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Migrants' utilization of Emergency Departments for paediatric care in the North of England compared to that of non-migrants: a mixed methods study.

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List of Abbreviations

A&E	Accident and Emergency
ARC	Applied Research Collaboration
BiB	Born in Bradford
BRI	Bradford Royal Infirmary
CAG	Confidential Advisory Group
CHC	Connected Health Cities
CLAHRC	Collaboration for Leadership in Applied Health Research and Care
CPRD	Clinical Practice Research Datalink
CRF	Clinical Research Facility
CURE	Centre for Urgent and Emergency Care Research
EEA	European Economic Area
ECDS	Emergency Care Data set
ECP	Emergency Care Providers
ED	Emergency Department
EU	European Union
GP	General Practitioner
GRAMMS	Good Reporting of A Mixed Methods Study
HES	Hospital Episode Statistics
HRA	Health Research Authority
HSR	Health Services Research
ICD	International Classification of Diseases
IMD	Index of Multiple Deprivation
IOM	International Organization for Migration
IRAS	Integrated Research Application System
IRR	Incidence Rate Ratios
IQR	Inter Quartile Range

LSOA	Lower Super Output Area
MRC	Medical Research Council
NHS	National Health Service
NIHR	National Institute for Health Research
OA	Output Areas
OGTT	Oral Glucose Tolerance Test
OR	Odds Ratio
PHC	Primary Healthcare
PPI	Patient and Public Involvement
REC	Research Ethics Committee
SCH	Sheffield Children's Hospital
ScHARR	School of Health and Related Research (University of Sheffield)
SECF	Sheffield Emergency Care Forum
STROBE	Strengthening the Reporting of Observational Studies in Epidemiology
UK	United Kingdom

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Abstract

Background

In the United Kingdom, children born to migrant parents are a rapidly growing group. Migrant populations, like all populations, require health services, but little is known about their use of emergency departments (EDs) for paediatric care. This study aimed to compare ED utilization between children born to migrant, as compared to non-migrant, parents in a region in the north of England.

Methods

This was a mixed methods study. Born in Bradford (BiB) cohort data were used to examine the association between paediatric ED utilization and maternal migration status. Fifteen semi-structured interviews with ED staff at two hospitals explored staff perceptions of migrant parents' use of paediatric ED services. The final study used routine data to identify whether, and how, patterns of ED utilization differ between Roma and White British/ Irish children in Sheffield.

Findings

The main findings of this thesis are: 1) patterns of ED utilization for paediatric care differ between migrant and non-migrant populations; 2) people with different regions of origin utilize EDs differently and time since arrival in host country is an important consideration in understanding patterns of ED use; 3) broad categorizations of 'migrant vs non-migrant' do, however, have limited use in understanding patterns of ED use as these differ within migrant populations.

Conclusion

While migrant status may be useful for health service planning, migrant status was not identified as a useful clinical variable, and this thesis found no evidence that migrant children were a population in greater need of emergency care. Instead, numerous individual, contextual, and process related factors are important in understanding patterns of ED utilization for people arriving in the UK. There is a need to explore, using an intersectional approach, the complex individual, family, community, and health system factors that may contribute to patterns of ED utilization by migrant populations.

Dissemination

Publications

Credé, S.H., Mason, S., Such, E. and Jacques, R.M. 2020. Paediatric emergency department utilisation rates and maternal migration status in the Born in Bradford cohort: A cross-sectional study. *PLoS Med* 17(3)

Credé, S.H., Such, E., & Mason, S. 2017. International migrants' use of emergency departments in Europe compared with non-migrants' use: A systematic review. *European Journal of Public Health*, 28(1), 61-73

In preparation

Study 2 (Chapter 7) will be submitted for publication with the following authors:

Credé, S.H., Such, E., Knowles, E. and Mason, S. 2020. Migrants' use of emergency departments for paediatric care in an English region: A qualitative study of healthcare providers' perceptions.

Study 3 (Chapter 8) will be submitted for publication with the following authors:

Credé S.H., Such E., Knowles, E., Mason, S., Jacques R.M. 2020. Patterns of paediatric emergency department utilization in Sheffield, UK: a comparison of Roma and White British children

Conferences Presentations

Credé, S.H., Such, E., & Mason, S. Differences in socio-demographic characteristics and emergency department use between migrants and non-migrants in the Born in Bradford cohort. HSRUK, Nottingham. July 4th 2018.

Credé S.H. Differences in socio-demographic characteristics and emergency department use between migrants and non-migrants in the Born in Bradford cohort. Born in Bradford Early Career Conference, Bradford. January 30th 2018.

Conference Posters

Credé, S.H., Such, E., & Mason, S. Differences in socio-demographic characteristics and emergency department use between migrants and non-migrants in the Born in Bradford cohort. HSRUK, Nottingham. July 4th & 5th 2018.

Credé, S.H., Such, E., & Mason, S. Differences in socio-demographic characteristics and emergency department use between migrants and non-migrants in the Born in Bradford cohort. SCHARR PGR Conference, 2018

Credé S.H., Such E and Mason S. 2017. International migrants' use of emergency departments in Europe compared to non-migrants' use: A systematic review. RCEM annual scientific conference, Liverpool, 2017

Credé S.H., Such E and Mason S. 2016. International migrants' use of emergency and urgent care services in Europe: A systematic review. HSRUK symposium, Nottingham, 16 -17 July 2016

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Chapter 1. Introduction

1.1 Overview

Globally, international migration is increasing. Between 2000 and 2017, the number of international migrants increased by 85 million, largely due to globalisation (United Nations Department of Economic and Social Affairs Population Division, 2017). Of the 165 million international migrants worldwide, 64% migrated into high-income countries, with Europe and Asia hosting nearly two thirds of these by 2017 (United Nations Department of Economic and Social Affairs Population Division, 2017). Europe, once a source of emigrants to countries globally, is now a net recipient of immigrants (Rechel et al., 2013). Migrants are found in all European countries, although in 2010 more than three quarters of all international migrants resident in the European Union (EU) were hosted by five member countries: Germany, Spain, the United Kingdom (UK), Italy and France (United Nations Department of Economic and Social Affairs. Population Division, 2013). This increasing trend for people to move across national borders to reside in a country in which they were not born is clearly evident in the UK; for the year ending December 2018, it was estimated that 258,000 more people moved to the UK with the intention of staying at least a year (Office for National Statistics, 2019d).

Migrants are a heterogeneous population, living in circumstances with differing levels of vulnerability, risk of illness and health outcomes (Gushulak et al., 2009). The health of migrants may be influenced by individual health needs, region of origin, the nature and process of the migration journey, as well as by the health policies and the accessibility of healthcare services at each stage of their migration journey (Zimmerman et al., 2011). When dealing with large, and increasing, numbers of migrants, managing their healthcare needs and ensuring equitable access to healthcare services is a challenge for the host country. The utilization of healthcare services may differ between migrants and non-migrants due to factors such as cultural differences, health seeking behaviour, healthcare needs and language differences, as well as the time since arrival in the host country (Norredam et al., 2010, Gushulak et al., 2010). Evidence shows that some migrants experience many barriers to healthcare in the host country – which may include a lack of understanding of the healthcare system, language and cultural barriers, as well as encountering legal obstacles to healthcare (Abubakar et al., 2016). Where barriers to healthcare exist, current evidence suggests that some migrant populations access emergency departments (EDs) over other healthcare services (Norredam et al., 2007, Mahmoud et al., 2015).

In the UK, National Health Service (NHS) EDs are facing an unsustainable increase in demand (Hassan and Judkins, 2018, Care Quality Commission, 2018). The reasons for increased demand are numerous and varied, and are driven in large part, but not solely, by demographic changes (Turner et al., 2014). Factors associated with increasing utilization of EDs include: an aging population; changes in organisation of provision of healthcare services; policy initiatives; as well as deprivation and social factors (Turner et al., 2014). Migrants have been described by some healthcare providers as one group of people who may be adding to the increasing pressure on urgent and emergency care services (O'Cathain et al., 2014). However, despite rapid population growth in the UK, little evidence exists to quantify migrants' use of EDs or to qualify their use. A paucity of empirical research on migrants' use of EDs has been recognised (Prederi, 2013). Furthermore, little is known about the emergency and urgent healthcare system's preparedness and responsiveness in dealing with the healthcare needs of migrant patients.

Understanding migrants' patterns of healthcare utilization, which would include EDs, is important, as health systems may need to adapt, or may require additional resources, to manage population changes as a result of migration (Abubakar et al., 2016). Better understanding migrants' access to, and use of, EDs requires two main questions to be addressed:

1) Are there differences in migrants' use of the ED compared to non-migrants?

Where differences are indeed apparent, the follow-up question would be:

2) Why are there differences in the access to, and use of, the ED between migrants and non-migrants?

This PhD seeks to address the first question and to explore ED utilization as a measure of realised access to healthcare.

1.2 Thesis structure and layout

This thesis is presented as an alternative format dissertation, comprising a combination of 'traditional' thesis chapters and academic publications. This thesis started with a broad general question that aimed to explore whether there are differences in ED utilization by migrants as compared to non-migrants. This broad research question was narrowed down as the PhD progressed, with each piece of empirical work seeking to answer a more focussed question that

contributes to our understanding of the form and nature of the differences in ED utilization between migrants and to non-migrants.

The background chapter (Chapter 2) sets the scene and begins with an overview of the challenges facing urgent and emergency care services in the UK. The chapter presents a broad overview of migration, the health and the provision of healthcare to migrant populations and the complexities relating to the use of migrant terminology. Chapter 3 presents the first paper, a systematic review of migrants' use of EDs in European Economic Area (EEA) Countries. This review was seen as the first step in the research process and identifies existing evidence that addresses the broad initial research question.

Based on the findings of the systematic review, the research questions for each of the subsequent pieces of empirical work became more focussed, addressing specific gaps in research knowledge that were identified in the research process. The aim of the empirical phase of this research was to address some of these research gaps (details in Chapter 4). Chapter 5 provides detail of the methods undertaken for each of the empirical studies, and Chapters 6, 7 and 8 present the results of the three empirical studies conducted for this PhD. Each of the papers prepared for publication in Chapters 6-8 has its own research question, aims and objectives. Chapter 9 presents a summary of the contribution and main findings of this work, its strengths and limitations, as well as the implications of the study findings and potential avenues for future research.

The journal articles (Chapters 3, 6, 7 and 8) present the main findings of the original research I have undertaken during my registration as a doctoral student at the University of Sheffield. As the first author for each of these papers, I was responsible for the main contribution to the design, conduct and write-up of each of these papers. A written statement of my contribution to each paper is provided in the introduction to the relevant chapters and is supported by a statement of contribution in Appendix 1. Permission to include published materials in this thesis is presented in Appendix 2. As this thesis incorporates published papers, there are some instances of duplication, where the published work overlaps with sections of the thesis. However, where possible, these have been kept to a minimum.

Due to the word count limitations imposed by journals, the full details for the methodology used in each study have been condensed. For the purposes of this thesis, additional detail for each study has been provided in the appendices, and reference to these has been provided in the relevant chapters.

This thesis provides an original empirical and theoretical contribution to knowledge.

The main contributions of this thesis are outlined as follows:

1. Completing a systematic review of the literature on migrants' use of EDs in European Economic Area countries. This is the first published systematic review, that I am aware of, that has synthesized evidence of migrants' use of EDs in Europe. The findings of this review enabled me to identify avenues for future research and guided the development of the empirical work for this PhD project.
2. The use of Born in Bradford (BiB) cohort data to explore migrant status as a factor that may explain patterns of ED utilization. This is the first such work to use migration data from the BiB study to identify patterns of healthcare utilization by migrant, as compared to non-migrant, populations. The work provides new insight into patterns of ED utilization by children born to migrant mothers.
3. The first qualitative study in the UK that explores ED healthcare providers' perceptions of migrant parents' use of EDs for paediatric care, and, as such, makes a contribution to existing knowledge.
4. The first study that I am aware of that seeks to understand patterns of paediatric ED utilization by Roma parents for their children in a UK setting. This study used of a novel approach of surname-based classification to identify children of probable Roma background attending the ED.

Chapter 2. Background

2.1 Chapter outline

This background chapter provides an overview of the current challenges facing hospital emergency departments (EDs) in the United Kingdom (UK). In addition, migration, the health of migrant populations and healthcare provision for persons born outside of the UK will be outlined in the context of the National Health Service (NHS) and in relation to ED utilization. The current research gaps in migrants' use of EDs will be highlighted. The chapter ends with a discussion of migration terminology and the definitions used in this PhD.

2.2 Emergency healthcare through the UK National Health Service

The NHS, established in 1948, provides health services which are free for users at the point of access for any person who is 'ordinarily resident' in the UK (Public Health England, 2019). These services are offered on the basis of clinical need rather than ability to pay and include primary care services, urgent and emergency care, as well as hospital services. In addition, certain categories of persons are currently entitled to free healthcare and these include: anyone insured for healthcare in another European Economic Area (EEA) member state; refugees (granted asylum, humanitarian protection or temporary protection in the UK); and asylum seekers whose applications have not yet been approved (Department of Health & Social Care, 2019). The healthcare cover of citizens from EEA countries and Switzerland may change after Brexit (Department of Health & Social Care, 2019). Importantly, any person is currently entitled to free emergency services, irrespective of migrant status or time since arrival in the UK. It must be noted that while emergency care is currently free to all users, the Department of Health has previously proposed to extend charging for migrants into EDs (Department of Health & Social Care, 2015).

Patients are able to access urgent and emergency care in the NHS through a variety of routes. Currently, when in need of urgent care, patients can contact their general practitioner (GP) surgery; call NHS 111; access walk-in centres or minor injuries units; make an emergency 999 call to an ambulance service; or use an ED. Each of these services is intended to offer a different service and perform a different function within the emergency and urgent care system. Year-on-year the demand for urgent and emergency care services for both adults and paediatric patients

in the UK is increasing and this is particularly evident in EDs (Bardot et al., 2013, Royal College of Paediatrics and Child Health., 2012, Care Quality Commission, 2018).

There are three types of EDs in England. Type 1 EDs, are the 'traditional' accident and emergency (A&E) service and are designed to meet the emergency care needs of patients with life-threatening emergencies (The Kings Fund, 2018). These consultant-led services have full resuscitation facilities, are accessible 24 hours a day and account for the majority of ED attendances (The Kings Fund, 2018). Type 2 EDs are also consultant-led, but these EDs are for single specialities, for example ophthalmology or dental units (The Kings Fund, 2018). Type 3 EDs treat minor injuries and illnesses, and these include minor injury units and walk-in centres (The Kings Fund, 2018). The focus of this PhD will be the utilization of Type 1 EDs.

2.3 Increasing demand for urgent and emergency care services

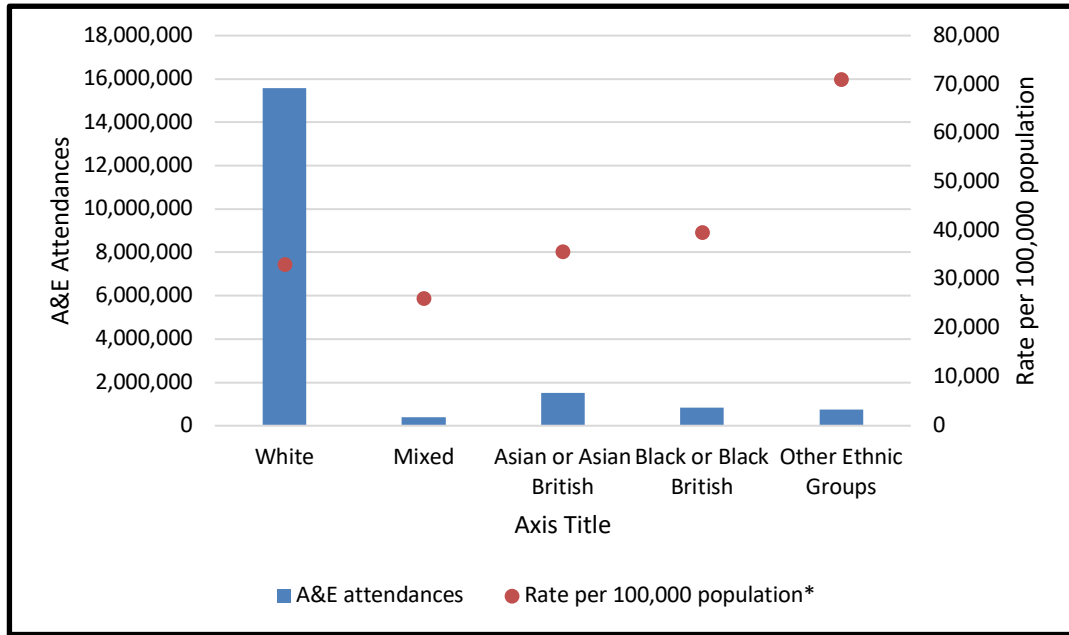
The demand for urgent and emergency care services in the UK continues to increase, with no signs of abating (Care Quality Commission, 2018). The rising demand for urgent and emergency care services in the UK is well documented. In 2017-18 NHS hospitals dealt with 23.8 million attendances to EDs, minor injury units and walk-in centres (National Audit Office, 2018). Attendance figures for Type 1 EDs have shown a year-on-year increase, with total annual attendances increasing by 9.1% between 2011/12 and 2017/18 (Care Quality Commission, 2018). Similarly, a trend towards increasing NHS emergency admissions is evident in the UK with a 24% increase seen between 2007-8 and 2016-17 (National Audit Office, 2018).

2.3.1 Who are ED users?

It is not only the increasing number of patients attending the ED that places pressure on emergency services, but also an ageing population, and the changing needs and the overall complexity of the conditions with which some patients present (Hassan and Judkins, 2018, Care Quality Commission, 2018).

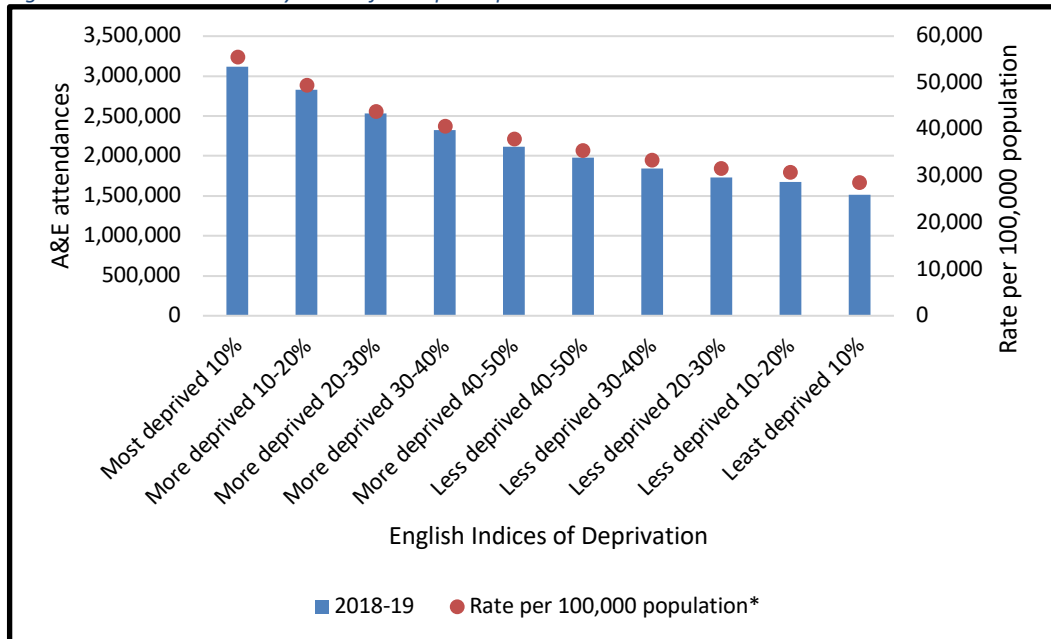
The majority of persons attending the ED are of White British ethnicity and a large portion of attendances are by people living in the most deprived areas (NHS Digital and NHS England, 2018) (see Figure 1 and Figure 2).

Figure 1: A&E attendance by Ethnicity and rate per 100,000 population



Source: NHS Digital and NHS England. Summary Report, 19, Hospital Accident and Emergency Activity, 2018-19

Figure 2: A&E attendances by Index of Multiple Deprivation



Source: NHS Digital and NHS England. Summary Report, 19, Hospital Accident and Emergency Activity, 2018-19

While the majority of attendances are for people aged 15-64 (NHS Digital and NHS England, 2018), the trends for increasing attendances are evident in both adult and paediatric services. Over the last ten years a steady increase in children’s ED attendances has been seen, with attendances 20% higher than a decade previously (Burger et al., 2016). It has previously been

estimated that approximately 25% of ED attendances involve children (Davies and Newton, 2015). EDs are also seeing an increasing proportion of older patients (>65 years) (NHS Digital and NHS England, 2018), who often present with multiple comorbidities, cognitive disorders and atypical presentations which makes their assessment and management increasingly complex in the ED (Samaras et al., 2010).

In understanding the challenges facing EDs, it is important to understand that the large number of patients presenting to the ED is not a true reflection of the number of patients who require the services of an ED. High numbers of non-urgent attendances have been seen in both adult (O'Keeffe et al., 2018) and paediatric EDs - nearly 90% of paediatric ED attendances in 2013/14 did not result in hospital admission (Holden et al., 2017). These patients could potentially have been seen in an alternative healthcare setting such as a general practice (O'Keeffe et al., 2018). Non-urgent attendances to the ED incur greater costs to the NHS, divert resources from those in most need of emergency care, increase waiting times, and inconvenience patients and families (O'Keeffe et al., 2018, Holden et al., 2017). In addition, patients are unlikely to receive the continuity of care offered in alternative settings (Holden et al., 2017, O'Keeffe et al., 2018). Thus, in seeking solutions to the challenges facing EDs it is important that research not only seeks to understand who ED users are, but also seeks to understand which groups, or sub-groups, of patients use the ED for non-urgent attendances.

2.3.2 Reasons for growing demand in EDs in the UK

The reasons for the growing pressures on EDs are numerous and relate to factors both internal and external to the ED. Some of the increasing pressure relates to increasing ED attendances, as well as an increase in the number of patients presenting to the ED who could be better managed elsewhere (The Kings Fund, 2018). Within the ED, workforce related issues relating to insufficient numbers of emergency medicine specialists and trainees (NHS England, 2013) – as well as a delay in patient transfers out of the ED, resulting from disrupted flow of patients through the hospital – add further to the challenges faced by EDs (The Kings Fund, 2018).

Patient level factors that have been found to influence ED use include sociodemographic factors such as: patient ethnicity (Forbes et al., 2007, Hull et al., 1998), population morbidity, population age and levels of deprivation (NHS Confederation, 2014, Rudge et al., 2013, Scantlebury et al., 2015, NHS Digital and NHS England, 2018). In 2017-18 the rate of ED attendance in the UK was

twice as high for people living in the most deprived areas as compared to those living in the least deprived areas (NHS Digital and NHS England, 2018). People from deprived communities have been found to access EDs for low acuity conditions in preference for primary care services due to the convenience and accessibility of EDs (Kangovi et al., 2013). Health service factors, such as proximity to both GP services and the ED, further influence ED utilization (Giebel et al., 2019). A shorter distance from home to the hospital has been found to be associated with increased ED attendance rates (Baker et al., 2011).

ED attendances can also result from problems patients' face in navigating urgent care services, or dissatisfaction with access to primary care (Campbell, 1994, Tammes et al., 2017, Turnbull et al., 2019). A lack of confidence in primary care services has been identified as a reason for patients bypassing primary care and seeking care from an ED (Coster et al., 2017). Patients' understanding, and expectations, of healthcare provision through the ED is a further factor that can influence their choice to attend the ED. People's perceptions of the need for emergency care, their health anxieties and the reassurance offered by emergency care settings are known to be important factors that influence patients' decisions to access care for non-urgent conditions (Coster et al., 2017). Furthermore, patients also choose to use the ED rather than primary care services because it is thought to be a convenient service, offering prompt treatment, a range of services, and 24-hour care without the need for an appointment, and one which some patients feel is best suited to their healthcare needs (Coster et al., 2017).

2.3.3 Demand for paediatric emergency care in the UK

With a steady increase in children's ED attendances being seen over the last ten years (Royal College of Paediatrics and Child Health., 2012, Burger et al., 2016), it is also important to understand the reasons for paediatric ED use. Patterns of ED attendance in paediatric populations need to be examined separately to those of adult patients, as children have different pathology and healthcare needs to adults and are mostly reliant on their parents or caregivers to manage their healthcare (Beattie et al., 2001). A large proportion of attendances to EDs for paediatric care have been found to be for minor injuries and illness, and most parents self-refer for these types of presentations (Hendry et al., 2005, Viner et al., 2017). For children who require emergency admission, babies and young children (<5 years) are at highest risk of admission (Purdy, 2010).

Numerous reasons for the increased use of EDs by parents for their children have been proposed. These included parental worry, the perceived advantages of seeing specialist doctors in the ED, the pressures of social networks and parents' lack of confidence, and low health literacy (Holden et al., 2017). Changes to the support available to parents, with fewer health visitors and a lack of traditional support offered by extended families, are also thought to be contributing factors (Heys et al., 2014). Where specific paediatric EDs exist, parents are thought to be more inclined to attend the ED prior to consulting a general practitioner (GP) (Hendry et al., 2005). GPs' perceived lack of confidence in treating children, and higher expectations from parents, may also increase the use of EDs for minor injuries and illness (Hendry et al., 2005). As with adults' use of EDs, deprivation is a strong predictive factor in children's ED attendances (Kossarova, 2017, Rudge et al., 2013). It has been suggested that deprivation levels are associated with the higher use of EDs for minor injuries and illness, although the mechanisms through which this association plays out are relatively poorly understood (Beattie et al., 2001). Although apparently unsustainable, the pressures facing EDs are set to continue as some groups of the population, historically known as high users of the ED, continue to show patterns of higher use (Phillips et al., 2019).

