <- sqrt(squalorstats.hhincsecondq$prev*(1-
squalorstats.hhincsecondq$prev)/squalorstats.hhincsecondq$total)
squalorstats.hhincsecondq$prev.pc <- squalorstats.hhincsecondq$prev*100
squalorstats.hhincsecondq$se.pc <- squalorstats.hhincsecondq$se*100
metareg.year.hhincsecondq <- rma(yi = prev.pc, sei = se.pc, data = squalorstats.hhincsecondq, mods =
~year)
metareg.year.hhincsecondq

squalorstats.hhincthirdq$se <- sqrt(squalorstats.hhincthirdq$prev*(1-
squalorstats.hhincthirdq$prev)/squalorstats.hhincthirdq$total)
squalorstats.hhincthirdq$prev.pc <- squalorstats.hhincthirdq$prev*100
squalorstats.hhincthirdq$se.pc <- squalorstats.hhincthirdq$se*100
metareg.year.hhincthirdq <- rma(yi = prev.pc, sei = se.pc, data = squalorstats.hhincthirdq, mods =
~year)
metareg.year.hhincthirdq

squalorstats.hhincfourthq$se <- sqrt(squalorstats.hhincfourthq$prev*(1-
squalorstats.hhincfourthq$prev)/squalorstats.hhincfourthq$total)
squalorstats.hhincfourthq$prev.pc <- squalorstats.hhincfourthq$prev*100
squalorstats.hhincfourthq$se.pc <- squalorstats.hhincfourthq$se*100
metareg.year.hhincfourthq <- rma(yi = prev.pc, sei = se.pc, data = squalorstats.hhincfourthq, mods =
~year)
metareg.year.hhincfourthq

squalorstats.tenureowned$se <- sqrt(squalorstats.tenureowned$prev*(1-
squalorstats.tenureowned$prev)/squalorstats.tenureowned$total)
squalorstats.tenureowned$prev.pc <- squalorstats.tenureowned$prev*100
squalorstats.tenureowned$se.pc <- squalorstats.tenureowned$se*100
metareg.year.tenureowned <- rma(yi = prev.pc, sei = se.pc, data = squalorstats.tenureowned, mods =
~year)
metareg.year.tenureowned

squalorstats.tenureprivrent$se <- sqrt(squalorstats.tenureprivrent$prev*(1-
squalorstats.tenureprivrent$prev)/squalorstats.tenureprivrent$total)
squalorstats.tenureprivrent$prev.pc <- squalorstats.tenureprivrent$prev*100
squalorstats.tenureprivrent$se.pc <- squalorstats.tenureprivrent$se*100
metareg.year.tenureprivrent <- rma(yi = prev.pc, sei = se.pc, data = squalorstats.tenureprivrent, mods
= ~year)
metareg.year.tenureprivrent

squalorstats.tenureLArent$se <- sqrt(squalorstats.tenureLArent$prev*(1-
squalorstats.tenureLArent$prev)/squalorstats.tenureLArent$total)
squalorstats.tenureLArent$prev.pc <- squalorstats.tenureLArent$prev*100
squalorstats.tenureLArent$se.pc <- squalorstats.tenureLArent$se*100
metareg.year.tenureLArent <- rma(yi = prev.pc, sei = se.pc, data = squalorstats.tenureLArent, mods =
~year)
metareg.year.tenureLArent
```

```
squalorstats.tenureHArent$se <- sqrt(squalorstats.tenureHArent$prev*(1-
squalorstats.tenureHArent$prev)/squalorstats.tenureHArent$total)
squalorstats.tenureHArent$prev.pc <- squalorstats.tenureHArent$prev*100
squalorstats.tenureHArent$se.pc <- squalorstats.tenureHArent$se*100
metareg.year.tenureHArent <- rma(yi = prev.pc, sei = se.pc, data = squalorstats.tenureHArent, mods =
~year)
metareg.year.tenureHArent

squalorstats.tenurerent$se <- sqrt(squalorstats.tenurerent$prev*(1-
squalorstats.tenurerent$prev)/squalorstats.tenurerent$total)
squalorstats.tenurerent$prev.pc <- squalorstats.tenurerent$prev*100
squalorstats.tenurerent$se.pc <- squalorstats.tenurerent$se*100
metareg.year.tenurerent <- rma(yi = prev.pc, sei = se.pc, data = squalorstats.tenurerent, mods =
~year)
metareg.year.tenurerent

squalorstats.hhtypealone$se <- sqrt(squalorstats.hhtypealone$prev*(1-
squalorstats.hhtypealone$prev)/squalorstats.hhtypealone$total)
squalorstats.hhtypealone$prev.pc <- squalorstats.hhtypealone$prev*100
squalorstats.hhtypealone$se.pc <- squalorstats.hhtypealone$se*100
metareg.year.hhtypealone <- rma(yi = prev.pc, sei = se.pc, data = squalorstats.hhtypealone, mods =
~year)
metareg.year.hhtypealone

squalorstats.hhtypewithothers$se <- sqrt(squalorstats.hhtypewithothers$prev*(1-
squalorstats.hhtypewithothers$prev)/squalorstats.hhtypewithothers$total)
squalorstats.hhtypewithothers$prev.pc <- squalorstats.hhtypewithothers$prev*100
squalorstats.hhtypewithothers$se.pc <- squalorstats.hhtypewithothers$se*100
metareg.year.hhtypewithothers <- rma(yi = prev.pc, sei = se.pc, data =
squalorstats.hhtypewithothers, mods = ~year)
metareg.year.hhtypewithothers

squalorstats.coupleno$se <- sqrt(squalorstats.coupleno$prev*(1-
squalorstats.coupleno$prev)/squalorstats.coupleno$total)
squalorstats.coupleno$prev.pc <- squalorstats.coupleno$prev*100
squalorstats.coupleno$se.pc <- squalorstats.coupleno$se*100
metareg.year.coupleno <- rma(yi = prev.pc, sei = se.pc, data = squalorstats.coupleno, mods = ~year)
metareg.year.coupleno

squalorstats.couplewith$se <- sqrt(squalorstats.couplewith$prev*(1-
squalorstats.couplewith$prev)/squalorstats.couplewith$total)
squalorstats.couplewith$prev.pc <- squalorstats.couplewith$prev*100
squalorstats.couplewith$se.pc <- squalorstats.couplewith$se*100
metareg.year.couplewith <- rma(yi = prev.pc, sei = se.pc, data = squalorstats.couplewith, mods =
~year)
metareg.year.couplewith

squalorstats.lonepar$se <- sqrt(squalorstats.lonepar$prev*(1-
squalorstats.lonepar$prev)/squalorstats.lonepar$total)
squalorstats.lonepar$prev.pc <- squalorstats.lonepar$prev*100
```

```
squalorstats.lonepar$se.pc <- squalorstats.lonepar$se*100
metareg.year.lonepar <- rma(yi = prev.pc, sei = se.pc, data = squalorstats.lonepar, mods = ~year)
metareg.year.lonepar

squalorstats.multiperson$se <- sqrt(squalorstats.multiperson$prev*(1-
squalorstats.multiperson$prev)/squalorstats.multiperson$total)
squalorstats.multiperson$prev.pc <- squalorstats.multiperson$prev*100
squalorstats.multiperson$se.pc <- squalorstats.multiperson$se*100
metareg.year.multiperson <- rma(yi = prev.pc, sei = se.pc, data = squalorstats.multiperson, mods =
~year)
metareg.year.multiperson

squalorstats.oneperless$se <- sqrt(squalorstats.oneperless$prev*(1-
squalorstats.oneperless$prev)/squalorstats.oneperless$total)
squalorstats.oneperless$prev.pc <- squalorstats.oneperless$prev*100
squalorstats.oneperless$se.pc <- squalorstats.oneperless$se*100
metareg.year.oneperless <- rma(yi = prev.pc, sei = se.pc, data = squalorstats.oneperless, mods =
~year)
metareg.year.oneperless

squalorstats.oneperover$se <- sqrt(squalorstats.oneperover$prev*(1-
squalorstats.oneperover$prev)/squalorstats.oneperover$total)
squalorstats.oneperover$prev.pc <- squalorstats.oneperover$prev*100
squalorstats.oneperover$se.pc <- squalorstats.oneperover$se*100
metareg.year.oneperover <- rma(yi = prev.pc, sei = se.pc, data = squalorstats.oneperover, mods =
~year)
metareg.year.oneperover

squalorstats.hhsize1$se <- sqrt(squalorstats.hhsize1$prev*(1-
squalorstats.hhsize1$prev)/squalorstats.hhsize1$total)
squalorstats.hhsize1$prev.pc <- squalorstats.hhsize1$prev*100
squalorstats.hhsize1$se.pc <- squalorstats.hhsize1$se*100
metareg.year.hhsize1 <- rma(yi = prev.pc, sei = se.pc, data = squalorstats.hhsize1, mods = ~year)
metareg.year.hhsize1