2.4 The implications of increased ED attendance and acute admissions

Increasing ED attendances and admissions have widespread implications for patients, EDs and for the acute trust¹, including: ED crowding, longer patient waiting times and increased service costs (Coster et al., 2017). Firstly, when an ED does not have the capacity or capability to manage a greater inflow of patients, and the hospital as a whole does not have the capacity to manage the flow of admissions, the department becomes crowded (Morris et al., 2012). ED crowding has been recognised as a serious global problem with numerous adverse consequences, including: increased in-patient mortality, poor patient experience, and greater proportions of patients leaving the ED without being seen (Morris et al., 2012). At the organisational level, high in-patient bed occupancy rates can result in trusts struggling to manage increasing emergency admissions-thereby reducing the capacity of the ED and affecting the performance of the ED and the acute trust (Blunt, 2014, The Kings Fund, 2018).

¹ An acute trust is an NHS trust that provides secondary health services within the NHS. Northern Devon Healthcare NHS Trust. 2019. *Definitions* [Online]. Available: <https://www.northdevonhealth.nhs.uk/have-your-say/current-consultations-and-engagement-opportunities/successregime/acute-services-review/definitions/>.

It is clear that growing pressure is being placed on EDs in the UK and this has been described as unsustainable both by policy-makers and practitioners. The reasons for the increasing use of these services among both the adult and paediatric populations are numerous and varied and driven in a large part by demographic change. Increasing attendance at EDs, increasing emergency admissions and ED crowding driven by increased demand for services and changes in patient demographics highlight the challenges faced by EDs and the need for better solutions. What is clear is that different patient groups use EDs differently. To manage increasing demand, it is important to understand who service users are, how they use services, and the reasons for these patterns of service utilization.

Recent immigrants are one group of patients who have been described, by key stakeholders within the urgent and emergency care system, as higher users of EDs in the UK (O'Cathain et al., 2014). Evidenced reasons include: poor understanding of the NHS and how to navigate it; poorer access to primary care; and communication barriers (O'Cathain et al., 2014). Immigrants are also one patient group, among others, who have been blamed for breaches in the four-hour waiting-time target in EDs (Nicholl and Mason, 2013). These reports suggest that migrant patients may be perceived to place an additional burden on the emergency services. Yet, despite rapid population growth in the UK, and a demographically changing population, there have been few attempts to collate and synthesise evidence on migrants' use of the ED, or to analyse their use. The extent to which international migrants create additional pressure on EDs in the UK is widely debated.

2.5 Migration

Migration may be defined as: "The movement of people, either across an international border, or within a country, including refugees, displaced persons, economic migrants, and persons moving for other purposes, including family reunifications" p.87 (Johnson et al., 2019). Throughout history humans have migrated - be this international migration (across countries) or regional movement within countries. Migration is a dynamic process over the life course and can be either temporary or permanent and made for various reasons (Hagen-Zanker, 2008, Abubakar et al., 2018, Gushulak et al., 2010). People's decisions to move may be influenced by globalization and economic incentives, social networks, political upheaval, climate change, armed conflict and fear of persecution (Hagen-Zanker, 2008). Over time, the process of migration has changed considerably, with modern-day migration (with the exception of the journeys of undocumented

migrants) being seen as comparatively easy in comparison to the journeys undertaken by early migrant populations (Bhopal, 2014). The increasing use of air travel, instead of long overland and sea journeys, has been a key factor that has made migration easier, and less hazardous (Bhopal, 2014). As migration has increased globally, communities have become more diverse as new arrivals have a range of backgrounds, countries of origin, migration experience, culture and ethnicity, levels of education, rights and entitlements, and varying levels of vulnerability (Phillimore et al., 2019).

2.5.1 Migration to the UK

Migration is a consistent feature of UK history. For the year ending December 2018, net migration in the UK was estimated to be 258,000 with an estimated 602,000 people immigrating to the UK during this period (Office for National Statistics, 2019d). It is important to note that within the UK there is no single source that is able to measure the migratory movements of all people (Office for National Statistics, 2018b). Migration statistics are derived from different sources of data which measure different things in different ways, and as migration is dynamic process, there is some uncertainty about the accuracy of these point-in-time migration measures (Sumption and Vargas-Silva, 2019, Office for National Statistics, 2019g). The latest population estimates for the UK suggest 14% of the UK's usually resident population were born abroad (Office for National Statistics, 2018c). Immigrants, directly and indirectly, make up the greatest contribution to this population growth: both directly due to new arrivals and indirectly due to their children being born in the UK (Office for National Statistics, 2019e).

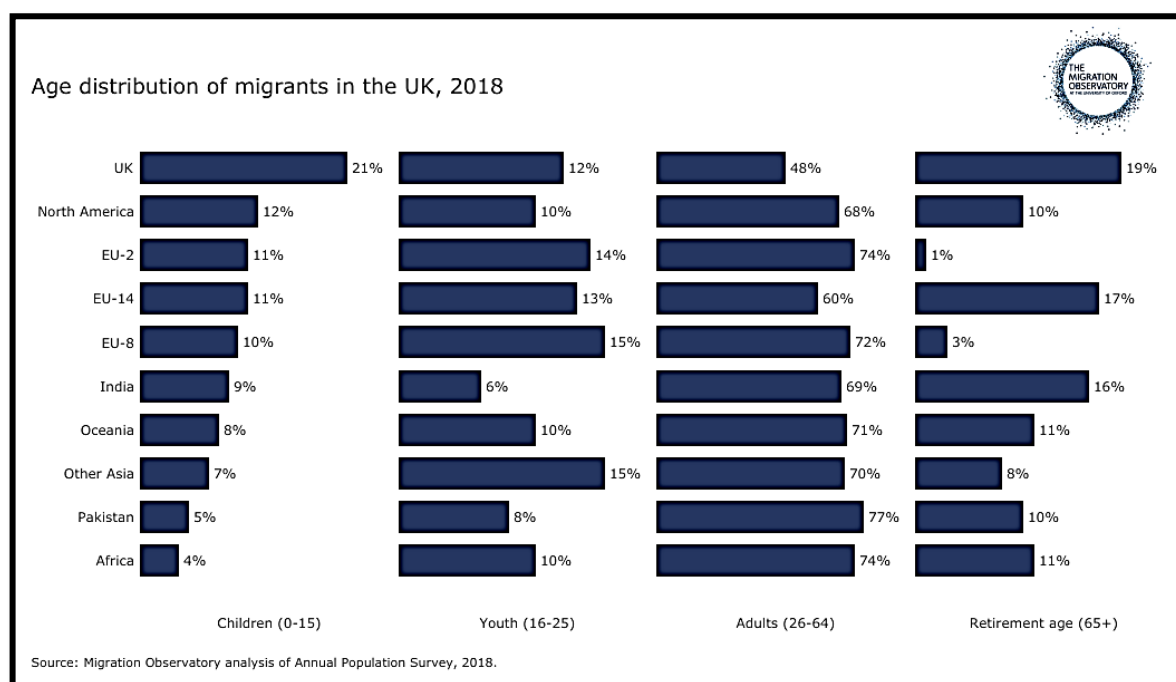
The entry of different migrant groups into the UK began at different times and has been driven by a combination of 'push' factors from their countries of birth as well as 'pull' factors into the host country. These 'push' and 'pull' factors are often related to economic conditions, political factors, cultural needs, education and family connections (Office for National Statistics, 2013). In addition, legislation within the UK, and changes to legislation, have affected migrants' choice to move (Office for National Statistics, 2013).

The majority of long-term migration into the UK is for the purposes of work and study (Office for National Statistics, 2019d). However, migration for the purposes of work has decreased since 2016 – largely due to a decrease in European Union (EU) immigrants (Office for National Statistics, 2019d). Although migration by EU citizens is decreasing, the most recent census estimates suggest that 2.68 million people born in other EU member countries were living in the UK in

March 2011 (Office for National Statistics, 2013). Additional reasons for long-term immigration include accompanying or joining others; returning to live at home; and asylum. The UK granted asylum to 17,304 people for the year ending March 2019 (Office for National Statistics, 2019d). Although this remains a relatively low proportion of new arrivals to the UK, the number has increased since the previous year (Office for National Statistics, 2019d).

The demographic profile of migrants in the UK differs from that of the UK born-population. Migrants are more likely to be adults (aged 26-64) and less likely to be children or retirees when compared to the UK-born population (Vargas-Silva and Rienzo, 2019). In 2018 nearly 69% of migrants to the UK were between the ages of 26-64, compared to 48% of the UK born population (See Figure 3) (Vargas-Silva and Rienzo, 2019).

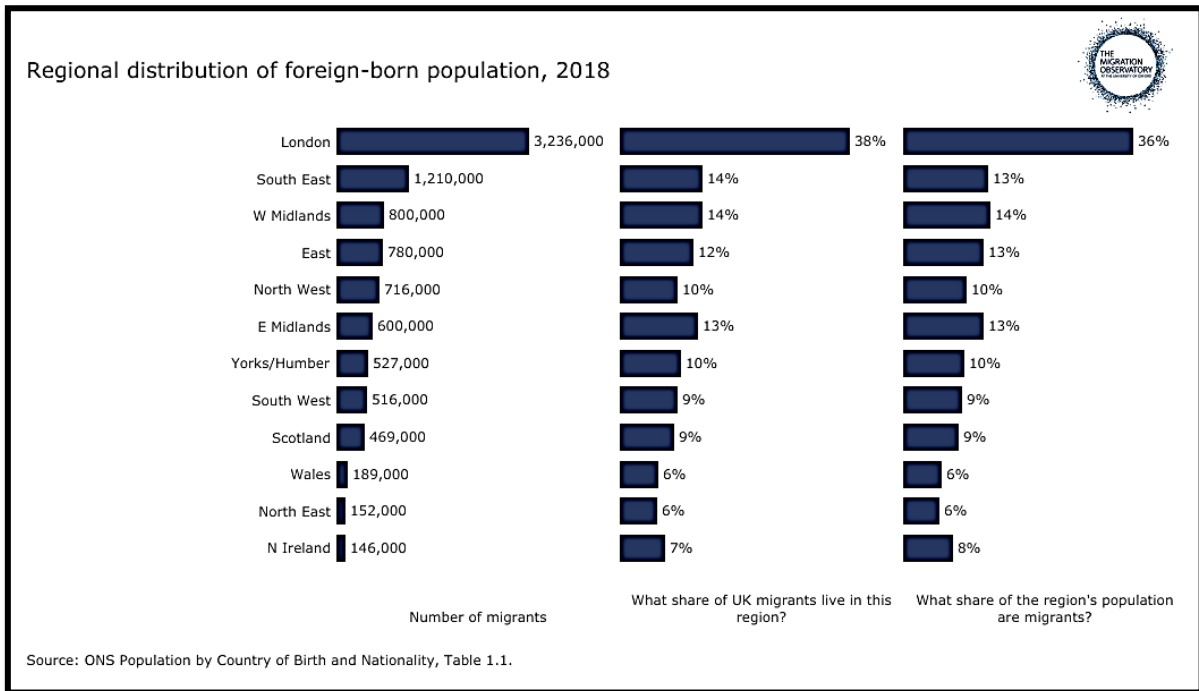
Figure 3: Age distribution of migrants in the UK, 2018



Source: Rienzo, C and Vargas-Silva, C. "Migrants in the UK: An Overview", Migration Observatory briefing, COMPAS, University of Oxford, October 2019

The distribution of migrants across the UK varies by region. The highest concentration of migrants can be found in London (about a third), while Northern Ireland hosts the lowest foreign-born population (Kone, 2018). Within England, the regions with the highest proportion of migrants are the West Midlands (13.8%) and the South East (13.4%). Approximately 10% of the population living in the Yorkshire and Humber region are foreign born (See Figure 4) (Sturge, 2019, Vargas-Silva and Rienzo, 2019).

Figure 4: Regional distribution of UK foreign-born population, 2018



Source: Rienzo, C and Vargas-Silva, C. "Migrants in the UK: An Overview", Migration Observatory briefing, COMPAS, University of Oxford, October 2019

It is clear that the UK population is constantly undergoing demographic change and that the number of migrants in the UK is substantial. With high rates of immigration into the UK it may be expected that migrant populations may have different healthcare needs and that an increasing number of people would create an increased need for public services, which would include urgent and emergency care provided by the NHS.

2.6 Migrant health and healthcare needs

Migration, migration-related terminology, and how migration affects health, are variously labelled and defined in the literature. This creates complexity in understanding this field. Furthermore, many countries in Europe often do not identify people on the basis of their migration status in their medical files or recording systems. Where data on migrant health are available, it is difficult to use these to make generalisations about the health of migrants, largely due to the diversity of migrants within populations in terms of: age, sex, country of origin, destination country, health conditions, socioeconomic status and the type of migration experienced (World Health Organization Regional Office for Europe, 2010). Much of the work around migrant health also compares the needs of migrants to those of the host population and in many cases, where their

needs are seen to differ and they require services that are not normally offered, migrants are perceived as being a burden to the healthcare system (Spencer and Cooper, 2006).

Migrant health is affected by: country of origin; means of transport; where and how the migrant lives in the host society; and the policies regarding migrants and migrant health in their host country. The act of migration is more complicated than a simple move from point A to point B. Zimmerman et al., 2011, describe five phases of immigration (pre-departure, travel, destination, interception and return) during which migrants will face varied health exposures and risks. The migratory journey for regular migrants may be well planned, safe and relatively stress free. In contrast, the journey faced by irregular migrants is often long and dangerous, which can have detrimental short and long term consequences on their physical and mental health (Davies et al., 2010).

Societal and individual level inequalities further affect the health of migrants (Gushulak et al., 2009). Different migrant groups have differing levels of risk of illness and differing health outcomes (Gushulak et al., 2009). Within the broad term of 'migrants' a number of migrant populations exist: asylum-seekers and refugees; long and short-term migrants; students; migrant workers; legal and illegal migrants; and victims of trafficking. Each of these sub-populations of 'migrants' will have different needs, including healthcare needs, which need consideration. The general health of migrants is often measured through self-reported measures, the findings from which often point towards lower levels of health for these groups, although many of these findings disappear when socio-economic status is controlled for (World Health Organization Regional Office for Europe, 2010).

Health conditions may differ between migrants and non-migrants. As an example, infectious diseases or 'unusual conditions' may be more prevalent in recently arrived migrants or among those who have recently returned from visiting their country of origin (Gushulak et al., 2010, World Health Organization Regional Office for Europe, 2010). The higher prevalence of communicable diseases among some migrant populations may be due to the higher prevalence of these conditions in the country of origin or due the conditions experienced in the migratory journey (Gushulak et al., 2010, Abubakar et al., 2018). At the same time, on arrival at their destination, evidence suggests that regular migrants tend to be healthier than their non-migrant counterparts; this is known as the healthy migrant effect (Urquia and Gagnon, 2011). Although this effect is seen initially, for some migrants their health deteriorates over time and this 'healthy migrant' effect diminishes (Urquia and Gagnon, 2011). Migrant mothers have, for example, been

found to report worsening health and depression with increasing length of residence in the UK (Jayaweera and Quigley, 2010). For some migrants their health may deteriorate after arrival as a result of their poor living conditions, poor nutrition and limited access to healthcare services in the receiving country (Spencer and Cooper, 2006). Newly arriving immigrants may also face social isolation, poverty, and lack of access to health and social services, and this may increase their susceptibility to poor health outcomes (Davies et al., 2010). Furthermore, some migrants may choose to adopt the lifestyles of the host population, such as smoking or consuming alcohol, when becoming integrated into their new communities and this too can have negative consequences on their health after arrival (Spencer and Cooper, 2006). While the links between migrant health and integration appear important, these links have not been well explored in the literature (Spencer and Cooper, 2006).

Traditionally, the public health focus on migrants has been on the risks and threats that mobile populations pose by way of communicable disease transmission, particularly aimed at protecting the host population (Gushulak and MacPherson, 2006, Abubakar et al., 2018). While global communicable disease outbreaks evidence the important public health threat that mobile populations pose in terms of infectious disease transmission, it must be noted that the epidemiology of chronic non-communicable diseases is also being affected by migration. Changes in non-communicable disease epidemiology impact public health promotion initiatives as well as the preparedness of health services for managing these epidemiological changes (Gushulak et al., 2009).

Non-communicable disease incidence rates differ, in some instances, between migrants and the normally resident population. For some migrants, particularly those who are refugees or asylum seekers, mental health outcomes appear worse than for native-born populations (Steel et al., 2009). Poor mental health among some migrants may relate to experiences during the migration process, increased vulnerability within a new society due differences in culture, language and unemployment that impact on health and wellbeing (Gushulak et al., 2010). Cardiovascular disease rates have also been seen to be higher amongst some migrant groups (World Health Organization Regional Office for Europe, 2010). In addition, some migrants have been found to be especially vulnerable to type 2 diabetes and obesity (World Health Organization Regional Office for Europe, 2010). Some of the driving factors behind the increased incidence of obesity, cardiovascular disease and diabetes include the transition to a western diet and reduced activity levels (World Health Organization Regional Office for Europe, 2010). This is an example of acculturation in which individuals adopt the norms, values and behaviours of the receiving society

and this drives changes in migrant health. Female migrants may also be at greater risk of reproductive and maternal health outcomes (Bollini et al., 2009) and can be at increased risk of sexual abuse and exploitation (Gushulak et al., 2009).

A further example of where health conditions may differ between migrants and non-migrants, relates to migrant workers. Migrant workers, who are often employed in low-skilled jobs are at high risk of occupational injury and ill health (Steel et al., 2009). Although studies comparing health outcomes between migrant and non-migrant workers are scarce, there is some evidence to suggest that migrant workers are at higher risk of injury and occupational hazard exposure than their non-migrant counterparts (Davies et al., 2010, European Agency for Safety and Health at Work, 2007).

When seeking to understand the health of migrant populations, it is important to note that much of the available literature focuses on the health of adult migrants, and the health of migrant children is under-researched. Migrant children, while having largely the same developmental requirements and many of the same healthcare needs as non-migrant children, are likely to have some specific and different healthcare needs (Jaeger et al., 2012). There is evidence to suggest that some migrant children, although variously defined in the literature and constituting a diverse group, do in fact, have specific healthcare needs. Some children of migrant background, including both those who have migrated and those born to migrant parents, have been found to have an increased prevalence of mental health conditions (Hölling et al., 2008); increased prevalence of some infectious diseases; higher odds of being obese; increased dental cavities; an increased risk of hospitalization; and different patterns of congenital disease as compared to non-migrant children (Jaeger et al., 2012). These disparities in health outcomes between migrant and non-migrant children may result from differing vulnerabilities within different migrant populations and are thought to be influenced by the child's, or their parent's, country of origin, the process of migration as well as factors within the host country (Jaeger et al., 2012). Some migrant children, particularly those of asylum seeking families, have been identified as having very specific and acute health care needs, particularly in relation to infectious diseases as a result of the prevalence of infectious diseases in their home countries as well as greater psychological health needs (Jaeger et al., 2012). Asylum seeking children have also been found to be over represented in studies of psychological health needs due to the psychosocial stressors of the migration process (Jaeger et al., 2012).

Differences in health outcomes between people who have migrated, and those who have not, may also be influenced by ethnic and cultural differences. The concepts of ethnicity and migrant status are subtly different and yet there may be some overlap. Ethnicity has been defined by Bhopal, 2004, as “the social group a person belongs to, and either identifies with or is identified with by others, as a result of a mix of cultural and other factors including language, diet, religion, ancestry, and physical features traditionally associated with race”. Thus, ethnicity is self-defined and may change over time. Migrant status, in comparison, can be measured objectively by a person’s country of birth (Bhopal, 2014). The categories of ethnicity and migration often overlap as some migrants will share the same ethnicity as the majority population in the host country and in some countries ethnic minority groups will be formed as a result of immigration (World Health Organization Regional Office for Europe, 2010). What is clear is that ethnicity, is not a good proxy for migrant status. In the UK it has been found that fewer than 50% of people categorized as belonging to an ethnic group are also considered ‘migrants’ (Steventon and Bardsley, 2011).

In many countries the focus of health research is on ethnic differences in health outcomes driven by concerns in inequities in health between ethnic groups, while migrant status and how it influences health is less well studied (World Health Organization Regional Office for Europe, 2010). Migrant status and ethnicity are both important ways of differentiating sub-populations and this distinction is often necessary to understand the health and health-care needs of these populations (Bhopal, 2014, Salway et al., 2020). The health beliefs and practices that come about as a product of people’s ethnicity, as well as their migration background, may influence both migrant health and health service utilization. Ethnic minorities often face discrimination and marginalisation and while ethnicity may create inequalities in health and healthcare, these inequalities may be exaggerated by a person’s migrant status (Bhopal, 2007).

It is clear that health status and healthcare needs may differ between migrants and non-migrants and that this may influence patterns of healthcare utilization. This PhD will focus on migrant status and how this may affect ED utilization, while ensuring that consideration is given to ethnicity and how this may relate to study findings.

2.7 Providing healthcare to migrant populations

When dealing with large, and increasing, numbers of migrant patients, managing their healthcare needs and ensuring equitable access to services can be a challenge for any host country.

International migrants are entitled to the same healthcare services as those provided to UK residents once they become 'ordinarily resident'², and all persons are entitled to emergency care services from the time of their entry into the UK (Public Health England, 2019). Migrants' access to, and utilization of, healthcare services (including EDs) may differ from that of non-migrants due to factors such as healthcare needs, health seeking behaviour, cultural and language differences, as well as the time since migrants' arrival in the host country (Norredam et al., 2010).

Evidence suggests that migrants may be poorly served in healthcare services which are not designed to cater for their differing needs, be these language, cultural or social (World Health Organization Regional Office for Europe, 2010). Even for countries with long-standing immigration patterns in Europe, providing secure and equitable access to health services appears to be difficult (Gushulak et al., 2010). Irregular migrants (people not complying with national regulations of entry, stay or employment), who are often excluded from health and social services while working and living in high risk environments, can be seen to be in a particularly vulnerable position (Rechel et al., 2013). Barriers in access to healthcare for migrants include those that are system-related (accessibility of the service, language difficulties, services offered, attitudes and skills of providers) and patient-related factors (culture, relative newness to the country, and understanding of the service and entitlement to such services). These barriers affect the availability, accessibility, acceptability, and quality of healthcare services for migrants.

As yet, the impact of increased population growth on healthcare service demand and utilization in the UK, and across Europe, is unclear. Data on migrants' use of healthcare services in the EU is inadequate and incomplete, which prevents comparisons across health systems, limits our ability to identify access barriers to healthcare, and prevents the identification of high risk groups for prevention interventions (Nielsen et al., 2009). In 2008-09, registry data on healthcare utilization, which indicates migrant status at a regional or national level, was only available in 11 of the 27 EU

² 'Ordinary residence is established if there is a regular habitual mode of life in a particular place for the time being, whether of short or long duration, the continuity of which has persisted apart from temporary or occasional absences.' Home Office. 2017. *Nationality policy: assessing ordinary residence. Version 2.0.* [Online]. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/655489/Nationality-policy-assessing-ordinary-residence-v2.0EXT.pdf.

member states (Nielsen et al., 2009). The UK was reported to have no available registers that could identify migrants' healthcare utilization (Nielsen et al., 2009).

Given the potential differences in the healthcare needs among migrant populations (outlined in section 2.6), clinicians in the NHS, including EDs, are likely to be treating a diverse group of adult and paediatric migrant patients presenting with communicable and non-communicable diseases and injury. In some instances migrants may present with conditions that are unfamiliar to healthcare services and these will often be among recently arrived immigrants or those that have just visited their country of origin (World Health Organization Regional Office for Europe, 2010). Where prevalence differences exist between migrant and host populations, they are likely to require health systems and services to respond to adverse health outcomes that are beyond their normal planning (Gushulak et al., 2009). Understanding migration and estimated numbers of migrant patients is important in understanding the impact on society and the economy. Migrants, like all UK born citizens, require health and social services. In order to plan and monitor service delivery, and to allocate resources effectively, governments need a quantification of how many people are using, or may require, these services and how people access and use the services available to them.

2.8 Migrants' use of UK healthcare services – including the use of EDs

Data on migrants' use of primary and secondary care services are not routinely collected in the UK making it difficult to assess NHS service use by people born abroad (The Kings Fund, 2015). It has been hypothesised that migrants place increased demand on both primary and secondary healthcare services, although the evidence is conflicting. Steventon and Bardsley, 2011, found that migrants were less likely to be admitted to hospital when compared to existing UK residents. Migrants have also been found to be less likely to suffer from long-term health conditions (excluding those seeking asylum) (Giuntella et al., 2018a). In contrast, a report published by the Department of Health suggests that the number of migrants, who are not 'ordinarily resident' in the UK, accessing primary and secondary care services is creating a significant additional cost to these services (Prederi, 2013). Patients from Eastern Europe are a particular group who are reportedly creating significant challenges in service provision, largely due to the growing number of patients from these regions (Prederi, 2013). However, there are a number of caveats on the validity of the data used in this report published by the Department of Health, and it is important the findings, which only measure costs to the NHS, are not overstated (Hanefeld et al., 2013). It is

clear that with limited data, these findings are at best tentative. As migrant status is not routinely collected in healthcare services, the extent to which immigrants use NHS services is unclear (The Kings Fund, 2015).

The evidence around migrants' use of EDs in the UK in particular is lacking, and the limited evidence variously suggests that migrants may, or may not, be placing increased demand on EDs. A small amount of empirical evidence exists and has identified migrants to be overrepresented at a London ED (Hargreaves et al., 2006). Further evidence identified an increasing number of Polish migrant workers to be attending an ED in Telford (Leaman et al., 2006). There is also a small amount of qualitative research in which healthcare providers perceive migrants, and overseas visitors, to frequent EDs for their healthcare needs (O'Cathain et al., 2014). While, on the other hand, immigrants have been found to have no effect on ED waiting times in England, due to the fact that recent immigrants are generally healthy and are unlikely to require these services (Giuntella et al., 2018b). These contradictory findings highlight the complexity of this field and the lack of understanding of migrants' use of EDs, the extent to which they use services, and the factors influencing service use. Furthermore, migrants' use of services is likely to vary across areas of the UK, depending on the number and type of immigrants (The Kings Fund, 2015), and the existing evidence cannot be seen to be generalizable to other regions of the UK.

As migration to the UK continues to increase, it may be expected that additional pressure will be placed on EDs as a result of population growth and increased service demand, as well as due to altered patterns of healthcare utilization. Understanding the emergency care needs, and associated emergency service utilization, of the migrant population is important to ensure that the health system is designed to meet the needs of these patients and to ensure appropriate use of EDs and the emergency care system as a whole. As migrants should have equal access to emergency services, migrants' needs should feature in service planning and delivery.

A clear gap exists in current literature interrogating migrants' use of the ED and whether that usage differs in relation to different categorizations of migrants (long-term versus short-term, or EU versus non-EU, for example). No previous review (either general or systematic) has examined differences in use of EDs between immigrants as compared to non-immigrant groups in Europe.

2.9 Migrant terminology

There is no single agreed definition of a 'migrant' within the international literature and the term is often used variously. Differing terminology for 'migrants', and how 'migrants' may be grouped, not only presents a challenge to researchers in their attempts to explain differences in health and healthcare utilization between migrants and non-migrants, but also impacts on how people, including the public, understand and interpret findings.

Table 1 presents some important migration terms that have been identified in reviewing the literature; some of which have been covered in this chapter. While this glossary of migration terms is not comprehensive, the list illustrates the diversity within the term 'migrant' as evidenced by the number of ways migrating people can be grouped. Deciding on how to define 'migrants' for this PhD has involved much reflection, discussion and review of the literature.

Table 1: Selected terminology of migration and migrant definitions used in literature

Term	Example definition
Migration	The movement of people, either across an international border, or within a country, including refugees, displaced persons, economic migrants, and persons moving for other purposes, including family reunifications (Johnson et al., 2019).
Superdiversity	A phrase used to indicate the increasing numbers of ways in which people may be categorised, usually by reference to their state/stage or 'cohort' of migration or nationality (Johnson et al., 2019).
Migrant	A person who moves away from his or her place of usual residence, whether within a country or across and international border, temporarily or permanently, and for a variety of reasons (International Organization for Migration, 2019).
International migrant	Any person who is outside a State of which he or she is a citizen or national, or, in the case of a stateless person, his or her State of birth or habitual residence. Includes migrants who intend to mover permanently or temporarily, and those who move in a regular or documented manner as well as migrants in irregular situations (International Organization for Migration, 2019).
Country of origin	The country that is a source of a migrant or migratory flows (regular or irregular)(Johnson et al., 2019).
Circular migration	The fluid movement of people between countries, including temporary or long-term movement, if voluntary (Johnson et al., 2019).
Forced migration	A migratory movement in which an element of coercion exists, including threat to life and livelihood, whether arising from natural or man-made causes (Johnson et al., 2019).
Selected examples of sub- grouping of people within migrant populations	
Migrant worker	A person who is to be engaged, is engaged or has been engaged in a remunerated activity in a State of which he or she is not a national (International Organization for Migration, 2019).
Regular migrant	Migration that occurs in compliance with the laws of the country of origin, transit and destination (International Organization for Migration, 2019).
Irregular migrant	A person who enters a country, usually in search of employment, without the necessary documents and permits (UNESCO, 2017).
Short term migrant	A person who changes his or her place of usual residence for more than three months but less than a year (12 months). Except in cases where the movement to that country is for purposes of recreation, holiday, visits to friends or relatives, business or medical treatment (International Organization for Migration, 2019).
Long-term migrant	A person who moves to a country other than that of his or her usual residence for a period of at least one year, so that the new country of destination effectively becomes his or her new country of residence (International Organization for Migration, 2019).
Refugee	A person who, owing to a well-founded fear of persecution for reasons of race, religion, nationality, membership of a particular social group or political opinions, is living outside the country of his nationality (Johnson et al., 2019).
Asylum seeker	An individual who is seeking international protection (International Organization for Migration, 2019).
Undocumented migrant	A non-national who enters or stays in a country with the appropriate documentation (International Organization for Migration, 2019).
Family members	People sharing ties joining people who have already entered an immigration country (UNESCO, 2017).

A migrant, according to the International Organization for Migration (IOM) 2019, is a person who moves away from his or her place of usual residence, whether within a country or across an international border, temporarily or permanently, and for a variety of reasons. Within this broad 'umbrella term' a number of well-defined categories of people exist, such as migrant workers; persons whose particular types of movements are legally defined, such as smuggled migrants; as

well as those whose status or means of movement are not specifically defined under international law, such as international students (International Organization for Migration, 2019). Many countries distinguish between different migrant populations in their policies and statistics, and given that there are no internationally agreed definitions for migration, the choice of categorisations between countries differs (UNESCO, 2017).

Migrants who have travelled across an international border can be defined as international migrants. In defining an international migrant the IOM includes not only those whose country of birth differs from that of their residence, but also individuals whose nationality may differ from their country of residence (International Organization for Migration, 2019). As nationality is not a static concept this definition suggests that a person's migrant status could change over time once citizenship is gained. Categorising migrants using nationality may not completely capture demographic differences between migrant and non-migrant populations as many migration-related social and economic factors may persist long after a person has gained nationality of a host country (Gushulak et al., 2010). International migrants may settle in the host country; they may move on to another country (transit migrants); or they may be considered 'circular migrants' who move back and forth between home and host country (World Health Organization Regional Office for Europe, 2010). Thus patterns of movement by people, in or out of their communities, can also be used to categorise people within migrant populations.

International migrants can be further categorised according to their countries of origin or duration of stay in a host country. The countries of origin of migrants globally are diverse and are typically associated with different types of migration. A person's country of origin will ultimately affect their ease of entry into their destination country; dependent on exit and host country legislation. Refugees and asylum seekers typically originate from areas of conflict and political unrest while unskilled labour migrants will often immigrate from a lower or middle income country (World Health Organization Regional Office for Europe, 2010). In the UK categorisations by region of origin includes the division of migrants according to whether they are EU citizens or non-EU citizens. EU migrants come from one of 27 countries belonging to the EU which is an economic and political union that allows the free flow of people, capital, goods and services between any of the member states (UK Government, 2020).

Migrants can be grouped by their legal status, reason for migration, circumstances of migration, for example: refugees and asylum seekers, labour migrants, family members of existing migrants, victims of trafficking, and irregular migrants, and, in some countries, international students

(World Health Organization Regional Office for Europe, 2010). Many migrants are considered to be 'regular migrants' whose migration complies with the laws of the country of origin and destination (International Organization for Migration, 2019). Irregular migrants are considered as those who are non-compliant with national regulations for entry, stay or employment (International Organization for Migration, 2019). Refused asylum seekers, 'over-stayers' and undocumented migrants are in this group. 'Over stayers' are those people who have remained in a country beyond the period for which entry or stay was granted (International Organization for Migration, 2019). These people are considered to be particularly vulnerable as they lack access to health and social services and are simultaneously exposed to high-risk living and working conditions (Rechel et al., 2013).

It is clear that within migrant populations, heterogeneous groups exist in terms of background and migration experience. Given the complexity of migration, and the realities of peoples' mobility, it is difficult to categorise individuals into any of these distinct categories as they may be categorised into several different categories or may move between categories (OHCHR, 2014). Even within migrant populations where people share the same national origins, there is likely to be great diversity in terms of socio-demographic, socio-economic and migration history, and this may result in varying strengths and vulnerabilities. Yet, analysing healthcare data by migrant status is in itself important, in order to measure health inequalities, and to develop and monitor health interventions that aim to reduce these inequalities (Bhopal, 2014, Abubakar et al., 2018). Defining and understanding healthcare utilization by migrants is important if one is to measure the impact on health systems and to enable services and interventions to be tailored to improve the health outcomes of these populations (World Health Organization, 2010). This highlights the need for studies that look particularly at migrant health and healthcare utilization by migrants.

It is important that migrants are classified accurately in research, as using proxy measures can lead to misclassification (Prederi, 2013). Previous research in the UK has tended to focus on the differences in health between different ethnic groups rather than on what effect being born outside the UK and undertaking a migration journey has on health and access to services. While ethnic disparities in health, and healthcare utilization, in the UK have been extensively studied, measuring a patient's ethnicity, as a proxy for migrant status, as discussed in section 2.6 is inaccurate.

For this PhD project, I chose to use country of birth as the determinant of migrant status. A 'migrant' is defined as someone whose country of birth was not in the UK. Country of birth is an

objective measure of migrant status and one which is either known by a person or is recorded in documentation, and by definition anyone born abroad has migrated (Bhopal, 2014). This PhD seeks to understand whether being a migrant may influence patterns of ED utilization – particularly ED utilization by migrant parents for their children. Children may have travelled either unaccompanied or with their parents to a new country or they may have been born in the UK to migrant parents. There is a strong view among some academics that children of migrants, who themselves are not migrants, should not be called migrant children but rather referred to as second, third or fourth-generation migrants (Bhopal, 2014). These children are nationals of the country under study. In this PhD maternal migration status has been used to identify children born to migrant mothers.

This research recognises the diversity within the term ‘migrant’ while seeking to identify the different patterns of ED utilization between, and within, migrant groups. While I use ‘migrants’ as an umbrella term, where more specific distinctions are necessary I will refer in the text to specified migrant groups. The comparison group are non-migrants, defined as those who were UK born (Table 2).

Table 2: Definitions of ‘migrant’ and ‘non-migrant’ used in this PhD

Study definition	Migration history
Migrant	Country of birth, not in the UK
Non-migrant	Country of birth, UK

2.10 Chapter summary

- Any person in the UK is currently entitled to free NHS urgent and emergency care.
- EDs in the UK are facing increasing pressure due to increasing service demand, complex patient presentations, an ageing population, as well as health system factors.
- Migrants are one population who have been perceived to place an additional burden on the UK's emergency services. Yet, there have been few attempts to collate and synthesise evidence on migrants' use of the ED, or to analyse their use.
- Health conditions, health needs and patterns of healthcare utilization may differ between migrants and non-migrants.
- Given the high rates of net migration into the UK, coupled with increasing pressure on EDs, it is important to understand how migrant patients are utilizing EDs in the UK.
- Research that examines ED utilization by migrants, as compared to non-migrants, is important for development of our understanding of whether ED services are accessible to migrant patients and whether formal and informal barriers to care may be preventing them from realising access.
- No previous systematic review has synthesized evidence of migrant, as compared to non-migrant, use of EDs across Europe.

Chapter 3. Systematic review (Paper 1)

This chapter presents the systematic review undertaken for my PhD which is presented in the format of a manuscript for a scientific journal. This paper, published in *The European Journal of Public Health*, was the first publication to arise from this PhD and synthesizes available literature relating to international migrants' utilization of emergency departments (EDs) in European Economic Area (EEA) countries as compared to that of non-migrants. The primary contribution to the design, data collection, data extraction, synthesis, and manuscript preparation was made by me as the first author. The contribution of each of the co-authors can be found in Appendix 1.

Due to the word count limitations imposed by journals, the full details of this systematic review had to be condensed. For the purposes of the PhD, additional detail on the methods used in this review have been included in Appendix 3 and 4. It is important to note that due to word count limitations, the published systematic review did not report on all the outcome measures covered by the review. The data for two additional outcome measures that were extracted, and a brief commentary on these findings, are presented in Appendix 3.

The following appendices have been provided to further support the methodology used in this systematic review:

Appendix 3: Additional detail on the rationale for the eligibility criteria for study inclusion, development of the search strategy, data collection processes, and quality assessment. The search strategy is also available in a published format, as online supplementary material supporting the review.

Appendix 4 includes:

- Tables provided as online supplementary information in publication.
- Example data extraction form used in this review.
- Example quality assessment form used in this review.
- Summary table of quality assessment for studies included in systematic review.

3.1 Rationale for undertaking a systematic review

There is limited evidence on migrants' use of EDs across Europe, and where evidence exists this appears to be conflicting. An up-to-date systematic review that describes migrants' use of EDs, and examines whether that use is different in relation to different categorizations of migrants is needed to guide decision making and further research. Systematic reviews are an effective way of scrutinizing all available research evidence in such a way as to provide a balanced and impartial summary of current evidence. In particular, systematic reviews can determine whether study findings are generalizable across populations and whether the findings vary by subsets of the population (Mulrow, 1994). These factors are particularly important to consider in assessing evidence on migrants' use of EDs among different populations, in varying settings and when considering the great diversity within migrant sub-groups.

3.2 Paper 1: International migrants' use of emergency departments in Europe compared to non-migrants' use: A systematic review

The manuscript presented below is a pre-copy-edited, author-produced PDF of an article accepted for publication in *The European Journal of Public Health* following peer review. The version of record:

Credé, S., Such, E. and Mason, S. International migrants' use of emergency departments in Europe compared with non-migrants' use: a systematic review, *European Journal of Public Health*, Volume 28, Issue 1, February 2018, Pages 61–73

is available online at:

<https://academic.oup.com/eurpub/article/doi/10.1093/eurpub/ckx057/3828489/International-migrants-use-of-emergency?guestAccessKey=6646877a-7f79-46b8-8b05-22948883c4a3>

In reporting this systematic review the criteria outlined in the PRISMA checklist have been followed, these are based on the PRISMA statement which aims to assist authors in improving the quality of review reporting (Moher et al., 2009).

ABSTRACT

Background: International migration across Europe is increasing. High rates of net migration may be expected to increase pressure on healthcare services, including emergency services. However, the extent to which immigration creates additional pressure on emergency departments (EDs) is widely debated. This review synthesizes the evidence relating to international migrants' use of EDs in European Economic Area (EEA) countries as compared to that of non-migrants.

Methods: MEDLINE, EMBASE, CINAHL, The Cochrane Library and The Web of Science were searched for the years 2000-2016. Studies reporting on emergency department service utilization by international immigrants, as compared to non-migrants, were eligible for inclusion. Included studies were restricted to those conducted in EEA countries and English language publications only.

Results: 22 papers (from six host countries) were included. 13/18 papers reported higher volume of ED service use by immigrants, or some immigrant sub-groups. Migrants were seen to be significantly more likely to present to the ED during unsocial hours and more likely than non-migrants to use the ED for low-acuity presentations. Differences in presenting conditions were seen in 4/7 papers; notably a higher rate of obstetric and gynaecology presentations among migrant women.

Conclusions: The principal finding of this review is that migrants utilize the ED more, and differently, to the native populations in EEA countries. The higher use of the ED for low-acuity presentations and the use of the ED during unsocial hours suggest that barriers to primary healthcare may be driving the higher use of these emergency services although further research is needed.

Key Words: Migrants, Emergency, Utilization, Europe, Healthcare

INTRODUCTION

The demand for emergency care in Europe has increased over the last few decades creating additional pressure on emergency departments (EDs) (Pines et al., 2011). This increased demand has coincided with rapid population change; in particular, high rates of international immigration into, and across, Europe. Higher rates of net migration and sustained levels of population growth may be expected to increase pressure on public services, although the extent to which international immigration is creating additional pressure on EDs is a topic of some debate. Some studies suggest that EDs are used more, and differently, by new migrants which may be as a result of unfamiliarity with the healthcare systems and difficulties accessing primary healthcare (PHC) services (Norredam et al., 2007, O'Cathain et al., 2014). However, little consistent evidence exists to quantify migrants' use of the ED or to analyse its origins. Furthermore, little is known about the emergency and urgent healthcare systems preparedness and responsiveness in dealing with the healthcare needs of migrant patients.

Migrants, like all citizens, require health and social services and one of the greatest challenges facing host countries lies in ensuring that healthcare services are equitable, accessible and able to meet the needs of diverse populations. Migrant populations are often healthier than the host population on arrival (Rechel et al., 2013), this phenomenon is often referred to as the 'healthy (im)migrant effect' (Urquia and Gagnon, 2011) and so generally do not have high healthcare needs. However, 'migrants' are a very diverse group and some migrant patients face particularly vulnerable circumstances (e.g. refugees and asylum seekers) or they may be undocumented and this may affect their health seeking practices. These factors, and others, make the process of establishing patterns and underlying reasons for migrants' use of ED and other healthcare services particularly challenging. The unique nature of the European Union (EU), allowing free movement of member citizens between countries, means that many challenges relating to population change are shared across the member states (Norredam et al., 2010). This is particularly acute in the contemporary context of conflict and instability around European borders. Migrant health, and the need to address any particular healthcare needs of migrants is increasingly being recognized (Rechel et al., 2013). However, without adequate monitoring procedures, many countries in Europe are unable to measure the healthcare needs and practices of migrants and it is difficult to establish the extent to which health services are accessible to migrant patients (Rechel et al., 2013). It is clear that a greater understanding of the healthcare needs of migrants and how they utilize emergency healthcare services, including EDs, in Europe is needed if we are to be able to

support and improve migrant health, manage healthcare costs and healthcare resources, and promote social and economic development (Gushulak et al., 2009).

Differences in healthcare use between migrants and non-migrants have been well documented (for example (Clough et al., 2013, Norredam et al., 2010)) although the results from these studies set in differing contexts, using differing methodologies and including differing migrant populations show a diverging picture of both higher, lower and equal levels of healthcare services use.

Analysis of differences in the use of emergency services, in particular, is lacking. A review looking at the use of somatic health services by migrants in Europe identified six papers which reported on emergency room use (Norredam et al., 2010). However, the findings from these studies differ and drawing conclusions about migrants' use of EDs, as compared to that of non-migrants, are difficult. Furthermore, this review focused only on volume of service utilization at an emergency room; understanding how, when, and for what clinical reasons migrants use EDs and whether this differs for non-migrants remains unknown.

Our review aimed to identify, and synthesize, available literature relating to international migrants' utilization of emergency departments in European Economic Area (EEA) countries as compared to that of non-migrants. The research question for this review was: *Are there differences in international migrants' use of emergency departments as compared to that of non-migrants in European Economic Area (EEA) countries?*

METHODS

The methods for undertaking this review were pre-specified and the protocol registered on PROSPERO (registration number: CRD42016037650).

Information sources and searches

Electronic databases of MEDLINE (via Ovid), EMBASE (via Ovid), CINAHL (EBSCO), The Cochrane Library and The Web of Science were searched in January 2016 using a pre-determined search strategy for the years 2000-2016 (current). Grey literature was searched using OpenGrey (March 2016). To enhance this search, supplementary search methods were employed, including: citation searching of key references, reference list checking of included papers and relevant systematic reviews, as well as hand-searching of key journals (*BMC Health Services Research*, *European Journal of Public Health*, and *Social Science and Medicine*) for the 6 months prior to the start of the database searches. The search was restricted to English language publications.

A highly sensitive search strategy using keywords and exploded MeSH terms was developed for Medline (available as supplementary material) and translated for the other databases.

Eligibility criteria

Studies that report on emergency department utilization by international immigrants were eligible for inclusion. To be eligible for inclusion, studies needed to report a definition of a 'migrant' that included: country of birth, citizenship or participant nationality. Studies were excluded if patients were classified by 'ethnicity' or in cases where ethnicity was used as a proxy for migrant status. The use of EDs by migrant adults or migrant parents for their children, irrespective of place of birth of the child, was eligible for inclusion. Studies reporting utilization of EDs by patients for specific conditions were excluded. All included studies had a comparison group of non-migrants or a population considered similar to the native population. Furthermore, the comparison group originated from the same source population as the migrant group.

We included studies that reported at least one outcome relating to: volume of ED service use; time of ED utilization; type of clinical presentation and 'appropriateness' of ED use (as defined by the study).

Studies set in emergency or acute care settings that are not integrated in a hospital setting, including emergency primary care services, or studies that report on use of these services (e.g. population surveys), were not eligible for inclusion. Finally, included studies were restricted to those conducted in European Economic Area (EEA) countries (including Switzerland).

Study selection

The initial database search, title and abstract screen and the full text review of articles were conducted by a single author (SC). A second reviewer (ES) reviewed papers that were initially included at the title and abstract screen but were excluded at full paper review. Where there was uncertainty or disagreement between the two reviewers this was resolved by discussion with a third reviewer (SM).

Data extraction and quality assessment

A single author (SC) extracted data onto a standardized and piloted data extraction form, and a random sample of 10% was extracted by a second author (ES). The following data were extracted

for each paper: author, year of publication, host country, study design, sample size, study population, definition of 'migrant', definition of 'control', outcomes, as well as potential confounders adjusted for in analysis. The full list of data items extracted is available on request. Quality assessment for the papers included in this review was undertaken using The National Institute for Health and Care Excellence's tool (adapted for this review): 'Quality appraisal checklist- quantitative studies reporting correlations and associations' (National Institute for Health and Clinical Excellence, 2012). Using this checklist the external and internal validity were assessed, according to key aspects of study design, to determine the overall study quality. Quality assessment was undertaken by SC and a second reviewer (ES) checked the quality assessment on a random sample of 20% of the included papers. Studies were not excluded from the review based on their quality, but study quality was considered in synthesizing the results and greater emphasis placed on the results of studies appraised to have higher internal and external validity. The final list of included studies was agreed by consensus with all study authors (SC, ES, SM).

Data synthesis and analysis

Study data were tabulated according to utilization of health services by the review outcomes of interest. Statistical meta-analysis of the included studies was not deemed to be appropriate due to the considerable heterogeneity between the studies. Using the data extracted from the studies, results of the quality assessment along with information provided in the text of the papers, a narrative synthesis of the available evidence was conducted.

RESULTS

The database searches yielded 3452 records, an additional 10 were identified through the supplementary search strategies. 2445 records were excluded during title and abstract screen and the full-texts of 63 papers were reviewed. 22 papers met the inclusion criteria and are included in this review (Figure 5).

Included studies

A summary of the main characteristics of the included studies are shown in Table 3 (more detail is available online in supplementary Tables (Appendix 4)). Papers were identified from six host countries with the majority of the papers reporting on studies conducted in Spain. Five of these used data from the Spanish Health Surveys; either from the 2003 survey, the 2006 survey or a combination of data from both surveys (Anton and Munoz de Bustillo, 2010, Carrasco-Garrido et

al., 2007, Carrasco-Garrido et al., 2009, Hernández-Quevedo and Jiménez-Rubio, 2009, Sanz et al., 2011). Just less than a third (7/22) of studies were conducted at a national level, while 15/22 were conducted at local or regional level. Fourteen studies were conducted within an ED setting, while the remaining eight report on patients' self-reported ED use.

The sample sizes (and number of migrants included) varied greatly between the studies. These ranged from a sample of 1082 (including 465 migrants) (Diserens et al., 2015) to a cross sectional study of 424,466 ED visits of which 64,435 were visits by migrant patients (Zinelli et al., 2014). Eighteen studies include more than 1000 migrants.

The sample of patients included in the studies set within EDs varied with regard to the severity of presenting conditions. The population of interest in nine studies consisted of all patients or all ED visits in a defined time period (Brigidi et al., 2008, Buja et al., 2014, Buron et al., 2008, Cots et al., 2007, Grassino et al., 2009, Norredam et al., 2004, Lopez Rillo and Epelde, 2010, Zinelli et al., 2014, Rue et al., 2008) while four studies only included patients presenting with non-urgent/ non-life-threatening conditions or 'walk-in' patients (Clement et al., 2010, Diserens et al., 2015, Hargreaves et al., 2006, Ruud et al., 2015). The one cohort study included in this review followed a cohort of healthy children for their first year of life (Ballotari et al., 2013).

The definitions used for 'migrants' varied between the included studies. Information on 'country of birth' or 'country of origin' was used to determine migrant status in 15/22 papers, while 'nationality' or 'citizenship' was used in 10 studies (3 papers recorded both country of birth and nationality/ citizenship). Three studies further classified patients as first or second generation migrants for their analyses (De Luca et al., 2013, Nielsen et al., 2012, Ruud et al., 2015). In the studies that include a paediatric sample, parents' country of birth or maternal citizenship was used to determine migrant status.

In the results presented in the studies, sub-group analysis was undertaken in many studies where the authors used country-of-birth/origin to categorise patients. These sub-groups were based on the predominant migrant groups in the region or country studied. Categories for sub-group analysis were also determined by the economic status or level of economic development of the countries of origin, irrespective of whether the country was considered a high migration country or not, and whether the country belongs within or outside the EU. Thirteen studies included adjustment for socio-demographic factors in their analysis of the outcomes of interest (Table 3).

Utilization of emergency departments by volume of service use

The studies included in this review differ in the utilization indicators used to describe volume of ED service use. Differences are apparent in whether service use measured ED contacts or visits; in the time scale used to measure the probability of service use (previous 4 weeks, 3 months, 12 months); and in the choice of comparison group (non-migrant patients attending the ED/ proportion of migrants in the population).

Fifteen studies report on ED use by migrants as compared to non-migrants (Anton and Munoz de Bustillo, 2010, Ballotari et al., 2013, Carrasco-Garrido et al., 2007, Carrasco-Garrido et al., 2009, Clement et al., 2010, Cots et al., 2007, De Luca et al., 2013, Diserens et al., 2015, Hargreaves et al., 2006, Hernández-Quevedo and Jiménez-Rubio, 2009, Lopez Rillo and Epelde, 2010, Rue et al., 2008, Zinelli et al., 2014, Buron et al., 2008, Ruud et al., 2015, Shah and Cook, 2008). A further three studies provide estimates of ED utilization by immigrant sub-group only (Nielsen et al., 2012, Norredam et al., 2004, Sanz et al., 2011). The trend that is evident in these results is that migrants have higher ED utilization than non-migrants and that the use of the ED differs by immigrant sub-group (country of origin and gender sub-groups). One study looking at utilization of the ED for children showed that, in Italy, immigrant mothers were significantly more likely to use the ED than non-migrant mothers (Ballotari et al., 2013). This higher use was apparent for mothers from all geographic regions and was twice as high for mothers from Sub-Saharan Africa (Ballotari et al., 2013).