squalorstats.hhsize2$se <- sqrt(squalorstats.hhsize2$prev*(1-
squalorstats.hhsize2$prev)/squalorstats.hhsize2$total)
squalorstats.hhsize2$prev.pc <- squalorstats.hhsize2$prev*100
squalorstats.hhsize2$se.pc <- squalorstats.hhsize2$se*100
metareg.year.hhsize2 <- rma(yi = prev.pc, sei = se.pc, data = squalorstats.hhsize2, mods = ~year)
metareg.year.hhsize2

squalorstats.hhsize3$se <- sqrt(squalorstats.hhsize3$prev*(1-
squalorstats.hhsize3$prev)/squalorstats.hhsize3$total)
squalorstats.hhsize3$prev.pc <- squalorstats.hhsize3$prev*100
squalorstats.hhsize3$se.pc <- squalorstats.hhsize3$se*100
metareg.year.hhsize3 <- rma(yi = prev.pc, sei = se.pc, data = squalorstats.hhsize3, mods = ~year)
metareg.year.hhsize3

squalorstats.hhsize4$se <- sqrt(squalorstats.hhsize4$prev*(1-
squalorstats.hhsize4$prev)/squalorstats.hhsize4$total)
```

```
squalorstats.hhsize4$prev.pc <- squalorstats.hhsize4$prev*100
squalorstats.hhsize4$se.pc <- squalorstats.hhsize4$se*100
metareg.year.hhsize4 <- rma(yi = prev.pc, sei = se.pc, data = squalorstats.hhsize4, mods = ~year)
metareg.year.hhsize4

squalorstats.hhsize5$se <- sqrt(squalorstats.hhsize5$prev*(1-
squalorstats.hhsize5$prev)/squalorstats.hhsize5$total)
squalorstats.hhsize5$prev.pc <- squalorstats.hhsize5$prev*100
squalorstats.hhsize5$se.pc <- squalorstats.hhsize5$se*100
metareg.year.hhsize5 <- rma(yi = prev.pc, sei = se.pc, data = squalorstats.hhsize5, mods = ~year)
metareg.year.hhsize5


#Meta-regression with other variables

aggregate(complete$hhinc, list(complete$year), FUN=mean)
squalorstats.basic$incav <-
c(21763.02,23251.03,23864.14,24628.92,23103.65,23472.07,23689.24,25076.25,25831.51,26982.89
,26908.61,27931.83,28961.04)
aggregate(complete$hhinc, list(complete$year), FUN=median)
squalorstats.basic$incmed <- c(16947.00, 18413.00, 19174.00, 19400.00, 18601.96, 19190.60,
19063.88, 20348.72, 20729.20, 22256.70, 22014.48, 22791.46, 23897.61)
squalorstats.basic$incprop <- c(0.673435, 0.713516, 0.740824, 0.743437, 0.702703, 0.710474,
0.700492, 0.736872, 0.735208, 0.773904, 0.744764, 0.750262, 0.758968)
completeX <- na.omit(complete)
aggregate(completeX$deprivation, list(completeX$year), FUN=mean)
squalorstats.basic$depav <- c(4.9282, 5.140314, 5.226118, 5.336514, 4.714056, 4.858204, 4.655798,
4.809556, 4.887678, 5.029813, 4.860988, 4.973650, 4.897340)
aggregate(complete$hhsize, list(complete$year), FUN=mean)
squalorstats.basic$hhsizeav <- c(2.390968,  2.403403,  2.383765,  2.404771,
        2.402029,  2.360845,  2.387563,  2.435519,  2.415923,  2.374617,
        2.363696,  2.36563, 2.322647)
prop.table(table(complete$tenure2, complete$year),2)
squalorstats.basic$ownedprop <- c(0.4839528,  0.520288,  0.5373476,  0.5362691,
        0.4208662,  0.4242324,  0.3847059,  0.4207761,  0.4017179,  0.4459966,
        0.4153947,  0.4428805,  0.453103)
prop.table(table(complete$hhtype2, complete$year),2)
squalorstats.basic$aloneprop <- c(0.2982367, 0.2816754, 0.2837907, 0.2793884, 0.2941555,
0.3037306, 0.2936134, 0.2738519,  0.2963330, 0.2902896, 0.3001805, 0.3031097, 0.3163370)