Ten studies show higher use of the ED for adult migrants (Anton and Munoz de Bustillo, 2010, Carrasco-Garrido et al., 2009, Clement et al., 2010, De Luca et al., 2013, Diserens et al., 2015, Hargreaves et al., 2006, Rue et al., 2008, Ruud et al., 2015, Zinelli et al., 2014, Hernández-Quevedo and Jiménez-Rubio, 2009). Four of these adjusted for health status in their analyses (Anton and Munoz de Bustillo, 2010, Carrasco-Garrido et al., 2009, De Luca et al., 2013, Hernández-Quevedo and Jiménez-Rubio, 2009). In an additional three studies immigrants from particular countries were found to have higher use of the ED as compared to non-migrants (Nielsen et al., 2012, Norredam et al., 2004, Sanz et al., 2011). No-significant difference in utilization by immigrants as compared to non-migrants was seen in three studies (Carrasco-Garrido et al., 2007, Lopez Rillo and Epelde, 2010, Shah and Cook, 2008). Of these, only the study by Shah, 2008, adjusted for health status. In contrast to these findings, a Spanish study showed lower use of the ED by migrants (Buron et al., 2008). This study adjusted for age, sex and emergency specialty.

Significant differences in ED utilization by migrant originating country were found in nine studies (Anton and Munoz de Bustillo, 2010, De Luca et al., 2013, Hernández-Quevedo and Jiménez-Rubio, 2009, Nielsen et al., 2012, Norredam et al., 2004, Rue et al., 2008, Sanz et al., 2011, Ruud et al., 2015, Ballotari et al., 2013). In Italy, Moroccan immigrants have been seen to have the greatest probability of using the ED compared to native Italians (De Luca et al., 2013). A study from Norway showed that migrants from Pakistan, Somalia and Sweden used the ED significantly more (Ruud et al., 2015). Similarly, in Denmark patients from Pakistan (Nielsen et al., 2012) and those from Somalia (Norredam et al., 2004) have been shown to use the ED more than natives. In Spain, higher service use was most pronounced for Latin Americans and Africans (Hernández-Quevedo and Jiménez-Rubio, 2009). A further two Spanish studies found that Latin American men and sub-Saharan African women (Sanz et al., 2011), and men and women from the Maghreb (Rue et al., 2008), showed a higher probability of ED use than natives. Among the paediatric population in Italy, mothers from all geographic regions were more likely to use the ED than Italian mothers; the likelihood of ED utilization was doubled for mothers from sub-Saharan Africa (Ballotari et al., 2013).

Looking specifically at emergency department use by migrants from within Europe, lower utilization of the ED by migrants from European countries was found in four studies (Anton and Munoz de Bustillo, 2010, Carrasco-Garrido et al., 2009, Hernández-Quevedo and Jiménez-Rubio, 2009, Norredam et al., 2004). This association remained when three of these studies adjusted for health status (Anton and Munoz de Bustillo, 2010, Carrasco-Garrido et al., 2009, Hernández-Quevedo and Jiménez-Rubio, 2009).

Utilization of emergency department services by arrival time at the ED

Five studies analysed differences in time of patient arrival at the ED between migrants and non-migrants (Buja et al., 2014, Clement et al., 2010, Grassino et al., 2009, Lopez Rillo and Epelde, 2010, Zinelli et al., 2014). Three of these showed that migrants were significantly more likely than non-migrants to present to the ED during unsocial hours (Buja et al., 2014, Clement et al., 2010, Lopez Rillo and Epelde, 2010). In contrast, one study reported no statistically significant difference between the percentage of migrants versus natives seen during day and night shifts (Zinelli et al., 2014). The only study reporting on paediatric ED visits showed no difference between the comparison groups, although this was not tested for significance (Grassino et al., 2009). Looking at specific migrant sub-groups in Switzerland, patients from Balkan and African

countries have been found to visit the ED significantly more frequently during unsocial hours as compared to Swiss nationals (Clement et al., 2010).

Two studies assessed the utilization of the ED by the day of the week, with contrasting results. In Italy, patients arriving at weekends and on bank holidays were most likely to be “temporarily present foreigners” or migrants from high migratory pressure countries (Buja et al., 2014). By contrast, no significant difference in day of the week of patient attendance was observed in Spain, with the majority of patients presenting during weekdays (Lopez Rillo and Epelde, 2010).

Utilization of ED by presenting condition

Seven papers provided information about the differences in presenting conditions between migrants and non-migrants. Grassino et al., 2009, reported that there was no difference in the presenting pathologies between foreign or Italian children and that both groups of patients presented most often with respiratory or gastro-enteric diseases. Differences in presenting pathologies among adult migrants were evident in four papers (Buja et al., 2014, Buron et al., 2008, Cots et al., 2007, Lopez Rillo and Epelde, 2010). Common to three of these papers was the finding of a higher rate of obstetric and gynaecology diagnoses among migrant women (Cots et al., 2007, Buja et al., 2014, Lopez Rillo and Epelde, 2010). Buja et al., 2014, and Lopez Rillo and Epelde, 2010, also found that adult migrants were more likely to present with digestive diseases (Buja et al., 2014, Lopez Rillo and Epelde, 2010).

The findings regarding the use of particular specialities among adult migrants vary, showing no difference in attending speciality (Clement et al., 2010) nor any greater use of general emergency clinic than trauma clinic (Ruud et al., 2015). Two further studies show lower use of surgery, traumatology and medicine for migrants as compared to non-migrants (Buron et al., 2008, Cots et al., 2007).

Utilization of ED by appropriateness of presentation

The severity of patient presentation (reflecting the clinical ‘appropriateness’ of service use) was measured in eight papers according to the triage categories given to each patient at initial assessment. In addition, one paper assessed the variable cost of treating patients and used this as a proxy to reflect the complexity of emergency care involved in patient treatment (Cots et al., 2007). Two papers reporting on severity of paediatric presentations both show a higher use of the

ED for non-urgent conditions by immigrant patients (Ballotari et al., 2013, Grassino et al., 2009). One of these was not tested for significance (Grassino et al., 2009).

Five of the six studies that used a triage scale to assess the severity of presentation among adult patients showed that migrant patients were more likely than native patients to use the ED for low-acuity presentations. Three of these papers tested their results for significance and the associations remained (Buja et al., 2014, Clement et al., 2010, Zinelli et al., 2014). A further two studies appear to show higher percentages of low-acuity triage codes among migrants, although these were not tested for significance (Brigidi et al., 2008, Diserens et al., 2015). Only one study showed no significant difference in the severity of triage scores between the two populations (Lopez Rillo and Epelde, 2010). This study concluded that both migrants and non-migrants consult for mostly non-urgent conditions, which reflects the findings of many other studies (Lopez Rillo and Epelde, 2010).

The final study included in this analysis compared the average direct cost of treating migrants as compared to non-migrants. The findings from this study showed that the cost of treating migrants was significantly lower than non-migrants, reflecting lower complexity of emergency care involved in treatment (Cots et al., 2007).

DISCUSSION

The principal findings of this review are that migrants in EEA countries show higher use of the ED than the native population and that different immigrant subgroups use the ED differently. These results are similar to those from a review by Norredam et al., 2010, which showed a trend towards higher utilization of the ED by migrants in Europe (Norredam et al., 2010). These findings also suggest that migrants attend the ED for presentations that could be better managed in primary healthcare settings. 'Irrelevant' visits to the ED by immigrants have previously been reported in a Danish study (Norredam et al., 2007). The higher use of the ED for low-acuity presentations suggests that migrant patients are not necessarily an unhealthy population in need of emergency care but, rather, that there may be barriers to accessing more appropriate healthcare services in their host countries.

Thirteen papers report higher volume of ED service-use either by immigrants as a whole or by some immigrant sub-groups. The higher rates of ED utilization appear to pertain mostly to non-European immigrants, particularly those from the 'global South', with lower utilization rates by migrants from European countries found in three studies (Anton and Munoz de Bustillo, 2010,

Hernández-Quevedo and Jiménez-Rubio, 2009, Norredam et al., 2004). It is important to highlight these findings, given the highly politicized nature of migration, particularly with regard to the free flow of migrants between countries in the EU, and the perceived pressure that European migrants place on public services within these countries.

Possible explanations for review findings

The use of healthcare services can be seen as a function of environmental factors as well as factors in the external environment and particular population characteristics that may act to either facilitate or impede the use of particular healthcare services (Andersen, 1995). While limited evidence exists to quantify migrants' use of EDs or to provide qualitative evidence of their reasons for the use of these services, a number of explanations for the differences in ED utilization between migrants and native populations are proposed.

Despite universal access to emergency care services in many settings, barriers to PHC may mean that migrant patients preferentially access ED services. Migrants may not register with a GP due to a lack of awareness, or knowledge of entitlement to available services (Mahmoud et al., 2015). In addition, short duration of stay in the host country and language barriers may prevent registration and consultation with a primary care provider (Mahmoud et al., 2015). These barriers to PHC service use may partly explain the higher percentage of low-acuity presentations to the ED. Furthermore, in three papers migrants were found to have higher self-referral rates to the ED which, again, may be evidence of barriers to more appropriate healthcare (Buja et al., 2014, Clement et al., 2010, Zinelli et al., 2014). The findings that show higher use of obstetric and gynaecology services by migrant women may serve as a further example. Migrant women, who are generally of reproductive age, may face barriers to accessing antenatal or gynaecology services in the PHC setting and as a result seek these services in an ED (Lopez Rillo and Epelde, 2010, Rue et al., 2008).

Health literacy, in particular a lack of understanding of the healthcare system, has been suggested as a reason for ED use, as the ED is a highly visible and accessible service (Mahmoud et al., 2015, Norredam et al., 2007). In many European countries GPs act as gate-keepers to more specialized care and many migrants may be unfamiliar with this design (Småland Goth and Berg, 2011) . Without knowing where or how to access PHC, patients may instead use the ED in times of healthcare need. This review found that, on sub-group analysis, migrants from the 'global South' showed higher levels of ED service use. For migrants moving from the South to the North (moving

from 'developing' to 'developed country') it may be important to consider their educational background, socio-economic status and language capabilities when interrogating the patterns of, and reasons for, the use of EDs. The observed differences in the utilization of EDs by different immigrant sub-groups may reflect differences in the need for healthcare, or may serve as an indication of particular barriers to receiving healthcare faced by some immigrant groups. This highlights the importance of separately assessing migrants' use of the EDs by different legal statuses and countries of origin.

The restricted opening hours of PHC facilities may be a further contributing factor to the over-utilization of the ED. Migrants, many of whom are in unstable employment situations, may have difficulty visiting a doctor during normal working hours (Rue et al., 2008). Accessing care in the ED for low-acuity conditions could serve as further evidence that immigrants are, in some instances, forced to seek healthcare out-of-hours as a result of inflexible working conditions.

It is also important to consider the differences in healthcare utilization in light of the analyses undertaken in each study, particularly to assess whether confounding may distort the relationships seen. Few studies included in this review adjusted their analyses for factors other than 'age' or 'gender' and thus confounding may be present in the results observed. Socio-economic status may be one such confounder that was only adjusted for in six studies. A high proportion of newly arriving migrants settle in deprived urban areas in their host countries (Robinson, 2010) and it is known that, in some settings, healthcare services serving deprived areas have high rates of potentially avoidable admissions (O'Cathain et al., 2014).

In addition, duration of residence in a host country may be another important confounder. It may be hypothesized that with increasing length of stay migrants have access to additional healthcare resources, may become better integrated into the society and acquire a greater understanding of the healthcare system, and this in turn may impact on how they use healthcare services. Significant differences in healthcare utilization by recent immigrants have been found to decrease with increasing duration of residence in the US (Leclere et al., 1994). However, only one study in this review adjusted for length of stay and this analysis found that the use of the ED increased with length of stay for most migrant groups (Nielsen et al., 2012). Without data on length of stay in the host country in more than one study it is not possible to determine whether this pattern is evident in other settings.

Strengths and weaknesses of the study

This is the first systematic review that looks at migrants' use of emergency services beyond 'volume of ED service use' only. A carefully-designed, highly sensitive search strategy was used in this review and it is thought unlikely that the search failed to identify additional papers that would have altered the overall findings significantly. However, it is possible that additional, eligible studies may not have been identified.

Studies included in this review were limited to English language publications and it is possible that important publications in other European languages could have been excluded. Studies were also restricted to those from 2000 onwards to ensure that only the most recent evidence was included and this may be seen as a limitation. As a result, previous findings that have been excluded may have altered the overall review findings. Finally, studies that looked at specific conditions in migrant patients attending the ED (e.g. psychiatric diagnoses) were excluded from this review and the utilization patterns for specific conditions may have implications for the healthcare services. The quality of the included studies varied greatly, with considerable risk of bias and lack of external validity in some of them. This high risk of bias lies mainly with the observational design of these studies, selection bias, and analyses that didn't fully control for factors that might have confounded the results. Although no great difference in the overall direction of the observed associations and the strength of these associations was apparent between the studies that adjusted for confounders and those that did not, drawing general conclusions across these study findings is made more difficult because of the methodological inconsistencies between studies. The risk of bias in many of the included studies was also affected by the outcome measures used and the reliability of the procedures for measuring these outcomes.

There are no universally accepted definitions for migrants and migration research and, as a result, the definitions for migrants used in the included papers varied greatly. Furthermore, in some instances the definitions provided for the comparison groups were vague. Without standard definitions, comparing these studies to one another is a problem. What is clear, and has been highlighted in a previous review, is that common definitions need to be used in future research to ensure comparability across studies (Norredam et al., 2010).

The literature identified in this review suggests that there is limited evidence regarding particular aspects of migrants' use of EDs. Only three studies were identified that included a paediatric population. There may be differences in migrants' use of EDs for their own care as compared to

their use of services for their children. In addition, limited evidence pertaining to asylum seekers, refugees and undocumented migrants as compared to the autochthonous population was found. Understanding how services are used by these populations will aid in determining whether specific barriers to care are present for particular groups of patients. With very limited evidence it is not possible to make meaningful statements on the use of emergency departments for children, or asylum seekers, refugees or undocumented migrants, and further research is needed to address these research gaps.

The studies included in this review represent a number of different countries that have very different migrant populations as well as differing healthcare systems. In addition, a number of studies were conducted at local or regional level and the results of these studies may only be applicable to these settings. While the results of individual studies may not be generalizable across wider populations, what is clear is that some of the trends seen regarding migrants' use of EDs are not country-specific but are evident in many of the EEA country settings. These trends are important as many cross-border healthcare policies impact on healthcare services within the EU.

Research implications

Considerable scope exists for further research to understand fully how and why migrants use emergency departments. In designing future studies careful consideration needs to be given to how migrants are defined and to the outcomes to be reported so as to enable comparisons between studies (Norredam et al., 2010). Ideally, both country of birth and citizenship should be collected to enable migration history to be determined. Studies should also capture the time since arrival in the host country as this is an important predictor of healthcare utilization (Dias et al., 2008) and provides information regarding migration history.

It is clear that there is a need to understand the relationship between primary care and ED use by patients within specific settings. The differences in the organization of PHC systems and patients' entitlement to use these services across Europe make it difficult to establish whether the barriers to PHC mentioned as possible reasons for over utilization of the ED are applicable within and between healthcare systems in the EU. The differences in utilization of EDs are likely to reflect differing needs for healthcare and the accessibility of the healthcare services in particular settings, and this will have particular implications for specific healthcare services. Furthermore,

in-depth qualitative research is needed that looks at migrants' reasons for using emergency departments.

CONCLUSION

This systematic review synthesizes available evidence on the differences in utilization of emergency departments between migrants and non-migrants in EEA countries. The findings from this review show that migrants use emergency departments in Europe more, and differently, to non-migrants and this may reflect barriers to more appropriate healthcare.

Migration across Europe is increasing and to ensure equity in access, healthcare services need to be appropriately designed to meet the needs of the populations they serve. It is clear that further research is needed that quantifies migrants' use of emergency services and interrogates migrants' reasons for using emergency departments. A clearer understanding of migrants' use of EDs will inform healthcare service planning and service delivery and help to ensure that these services are designed to meet the needs of the demographically changing population in Europe.

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Conflict of interest

None declared

Key points

- The review findings suggest that migrants show higher levels of emergency department utilization, and that their use of the ED differs to that of non-migrants across Europe.
- Trends may reflect differing health needs and problems in accessing alternative healthcare.
- The higher use of the ED for low-acuity presentations and the use of the ED during unsocial hours suggest that barriers to primary healthcare may be driving the higher use of emergency department services.
- A greater understanding of migrants' healthcare needs and how they utilise emergency departments in Europe is needed to inform healthcare services, to ensure they are designed to meet the needs of the demographically changing population.

Figure 5: PRISMA flow diagram of results of literature identification, eligibility and inclusion

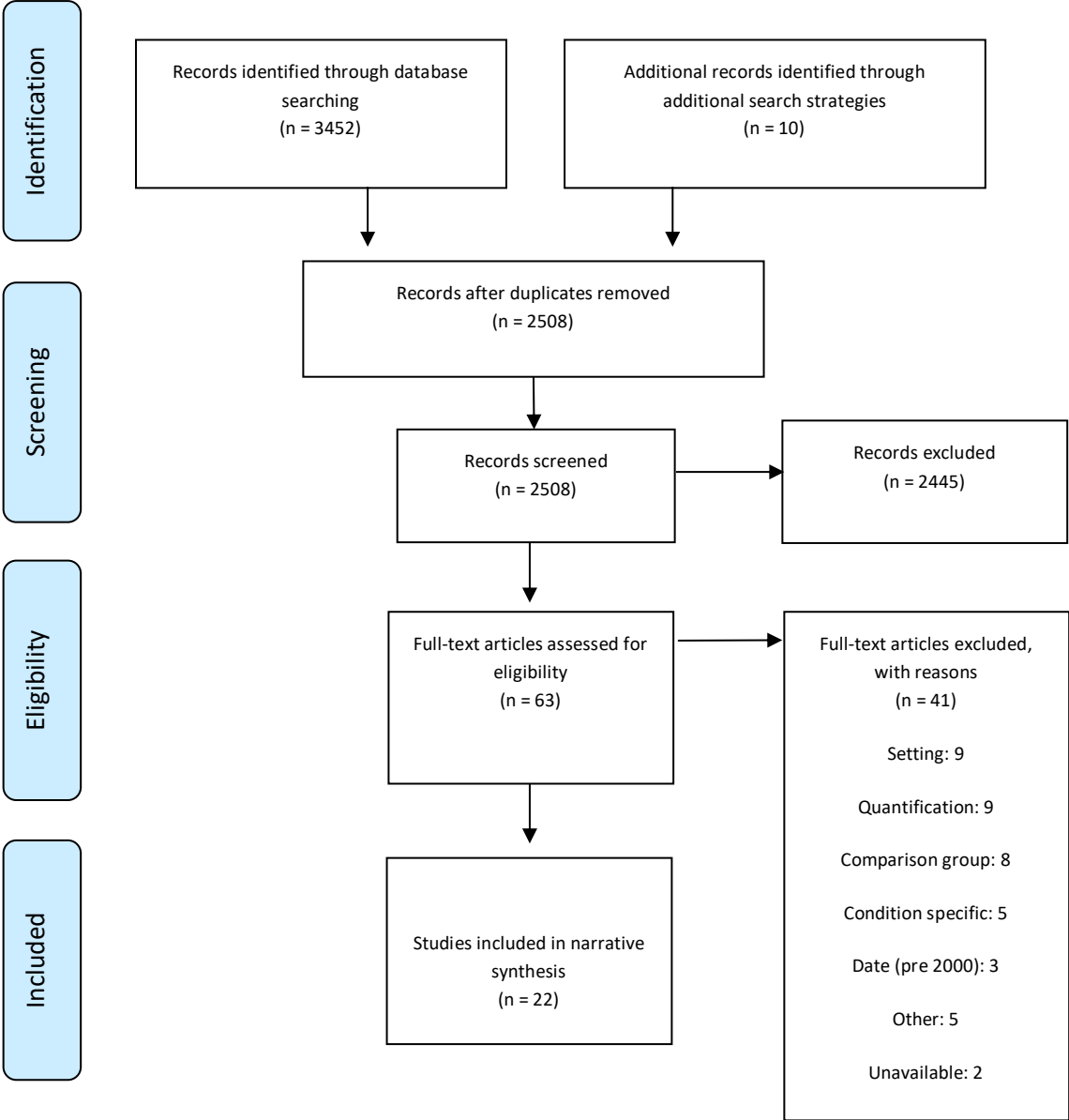


Table 3: Summary of main study characteristics and key findings by review outcomes of interest

Volume of ED utilization						
Reference & host country	Study design (sampling method)	Sample and number of migrants	Migrant definition	Overall quality assessment rating for internal validity (IV) and external validity (EV)		Key findings
				IV	EV	
Ballotari et al., 2013, Italy	Cohort (Record linkage of three databases)	Healthy singleton live births in the years 2008-2009 followed for the first year of life. N=8788 (migrants n=2383)	Maternal citizenship. Mothers who were citizens of High Migration Countries (HMC).	++	++	Higher use of ED in the first year of life by immigrant mothers. ⁸
De Luca et al., 2013, Italy	Cross-sectional (Population survey: Italian health conditions survey 2004/2005)	Nationally representative population sample (0-64 years)N=102,857 (Migrants n=5167).	Place of birth and citizenship. 1 st generation migrants: (born outside Italy without Italian citizenship). 2 nd generation: (born in Italy without Italian citizenship). Naturalized Italians: (born outside Italy with Italian citizenship).	++	+	Immigrants have a higher probability of using emergency services than natives. ^{a,b,c,d,f} Highest use in immigrants from Morocco, Africa and Albania.
Zinelli et al., 2014, Italy	Cross-sectional (ED database)	Visits to the ED by Italian-native and foreign born patients during 2008 to 2012.	Country of birth. 'Foreign-born' persons born outside Italy, whose parents were either foreign citizens or born outside the national territory. (first generation)	+	+	Higher ED use in immigrants.

		N=424,466 visits. (migrants 64,435 visits)				
Clement et al., 2010, Switzerland	Cross-sectional (ED database)	Patients attending the ED with non-urgent problems N=11258. Migrants (n=2948)	Nationality.	+	+	Higher proportion of visits by non-Swiss nationals.
Diserens et al., 2015, Switzerland	Cross-sectional (Patient survey)	Patients (≥16 years) presenting to ED with non-life-threatening condition. N=1082 (Migrants N=465)	Nationality.	-	+	Higher proportion of visits by non-Swiss nationals.
Ruud et al., 2015, Norway	Cross-sectional (Patient survey)	Walk-in patients with non-urgent or semi-urgent health conditions attending A&E outpatient clinic N=3864. Migrants (n=1364)	Country of birth. 1 st generation immigrants: patient and both parents born abroad. 2 nd generation: Norwegian born with immigrant parents.	+	+	1 st and 2 nd generation immigrants use ED more than Norwegians. ^{a,b} Higher use among Swedish, Pakistani and Somali. No difference in visits among Polish ^{a,b}
Shah and Cook, 2008, England	Cross-sectional (Population survey: British general household survey 2004-2005)	Persons living in private households in Britain (N=20421). Migrants (n=1728)	Country of birth.	+	+	No significant difference in use of casualty by immigrants versus UK born person. ^{a,b,d,f}
Hargreaves et al., 2006, England	Cross-Sectional (Patient survey)	Walk-in patients attending the A&E N=1611. Migrants (n=720).	Country of birth and Nationality.	+	+	Overseas-born over-represented in A&E.
Nielsen et al., 2012, Denmark	Cross-sectional (Nationwide survey, data linked)	Random sample of each immigrant group and Danes (≥18-66) from nationwide survey.	Country of birth and citizenship.	++	+	Higher among all immigrant groups (except Lebanese). Highest use among Pakistanis, former Yugoslavia and Iran. ^{a,b,f}

	to healthcare registries)	(N=4952). Migrants (n=2866)					Higher use among second generation immigrants from Turkey. ^{a,b,f} No difference in service use for decedents from Pakistan.
Norredam et al., 2004, Denmark	Cross-sectional (Data from Statistical office of the Municipality of Copenhagen)	Patients (≥20 years)attending ER (N=152,253). (Migrants N=24,433)	Country of birth.	++	+		Higher ER utilization for persons born in Somali, Turkey and ex-Yugoslavia compared to Danish-born residents. ^{a,b,c} Lower ER utilization for persons born in other Nordic countries, the European countries and North America ^{a,b,c} No difference in utilization rates for persons born in Iraq, Pakistan and 'other countries'. ^{a,b,c}
Carrasco-Garrido et al., 2009, Spain	Cross-sectional (Secondary analysis of survey data :Spanish National Health Survey 2006-2007)	Sample of Non-institutionalised adults (≥16 years) resident in Spain. (N=29,478). (Migrants N=1436).	Nationality. Those not from EU, USA or Canada defined as 'economic migrants'.	+	+		Higher use of emergency services by economic migrants. ^{a,b,d}
Carrasco-Garrido et al., 2007, Spain	Cross-sectional (Secondary analysis of survey data: Spanish National Health Survey 2003)	Sample of non-institutionalised adults (≥16 years) resident in Spain (N=1506). (Migrants N=502).	Nationality. Non-EU migrants (not from EU, the USA or Canada).	-	+		No significant difference in emergency service use. ^{a,b,f}
Hernández-Quevedo and Jiménez-Rubio, 2009, Spain	Cross-sectional (Secondary analysis of survey data: Spanish National Health	Sample of non-institutionalised adults (≥16 years), resident in Spain (N=49,123). (Migrants n=2705.)	Nationality.	++	+		Higher use among non-Spaniards. ^{a,b,c,d,f} Highest probability of use among Latin-Americans and Africans.

	Survey 2003 and 2006)					Lower use among patients from EU and Europe. No significant difference those from Asia, North America and Oceania. ^{a,b,c,d}
Antón & Muñoz de Bustillo, 2010, Spain	Cross-sectional (Secondary analysis of survey data: Spanish National Health Survey 2006-2007)	Sample of non-institutionalised adults (≥16 years), resident in Spain (N=25,033). (Migrants n=3042)	Country of birth.	++	+	Higher use of ED among Non-EU15. EU-15 immigrants show lower rates of emergency service use. ^{a,b,c,d,f}
Sanz et al., 2011, Spain	Cross-sectional (Secondary analysis of survey data: Spanish National Health Survey 2006)	Sample of non-institutionalised adults (≥16- 74), resident in Spain (N=26,728). (Migrants N=3570)	Country of birth.	+	+	Higher, equal and less use by different sub groups. ^{a,c,d,f} Higher use by men from Latin America; no difference those from Sub-Saharan Africa or North Africa and less use by those from: Western Countries, Eastern Europe and Asia/ Oceania. ^{a,c,d,f} Higher use by women from Sub-Saharan Africa. ^{a,c,d,f}
Buron et al., 2008, Spain	Cross-sectional (Emergency department patient register)	All emergency care episodes for registered patients (≥15 years) living in study area (N=29,451 visits). Visits by migrants n=10,224.	Country of birth.	++	++	Lower utilization of ED by foreign born. ^{a,b,f}
López Rillo & Epelde, 2010, Spain	Cross-sectional (Medical records)	Patients attending the ED during a two week period N=5,660. (Migrants N=792).	Country of origin.	-	+	No significant difference.
Rue et al., 2008, Spain	Cross-sectional	Emergency visits in patients (15-64 years)during 2004 and 2005	Country of birth.	+	+	Higher use of emergency by immigrants. ^a

	(Hospital database)	(N= 96,916 visits). Migrants n=20,663 visits.				Women from Maghreb, Sub-Saharan Africa, Latin America, Eastern Europe and HIC had higher use than Spanish. Men from Maghreb, HIC, Latin America and Eastern Europe. Rates were lower for other LIC and Sub-Saharan Africa. ^a
Patient's presenting condition to the ED						
Reference & host country	Study design (sampling method)	Sample and number of migrants	Migrant definition	Quality assessment		Key findings
				IV	EV	
Grassino et al., 2009, Italy	Cross-sectional. Survey of paediatric ED clinical notes.	Patients (0-adolescent) admitted to the emergency department N=4874. (Foreign n=2437)	Parents' country of birth. One or both parents born outside Italy and the EU.	-	+	No difference in presenting pathologies.*
Buja et al., 2014, Italy	Cross-sectional (<i>not stated in paper</i>) (Record linkage database)	Patients (18-65 years) attending A&E. N=35,541 (migrants N=5,385)	'Citizenship'. Nationality assumed to be that of country of birth if not born in Italy.	++	+	Significant difference in presenting conditions. Higher digestive disease in TPF males and those from HMPC. Higher obstetric and gynaecology diagnoses in TPF women.

Clement et al., 2010, Switzerland	Cross-sectional (ED database)	Patients attending the ED with non-urgent problems N=11258. Migrants (n=2948)	Nationality.	+	+	No significant difference in admission reason (trauma or other).
Ruud et al., 2015, Norway	Cross-sectional (Patient survey)	Walk-in patients with non-urgent or semi-urgent health conditions attending A&E outpatient clinic N=3864. Migrants (n=1364)	Country of birth. 1 st generation immigrants: patient and both parents born abroad. 2 nd generation: Norwegian born with immigrant parents.	+	+	Higher use of general emergency clinic (versus trauma clinic) for migrants.
Buron et al., 2008, Spain	Cross-sectional (ED patient register)	All emergency care episodes for registered patients (≥15 years) living in study area (N=29,451 visits). Visits by migrants n=10,224.	Country of birth.	++	++	Lower use of surgery, traumatology, medicine and psychiatry among foreign-born ^{a,b,f} No significant difference in gynaecology, utilization among foreign-born women. ^{a,f}
López Rillo & Epelde, 2010, Spain	Cross-sectional (Medical records)	Patients attending the ED during a two week period N=5,660. (Migrants N=792).	Country of origin.	-	+	Higher rates of presentation with obstetric and gynaecological disease among migrant women. Higher presentation with digestive tract disease among migrants.
Cots et al., 2007, Spain	Cross-sectional (Hospital database)	All emergency visits between 2002 and 2003 (N= 165,257 visits). Migrants = 32,822 visits	Country of origin. Neonates classified by parents' country of origin.	+	++	Higher use of gynaecology and obstetric services among migrant women.* Lower use of medicine and traumatology.*

Appropriateness of ED presentation by severity of presenting condition.						
Reference & host country	Study design (sampling method)	Sample and number of migrants	Migrant definition	Quality assessment		Key findings
				IV	EV	
Ballotari et al., 2013, Italy	Cohort (Record linkage of three databases)	Healthy singleton live births in the years 2008-2009 followed for the first year of life. N=8788 (migrants n=2383)	Maternal citizenship. Mothers who were citizens of High Migration Countries (HMC).	++	++	Immigrants more likely to visit the ER inappropriately. ⁸
Grassino et al., 2009, Italy	Cross-sectional. Survey of paediatric ED clinical notes.	Patients (0-adolescent) admitted to the emergency department N=4874. (Foreign n=2437)	Parents' country of birth. One or both parents born outside Italy and the EU.	-	+	Both immigrant and Italian patients access ED mostly for non-urgent or semi-urgent conditions. Higher proportion white triage codes among foreigners.*
Brigidi et al., 2008, Italy	Cross-sectional (ED patient database)	Patients attending ED. 51,000 patients treated (Latin Americans N=3832)	Country of origin: Latin America.	-	+	Latin American users of the ED use the ED for non-urgent rather than emergency medical treatment. Higher percentage of white triage codes among Latin Americans.*
Buja et al., 2014, Italy	Cross-sectional <i>(not stated in paper)</i> (Record linkage database)	Patients (18-65 years) attending A&E. N=35,541 (migrants N=5,385)	'Citizenship'. Nationality assumed to be that of country of birth if not born in Italy.	++	+	Foreigners more likely to attend A&E with non-urgent clinical conditions.
Zinelli et al., 2014, Italy	Cross-sectional (ED database)	Visits to the ED by Italian-native and foreign born patients during	Country of birth. 'Foreign-born' persons born outside Italy, whose parents were either foreign	+	+	Higher rate of use of ED for non-urgent conditions among migrants.

		2008 to 2012. N=424,466 visits. (migrants 64,435 visits)	citizens or born outside the national territory. (<i>first generation</i>)			
Clement et al., 2010, Switzerland	Cross-sectional (ED database)	Patients attending the ED with non-urgent problems N=11258. Migrants (n=2948)	Nationality.	+	+	Significantly higher attendance at ED with non-urgent conditions among foreigners
Diserens et al., 2015, Switzerland	Cross-sectional (Patient survey)	Patients (≥16 years) presenting to ED with non-life-threatening condition. N=1082 (Migrants N=465)	Nationality.	-	+	Higher proportion of foreigners visits ED with non-urgent conditions.*
López Rillo & Epelde, 2010, Spain	Cross-sectional (Medical records)	Patients attending the ED during a two week period N=5,660. (Migrants N=792).	Country of origin.	-	+	No significant difference in severity of triage scores.
Cots et al., 2007, Spain	Cross-sectional (Hospital database)	All emergency visits between 2002 and 2003 (N= 165,257 visits). Migrants = 32,822 visits	Country of origin. Neonates classified by parents' country of origin.	+	++	Lower cost of treating migrants in ED compared to Spanish patients reflects lower complexity of emergency care and workload. ^{a,b,f}
Patient's arrival time at the ED						
Reference & host country	Study design (sampling method)	Sample and number of migrants	Migrant definition	Quality assessment (IV) and external		Key findings
				IV	EV	
Zinelli et al., 2014, Italy	Cross-sectional (ED database)	Visits to the ED by Italian-native and foreign born patients during 2008 to 2012.	Country of birth. 'Foreign-born' persons born outside Italy, whose parents were either foreign citizens or born outside the national territory. (<i>first generation</i>)	+	+	No significant difference between the percentage of Italians and migrants seen during the day and night shifts.

		N=424,466 visits. (migrants 64,435 visits)				
Clement et al., 2010, Switzerland	Cross-sectional (ED database)	Patients attending the ED with non-urgent problems N=11258. Migrants (n=2948)	Nationality.	+	+	Non-Swiss nationals significantly more likely to present to ED during unsocial hours.
López Rillo & Epelde, 2010, Spain	Cross-sectional (Medical records)	Patients attending the ED during a two week period N=5,660. (Migrants N=792).	Country of origin.	-	+	Immigrants significantly more likely to present during unsocial hours. No differences in day of week patients attend.
Grassino et al., 2009, Italy (paediatric)	Cross-sectional. Survey of paediatric ED clinical notes.	Patients (0-adolescent) admitted to the emergency department N=4874. (Foreign n=2437)	Parents' country of birth. One or both parents born outside Italy and the EU.	-	+	No Difference*
Buja et al., 2014, Italy	Cross-sectional (not stated in paper) (Record linkage database)	Patients (18-65 years) attending A&E. N=35,541 (migrants N=5,385)	'Citizenship'. Nationality assumed to be that of country of birth if not born in Italy.	++	+	Patients arriving at weekends and bank holidays mainly Temporarily Present Foreigners and those from High Migratory Pressure Countries. Most patients arrive at A& E between 08h00-16h00, patients arriving between 16h00 and 24h00 mainly from HMPC group.

(A study that reported more than one review outcomes of interest will appear more than once in the table).

- ++ All or most of the checklist criteria have been fulfilled; where they have not been fulfilled the conclusions are very unlikely to alter.
 - + Some of the checklist criteria have been fulfilled, where they have not been fulfilled, or not adequately described, the conclusions are unlikely to alter.
 - Few or no checklist criteria have been fulfilled and the conclusions are likely or very unlikely to alter. (9)
 - a. Adjusted for age
 - b. Adjusted for gender
 - c. Adjusted for socio-economic status
 - d. Adjusted for health status
 - e. Adjusted for time in host country
 - f. Adjusted for other factors (region, marital status, attending speciality, Triage colour)
 - g. Adjusted for mother's age at
- *Not tested for significance

3.3 Chapter summary

- This systematic review provides the most comprehensive evidence to date of research findings related to migrants' use of emergency departments in EEA countries.
- The principal finding of this review is that migrants in EEA countries show higher use of the ED than the autochthonous population and different immigrant subgroups use the ED differently.
- Due to the varying methodological quality of the included studies, and the high risk of bias in some of these studies, drawing general conclusions across these study findings is difficult.
- This review identified that there is considerable scope for further studies to explore migrants' utilization of EDs. In the first instance, there is a need for high quality research looking at migrants' use of EDs, in other European countries.
- To fully understand migrants' use of EDs it is important that further research seeks to understand ED utilization beyond 'volume' of service use only.
- Research is needed that considers the use of paediatric ED services by migrant parents or caregivers.
- It is important to consider the educational background, socio-economic status, country of origin and time since arrival of migrants when interrogating the patterns of, and reasons for, the use of EDs.

Chapter 4. Planning the empirical work

4.1. Summary of chapters 1, 2 & 3

As highlighted in Chapters 1, 2 & 3, migration across Europe is increasing. Increasing migration may be expected to increase pressure on healthcare systems across Europe due to population growth and changing patterns of healthcare utilization. However, evidence of migrants' use of healthcare services, including EDs, across Europe, and the UK in particular, are lacking. As new migrant populations enter the UK it is important to understand how people of foreign background use healthcare services and whether the established services are adequately prepared to meet the needs of diverse migrant populations (Healy and McKee, 2004).

The limited evidence that exists in the UK suggests that migrant populations use NHS services at similar rates to the UK born population (Wadsworth, 2013), although there is some literature to suggest that migrant patients are perceived by healthcare providers to be high service users of EDs in the UK (Nicholl and Mason, 2013, O'Cathain et al., 2014). EDs in the UK are one health service, among others, that is facing unsustainable pressures, and research evidence suggests that migrant populations may use the ED differently to non-migrant populations. The findings of the systematic review in Chapter 3 which synthesized evidence on migrants' use of EDs across Europe concluded that migrants use EDs in Europe more, and differently, to non-migrants, and this may reflect the existence of barriers to more appropriate healthcare. My review highlighted a lack of evidence on migrants' use of EDs in the UK.

The paucity of this evidence means that little is known about the system's preparedness to manage migrant patients. For local EDs to be well informed as to whether their services are accessible, and acceptable, to migrant populations, a number of research issues need to be addressed. These research gaps include: the volume of overall service utilization at the population level; the proportion of ED service users who are migrant patients; the nature of ED service use by migrant populations; the characteristics of the migrant users; and whether EDs meet the needs of migrants and, if not, why more appropriate services are not being used. Thus, research that quantifies migrants' use of EDs in the UK is needed, as is research that seeks to understand why differences in ED utilization may differ between populations.

As identified in Chapter 2, there is evidence that migrant populations are perceived to be high service users of EDs in the UK (Nicholl and Mason, 2013, O’Cathain et al., 2014), despite little quantitative evidence to support this. Thus, not only is it clear that further quantitative research is needed, but it is also important to understand whether ED providers do, in fact, have these perceptions and why, and what gives rise to them. If services are to be appropriately supported and resourced to enable the provision of quality healthcare services, it will be particularly important to establish whether these perceptions are formed by differences in ED utilization by migrant families, or, as a result of challenges faced by providers when caring for migrants. It follows that qualitative evidence that explores providers’ views of migrants’ use of ED services is also needed. A clearer understanding of migrants’ use of EDs in the UK will inform healthcare service planning and service delivery and help to ensure that these services are designed to meet the needs of the demographically changing population.

4.2 Devising the empirical work for this PhD that quantifies migrants’ ED utilization

In devising empirical work quantifying migrants’ ED utilization, the key question that emerged was whether any data existed that could address these research gaps or whether the empirical work would need to generate primary data. To measure migrants’ utilization of EDs, individual patient level data that includes migrant status needs to be linked to individual patient ED episodes. As discussed in Chapter 2, there is great variation in how migrants are categorized in the literature and there is a need for standard classifications to ensure comparability between studies. To enable standardized and uniform health information to be compared between settings the use of migration-related elements in data such as country of birth, the nature of the migratory process, and duration of residence in the host country has been suggested (World Health Organization, 2010). Thus patient data should include at least one of the following migration indicators: a person’s country of birth, or mother or father’s country of birth to objectively determine those people who were born outside of the UK.

Data quantifying migrants’ use of healthcare services in the UK is lacking. In 2009, it was reported that only 11 of the 27 European Union (EU) member states collected data that enabled migrants to be identified in healthcare records (Nielsen et al., 2009). The UK was identified as one of the EU member states that had no available registers for identifying migrants’ healthcare utilization (Nielsen et al., 2009). This suggested that it was unlikely that routine healthcare data capturing ED utilization by migrant status would be available in the UK to address the research gaps

identified. However, given that the Nielsen et al. 2009, paper was published in 2009, the possibility existed that some data sets might have been amended subsequently to include migrant status, and this needed to be explored.

In order to identify whether any appropriate data existed to address the research question, the following five sources were investigated (Table 4):

- Routine ED NHS data available through NHS trusts
- The National Urgent and Emergency Care Data Set (ECDS)
- Other routine data (NHS 111, Personal demographic service through NHS Digital, ResearchOne and The Clinical Practice Research Datalink (CPRD))
- Secondary data collected from ongoing or completed studies in the UK
- Key stakeholders/ individuals were approached.

4.2.1 Routine data available through NHS trusts

Key individuals (information managers, information analysts, business managers and ED consultants) at 14 NHS Trusts in Yorkshire and Humber, covering 21 hospital sites, were contacted via email and asked whether routine data, collected in the EDs at their Trusts, included: country of birth, citizenship, or nationality data for the patients attending the ED. These individuals were identified, with the help of the National Institute for Health Research Collaboration for Leadership in Applied Health Research and Care Yorkshire and Humber (NIHR CLAHRC YH) avoidable admissions theme study team, as those who had previously assisted with the preparation of data from these Trusts for the theme's data linkage study. In total, responses were received from 12 Trusts.

4.2.2 The new national urgent and Emergency Care Data Set (ECDS)

During my search for existing data I became aware that within the ED setting a new national data set (ECDS) was being developed. This data set has been created to improve and standardise data collection for all emergency attendances at Type 1 EDs, with the aim of improving the quality of data recorded and held on patient care in EDs, in the hope that this might lead to lead to improving both the quality and safety of patient care. In discussion with the clinical lead for this

data set I became aware that migration indicators are not included in this data, with patient ethnicity being included as the only mandatory requirement. Thus, for this PhD, this data set did not provide the required data.

4.2.3 Other routine data

Four other routine data sets were investigated (Personal Demographic Service, NHS 111, ResearchOne and CPRD data). Each of these options was investigated, either through direct contact with the organization or through discussions with colleagues who have used the relevant services. Through these investigations it became clear either that the data do not include the required migration variables, or that the costs and time associated with obtaining the data do not meet the timeline and resources available for this PhD project.

4.2.4 Investigation of data collected on large studies in the UK

My fourth approach involved looking for secondary data collected from other studies conducted in the UK. Through an initial internet search of the UK Medical Research Council's (MRC) cohort directory, I identified three possible studies of interest: The Born in Bradford cohort; The Yorkshire Health Study; and the Millennium cohort. Both the Millennium cohort study and the Yorkshire Health study were found to have data only on participant ethnicity. The final data set I explored was the Born in Bradford (BiB) cohort: a multi-ethnic birth cohort of children born between 2007-2011. This data set includes detailed demographic information, including migration history, of 12,450 mothers. This data set has also been linked, on an individual patient level, to healthcare data including ED, SystemOne GP records, and hospital admission data. The BiB data were identified as the only data that contain migration history, ED episode information and linkage to primary healthcare records, thus making the data suitable for the purposes of this research.

4.2.5 Key stakeholders/ individuals were approached

The final approach involved contacting key persons, identified with the help of my supervisors, to enquire whether they knew of any data that included both information on both patients' countries of birth and NHS episode data. The responses from these five individuals made it clear

that, while migrants' use of emergency services was of interest, there are no data that they are aware of that capture this. Interestingly, two of these contacts suggested that where I'd 'see the "problem"' or where 'high use would be most evident' was in the use of EDs for paediatric care. The responses from these individuals are captured in Table 4.

Table 4: Summary of data enquiries – what data exists in the UK that include migrant status and healthcare utilization?

Lines of enquiry	Routine ED data available through NHS Trusts				Additional information	
	Country of birth	Nationality	Ethnicity	Overseas visitor (fee status)		
NHS trusts in Yorkshire and the Humber	Airedale NHS Foundation Trust	X	X	✓	•	
	Barnsley Hospital NHS Foundation Trust	X	X	✓	✓	
	Bradford Teaching Hospitals NHS Foundation Trust	•	•	•	•	NO RESPONSE
	Calderdale And Huddersfield NHS Foundation Trust	X	X	✓	•	
	Doncaster And Bassetlaw Hospitals NHS Foundation Trust	X	X	✓	✓	
	Harrogate And District NHS Foundation Trust	X	X	✓	•	
	Hull And East Yorkshire Hospitals NHS Trust	X	X	✓	•	
	Leeds Teaching Hospitals NHS Trust	X	X	✓	✓	
	Mid Yorkshire Hospitals NHS Trust	X	X	✓	✓	
	Northern Lincolnshire And Goole NHS Foundation Trust	X	X	✓	•	
	Sheffield Teaching Hospitals NHS Foundation Trust	✓	✓	✓	✓	'Nationality' and 'Country of birth' captured as free text entries and these are poorly completed (55% in last 6/12). Possible biases in data as unclear which patients have this information recorded.
	The Rotherham NHS Foundation Trust	•	•	•	•	NO RESPONSE
York Teaching Hospital NHS Foundation Trust	X	X	✓	•		
Yorkshire Ambulance Service	X	X	✓	X		
UK cohort studies	Born in Bradford cohort	✓	✓	✓	X	
	Millennium cohort study	X	X	✓	n/a	
	Yorkshire Health Study	X	X	✓	n/a	
Existing data sets	Research one data base	X	X	✓	X	
	NHS111	X	X		X	
	New ECDS data	X	X	✓	✓	
	Clinical Practice Research Datalink (CPRD) data	CPRD not contacted directly. Discussions with colleagues in SchARR who've previously used this data.				Biased towards South East of England. Large costs in accessing data.
	Personal Demographics service data (NHS Digital)	PDS not contacted directly. Discussions with colleagues in SchARR who've previously used this data.				Anticipated long delay in receiving approval for this data.
Direct enquiries to key contacts	John Soady (Public Health England)	Unaware of any such data. Services don't ask as it's not relevant to their treatment.				
	Katherine Henderson (Guys St Thomas London)	No data on migrant status at Guys St Thomas or other London facilities that she's aware of.				
	Catia Nicodemo (author Immigration and the NHS project)	Data unable to be linked at individual patient level. Only ethnicity in HES data.				
	Derek Burke (Sheffield Children's hospital)	No migrant status in ED data set. Previously surnames have been used to determine nationality.				
	Luke Minshall (Broad lane walk-in centre, Sheffield)	Data for the walk-in centre is available through SystemOne although no migrant status collected here.				

4.3 Deciding on the direction of the empirical work

Through my search for existing data it became very apparent that, despite being an area of importance and of interest, data quantifying migrants' use of EDs in the UK are lacking. Two things remained clear to me: 1) despite a lack of quantitative evidence to support this, ED service providers perceive that migrants use EDs differently to non-migrants, particularly for paediatric care; and 2) to understand the pressures facing EDs it is important to identify who is using EDs and the factors that predispose patients to use these services.

My initial thoughts for this project had been to look at adult migrants' use of EDs. However, after some consideration, it became clear that it would be more practical and useful to focus on migrants' use of ED services for paediatric care. My systematic review highlighted a gap in existing literature looking specifically at the paediatric population, and focusing this PhD on this population would accordingly make an important contribution to current evidence. I also became increasingly aware through information discussions with emergency healthcare service providers that migrant parents are perceived to use EDs differently to the UK-born population, and understanding more about these perceptions is important. Furthermore, the birth rate among new migrant arrivals is high, as the population is largely of family-forming age, and this makes understanding patterns of ED use for paediatric care important from a health service design perspective from the point of view of ensuring services are appropriate and accessible for these families. Finally, the BiB data set was the only comprehensive data set to include migration history and ED episode data that would enable me to answer questions directly related to the use of EDs by children born to migrant parents.

Three pieces of empirical work were completed for this thesis. The research questions, aims and objectives of the first two empirical studies developed out of the findings of the literature review. The third study developed as a result of the findings of studies 1 & 2 and the identification of particular gaps in research knowledge. The following section summarises the primary research question and for each of these pieces of empirical work. The rationale for using a mixed-method approach and the general methodology used for each of these studies are addressed in Chapter 5.

4.4 Research questions and aims for each study

Study 1: Paediatric emergency department utilization rates and maternal migration status in the Born in Bradford cohort: A cross-sectional study.

Primary Aim:

To establish whether there are differences in ED utilization for paediatric care in the first five years of life for children born to migrant, as compared to non-migrant, mothers in the Born in Bradford (BiB) cohort.

Research question:

What are the differences/ similarities in the use of the ED between children born to migrant as compared to UK/ Irish-born mothers in BiB cohort?

Study 2: Migrants' use of emergency departments for paediatric care in an English region. A qualitative study of healthcare providers' perceptions.

Primary Aim:

To explore, through in-depth qualitative interviews, service providers' perceptions and experiences of migrants' use of the emergency department for paediatric care.

Research question:

What are healthcare providers' perceptions and experiences of migrants' use of the emergency department for paediatric care?

Study 3: Patterns of paediatric emergency department utilization in Sheffield, UK: a comparison of Roma and White British children

Primary Aim:

To identify whether patterns of ED utilization differ between Roma and White British/ Irish children in Sheffield, UK.

Research question:

What are the differences/ similarities in the use of Sheffield Children's Hospital ED by Roma as compared to White British/ Irish children?

Chapter 5. Methodology and research methods

This chapter presents an overview of the methods used to address the PhD research questions. The chapter begins with a discussion of the research paradigm that informed this research, along with a justification for the use of a mixed methods approach. The design of the mixed methods study is presented. This chapter presents a brief account of the methods used in each study. More detailed information about the methods used in each of the three studies can be found in Chapters 6-8 where the papers are presented. Given the word count limitations of papers prepared for publication, additional detail on the methods used in studies 1 and 2 can be found in appendices 5 and 6. Patient and public involvement (PPI) and ethical considerations, as they relate to this PhD, are included at the end of this chapter.

5.1 Research paradigm

Research questions, and the choice of methods the researcher uses to answer these questions, are informed, and influenced by, different philosophical perspectives (Bowling, 2014). These perspectives, or paradigms, encompass beliefs and values about how one looks at the world or how reality is interpreted (Bowling, 2014). Within each paradigm are philosophical issues of ontology (nature of reality), epistemology (how the world is understood), methodology (how one acquires knowledge) and axiology (ethics and values in social inquiry) (Greene and Hall, 2010). It is important that the researcher is aware of these perspectives, as they influence how research is designed and how the findings are interpreted.