metareg.year <- rma(yi = prev.percent, sei = se.pc, data = squalorstats.basic, mods = ~ year)
metareg.year
metareg.dep <- rma(yi = prev.percent, sei = se.pc, data = squalorstats.basic, mods = ~ depav)
metareg.dep
metareg.inc <- rma(yi = prev.percent, sei = se.pc, data = squalorstats.basic, mods = ~ incav)
metareg.inc
metareg.incmed <- rma(yi = prev.percent, sei = se.pc, data = squalorstats.basic, mods = ~ incmed)
metareg.incmed
metareg.incprop <- rma(yi = prev.percent, sei = se.pc, data = squalorstats.basic, mods = ~ incprop)
metareg.incprop
metareg.hhsiz <- rma(yi = prev.percent, sei = se.pc, data = squalorstats.basic, mods = ~ hhsizeav)
```

```
metareg.hhsiz
squalorstats.basic$aloneprop.pc <- squalorstats.basic$aloneprop*100
metareg.livealone <- rma(yi = prev.percent, sei = se.pc, data = squalorstats.basic, mods = ~
aloneprop.pc)
metareg.livealone
squalorstats.basic$ownedprop.pc <- squalorstats.basic$ownedprop*100
metareg.own <- rma(yi = prev.percent, sei = se.pc, data = squalorstats.basic, mods = ~ ownedprop.pc)
metareg.own
metareg.yearinc <- rma(yi = prev.percent, sei = se.pc, data = squalorstats.basic, mods = ~ year+incav)
metareg.yearinc
metareg.yearincown <- rma(yi = prev.percent, sei = se.pc, data = squalorstats.basic, mods = ~
year+incav+ownedprop.pc)
metareg.yearincown

metareg.1 <- rma(yi = prev.percent, sei = se.pc, data = squalorstats.basic, mods = ~
incprop+ownedprop.pc)
metareg.1


# Logistic regression with complete dataset

library(logistf)

modeldeprivation <- logistf(squalor2 ~ deprivation, data = completeX, firth = TRUE)
summary(modeldeprivation)
exp(coef(modeldeprivation))
modelincome <- logistf(squalor2 ~ hhinc, data = complete, firth = TRUE)
summary(modelincome)
modelhhtype <- logistf(squalor2 ~ hhtype2, data = complete, firth = TRUE)
summary(modelhhtype)
modeltenure <- logistf(squalor2 ~ tenure2, data = complete, firth = TRUE)
summary(modeltenure)
modelhhsize <- logistf(squalor2 ~ hhsize, data = complete, firth = TRUE)
summary(modelhhsize)

modelmulti1 <- logistf(squalor2 ~ deprivation+hhinc+hhtype2+tenure2+hhsize, data = completeX,
firth = TRUE)
summary(modelmulti1)
modelmulti2 <- logistf(squalor2 ~ deprivation+hhinc+tenure2+hhsize+hhtype2, data = completeX,
firth = TRUE)
summary(modelmulti2)
modelmulti3 <- logistf(squalor2 ~ hhinc+tenure2+hhsize+hhtype2, data = complete, firth = TRUE)
summary(modelmulti3)
modelint1 <- logistf(squalor2 ~ hhtype2*deprivation, data = completeX, firth = TRUE)
summary(modelint1)

modelX1 <- logistf(squalor2 ~ deprivation, data = dbhhtype2.1, firth = TRUE)
summary(modelX1)
modelX2 <- logistf(squalor2 ~ deprivation, data = dbhhtype2.2, firth = TRUE)
summary(modelX2)
```

Appendix 6.1

Ethics Approval Letter

The University Of Sheffield.

Downloaded: 20/03/2023
Approved: 16/06/2022

Michael Norton
Registration number: 200193610
Psychology
Programme: PhD Psychology

Dear Michael

PROJECT TITLE: Living in Squalor: Interviews with Professionals
APPLICATION: Reference Number 045820

On behalf of the University ethics reviewers who reviewed your project, I am pleased to inform you that on 16/06/2022 the above-named project was **approved** on ethics grounds, on the basis that you will adhere to the following documentation that you submitted for ethics review:

- University research ethics application form 045820 (form submission date: 16/06/2022); (expected project end date: 01/08/2022).
- Participant information sheet 1106088 version 1 (12/05/2022).
- Participant information sheet 1106236 version 1 (16/05/2022).
- Participant consent form 1103645 version 1 (18/03/2022).

If during the course of the project you need to deviate significantly from the above-approved documentation please inform me since written approval will be required.

Your responsibilities in delivering this research project are set out at the end of this letter.

Yours sincerely

Department Of Psychology Research Ethics Committee
Ethics Administrator
Psychology

Please note the following responsibilities of the researcher in delivering the research project:

- The project must abide by the University's Research Ethics Policy:https://www.sheffield.ac.uk/research-services/ethics-integrity/policy
- The project must abide by the University's Good Research & Innovation Practices Policy: https://www.sheffield.ac.uk/polopoly_fs/1.671066!/file/GRIPPolicy.pdf
- The researcher must inform their supervisor (in the case of a student) or Ethics Administrator (in the case of a member of staff) of any significant changes to the project or the approved documentation.
- The researcher must comply with the requirements of the law and relevant guidelines relating to security and confidentiality of personal data.
- The researcher is responsible for effectively managing the data collected both during and after the end of the project in line with best practice, and any relevant legislative, regulatory or contractual requirements.

Appendix 6.2

University of Sheffield Risk Assessment Form

PERSONS AT RISK: Mike Norton, Participants			**Reference number: RA 107**	
RISK L- low			**Environment : Office space (Cathedral court, other University building, participant's place of work)**	
TASK or ACTIVITY: Collecting data through one-to-one interviews. Activities taking place under minor Covid-19 restrictions, see specific Cathedral Court Covid RA for more general guidance		**INITIAL RISK RATING**		**FINAL RISK RATING**
Significant Hazard	**Potential Consequences of Hazard**		**Existing Control/Proposed Control Measures**	
Working alone/ low building occupancy	Increased risk of general accidents through working alone e.g,. slips, trips, falls, Increased risk of serious injury or death due to unavailability of immediate assistance.	**M**	Participants will not be tested at a time when no one else is in the building; other staff will be present. A system will be in place where researcher will let a member of staff in the building know they are testing, and that member of staff will be present in close proximity in case any issues arise. To avoid any general accidents, we will ensure there is enough space and safe positioning of any objects, all spillages to be cleaned up immediately, ensure all seatings are suitable for participants, participants to	**L**

			be reminded not to climb on chairs, or act dangerously with materials if situation arises, ensure participants do not sit or lean against unstable surfaces.	
Recruiting members of the public as research volunteers	Possibility for violence by virtue of being in an empty building with a stranger.	**L**	Participants will not be tested at a time when no one else is in the building; other staff will be present. A system will be in place where researcher will let a member of staff in the building know they are testing, and that member of staff will be present in close proximity in case any issues arise.	**L**
Carrying out testing	Risk of electric shock if equipment is not properly set-up.	**L**	All equipment is set up in line with manufacturer recommendations. All equipment has been checked and PA tested.	**L**
Manual handling of goods greater that 5kg	Risk to back, ligaments, tendons and muscles of the body through incorrect lifting and moving techniques	**L**	We will not attempt to lift or move any load by yourself which is likely to put you at all at risk of injury. Plan for your out-of-hours work and ensure that equipment/items are moved safely beforehand with the aid of a colleague. If lone lifting is unavoidable use lifting/moving aids where safe to do so.	**L**
Violence: intruder in building	Risk of injury to lone worker and/or risk of	**L**	Contact University Security promptly, should you know or suspect that an intruder is present in your	**L**

	damage to building/equipment		building. Do not confront the intruder, lock your door and await the arrival of Security.	
Research taking place during covid-19 pandemic	Risk of researcher or participants contracting COVID-19	**L**	See Cathedral Court covid-19 risk assessment for additional measures in place to reduce this risk Participants will be asked to sign that they have not had covid-19 symptoms (or been in contact with someone who has) within the last 5 days. Face masks are no longer mandatory, however, we understand that some people will feel more comfortable wearing face coverings and that others will not want to, and we ask all staff and students to be respectful of personal choice in this matter. The study will be conducted in a ventilated room.	**L**
			Overall Risk:	**Low**