The research paradigm that influenced this work was that of 'pragmatism'. Pragmatism was seen to influence the work, rather than to inform it, as there is broad consensus in the field of mixed methods research that a mixed methods approach is chosen because of the question that it seeks to answer rather than being research that starts from a particular philosophical assumption (Biesta, 2010).

Pragmatism is a paradigm that has gained popularity for mixed methods enquiry because of its epistemological and methodological flexibility. Pragmatist epistemology, as a relatively new philosophical position, places emphasis on identifying explanations while acknowledging the existence of an external world independent of people's minds (Pansiri, 2005)- a typically positivistic assumption. The pragmatic approach is flexible in that it allows for both inductive and

deductive reasoning and places emphasis on problem-solving rather than seeking to identify a single reality (Powell, 2001).

A pragmatic approach is philosophically consistent with my desire to contribute to an understanding of a complex and contested area where there is no single reality or answer. Rather, I seek to address a series of carefully constructed questions that can help reveal descriptions and plausible explanations of the phenomena under question. Although I believe that patterns of ED use by migrant populations may be measured, and are a recordable phenomenon using quantitative methods (a positivist position), I also believe that patterns of ED use are likely to be shaped by social, political, and cultural circumstances. As discussed in Chapter 2, defining migration, and who migrant patients are, is difficult and the 'migrant person' is a category that conceals considerable heterogeneity. Given the heterogeneity within migrant populations, evaluating their use of healthcare services and understanding the reasons for different patterns of healthcare utilization, requires a deeper understanding of the populations under consideration (Bhopal, 2014). Thus, aspects of this research that seek to understand, through qualitative methods, the social context that drives patterns of ED utilization, and how knowledge of these patterns can be transferred to other settings, can be seen to be constructivist. The pragmatic approach allows this flexibility and supports mixed methods work that combines both qualitative and quantitative research that considers multiple positions, viewpoints and perspectives (Johnson et al., 2007, Morgan, 2007, Creswell and Plano Clark, 2018).

5.2 Mixed methods research

5.2.1 Definition of mixed methods research

Mixed methods research, involving the use of both qualitative and quantitative data to address the research question (Creswell, 2014), was employed in this PhD study. Mixed methods research has been variously defined over the years depending on whether authors have chosen to focus on the research methods, the philosophical position informing the study, the purpose of the research, or the research process (Creswell and Plano Clark, 2018). While the available definitions vary, Creswell and Plano Clark (2018 p.5) list the following core characteristics that they believe should be incorporated into a mixed methods study. It:

- collects and analyses both qualitative and quantitative data rigorously in response to research questions and hypotheses,
- integrates the two forms of data and their results,

- organizes these procedures into specific research designs that provide the logic and procedures for conducting the study, and
- frames these procedures within theory and philosophy.

Health Services Research (HSR) has historically been dominated by research that employs quantitative methodology, however the use of mixed methods has gained popularity and is now commonly seen in HSR in the UK (O'Cathain et al., 2007). In the following section I justify the use of mixed methods approach in this study and describe the mixed methods design according to the Good Reporting of A Mixed Methods Study (GRAMMS) guidelines (O'Cathain et al., 2008).

5.2.2 Justification for using a mixed methods approach

Combining qualitative and quantitative research is undertaken for a number of reasons. Within HSR, mixed methods research has most commonly been used to increase the comprehensiveness of study findings by accessing a wider range of data (O'Cathain et al., 2007, Johnson et al., 2007). Further reasons for a mixed methods approach are for complementarity (gaining different perspectives on the same phenomenon), development (one method aids the other), and triangulation (agreement of findings is sought from combining methods) (O'Cathain and Thomas, 2008). Mixed methods can also be used to answer two linked, equally important, research questions (O'Cathain and Thomas, 2008).

To achieve the overall aim of this PhD, and to successfully gain an in-depth understanding of ED utilization by migrant populations including: patterns of ED utilization, characteristics of patient users, perceptions of service staff, and differences between migrant and non-migrant groups, a mixed methods approach was needed. The main reason for a mixed methods approach being necessary was the need to address different, but linked, research questions, thus enabling the overall study findings to be more comprehensive. First, quantitative methods were used to measure the volume and frequency of ED use, and patterns of ED utilization, by parents from migrant as compared to non-migrant backgrounds. While quantitative methods enable the extent of volume and frequency of ED utilization to be measured, these methods also provide a more general understanding of the topic of interest.

A qualitative component was included in this study to move beyond numbers and quantifiable evidence in undertaking an in-depth exploration of healthcare providers' perceptions and

experiences of migrants' use of the ED (Pope and Mays, 2008). The systematic review and quantitative analysis in this thesis observe difference in patterns of ED utilization and are suggestive of reasons for these differences. The qualitative data helps to explain the possible reasons for differences in patterns of utilization through the perspectives of service providers. ED staff are important agents of service delivery whose views, perceptions, and experiences of migrants' use of the ED was identified to be important in understanding the complexity of the topic. A more comprehensive understanding of the topic has been developed through exploring a range of perspectives on how, and why, patterns of ED utilization may differ between migrant and non-migrant populations. A qualitative component was therefore included in this PhD to provide an additional perspective on the same social phenomena (Pope and Mays, 2008) and to provide a more detailed understanding of the research area of interest (Creswell and Plano Clark, 2018).

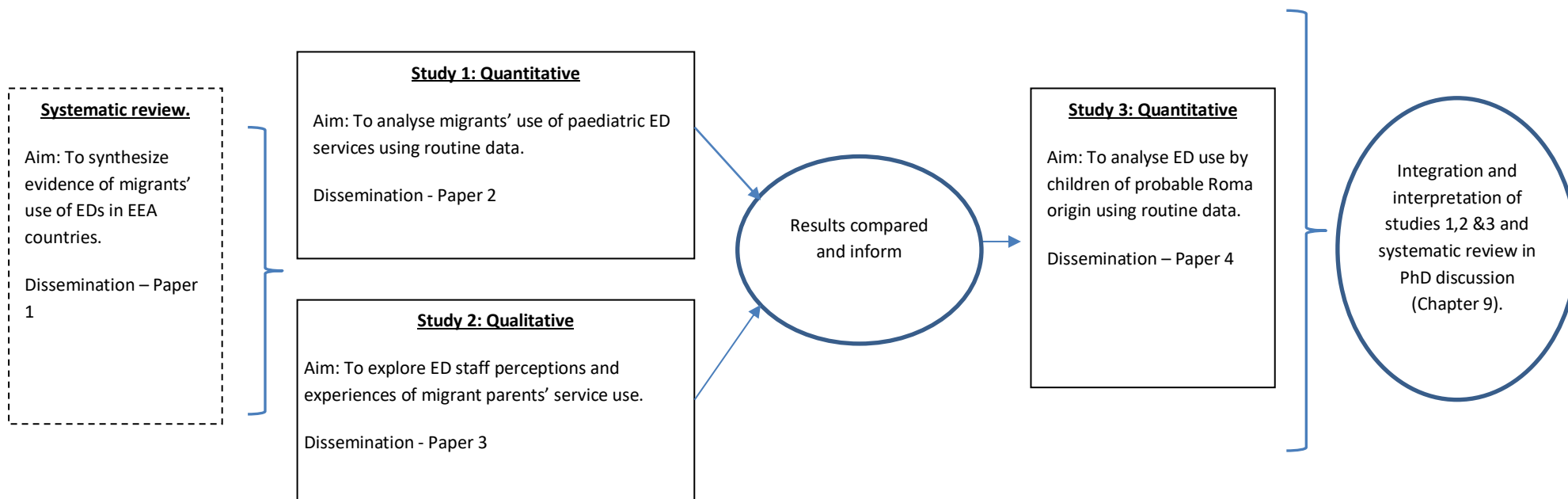
It was anticipated that the increased 'yield' (O'Cathain and Thomas, 2008), over and above the use of purely qualitative or purely quantitative studies, would be a greater insight and better understanding of ED use by parents of migrant background for their children. The qualitative data complement the quantitative data and help us to understand the phenomena of interest more fully (Pope and Mays, 2008).

5.2.3 A description of the mixed methods design.

Just as there are varying definitions for mixed methods research, different authors have described varying typologies of mixed methods designs. These differing typologies have emerged as different scholars focus on different aspects of the study design, and prioritise different features in their mixed methods designs (Creswell and Plano Clark, 2018). In conceptualizing the design of a mixed methods study some important considerations include: (a) whether the study was partially or fully mixed; (b) whether the studies took place concurrently or sequentially; and (c) the emphasis placed on each approach (Leech and Onwuegbuzie, 2009). Three core designs have been described by Creswell and Plano Clark, 2018, these are: explanatory sequential design, exploratory sequential design and convergent design (Creswell and Plano Clark, 2018). While the design used in this PhD does not accord exactly with any of these three core designs, this study has used a variation of the convergent design, where the results of the quantitative and qualitative components are brought together to create a deeper understanding of the topic (Creswell and Plano Clark, 2018).

The mixed methods study design used in this PhD is presented in Figure 6. Studies 1 and 2 took place concurrently, with equal importance placed on the both the qualitative and quantitative findings. The data generated from each of these studies was analysed separately and the results have been reported in separate publications (Chapters 6 and 7).

Figure 6: Flow chart of mixed methods design used in this PhD



It can be seen from Figure 6 that there was also a sequential element to this study design. The initial results from studies 1 and 2 pointed to specific findings that required further investigation. Study 3 addresses a further, more focused, research question developed from the initial results of studies 1 and 2. The mixed methods design used in this PhD can be seen to have involved both fixed and emergent aspects. Studies 1 and 2 were pre-determined and planned at the start of the study (fixed mixed methods design) (Creswell and Plano Clark, 2018). The details of study 3 emerged based on the results from the first two studies (emergent mixed methods design) (Creswell and Plano Clark, 2018). While the findings of each of these three studies have been written-up in separate papers (Chapters 6-8), the overall findings from the three studies (and the systematic review, Chapter 3) have been combined in the discussion section of the PhD (Chapter 9).

5.3 Study setting

The empirical work for this PhD is set in Yorkshire in the north of England. A fundamental driver for the choice of study setting was the availability of data through the Born in Bradford (BiB) cohort, based in Bradford. As discussed in Chapter 3, there is a paucity of variables relating to migration background in large quantitative datasets and the BiB data provided a unique opportunity to examine the use of ED services for children's healthcare needs, by mother's country of birth.

Migrants can be found in all regions of the UK, and NHS services throughout the UK are likely to see non-UK born patients but, to date, little research exists that quantifies migrants' use of EDs outside of London. Healthcare service utilization is likely to differ across England, and understanding migrants' use of EDs outside of London is important in allowing healthcare Trusts and facilities to be adequately prepared to manage the demographically changing population. The Yorkshire and Humber region, which includes the city of Bradford, has high rates of net migration but does not represent the opposite extremes of London or the North East (Rienzo and Vargas-Silva, 2017). In 2016, Yorkshire and Humber was estimated to have a population of 5,425,400, an increase of 35,200 people across 2015-16 (Migration Yorkshire, 2018b). More recently, in 2018, it was estimated that nearly 32,000 newcomers (new migrant arrivals issued with a national insurance number), arrived in the Yorkshire and Humber (Migration Yorkshire, 2018a). These new migrant arrivals represented 133 different countries of origin. International migration contributes significantly to population growth in this region (Migration Yorkshire,

2018b). The study setting was also been chosen for pragmatic reasons due to the location of the researcher.

5.4 Overview of methods

The aims and methods of the three empirical studies are presented in short below. The methods used in each of the studies can be found within the individual papers (Chapters 6-8). Additional detail on the design and analysis of study 1 and 2 can be found in Appendices 5 and 6 respectively.

5.4.1 Study 1: Paediatric emergency department utilization rates and maternal migration status in the Born in Bradford Cohort: A cross-sectional study

Table 5: Overview of methods used in Study 1

Primary Aim:	To establish whether there are differences in paediatric ED utilization in the first five years of life for children born to migrant, as compared to non-migrant, mothers in the Born in Bradford (BiB) cohort.
Methodology:	Quantitative
Design:	Secondary data analysis of linked data from the BiB cohort study.
Data collection:	A data set was provided by BiB that included baseline questionnaire data (completed by mothers at recruitment) linked on an individual patient level basis to children's Bradford Royal Infirmary ED data.
Primary outcome:	ED utilization in first five years of life (no visits versus at least one visit) and utilization rates by children who had made at least one visit to the ED.
Secondary outcomes:	Day of week of ED attendance; presenting condition (ICD 10); type of discharge.
Main explanatory variable:	Maternal country of birth. Mothers were defined as being 'migrant' if they were born outside of the UK/ Ireland and thus all children were either born to a 'migrant' or a 'non-migrant mother'
Covariates of interest:	Child's gender, mother's age at recruitment, mother's level of residential deprivation (Index of Multiple Deprivation (IMD) quintiles), mother's parity*, mother's educational level and distance from home to hospital.
Sub-group analyses:	Sub-group analyses by region of birth, and by time since arrival in UK.
Data analysis:	Descriptive analyses followed by multivariable analyses (logistic and zero-truncated negative binomial regression) were conducted adjusting for socio-demographic, socio-economic, and ED utilization factors.

*parity is the number of times a female has carried a pregnancy to a viable gestational age.

5.4.1.1 Description of the Born in Bradford cohort

The BiB study is a multi-ethnic prospective birth cohort study. A cohort of pregnant mothers who were booked for delivery at Bradford Royal Infirmary (BRI) was recruited at antenatal care between March 2007 and December 2011. Potential participants were approached at an oral glucose tolerance test (OGTT), which all pregnant mothers are invited to take and which typically takes place between 26-28 weeks gestation. The BiB study has followed the children born to these mothers over time to assess how social, genetic, environmental and behavioural factors impact on health from childhood to adulthood (Wright et al., 2013) .

Of all the women approached during their antenatal care, 80% agreed to take part at the time of the OGTT, with a small number of additional women recruited through other hospital appointments (Wright et al., 2013). In total, 12,453 women were recruited (13,776 pregnancies) and 13,858 babies (live births and still births) were born to these mothers. Full details of the BiB cohort have been published elsewhere (Wright et al., 2013).

Some small differences between women recruited and those not recruited are evident in the BiB cohort (Wright et al., 2013). Women who were recruited were older than those not recruited to cohort. In addition, more South Asian women, as well as more nulliparous women, were recruited. Furthermore, of those not recruited to the study fewer were considered to be living in deprived areas (Wright et al., 2013). The potential impact of these differences on the overall study findings has been addressed in the paper 2 (Chapter 6).

At recruitment, all women who consented to take part in the cohort study were invited to complete an interviewer-administered questionnaire. This baseline questionnaire provided detailed information on: mother's socio-demographic; general health; and financial, social and environmental characteristics. In particular, and of importance for this PhD project, this questionnaire gathered detailed migration history of the parents, including: country of birth data for both parents and both maternal and paternal grandparents, and time since mother's arrival in the UK. At recruitment, mothers also consented to the use of their own medical, as well as their children's medical and education records. Linked records across primary and secondary medical care for these children enabled the patterns of healthcare, including ED utilization, to be assessed. The BiB data set provided a unique opportunity to explore ED utilization by migrant parents for their children.

5.4.1.2 Reason of focusing on ED use in first five years of life

The focus of this study is on the use of EDs in the first five years of life. The reason for focussing on ED attendance in this time period is that firstly, children and young people are known to frequent the ED. In 2017-18 10% of ED attendances were for children under 5 years (NHS Digital and NHS England, 2018). Children under 5 are also at high risk of hospital admission (Purdy, 2010). Thus, this is an important group to look at when addressing demand on our emergency departments.

5.4.2 Study 2: Migrants' use of emergency departments for paediatric care in an English region. A qualitative study of healthcare providers' perceptions

Table 6: Overview of methods used in Study 2

Primary Aim:	To explore, through in-depth qualitative interviews, service providers' perceptions and experiences of migrants' use of the emergency department for paediatric care.
Methodology:	Qualitative
Design:	Semi-structured qualitative interviews with ED healthcare providers at two EDs in the north of England.
Data collection:	15 individual, semi-structured interviews were conducted with a range of ED service providers, including nurses, consultants, specialist registrars and clerical staff. Interviews were audio recorded and transcribed verbatim.
Broad themes explored in interview: Interview guide (Appendix 7)	<ul style="list-style-type: none"> • Perceptions of migrant parents' use of ED for their children. • Experience of managing children of migrant parents in the ED. • Differences/ similarities in patient presentation to ED between migrant and non-migrant families. • Challenges and barriers to providing care in ED to families with migrant parents. • Ways in which ED service provision could be improved for children of migrant parents.
Data analysis:	Interviews were coded and analysed using thematic analysis.

5.4.2.1 Semi-structured interviews

The rationale for the use of qualitative methods in understanding providers' perceptions of migrants' use of paediatric ED services is that qualitative research enables the factors that underpin or influence a particular perception or attitude to be examined in depth (Ritchie et al., 2014). Developing an in-depth explanation of people's beliefs and opinions is not possible using quantitative methodology (Pope and Mays, 1995). Interviews are seen to be a valuable research tool which enables the researcher to gain insight into participants' views, perceptions and constructions of reality (Ritchie et al., 2014, Punch, 2005). The qualitative data enabled the

provision of in-depth accounts of the perceptions of health service staff on the characteristics of migrant users and the perceived difference in migrants' use of the ED compared to non-migrants' use.

Semi-structured interviews were chosen for this study as it was felt that they allow participants to provide a more detailed, in-depth response to a particular topic or idea (Britten, 2000). The loose structure of semi-structured interviews helps to guide the conversations to the defined topic area while still allowing more in-depth exploration of particular thoughts or ideas that emerge (Pope and Mays, 2008). The nature of semi-structured interviews also allows participants to set the pace and direct the course of the interview towards topics which they feel most comfortable discussing, or which are most important to them (Silverman, 2013).

5.4.2.2 Reflexivity in qualitative research

Within qualitative research it is known that the researcher's background and characteristics can subjectively influence the research process and the data generated (Hennink et al., 2011b). Through the process of reflexivity researchers can seek to understand how their background may influence the collection, analysis and interpretation of data. Reflexivity has been defined by Pope and Mays (2000 p.96) as follows: "Reflexivity means sensitivity to the ways in which the researcher and the research process have shaped the data collected, including the role of prior assumptions and experience, which can influence even the most avowedly inductive enquiries". From the inception of this qualitative study, I have constantly reflected on my own background, prior assumptions and characteristics, particularly with regard to how these may have influenced the research process and findings. Here I discuss some of these reflections.

Having had a career working clinically as a physiotherapist in healthcare settings, and more recently in public health (having gained an MPH) working on research projects situated within health services research, I have developed a particular interest in patterns of healthcare utilization. This interest relates particularly to understanding how, and why, people use healthcare services in the patterns that they do. Of particular interest to me are patterns of utilization that are perceived to be different from what is the expected 'norm'. While my clinical, academic and professional experiences have driven my interest in the area of healthcare utilization, my particular interest in migrants' use of ED services stemmed largely from the negative political and media rhetoric that has, in the past, portrayed migrants as a population who may be creating disproportionately increased pressure on UK healthcare services.

The decision to pursue this PhD topic has also been influenced by the fact that I work at the University of Sheffield within the Centre for Urgent and Emergency Care research (CURE) and this topic fits well within the work that is undertaken in CURE. I also received a studentship from the National Institute for Health Research (NIHR) Collaboration for Leadership in Applied Health Research and Care (CLAHRC) Yorkshire and Humber to enable me to pursue this work, and the work, again, was chosen to fit within a specific CLAHRC theme (Avoidable Attendance and Admission in Long Term Conditions). A focus of this CLAHRC theme was on preventing unnecessary ED attendances and identifying key patient groups amenable to alternative care. To ensure that this research project was not solely influenced by the remit of either CURE or the CLAHRC theme, I chose my supervisory team to ensure that both a public health and a health service research (academic emergency medicine) angle were included in this work.

It is also important to state that I am a 'migrant' myself; I moved to the UK permanently six years ago. My status as a 'migrant' could have influenced my assumptions, the research questions I asked and how I interpreted the data. My status as a migrant may have influenced the responses received in my qualitative interviews if interviewees gave responses that they thought I wanted to hear. Furthermore, as a migrant, I may not want 'migrants' to be portrayed in a negative light and this could have influenced my interpretation of the data. I may have been identifiable to participants as a migrant, particularly due to my accent, and this may have influenced the participants' responses in the interview. To avoid this, I firstly provided a definition of the word 'migrant' and allowed participants to explore their own meanings of the word. Further, the topic guide that I developed was shared with my supervisors to ensure that the questions asked weren't informed by my subjective opinion. During the processes of data coding, and in identifying the themes from the data, these were checked by my supervisor (ES) to again ensure that these accurately reflected the data and were not influenced by my prior assumptions or experiences. Co-authors contributed to the final write-up of the paper and their involvement in the write up has helped to ensure that the paper reflects the data and is not my subjective interpretation of the findings.

However, despite being a migrant, I have rarely felt like a 'migrant' in the UK and, on reflection, I think that as a white, English speaking professional in the UK I am probably not often considered to be a 'migrant' as I don't look physically different from the White British population. This would be supported by Bhopal (2014, p96) who suggest immigrants are often identified as people who are physically different in terms of culture and biology. Here the concept of ethnicity may also be helpful, as I may have been perceived by study participants to fit within the ethnic category of

‘White British’ (the majority population), due to perceptions of a shared social background, shared culture and traditions, and a common language.

5.4.3 Study 3: Patterns of paediatric emergency department utilization in Sheffield, UK: a comparison of Roma and White British children

Table 7: Overview of methods used in Study 3

Primary Aim:	To identify whether patterns of ED utilization differ between Roma and White British/ Irish children of similar deprivation levels in Sheffield, UK.
Methodology:	Quantitative
Design:	Cross-sectional analysis of routine ED data from the Connected Health Cities (CHC): CUREd Research Database.
Data collection:	Pseudo-anonymised data were provided by the CUREd Research Database project team. Children were identified by the project team as ‘likely’ Roma using a surname-based ethnicity classification system prior to pseudo-anonymising the data.
Primary outcome:	Patterns of ED utilization including: number of ED episodes, presenting condition, arrival time, duration of ED attendance and discharge destination.
Main explanatory variable:	Likely Roma ethnicity, identified through surname.
Data analysis:	ED utilization was compared between children of likely Roma and White British/ Irish children using univariate comparisons of the outcomes of interest.

5.4.3.1 Justification for this study

The third piece of empirical work undertaken in this PhD addresses a specific research question that emerged from the results of studies 1 and 2. Findings from the BiB study (presented in Chapter 6) identified that children born to Eastern European mothers in Bradford had a higher rate of ED utilization as compared to UK/ Irish born mothers. These findings were corroborated by findings from the qualitative interviews in which Eastern European parents, particularly those of Roma origin, were perceived by ED staff to utilize the ED more, and differently, to other migrant groups (full details in Chapter 7). Having compared the results from studies 1 and 2, the broad question that emerged was whether patterns of ED utilization do, in fact, differ between children of Roma as compared to non-Roma children. Using an iterative approach to this mixed methods PhD this final study aimed to address this gap in knowledge by answering the question: “What are the differences/ similarities in the use of the ED by Roma as compared to non-Roma children?”

Identifying children of Roma origin is not usually possible using routine NHS data as neither country of birth nor Roma ethnicity are captured in routine NHS data. However, data available from the CUREd Research Database provided a unique opportunity for children to be identified as 'probable Roma' using patient identifiable data provided by urgent and emergency care service providers in the Yorkshire and Humber. The CUREd project is managed by the University of Sheffield and is funded by Connected Yorkshire – part of the Connected Health Cities programme.

5.4.3.2 CUREd Research Database

The CUREd Research Database is a large research database that contains routine NHS patient data linked across the urgent and emergency care services in Yorkshire and Humber (CUREd The University of Sheffield, 2019). This routine data includes: linked data from acute NHS trusts, the Yorkshire Ambulance Service and NHS 111. The overall aim of this data source is to enable the generation of a whole-system view of urgent and emergency care services within the region. The CUREd database includes data from Sheffield Children's Hospital ED. As significant Roma populations reside in the Yorkshire and Humber (Brown et al., 2013), including a large population of Slovak Roma residing in Sheffield (Willis, 2016), the data available from Sheffield Children's Hospital provided a unique opportunity to address the research question.

The CUREd project team received identifiable patient data from Sheffield Children's Hospital NHS Foundation Trust and this enabled the project team to identify children of 'likely Roma origin' using a novel surname-based ethnicity classification system prior to removing patient identifiers from the data. There are limitations to this approach, as discussed in Chapter 8, however this approach was seen to be the 'best' of a limited range of options that seeks to sensitively address a challenging observation that emerged in studies one and two in an area of distinct healthcare need. One year's (2017) worth of pseudo-anonymised ED episode data from Sheffield Children's Hospital was requested from the CUREd project team. Children were identified by the CUREd data manager as being of likely Roma origin before pseudo-anonymisation of the data. A full description of the analysis undertaken in this study can be found in Paper 4 (Chapter 8).

5.5 Integration of the findings

Integration of the study findings occurred at various stages of this project. The first phase of integration took place while studies one and two were taking place. This integration involved the use of some of the initial quantitative findings to inform some of the questions asked in the qualitative interviews. Initial quantitative results identified particular patterns of ED utilization by migrant sub-populations. Without sharing the exact findings from this quantitative study, some of the questioning in the qualitative interviews aimed to gain the perspectives of ED staff on the quantitative results that were identified, particularly whether ED use differed by migrant sub-groups.

Analysis of the results of studies one and two took place separately, and these results have been written up in separate publications. Further integration of the findings from studies one and two took place to inform the development of study three, where a particular theme emerged in the qualitative data that was supported by the quantitative findings. Through discussions with my supervisors, we believed that these results needed further investigation. Study three was conducted after the first two studies, the results were analysed independently, and the findings have been written up for publication.