Comments: **Procedure for testing:**				

- Participants will first be contacted through an email screening to ensure they meet study criteria, and arrange dates for testing.
- Before the first testing session, participants will complete a questionnaire online.
- The participants will be asked if they want to wear, or want the researcher to wear, a face mask on arrival, and one will be provided if needed.
- They will be asked if they have had symptoms of covid within the last 5 days.
- They will be taken to the interview space.
- They will already have read the information sheet and signed the consent form during the initial questionnaire filling online
- Participants who choose to be interviewed in person will complete a semi-structured interview lasting around 45 minutes at a University building or their own workplace.
- At the beginning and the end of the study, participants will be reminded how to access contact details if they feel in any way affected by the experiment
- After each session, the researcher will sanitise the furniture (table, chairs, keyboard, mouse, table).

Undertaken By:	**Mike Norton**		
Other Persons Consulted:	**Sharon Keighley (DHSO)**		
Signed off by Supervisor:	**Vyv Huddy**		
Date:	**15/06/2022**	**Revision Date: 15/06/23**	**Or in line with any covid-19 restriction changes, or changes to tasks**

Appendix 6.3

Online survey – Including study information and consent processes

Living in Squalor: Interviews with Professionals

Start of Block: Information sheet

Participant Information Sheet

Research Project Title
Professional perspectives of individuals who live in squalor: A qualitative study

You are being invited to take part in a research study collecting information on your views, experiences and understanding of individuals who live in unclean and unsanitary dwellings. The following information will explain why the research is being conducted and what it will involve. It is important that you read the information sheet carefully and ensure that you fully understand what you will be expected to do during the study. If there is anything that is unclear, please ask any questions you have, or discuss the research with others.

What is the project's purpose?
The aim of this study is to improve the understanding of individuals who live in squalid circumstances and the experiences and views of the professional workers who interact with them.
The study is being conducted as part of a PhD Investigating individuals living in squalor.

Why have I been chosen?
Due to the nature of your work, you have experience interacting with individuals who are living in squalid conditions. Therefore, you have a unique insight into their homes and their views and behaviours. These insights are a key element in understanding the needs of these individuals and the motivation behind their way of living.

Do I have to take part?
It is completely your choice whether you wish to take part or not. There will be no negative consequences if you choose not to take part, or if you begin the study, but decide not to complete it. Also, if on completion of the interview you wish to remove your data from the research, you can do so up to two weeks later by contacting the lead researcher listed below. After this time, your data will have been used as part of the analysis and withdrawal will not be possible.
Please note that that by choosing to participate in this research, this will not create a legally binding agreement, nor is it intended to create an employment relationship between you and the University of Sheffield.

What will happen to me if I take part? What do I have to do?
If you agree to take part in the study, you would be required to complete an interview in person or online. If the interview is conducted in person, it would be recorded using a digital audio recorder. If conducted online, the interview audio would be retained. The questions would focus on your

understanding and experiences working with individuals who live in extremely dirty conditions, including questions on your working procedures, the mental health needs of the individuals and their understanding of their own circumstances. The interview will be an open discussion lasting approximately 30-60 minutes.

What are the possible disadvantages and risks of taking part?
There are no significant risks to taking part in this study. However, in the course of discussions, information may arise which could lead to the identification of yourself, another worker or a service user. All identifying information will be edited to ensure anonymity and to make sure that individuals can't be identified.

Alternatively, if you have any concerns related to the research itself, please contact the lead researcher via the contact details below.

What are the possible benefits of taking part?
Although there are no direct benefits to the individual taking part in this study, research of this kind will help improve the understanding of why individuals live in extreme conditions and what can be done to help them.

Will my taking part in this project be kept confidential?
All the information that is collected during the course of the research will be kept strictly confidential and will only be accessible to members of the research team. You will also not be identified in any reports or publications that arise from the data collected. However, please note that if, during the interview process, information is volunteered that suggests that illegal activity or professional malpractice has taken place, or an individual is a danger to themselves or others, then this information may be passed on to a relevant agency.

Whether the interview is conducted in person or online, consent documents and recordings will need to be completed. However, these will be completed online and then transferred to the University of Sheffield secure server.

Following completion of the study, transcripts of the interviews will be made available to the UK Data Service to be used in future research projects. However, this will not include your name or any other identifiable information. If you would prefer for your answers to not be made available to a data archive, then this can be indicated in the consent process.