The findings from each of the three empirical studies have been integrated in the Discussion chapter (Chapter 9) using a method of triangulation.

5.5.1 Triangulation

Triangulation is a methodological approach to integrating research results that have employed multiple methods (Farmer et al., 2006). Triangulation involves comparing the findings from each component study to identify areas of complementarity (findings from one study help to explain the findings from another), to test for convergence (agreement) of study results, or to identify dissonance of ideas (O'Cathain et al., 2014).

By triangulating the study findings from each component study this can lead to a deeper understanding of complex health issues (Farmer et al., 2006). The process of triangulation is recognised to add credibility and validity to the research findings (Lincoln and Guba, 1985). Although the Triangulation protocol was developed to integrate sources of qualitative data, the

ideas generated by Farmer can be used within mixed methods approaches that use both qualitative and quantitative methodology (O’Cathain et al., 2010). Using the methods of triangulation, the findings from each of the empirical phases of this thesis have been presented in themes and displayed in a matrix (Table 16, Chapter 9).

Through the process of triangulation, and using a matrix of key study findings (presented in Chapter 9), both the unique contributions of each study, as well as findings that are similar between the studies, have been highlighted (Farmer et al., 2006). Combining the findings of the three empirical studies has created a broader understanding of the research question.

5.6 Ethical considerations

Research involving human participants needs to be scientifically sound and guided by ethical principles. Formal Ethics Committee approval was obtained for each component of the empirical work prior to commencing each study. Details of the main ethical considerations for each of the studies, and the ethical approvals attached to each of these, will be found below.

5.6.1 Study 1: Ethical considerations

The Born in Bradford study received ethics approval from the Bradford Research Ethics Committee (Ref 07/H1302/112). The data used in this PhD project is secondary, anonymised patient data from the Born in Bradford study and the present study falls within the ethical approval granted for the BiB cohort study. At the point of recruitment into the BiB cohort, mothers provided full informed consent for their baseline questionnaire data to be linked to NHS records. In the data set provided by BiB all participants are identified only by a study number, and the only data provided was the data needed to answer my research questions.

5.6.1.1 Key ethical considerations

The main ethical considerations for this study related to the management of large data sets and data protection. In managing a large data set I was adequately trained in data management. I completed the ScHARR information security training which includes training on: protecting information, protecting personal data, protecting research data, and information governance. This training was important for each of the studies undertaken in this PhD. To ensure data

security, all data provided by BiB was secured on a University of Sheffield password protected network that was only accessible by me.

Permission to use the BiB data for the purposes of this PhD was granted by the Born in Bradford Executive committee, and a collaboration and information-sharing agreement was signed between BiB and Sarah Credé on the 20/02/2017. The information-sharing agreement was signed to ensure that only high-quality research was undertaken using the BiB data, and that the research conducted would in no way harm participants.

5.6.2 Study 2: Ethical considerations

5.6.2.1 Key ethical considerations

The qualitative study undertaken for this PhD, was an observational study which was considered to carry minimal risk to the participants. The key ethical considerations for this study included: participant consent, confidentiality, data protection, and the personal safety of the researcher. It was acknowledged that taking time to attend an interview might be seen as inconvenient and a potential risk to the participant. In addition, the nature of the interview might have raised sensitive issues.

Participation in this study was voluntary and every effort was made to arrange the interview at a time and location that was convenient to the participant. Participants were fully informed about the requirements of the study, through a written participant information sheet that accompanied their letter of invitation (Appendix 7). Participants were given time to read the information sheet and consider their involvement, prior to signing a consent form (Appendix 7) at the time of the interview.

The sensitive nature of the issues raised during the interviews, including migration, might have been viewed as a potential risk to participants. To manage this potential risk, and to maintain participant well-being, the study was entirely voluntary, and all participants were fully informed of the study requirements prior to interview. Participants were free to withdraw at any stage during data collection. To minimise the risk of harm/ distress to participants in discussing sensitive issues, I received appropriate training in qualitative interviewing. All interviews were conducted in a location that ensured privacy for the participant with a view to ensuring that others were not able to overhear the conversation and any sensitive issues raised.

To maintain participant confidentiality, an encrypted audio recording device was used. All data was handled in accordance with the Data Protection Act 1998. All consent forms and interview transcripts were kept in a locked cabinet at SchARR and were only accessible to the principal researcher. All audio recordings were transferred to an encrypted University of Sheffield network prior to deleting the recordings from the recording device. To ensure that participants' views remain confidential and that the participant is not identifiable in any reports, presentations or publications, participants were assigned study numbers. No personal identifiable information has been used in writing up the study results and the hospital sites have not been named.

As the interviews for this study were conducted off University premises, personal safety was a potential risk to the researcher. To manage the safety of the lead researcher, all interviews were conducted on hospital premises at a location mutually agreed by the researcher and participant.

5.6.2.2 Application for ethical approval

Ethical approval for this study was obtained from the School of Health and Related Research (SchARR) Research Ethics Committee (REC), University of Sheffield (SchARR REC Reference Number 013510) (Appendix 8). NHS REC approval was not required as this study involved NHS staff, rather than patients, as participants. Although this project did not require NHS REC approval, an application was submitted to Health Research Authority (HRA) via the Integrated Research Application System (IRAS) on the 21/07/17 to comply with research governance requirements. This project received HRA approval on the 1/08/2017, having been formally assessed to comply with NHS governance and legal requirements (IRAS project ID: 231220) (Appendix 8).

The project was submitted to the SchARR Ethics Committee on 24/06/2017 and received approval on 12/07/2017. Prior to receiving approval, I was required to attend the SchARR REC committee meeting (21/06/2017) and to make minor amendments to this project. The concerns raised by the REC included: how potential participants would be identified and approached in order to adhere to the data protection act; the timing of gaining participant consent; and clarification as to whether or not the recording device to be used for participant interviews would be encrypted.

The first concern raised by the REC related to the process of participant recruitment. The initial strategy I proposed for participant recruitment was to obtain a list of ED staff working at the hospital sites and to contact these potential participants directly. This was identified by the REC as a breach of the data protection act as NHS email addresses cannot be given out without the

participants' consent. To address this concern an amendment was made to the recruitment process. It was agreed that an ED consultant would be identified at each hospital site and would act as a 'gatekeeper' for this project. The gatekeeper was responsible for identifying potential participants and approaching these participants via a standard recruitment email worded by the researcher (Appendix 7). Potential participants were then required to contact me directly if they were willing to take part in this study.

The second concern related to the timing of gaining participant consent, with particular respect to my having noted in my application that the interview could be cancelled at the scheduled time if a participant chose not to consent to interview. This was addressed by amending the information sheet to state that agreeing to take part would involve the need to sign consent before taking part in the interview. The consent form and information sheet would be sent to the participant prior to the arranged interview and participants would be invited to raise any concerns with this before agreeing a time for an interview. The consent form would be signed at the time of the interview. With this minor amendment to the process of gaining consent it was thought unlikely that an interview would need to be cancelled at the agreed interview time due to an unwillingness of the participant to sign the consent form.

During the Ethics Committee meeting it was queried whether an encrypted audio recording device would be used for these interviews. Clarification was given that this would be the case. Following this REC meeting, amendments were made to the ethics application, participant consent and information sheets (Appendix 7). After making these changes, the application was resubmitted and approved.

5.6.2.3 Approaching ED managers for study approval

Lead ED consultants at the two hospital sites, identified with the assistance of my primary supervisor, were approached via email about my proposed study to seek their support to conduct this study at their EDs. The email sent to these ED consultants outlined the purpose of the study and the proposed methodology. These lead consultants at both hospital sites offered their support for this study and identified potential 'gatekeepers' (ED consultants) to facilitate participant recruitment. These potential 'gatekeepers' were subsequently contacted and expressed willingness to assist with this study. A gatekeeper was identified at each site and named as the local principal investigator.

5.6.2.4 Research governance approvals

The feasibility requirements for this study differed between the two hospital sites. A feasibility discussion was not required from site 1 as no support was needed from the Clinical Research Facility (CRF). Site 1 confirmed their capacity and capability to support this study on the 29th August 2017.

The feasibility of the study was discussed with site 2. A number of actions were stipulated by site 2 prior to study commencement. One of their requirements was that the divisional manager for the ED at site 2 be contacted and the study requirements and impact of the study on the organisation be discussed with her. She requested that interviews take place outside of participants' clinical times due to the pressures on the ED. On the understanding that I would meet the requirements stipulated by site 2, the Trust confirmed their capacity and capability to deliver the study on the 21st September 2017.

As I do not hold an NHS contract I was required to apply for a research passport to access, and conduct research, at both hospital facilities. A letter of access for site 1 was granted on the 29th August 2017 and for site 2 on 5th October 2017.

5.6.3 Study 3: Ethical considerations

The data for study three was supplied by the Connected Health Cities (CHC): CUREd Research Database. The CUREd Research Database gained approval from the Health Research Authority Ethics Committee (18/YH/0234) and Confidentiality Advisory Group (CAG/18/0126) for data that does not contain patient identifiers, to be supplied and used in research projects. The data used in this PhD project is secondary, pseudo-anonymised patient data, and thus this study falls within the ethical approval granted for the CUREd Research Database.

5.6.3.1 Key ethical considerations

This retrospective study used pseudo-anonymised, routine patient data, and was accordingly a low risk study. The main ethical considerations were the management of large data sets and the maintenance of the anonymity of the routine clinical data.

All patient level data was provided by the CUREd study team in a pseudo-anonymised format.

The only data items requested were those required to enable the study objectives to be achieved. Data were securely stored on the University of Sheffield's Networked File store within controlled access project folders.

5.7 PPI involvement

Patient and Public Involvement (PPI) in research, where patients or the public are actively involved in the research process, is an integral part of healthcare research in the UK (Mathie et al., 2014). The key features of PPI are that research should be carried out 'with' or 'by' members of the public rather than 'for' or 'about' them (INVOLVE., 2012). NHS guidance indicates that where possible service users and representative groups should be involved in the research process (NHS Health Research Authority, 2017). PPI involvement in research is largely undertaken for methodological, moral/ ethical or political reasons. Methodologically, involving patients in research has the potential to improve the quality, transferability and credibility of the research findings (Ward et al., 2010). Public involvement in research is also seen to be a democratic principle, in that people who are affected by research should be able to influence how publicly funded research is undertaken (INVOLVE., 2012). There is an expectation from many funding bodies that researchers consider their plans for involving patients in their work (INVOLVE., 2012).

As the studies for this PhD did not propose to include patients, extensive consideration was given to how this project could involve the public in a meaningful way. It was decided that patient groups should know about the research being undertaken and how routine NHS data was being used. It also seemed important to consult a PPI group to gain their views on the importance of the study.

PPI activity for this PhD involved the engagement of the Sheffield Emergency Care Forum (SECF). The SECF is a PPI group that focuses on providing the public and patient perspective on studies undertaken within pre-hospital or urgent and emergency care service. It must be noted that migrant patients are not represented on the group. The purpose of consulting with SECF was to gain their views on the importance and relevance of the study, and to ask for feedback on any aspect of the proposed study. This feedback and advice was used to inform decision making.

On 09/06/2017 I presented an overview of the proposed study to ten members of SECF. The panel felt that this was a very valid research project and that its findings could be used by a substantial number of EDs to inform their service delivery. Some panel members were surprised that no data exist identifying migrant status in healthcare records, and felt that it was important that future studies examine service use by migrant populations. The panel provided valuable feedback on the proposed study and suggested some minor amendments, including a minor change to the

study title. The panel asked for clarification on how a 'migrant' would be defined. The SECF panel also recommended that the results of this study be shared with the clinical commissioning group (CCG) as it was felt that the information generated by this study would help the CCG to plan for the future, particularly helping migrant parents access appropriate healthcare services. Feedback to the panel is also planned.

5.8 Chapter summary

- A pragmatist paradigm influenced this PhD as it supports the use of mixed methods in research that considers multiple positions, viewpoints and perspectives in gaining an in-depth understanding of the research question.
- A mixed methods approach was chosen to address different, but linked, research questions, thus enabling the overall study findings to be more comprehensive.
- The mixed methods design used in this study is a variation of the convergent design.
- Studies 1 (quantitative) and 2 (qualitative) were pre-planned and took place concurrently. Study 3 (quantitative) emerged based on the results from the first two studies.
- The findings of each of these three studies have been written-up in separate papers, the overall findings from the three studies (and the systematic review) have been integrated in the discussion chapter using a method of triangulation.
- Each of the studies received necessary ethical approvals prior to study commencement.

Chapter 6. Study 1 (Paper 2)

This chapter presents the study findings from study 1 in the format of a paper for a scientific journal. This paper has been published in *PLOS Medicine*. All publications in *PLOS Medicine* are done so under open access Creative Commons Attribution (CC BY) license. Under this licencing the content of the article can be reused by anyone, for any reason, as long as the author and original source are properly cited.

As the first author, I was responsible for the study design, data analysis and wrote the first draft of the paper. Detail of the co-authors' contributions to this paper can be found in Appendix 1.

The manuscript presented below is a copy-edited version of an article accepted for publication in *PLOS Medicine*. The version of record:

Credé, S., Mason, S., Such, E. and Jacques, R.M. 2020. Paediatric emergency department utilisation rates and maternal migration status in the Born in Bradford cohort: A cross-sectional study. *PLoS Med* 17(3)

The following appendix has been provided to support this chapter:

Appendix 5: This appendix provides additional detail on the quantitative methods used in study 1 and includes the following supplementary files that are published online alongside the journal article:

- S1 Checklist. Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) checklist
- S1 Table

6.1 Paper 2: Paediatric emergency department utilisation rates and maternal migration status in the Born in Bradford Cohort: A cross-sectional study

ABSTRACT

Background: Globally, international migration is increasing. Population growth, along with other demographic changes, may be expected to put new pressures on healthcare systems. Some studies across Europe suggest that emergency departments (EDs) are used more, and differently, by migrants compared to non-migrant populations, which may be a result of unfamiliarity with the healthcare systems and difficulties accessing primary healthcare. However, little evidence exists to understand how migrant parents, who are typically young and of childbearing age, utilize EDs for their children. This study aimed to examine the association between paediatric ED utilization in the first five years of life and maternal migration status in the Born in Bradford (BiB) cohort study.

Methods and Findings: We analysed linked data from the BiB study - an ongoing, multi-ethnic prospective birth cohort study in Bradford. Bradford is a large, ethnically diverse city in the north of England. In 2017, more than a third of births in Bradford were to mothers who were born outside the UK. Between March 2007 and December 2010, pregnant women were recruited to BiB during routine antenatal care, and the children born to these mothers have been, and continue to be, followed over time to assess how social, genetic, environmental, and behavioural factors impact on health from childhood to adulthood. Data analysed in this study included baseline questionnaire data from BiB mothers, and Bradford Royal Infirmary ED episode data for their children. Main outcomes were likelihood of paediatric ED use (no visits versus at least one ED visit in the first five years of life) and ED utilization rates (number and frequency of ED visits) for children who have accessed the ED. The main explanatory variable was mother's migrant status (foreign-born versus UK/Irish-born). Multivariable analyses (logistic and zero-truncated negative binomial regression) were conducted adjusting for socio-demographic and socio-economic factors.

The final dataset included 10,168 children born between April 2007 and June 2011, of whom 35.6% were born to migrant mothers. Foreign-born mothers originated from South Asia (28.6%), Europe/Central Asia (3.2%), Africa (2.1%), East Asia/Pacific (1.1%), and the Middle East (0.6%). At

recruitment the mothers ranged in age from 15 to 49 years old. Overall, 3,104 (30.5%) children had at least one ED visit in the first five years of life, with the highest proportion of visits being in the first year of life (36.7%). The proportion of children who visited the ED at least once was lower for children of migrant as compared to children of non-migrant mothers (29.4% vs 31.2%). Children of migrant mothers were found to be less likely to visit the ED (odds ratio 0.88 (95% CI 0.80 to 0.97), $p=0.012$). However, among children who visited the ED, the utilization rate was significantly higher for children of migrant mothers (incidence rate ratio (IRR) 1.19 (95% CI 1.01 to 1.40), $p=0.040$). Utilization rates were higher for children born to mothers from Europe (IRR 1.71 (95%CI 1.07 to 2.71), $p=0.024$) and established migrants (≥ 5 years living in UK) (IRR 1.24 (95% CI 1.02 to 1.51), $p=0.032$) compared to UK/Irish-born mothers. Important limitations include being unable to measure children's underlying health status and the urgency of ED attendance, as well as the analysis being limited by missing data.

Conclusions: In this study we observed that there is no higher likelihood of first paediatric ED attendance in the first five years of life for children in the BiB cohort for migrant mothers. However, among ED users, children of migrant mothers attend the service more frequently than children of UK/Irish-born mothers. Our findings show that patterns of ED utilization differ by mother's region of origin and time since arrival in the UK.

Key words: Migrants, Emergency department, Europe, Utilization

AUTHOR SUMMARY

Why Was This Study Done?

- Migrant populations are typically of childbearing age and contribute to a growing proportion of the birth rate in the UK.
- Migrant populations demonstrate different patterns of emergency department (ED) use compared to people born in country across many European states. There is limited understanding of migrant parents' use of EDs in the UK for their children's healthcare needs.
- We conducted a study to explore whether migrant parents use EDs in different ways to non-migrant parents for their children.

What Did the Researchers Do and Find?

- We analysed patterns of ED utilization in the first five years of life for 10,168 children in the Born in Bradford cohort. We compared ED use between children born to migrant (non-UK/ Irish-born) mothers and UK/Irish-born mothers.
- We found that children of migrant mothers were less likely to make a first visit to the ED during their first 5 years of life, but children of migrant mothers who did use the ED were found to use it more frequently than children of UK/Irish-born mothers who used the ED.
- We also found that children of mothers with different regions of origin utilized the ED differently, and that children of migrant mothers who have been in the UK for a long time used the ED in similar patterns to children of mothers born in the UK.

What Do these Findings Mean?

- Overall, children of migrant mothers are less likely to make a first visit to the ED for their healthcare needs when compared to children of UK/Irish-born mothers. This raises the question of potential underuse, or low awareness of EDs, among some migrant groups.
- Different patterns of ED use between migrant and non-migrant parents for their children may be due to different underlying health needs in these populations, lack of understanding of the UK healthcare service, or barriers to more appropriate healthcare services.
- It is important that further research seeks to understand the reasons why some migrant families use the ED more frequently, particularly whether barriers to other healthcare exist.
- The main limitations of this study relate to the analysis being limited by missing data for some of the mothers in the cohort and being unable to measure children's underlying health status and the urgency of their ED attendances.

INTRODUCTION

International migration into, and within, Europe continues to increase, with migrants forming a growing proportion of the population in many countries (International Organization for Migration., 2018). Population growth, along with other important demographic changes, such as population ageing, can be expected to put new pressures on healthcare systems due to altered service demand (Ledoux et al., 2018, Gushulak et al., 2009). Much discussion and political debate in the United Kingdom (UK) on migrants' use of healthcare has centred on emergency services. It is often argued that migrants place increased pressure on already overstretched services (Giuntella et al., 2018b). However, these debates are often unsupported by empirical evidence as there is a paucity of detailed research on migrants' use of emergency services.

The UK's National Health Service (NHS) provides health services that are free for users at the point of access for any person who is 'ordinarily resident' in the UK (Public Health England, 2019). These services are offered on the basis of clinical need rather than ability to pay and include primary care services, urgent and emergency care, as well as hospital services. Importantly, any person, irrespective of migrant status or time since arrival in the UK, is currently entitled to free general practitioner (GP), primary care, and emergency services (Public Health England, 2019). Parents, or caregivers, can access urgent and emergency care for their children through their GP; via NHS 111, which provides online or telephone advice to people with urgent medical problems; by making an emergency call; by accessing a walk-in centre or minor injuries unit; or by accessing an emergency department (ED). No referral is needed to access an ED. EDs provide 24-hour urgent and emergency care, while GPs, walk-in centres, and minor injuries units have restricted opening hours, with some services having a provision for out-of-hours urgent care. In non-emergency situations, parents and caregivers are encouraged, where possible, to consult their GP, or to access other urgent care services, before using an ED.

The current demand for NHS emergency care is unprecedented. Adding to this pressure, and of concern, is the increase in ED attendances and admissions of children under 5 years over the last decade (Keeble and Kossarova, 2017). Of these attendances, 60% are non-urgent (Watson and Blair, 2018). Children are often vulnerable users of emergency services, dependent on their caregivers when accessing care (Keeble and Kossarova, 2017). Migrants to the UK are typically young and of childbearing age (Migration Observatory, 2016) and contribute to a substantial proportion of the UK birth rate (Office for National Statistics, 2019a). It is therefore important to

understand whether differences in patterns of paediatric ED use by migrant populations, as compared to the UK-born population, may contribute to increased paediatric ED use.

In many other European countries, higher use of EDs by immigrants, compared to people born in-country, has been observed in both children and adults (Credé et al., 2018). Evidence suggests migrants tend to access EDs for low-acuity presentations, which indicates that barriers to more appropriate primary healthcare services exist (Credé et al., 2018). To ensure the provision of appropriate and accessible emergency services to the demographically changing population, and to manage demand for these services, it is essential to understand paediatric ED utilization by migrant caregivers for their children (Rechel et al., 2012).

This study aimed to establish whether there are differences in paediatric ED utilization in the first 5 five years of life for children born to migrant, as compared to non-migrant, mothers in the Born in Bradford (BiB) cohort.

METHODS

Participants

We used data from the BiB cohort study (Raynor, 2008), an ongoing birth cohort study in the city of Bradford, a city in the north of England that is ethnically diverse and has high levels of residential deprivation. Approximately 16% of the community living in Bradford is non-UK-born, and 34% of births in this area are to mothers who themselves were born outside the UK (Migration Yorkshire, 2019).

Between March 2007 and December 2010, 12,453 pregnant women were recruited to BiB during routine antenatal care. The babies born to these mothers have been, and continue to be, followed over time to assess how social, genetic, environmental and behavioural factors impact on health from childhood into adulthood (Wright et al., 2013). Detailed methods for the BiB study have been reported elsewhere (Wright et al., 2013). This study is reported as per the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guideline (Appendix 5 S1 Checklist) (Von Elm et al., 2007b).

Data for this study included BiB baseline questionnaire data (Born in Bradford) matched on an individual patient level basis – using an exact match on NHS number, surname, date of birth and sex – to Bradford Royal Infirmary (BRI) ED attendance records (Born in Bradford). The baseline questionnaire was completed by all mothers at recruitment and included socio-demographic, general health, financial, social, and environmental characteristics. Detailed migration history was collected, including country of birth data for both parents and time since mother’s arrival in the UK.

The ED attendance data contain information about all ED visits to BRI in the first five years of the child’s life, including the date of attendance, date of discharge, and presenting condition, coded using the International Classification of Diseases-10th revision (ICD-10) codes. BRI ED is one of two EDs that serve Bradford and the surrounding districts, with BRI ED primarily serving the population of Bradford (Care Quality Commission, 2016).

Ethics

The BiB cohort participants provided written informed consent for data collection and granted permission for the study to access routine medical records. Ethical approval for the data collection was granted by Bradford Research Ethics Committee (Ref 07/H1302/112).

Outcomes of interest and other variables

The main outcome of interest was any ED use at BRI in first five years of life (no visits versus at least one ED visit). We also analysed utilization rates, considering the number and frequency of ED visits by children who used the ED. As some children in the cohort were born to the same mother, first ED visit was defined as the first ED attendance per child.

The main explanatory variable was mother’s migrant status. A migrant mother was defined as a mother who was born outside the UK or Ireland. UK- or Irish-born mothers were considered non-migrants.

Migrants are not a homogeneous group; populations will have had different experiences in their host country and are ethnically, socio-economically, and socio-demographically diverse, which may affect health and healthcare use (Gazard et al., 2015). To gain a deeper understanding of the relationship between migration status and health, sub-group analyses were conducted by mother’s region of birth, according to World Bank regions, and by mother’s time since arrival in

the UK at time of recruitment: short-term migrant (<1 year in UK), long-term migrant (living in UK ≥ 1 to <5 years), or established migrant (≥ 5 years in UK).

Health condition diagnoses were coded using the ICD-10 system and grouped according to categories. Type of discharge from the ED was categorised as either discharged from ED (0 days' stay) or admitted to hospital (≥ 2 days' length of stay). Children who were categorised as having a duration of stay of one day were excluded for this analysis. These children were excluded because, in the dataset, any child whose date of ED attendance was different to their discharge date was recorded as having a duration of stay ≥ 1 day. However, this may include children who attended late at night and who were discharged the following morning, or the following day, from the ED (duration of attendance of one day), although these children will not have been admitted to an in-patient ward.

The analysis was restricted to all children for whom there was complete country of birth data for the mother as well as complete data for the covariates of interest. The final cohort included 10,168 children. A comparison of the children included and those excluded from the analysis due to missing data is reported (in Appendix 5 S1 Table).

Statistical analysis

A prospective protocol for analysis was not prepared for this study however; all analyses were planned in advance of data analysis. Descriptive analyses were undertaken to identify the differences in socio-demographic characteristics between migrant and non-migrant mothers using Pearson chi-squared tests or Fisher's exact tests for categorical variables, and Mann Whitney U tests for numeric variables. To describe paediatric ED utilization, summary statistics were calculated along with ED utilization rates. Crude ED utilization rates per 1,000 children per year were calculated as the ratio of the number of ED episodes recorded for each sub-group of interest divided by the number of children in that particular sub-group. This ratio was divided by the number of years of follow-up (5) and multiplied by 1000.

Two approaches were used to analyse patterns of paediatric ED utilization. We assessed the likelihood of any ED use in the full cohort using unadjusted and multiple logistic regression models. We then conducted zero-truncated negative binomial regression to model the count of ED visits among ED users, i.e. conditional on ever using the ED, to study the frequency of use

(number of visits over the first five years of life). Regression coefficients from zero-truncated negative binomial regression models are interpreted as incidence rate ratios (IRR).