What is the legal basis for processing my personal data?
According to data protection legislation, we are required to inform you that the legal basis we are applying in order to process your personal data is that 'processing is necessary for the performance of a task carried out in the public interest' (Article 6(1)(e)). Further information can be found in the University's Privacy Notice https://www.sheffield.ac.uk/govern/data-protection/privacy/general.
As we will be collecting some data that is defined in the legislation as more sensitive (information about mental health and substance use) we also need to let you know that we are applying the following condition in law: that the use of your data is necessary 'for archiving purposes in the public interest, scientific research purposes or statistical purposes' (9(2)(j)).

What will happen to the data collected, and the results of the research project?
Following completion of data collection, you will have up to two weeks to withdraw your data if for

any reason you wish to do so. After this date your transcript will be anonymised, making it not possible to identify your responses. Although your responses will be anonymous after this date, contact details may be saved for up to 2 months in case we need to contact you for any further questions or about further research opportunities. However, this information will be retained on the University of Sheffield secure server and only be available to the research team.
Following completion of the project, of which this study is only a small part, all data will be uploaded onto the UK Data Service in an anonymised form to be accessed by other researchers who may find the data useful in answering future research questions. During the consent process, we will ask for your permission for the data to be shared in this way.

Who is organising and funding the research?
The project Is being organised in accordance with the University of Sheffield. The organiser and lead research Is Mike Norton, a second year PhD student, who receives funding from the Economic and Social Research Council (ESRC), and he is supported in the research process by his supervisors.

Who is the Data Controller?
The University of Sheffield will act as the Data Controller for this study. This means that the University is responsible for looking after your information and using it properly.

Who has ethically reviewed the project? This project has been ethically approved via the University of Sheffield's Ethics Review Procedure, as administered by the psychology department.

What if something goes wrong and I wish to complain about the research or report a concern or incident?
If you are dissatisfied with any aspect of the research and wish to make a complaint, please contact lead researcher Mike Norton on mjnorton1@sheffield.ac.uk in the first instance. If you feel your complaint has not been handled in a satisfactory way you can contact supervisors Dr Vyv Huddy (v.huddy@sheffield.ac.uk) or Dr Stephen Kellett (stephen.kellett@nhs.net) or the Head of the Department of Psychology (Prof Elizabeth Milne - e.milne@sheffield.ac.uk). If the complaint relates to how your personal data has been handled, you can find information about how to raise a complaint in the University's Privacy Notice: https://www.sheffield.ac.uk/govern/data-protection/privacy/general.
If you wish to make a report of a concern or incident relating to potential exploitation, abuse or harm resulting from your involvement in this project, please contact the project's Designated Safeguarding Contact (Mike Norton - mjnorton@sheffield.ac.uk). If the concern or incident relates to the Designated Safeguarding Contact, or if you feel a report you have made to this Contact has not been handled in a satisfactory way, please contact the Head of the Department of psychology (Prof Elizabeth Milne - e.milne@sheffield.ac.uk) and/or the University's Research Ethics & Integrity Manager (Lindsay Unwin - l.v.unwin@sheffield.ac.uk). 16.

Contact for further information

Lead Researcher (PhD student)
Mike Norton
Department of Psychology
Cathedral Court
1 Vicar Lane
Sheffield

S1 2LT
mjnorton1@sheffield.ac.uk

Supervisors
Dr Vyv Huddy
Department of Psychology
Cathedral Court
1 Vicar Lane
Sheffield
S1 2LT
V.Huddy@sheffield.ac.uk

Dr Stephen Kellett
Department of Psychology
Cathedral Court
1 Vicar Lane
Sheffield
S1 2LT
Stephen.Kellett@nhs.net

Thank you for agreeing to take part in this study. Your participation is appreciated and valuable.

End of Block: Information sheet

Start of Block: Consent form

*

Taking part

I have read and understood the project information sheet

- ○ Yes
- ○ No

---

*

I have been given the opportunity to ask questions about the study, or to discuss it with another individual

- ○ Yes
- ○ No

---

*

I understand that taking part in the project will involve answering questions and discussing my work and experiences with individuals living in squalid dwellings

- ○ Yes
- ○ No

---

*

I understand that my answers will be confidential throughout the data collection process and stored in a fully anonymised format

- ○ Yes
- ○ No

---

*

I understand that by choosing to participate as a volunteer in this research, this does not create a legally binding agreement nor is it intended to create an employment relationship with the University of Sheffield.

- ○ Yes
- ○ No

---

*

I understand that my taking part is voluntary and that I can withdraw from the study at any time up to two weeks after completion of the survey. I do not have to give any reasons for why I no longer want to take part and there will be no adverse consequences if I choose to withdraw.

- ○ Yes
- ○ No

---

*

I agree to take part in this study

- ○ Yes
- ○ No

---

*

How my information will be used

I understand and agree that other authorised researchers will have access to this data only if they agree to preserve the confidentiality of the information as requested in this form.

- ○ Yes
- ○ No

I understand and agree that other authorised researchers may use my data in publications, reports, web pages, and other research outputs, only if they agree to preserve the confidentiality of the information as requested in this form.

- ○ Yes
- ○ No

I give permission for the answers that I provide to be deposited in the UK Data Service so it can be used for future research and learning

- ○ Yes
- ○ No

This question allows the information you provide to be used legally by the researchers

I agree to assign the copyright I hold in any materials generated as part of this project to The University of Sheffield.

- ○ Yes
- ○ No

End of Block: Consent form

Start of Block: About you

What is your age?

_____

To what gender identity do you most identify?

- ○ Male
- ○ Female
- ○ Non-binary / third gender
- ○ Prefer not to say

What is your ethnicity?

- ○ White - British
- ○ White - Irish
- ○ White - Gypsy or Irish Traveller
- ○ White - Any other background (Please describe) _____
- ○ Mixed/Multiple Ethnic Groups - White and Black Caribbean
- ○ Mixed/Multiple Ethnic Groups - White and Black African
- ○ Mixed/Multiple Ethnic Groups - White and Asian
- ○ Mixed/Multiple Ethnic Groups - Any other mixed/multiple ethnic background (Please describe) _____
- ○ Asian/Asian British - Indian
- ○ Asian/Asian British - Pakistani
- ○ Asian/Asian British - Bangladeshi
- ○ Asian/Asian British - Chinese
- ○ Asian/Asian British - Any other Asian background (Please describe) _____
- ○ Black/Black British - African
- ○ Black/Black British - Caribbean
- ○ Black/Black British - Any other Black background (Please describe) _____
- ○ Arab
- ○ Any other ethnic group (Please describe) _____

What is your professional role?

_____

How long have you had this role?

_____

How long, in total, have you worked in this field?

_____

What professional qualifications do you have?

_____

Approximately how many cases of squalor have you been involved with professionally?

_____

Thank you for taking the time to complete these questions.

End of Block: About you

Appendix 6.4

Formal Invitation to Participate

Hello.

My name is Mike Norton and I am a PhD student in the Psychology department.

You are being invited to take part in a research project interviewing professionals who work with individuals who live in squalor.

The interview will take approximately 40-50 minutes and will discuss your experiences working with these individuals, including their mental health needs, their awareness of their environment and the day-to-day experiences of working in this field. You must be over 18 years old and have had some experience, now or in the past, of working with people who are living in extremely unclean, cluttered and verminous households.

The study has received ethical approval from the University of Sheffield Department of Psychology Ethics Subcommittee.

Further information, a consent form and some basic demographic questions can be accessed at the following link:

[Add link here]

If you are happy to take part in the interview, please contact mjnorton1@sheffield.ac.uk to arrange an appropriate time and interview method (If you have not already done so).

Thank you for taking the time to read this email and for those of you who choose to complete the research. Your participation is appreciated and valuable.

Mike Norton

Department of Psychology

University of Sheffield

Appendix 6.5

Interview Schedule

Formalities

- Welcome and thanks for taking part
- Have consent documents been completed?
- Any initial questions
- Remind that contact details and other key information can be found on the information sheet
- Are they happy for this to be recorded?
- What is the participant ID code? (Stated for the recording)

Squalor

- What does the term 'squalor' mean to you? How do you define it?
- How is the term used in relation to individuals you work with?
- Is there another term you would use to describe this?

Homes

- Can you remember/describe a typical experience of a squalor house?
    - What are the sensory qualities of the house - smell, appearance, light level or air quality?
    - How do you respond to these?
    - Do they have an impact on you? (Prompt: Emotional impact?)
    - What is their impact on you, emotionally?
- How do these houses vary?
- What is your focus or aims when you first enter a squalor home?

Residents

- Could you describe a typical person who lives in squalor?
- Could you describe the mental ill health or wellbeing of people you've encountered?

Potential follow-up question if mental health understanding shows sufficient depth.

    - What is the relationship of living conditions to their mental health?
- Can you describe the relevance of self-neglect to residents?
- What support do residents have?
    - What is their social network?
    - What is their relationship with neighbours or other professionals?
- What is your experience of building a relationship with residents, and how important is that relationship to your work? How important is to them?
- How do residents view their surroundings? Do they understand the need for intervention?
    - Have you had experiences where the individual resists intervention and what additional challenges does this create?

- Do you find that there is a common reason why squalor behaviour starts?
- Do you do follow-ups and if so, what are the common outcomes in cases of this type?

Training and support

- Do you have specific training to deal with aspects of the situation?
    - What support systems are in place for your work? Do you have supervision or other opportunities to talk about the work with other professions?
    - Do you have any specific training such as mental health problems, or uncooperative individuals?
- Can you describe your work with other agencies supporting the resident?

Formalities

- Thanks
- Remind that contact details and other key information can be found on the information sheet