Separate models were fitted for mothers' migrant status (migrant yes/no), time since mothers' arrival in the UK, and mothers' region of origin. In all models, UK/Irish-born mothers were the reference population. For each multivariable model we controlled for covariates of interest including: child's sex, mother's age, parity (no previous live births vs at least one previous birth), maternal education (less than A level or equivalent qualification, A level or higher qualification, or unknown highest level of education), maternal level of residential deprivation using Index of Multiple Deprivation (IMD)(Department for Communities and Local Government, 2015) quintiles derived from national data zones, and distance from home to BRI ED in Kilometres (calculated from postcode at time of birth). These covariates were included in the multivariable analysis based on knowledge about the relationship between covariates and migrant status or a priori hypothesised relationships with the outcome of interest, and were further considered if the variable showed a significant association in univariable logistic regression analyses ($p < 0.05$). Continuous covariates were included in the model as linear terms. Zero-truncated negative binomial regression was chosen because, among users of the ED, the possibility of a count of zero attendances is not possible and the use of negative binomial regression is inappropriate (Hilbe, 1999). All analyses were undertaken using Stata 14 (StataCorp, 2015). Significance was accepted at the 5% level ($p < 0.05$).

RESULTS

Description of the cohort

The cohort included 10,168 children of whom 3,620 (35.6%) were born to migrant mothers. The majority of migrant mothers were from South Asia (Table 8), of whom 88.2% were of Pakistani origin. At the time of recruitment, 58.7% of migrant mothers had been living in the UK for at least five years, 35.2% had been in the UK for 1 to ≤ 5 years, and 6.1% had lived in the UK for less than one year at time of study recruitment. The relative deprivation in this cohort, particularly among migrant mothers, is highlighted by the large proportion of mothers who lived in the most deprived areas of Bradford (Table 8). Migrant mothers, on average, lived closer to BRI ED, and for a greater proportion of these mothers (99.9% vs 97.9%), BRI was the closest ED to their home at the time of their child's birth.

Table 8: Socio-demographic and socio-economic characteristics of mothers in the Born in Bradford (BiB) cohort

Characteristic	Total	UK/ Irish-born mothers		Migrant-mothers		P*
	N= 10,168	N= 6,548		N=3,620		
	N (%)	N	%	N	%	
Region of origin						
UK/Ireland	6,548 (64.4%)					
South Asia	2,913 (28.6%)					
Europe/Central Asia	322 (3.2%)					
Africa	211 (2.1%)					
East Asia/Pacific	112 (1.1%)					
Middle East	62 (0.6%)					
Child sex						
Male	5,157 (50.7%)	3,350	51.2%	1,807	49.9%	0.230
Female	5,011 (49.3%)	3,198	48.8%	1,813	50.1%	
Mother's age at recruitment (years)						
Median (IQR)	27 (23; 31)	26 (22; 31)		28 (24; 32)		<0.001
Range	15-49	15-45		15-49		
Parity						
No previous birth	4,179 (41.1%)	2,961	45.2%	1,218	33.6%	<0.001
At least one previous birth	5,989 (58.9%)	3,587	54.8%	2,402	66.4%	
Maternal education						
Less than A level or equivalent	5,286 (52.0%)	3,348	51.1%	1,938	53.5%	<0.001
A level equivalent or higher	4,670 (45.9%)	3,140	48.0%	1,530	42.3%	
Don't know/ foreign unknown	212 (2.1%)	60	0.9%	152	4.2%	
Marital and cohabitation status						
Married and living with partner	6,642 (65.3%)	3,383	51.7%	3,259	90.0%	<0.001
Not married, living with partner	1,838 (18.1%)	1,686	25.7%	152	4.2%	
Not living with partner	1,688 (16.6%)	1,479	22.6%	209	5.8%	
Residential deprivation IMD quintile 2010						
1 (most deprived)	6,712 (66.0%)	3,887	59.4%	2,825	78.0%	<0.001
2	1,838 (18.1%)	1,278	19.5%	560	15.5%	
3	1,141 (11.2%)	948	14.5%	193	5.3%	
4	302 (3.0%)	274	4.2%	28	0.8%	
5 (least deprived)	175 (1.7%)	161	2.4%	14	0.4%	
Closest ED to home						
Bradford Royal Infirmary	10,029 (98.6%)	6,414	97.9%	3,615	99.9%	<0.001
Other	139 (1.4%)	134	2.1%	5	0.1%	
Distance from home to hospital (Km)						
Median (IQR)	3.61 (2.14; 4.88)	4.06 (2.56; 5.23)		2.71 (1.42; 4.24)		<0.001
Range	0.33-21.14	0.33-21.14		0.33-10.77		

Data are n(%) unless otherwise indicated. Significant p-values ($p < 0.05$) are bolded

*Chi-squared analysis for categorical variables; Mann-Whitney U analysis for numeric variables.

ED, emergency department; IMD, Index of Multiple Deprivation.

ED attendance and volume of utilization

Overall, 3,104 (30.5%) children had at least one ED attendance in the first five years of life, with a total of 5,395 ED visits (Table 9). The proportion of children who ever visited the ED was lower for children of migrant mothers (29.4% vs 31.2%).

Table 9: ED visit frequency by maternal migrant status and migrant sub-group

Outcome	Total N (%)	Migrant status		Mother's region of origin					Mother's time since arrival in the UK		
		UK/ Irish-born mothers (reference)	Migrant mothers	Europe/ Central Asia	East Asia/ Pacific	Middle East	South Asia	Africa	Established (≥ 5 years in UK)	Long term (≥1 to <5 years in UK)	Short term (<1 year in UK)
Study cohort N (%)	10,168 (100%)	6,548 (64.4%)	3,620 (35.6%)	322 (3.2%)	112 (1.1%)	62 (0.6%)	2,913 (28.6%)	211 (2.1%)	2,125 (21.0%)	1,274 (12.5%)	221 (2.2%)
Total ED visits (count)	5,395 (100%)	3,406 (63.2%)	1,989 (36.8%)	179 (3.3%)	49 (0.9%)	24 (0.4%)	1,636 (30.3%)	101 (1.9%)	1,232 (22.8%)	646 (11.9%)	111 (2.1%)
N. of ED visits per child											
No visits	7,064 (69.5%)	4,506 (68.8%)	2,558 (70.6%)	243 (75.5%)	83 (74.1%)	49 (79.0%)	2,020 (69.3%)	163 (77.3%)	1,465 (68.9%)	930 (73.0%)	163 (73.8%)
At least one	3,104 (30.5%)	2,042 (31.2%)	1,062 (29.4%)	79 (24.5%)	29 (25.9%)	13 (21.0%)	893 (30.7%)	48 (22.7%)	660 (31.1%)	344 (27.0%)	58 (26.2%)
Crude ED Utilization rate per 1,000 children in cohort per year*	106.12	104.03	109.89	111.18	87.50	77.42	112.32	95.73	115.95	101.41	100.45
ED use among children who made use of the ED											
Number of ED users [#]	3,104	2,042	1,062	79	29	13	893	48	660	344	58
Mean number of ED visits per user [#]	1.74	1.67	1.87	2.27	1.69	1.84	1.83	2.10	1.87	1.88	1.91
Crude ED Utilization rate per 1,000 children using the ED per year. [^]	347.62	333.59	374.58	453.16	337.93	369.2	366.40	420.83	373.33	375.58	382.76

*Crude ED utilization rate per 1,000 children in cohort per year calculated as the ratio of the number of ED episodes recorded for each sub-group of interest divided by the number of children in that particular group. This ratio was divided by the number of years of follow-up (5) and multiplied by 1,000.

[#]User is defined as a child who made at least one visit to the ED in the first five years of life.

[^]Crude ED utilization rate per 1,000 children using the ED per year is calculated as the ratio of the number of ED episodes recorded for each sub-group of children using the ED divided by the number of children in that particular group. This ratio was divided by the number of years of follow-up (5) and multiplied by 1,000.

ED, emergency department.

The greatest proportion of ED attendances for this cohort of children took place in the first year of life (Table 10). Patterns of ED utilization across weekends and weekdays were similar for both groups. Of the 5,395 ED attendances, 57.3% resulted in a hospital admission of at least two days. The most common reason for ED attendance, for both migrant and non-migrant children, was for respiratory conditions, with infectious diseases and injuries being the next most common reasons for presentations. For children who attended the ED, the average distance from home to hospital was 3.56km, with migrants, on average, living closer to the BRI ED (2.58 vs 4.05 Km).

Table 10: Detail of ED attendances (N=5395)

Characteristic	Total ED visits		Children of UK/ Irish-born mothers N=3,406	Children of migrant mothers N=1,989
	N=5,395			
	<i>n</i>	%		
Child sex				
Male	3,026	56.1%	1,892 (55.5%)	1,134 (57.0%)
Female	2,369	43.9%	1,514 (44.5%)	855 (43.0%)
Age of child at time of attendance				
0 to <1years	1,978	36.7%	1,282 (37.7%)	696 (35.0%)
1 to <2 years	1,252	23.2%	808 (23.7%)	444 (22.3%)
2 to <3 years	844	15.6%	518 (15.2%)	326 (16.4%)
3 to <4 years	747	13.9%	468 (13.7%)	279 (14.0%)
4 to 5 years	574	10.6%	330 (9.7%)	244 (12.3%)
Type of day				
Weekday	3,888	72.1%	2,437 (71.5%)	1,451 (72.9%)
Weekend/ Bank holiday	1,507	27.9%	969 (28.5%)	538 (27.1%)
Type of discharge from ED				
Discharged (0 days' admission)	1,615	42.7%	1,048 (44.2%)	566 (40.0%)
≥2 days' hospital admission	2,171	57.3%	1,322 (55.8%)	849 (60.0%)
Duration of admission (days) (for those duration of stay ≥2 days, N=2,171)				
Median (IQR)	2 (2;4)		3 (2;4)	3 (2;5)
Range	2-111		2-49	2-111
ICD-10 code for ED attendance				
Respiratory disease	2,024	37.5%	1,257 (36.9%)	767 (38.6%)
Infectious disease	974	18.1%	619 (18.2%)	355 (17.8%)
Injury	641	11.9%	430 (12.6%)	211 (10.6%)
Digestive disease	325	6.0%	209 (6.1%)	116 (5.8%)
Perinatal condition	293	5.4%	184 (5.4%)	109 (5.5%)
Other condition not classified	285	5.3%	181 (5.3%)	104 (5.2%)
Skin condition	216	4.0%	147 (4.3%)	69 (3.5%)
Genitourinary disease	141	2.6%	82 (2.4%)	59 (3.0%)
Disease of circulatory system or blood	101	1.9%	46 (1.4%)	55 (2.8%)
Other	395	7.3%	251 (7.4%)	144 (7.2%)
Distance from home to hospital (km)				
Median (IQR)	3.56 (1.81; 4.82)		4.05 (2.5; 5.08)	2.58 (1.42; 4.19)
Range	0.33 -13.59		0.33-13.59	0.33-8.12

Data are *n* (%) unless otherwise indicated.
ED, emergency department.

The average utilization rate for the whole cohort was 106.12 visits per 1,000 children per year ($(5395/10,168) \div 5 \times 1000$) and the rate was higher for children of migrant mothers as compared to children of UK/Irish-born mothers (Table 9). The results in Table 9 show that in sub-group analysis, when not adjusting for covariates, the highest rates of ED utilization were for children whose mothers were from South Asia (112.32 visits per 1,000 children per year), from Europe or Central Asia (111.18 visits per 1,000 children per year), or considered established migrants (115.95 visits per 1,000 children per year).

Among ED users (those who used the ED at least once) the crude utilization rates show that the highest rates of ED utilization were by children of mothers from Europe or Central Asia (453.16 visits per 1,000 children per year) and Africa (420.83 visits per 1,000 children per year) and those most recently arrived in the UK (382.76 visits per 1,000 children per year).

Multivariable analyses

Likelihood of any ED use

The multiple logistic regression analyses confirmed that children of migrant mothers were significantly less likely than children of UK/Irish-born mothers to have visited the ED in the first five years of life when adjusting for other important covariates of interest (odds ratio [OR] 0.88 [95% CI 0.80 to 0.97], $p=0.012$) (Table 11). The findings highlight that, while children of migrant mothers from all regions appear less likely to use the ED than children of UK/ Irish-born mothers, this difference is only significant for children of mothers from Europe/ Central Asia (OR 0.73 [95% CI 0.55 to 0.95] $p=0.018$) and from Africa (OR 0.68 [95% CI 0.49 to 0.95] $p=0.022$).

Table 11: Unadjusted and adjusted ORs and IRRs for ED utilization

Model and sub-group	Likelihood of ED utilization (odds of use) (N=10,168)				Frequency of ED utilization among ever users (N=3,104)			
	Unadjusted OR (95% CI)	P value*	Adjusted OR (95% CI)	P value^	Unadjusted IRR (95% CI)	P value*	Adjusted IRR (95% CI)	P value†
Model 1: Mother's migrant status								
<i>UK/ Irish-born (ref)</i>	1.00		1.00		1.00		1.00	
Foreign-born	0.92 (0.83 to 1.00)	0.053	0.88 (0.80 to 0.97)	0.012	1.36 (1.17 to 1.58)	<0.001	1.19 (1.01 to 1.40)	0.040
Model 2: Mother's region of origin								
<i>UK/ Irish-born (ref)</i>	1.00		1.00		1.00		1.00	
East Asia/ Pacific	0.77 (0.50 to 1.18)	0.231	0.84 (0.54 to 1.28)	0.414	1.04 (0.48 to 2.22)	0.926	1.15 (0.52 to 2.55)	0.722
Europe/ Central Asia	0.72 (0.55 to 0.93)	0.012	0.73 (0.55 to 0.95)	0.018	2.09 (1.33 to 3.28)	0.001	1.71 (1.07 to 2.71)	0.024
Middle East	0.59 (0.32 to 1.08)	0.087	0.61 (0.33 to 1.13)	0.115	1.31 (0.43 to 3.99)	0.635	1.69 (0.52 to 5.46)	0.382
South Asia	0.98 (0.88 to 1.07)	0.607	0.93 (0.84 to 1.03)	0.153	1.28 (1.09 to 1.51)	0.002	1.11 (0.93 to 1.32)	0.257
Africa	0.65 (0.45 to 0.90)	0.010	0.68 (0.49 to 0.95)	0.022	1.78 (1.00 to 3.17)	0.049	1.67 (0.91 to 3.06)	0.097
Model 3: Time since mother's arrival in UK								
<i>UK/ Irish-born (ref)</i>	1.00		1.00		1.00		1.00	
Short term (<1 year in UK)	0.79 (0.58 to 1.06)	0.119	0.76 (0.56 to 1.03)	0.080	1.43 (0.84 to 2.43)	0.186	1.22 (0.70 to 2.11)	0.482
Long term (≥1 to <5 years in UK)	0.82 (0.71 to 0.93)	0.003	0.78 (0.68 to 0.90)	0.001	1.37 (1.08 to 1.73)	0.009	1.09 (0.85 to 1.39)	0.474
Established (≥ 5 years in UK)	0.99 (0.89 to 1.10)	0.913	0.97 (0.87 to 1.09)	0.639	1.35 (1.12 to 1.61)	0.001	1.24 (1.02 to 1.51)	0.032

*Univariable logistic regression

^Multiple logistic regression

†Zero-truncated negative binomial regression

Significant p-values (p<0.05) are bolded

ED, emergency department; IRR, incidence rate ratio; OR, odds ratio.

Models adjusted for: Child's sex, distance from home to hospital and mother's: age, parity, education and level of deprivation (IMD quintiles)

Children of migrant mothers, irrespective of the mother's time since arrival in the UK, were less likely to have visited the ED. However, the multivariable analyses illustrate that, with increasing time since the mother's arrival in the UK, children of migrant mothers show increasingly similar patterns of utilization compared to children of UK/ Irish-born mothers.

Frequency of ED use

For those children who had ever used the ED (N=3,104) a significant association was shown between rate of ED use and migrant status when controlling for covariates of interest (IRR 1.19 [95% CI 1.01 to 1.40] $p=0.040$) (Table 11). This indicates a higher rate of ED use by children of migrant mothers. However, this higher rate of utilization was only significant, in sub-group analysis, for children of migrant mothers from Europe or Central Asia (IRR 1.71 [95% CI 1.07 to 2.71] $p=0.024$) and for children of established migrants (IRR 1.24 [95% CI 1.02 to 1.51] $p=0.032$) when compared to children of UK/Irish-born mothers.

DISCUSSION

In this study we observed that children born to migrant mothers were less likely than those born to UK/Irish-born mothers to make a first attendance to the ED in the first 5 years of life. Children of migrant and non-migrant mothers attended the ED on similar types of days and with similar conditions, and similar proportions were admitted to hospital. However, among the sub-population of children who attended the ED, those born to migrant mothers had a higher utilization rate compared to children of UK/ Irish-born mothers. This indicates a higher rate of return to the ED for children of migrant mothers once the service has been accessed. Although the rates of use were found to be statistically significantly different, the absolute differences in ED utilization between children of migrants and non-migrant mothers, both for first use (5.86 additional ED visits per 1,000 person-years) and for repeated use (40.99 additional ED visits per 1,000 person-years), were rather small. These findings highlight the importance of analysing both the likelihood and the volume of service utilization separately when seeking to understand patterns of ED utilization.

Our findings show that after adjusting for important covariates, children of migrant mothers had a lower odds of first ED use in the first 5 years of life. To our knowledge, the only other study looking at paediatric ED use by children born to migrant mothers, although conducted in a different context, found contrasting results (Ballotari et al., 2013). Our findings may suggest that

either 1) children of migrant mothers in Bradford are generally not an unwell population in need of emergency care or 2) children of migrant mothers did not utilize the ED because they received care elsewhere. Of more concern is the possibility that medical care was not sought when children were in need. Existing evidence suggests that migrants in more vulnerable circumstances, such as undocumented migrants, experience substantial barriers to care (Poduval et al., 2015, Mladovsky, 2007, Jayaweera, 2011, Suess et al., 2014).

Time since mother's arrival in the UK was found to be an important factor in understanding likelihood of ED use. No previous studies looking at paediatric ED utilization by children of migrant mothers have accounted for this as an explanatory factor. The odds of ED use were lowest for children of short-term migrants, and, with increasing length of stay in the UK, the difference in likelihood of first use for children of migrant and non-migrant mothers was seen to diminish. These findings may demonstrate that the migrant mothers who most recently arrived in the UK may be unfamiliar with the healthcare system and may not initially seek care for their children in the ED. With increasing length of stay in the UK, migrants' understanding of the health service may develop, and in turn their children's likelihood of paediatric ED use becomes more similar to that of children of UK/Irish-born mothers.

Despite all sub-groups of children born to migrant mothers in the cohort being less likely to have a first visit to the ED, once ED services were accessed, migrant mothers were found to be more likely to return to the service. This finding reflects those of other studies (Ballotari et al., 2013) and has important service implications for EDs and the wider healthcare system. Frequent paediatric ED visits may be expected if this population has higher levels of underlying chronic illness (Lacalle and Rabin, 2010). However, frequent attendances may also reflect access barriers migrants' face when seeking other forms of healthcare (Ballotari et al., 2013, Mahmoud et al., 2015), poor understanding of the host country's healthcare system, prior positive experiences of the ED, and previous experiences within the healthcare system that result in a preference for seeking care in the ED (Mahmoud et al., 2015, Norredam et al., 2007, Småland Goth and Berg, 2011, Gallagher et al., 2013). Parents may also access the ED because this model of care most closely resembles the healthcare service in their home country.

ED utilization rates were higher, but variable, for children of migrant mothers from all regions as compared to children of UK/Irish-born mothers. In particular, the results show significantly higher rates of utilization by children of mothers from Europe/ Central Asia and from Africa. Higher rates of ED utilization by migrants by region of origin have been found in other studies (Norredam et al.,

2004, Ballotari et al., 2013, Nielsen et al., 2012, Sanz et al., 2011, Sandvik et al., 2012).

Recognising the heterogeneity within the migrant population, and identifying differential use by people from different nation states and ethnicities, is important to enable health services to better understand population healthcare needs and to target health policies and interventions to meet these needs. Although, in our study, the effect sizes for some migrant populations did not reach statistical significance and have wide confidence intervals, most likely due the size of the sub-group, the patterns of utilization by these sub-groups may have clinical and public health relevance and should be explored further.

Children of migrant mothers, irrespective of time since the mother's arrival in the UK, showed higher frequency of ED utilization following first access. When adjusted for covariates, ED utilization rates remained significantly higher for children of established migrants. This contradicts the expectation that, over time, as migrant mothers become more familiar with the healthcare services in the UK, their rate of paediatric ED utilization will become more similar to that of UK/Irish-born mothers. One possible explanation for these findings is that some children in this cohort born to established migrant mothers may have greater or more complex healthcare needs. This may be a reasonable explanation given that in Bradford the infant mortality rate is higher than the national average, along with high levels of morbidity within the Bradford population (Wright et al., 2013). A lack of data meant that health status could not be controlled for. Other explanations again may include a range of demand- and supply-side factors including: satisfaction with previous ED encounters, barriers to accessing out-of-hours services, the convenience of out-of-hours services, and long waiting times for primary care appointments (O'Cathain et al., 2019, Norredam et al., 2007).

This study has several limitations. A lack of clinical information made it impossible to analyse the acuity with which children presented, and children's underlying morbidity may confound these results. The high proportion of hospital admissions for children of migrant mothers does suggest that for many of these children the utilization of the ED was for conditions that require ongoing medical care. Therefore, one possible explanation for the higher rate of ED utilization among children of migrant mothers may be that a child's underlying health status drives both first ED use and subsequent ED use. If migrant mothers with the sickest children make use of the ED, it would not be unexpected that these children, due to the severity of their condition, are more likely to visit the ED more frequently.

A further limitation to this study is sources of selection bias in the BiB cohort, as well as bias that may have arisen from restricting the analytic cohort to mothers for whom there were complete data on the country of birth and other covariates of interest. Although the participation rate for the BiB study was not determined for migrant as compared to non-migrant mothers, some small differences overall between women recruited and those not recruited are evident in the BiB cohort (Wright et al., 2013). Women who were recruited were older and lived in less deprived circumstances. In addition, more South Asian women than women from other regions were recruited to the BiB cohort. Thus, selection bias may be present in this study if migrants were less likely to join the BiB cohort, as might be the case particularly for vulnerable migrants such as those living in the most deprived areas and those most recently arrived in the UK. A further source of potential bias is evident in this study: a larger percentage of migrant mothers and less educated mothers were excluded from the analytical cohort due to missing data (S1 Table). These two sources of bias may have selected educated migrant mothers with higher socio-economic status and better language skills into the study, who would be expected to differ less from UK/Irish-born mothers. Thus, the findings of this study might have underestimated migrants' use of services, or underestimated the use of ED services by some migrant populations.

It is possible that ED attendances for children of both migrant and non-migrant mothers were underestimated if children were taken to EDs outside of Bradford when in need of urgent care. Migrant populations are relatively mobile and may have been more likely to have sought healthcare in other EDs. Although BRI is the only ED facility within Bradford, and for 98.6% of children in the cohort was the closest ED to their home at the time of birth, it is possible that urgent and emergency care was sought in other EDs.

A further limitation is that due to incomplete data, we were unable to account for multiple children per mother within the cohort. However, by adjusting for mother's parity, the effect of having additional children, and the experience that this brings, will have been adjusted for. Finally, the BiB cohort largely included children with mothers of British and Pakistani origin and thus may be quite different from other populations (Wright et al., 2013). However, because we analysed the findings by maternal region of origin sub-groups, the findings may be more generalizable to other populations.

Our findings add to our knowledge and highlight differences in ED utilization patterns between children of migrant and non-migrant mothers. The challenge for healthcare services is to identify those children accessing EDs most and to work with their parents to better understand their

healthcare needs. It is important to understand when, and why, migrant and non-migrant mothers make their first ED visit for their child and, importantly, why some migrant mothers choose to return to the service.

Our study found that children of migrant mothers were less likely to use the ED for the first time in the first 5 years of life than children of non-migrant mothers, but, once accessed, the rate of repeat attendance was higher. Our findings confirm that immigrant groups use the ED differently when the analysis is adjusted for covariates of interest. Further research and better data are needed to understand these patterns of utilization, the variations in use between people with different origins and backgrounds, and the reasons for these differences in utilization. Understanding the reasons for frequent or repeated ED use among some migrant groups is important to ensure that the healthcare service is meeting the needs of the demographically changing population, while simultaneously addressing demand in paediatric EDs.

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Supporting information

S1 Checklist. Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) checklist (Appendix 5)

S1 Table. Comparison of analytic cohort and cohort excluded from analysis due to missing data (Appendix 5).

Chapter 7. Study 2 (Paper 3)

This chapter presents the findings of study 2 presented in the format of a paper ready for submission to an academic journal. As the primary author, I was responsible for the study design, data collection, data analysis and wrote the first draft of the paper. Each co-author's contribution to this work is detailed in Appendix 1.

The following appendices have been provided to support this chapter.

Appendix 6: Additional detail of the qualitative methods used in this study.

Appendix 7 includes:

- Participant recruitment email
- Participant information sheet
- Participant consent form
- Interview guide

Appendix 8: Letters of research ethics approval

7.1 Paper: 3 Migrants' use of emergency departments for paediatric care in an English region. A qualitative study of healthcare providers' perceptions

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ABSTRACT

Background: The UK is home to a large, and growing, migrant population. Migrants are frequently cited in the UK popular press and beyond as a cause of increased burdens on healthcare services, including emergency departments (EDs) which are facing year-on-year increased attendances and emergency admissions. Many migrant women are of childbearing age and the number of children born to migrant parents in the UK is increasing. While there is a wealth of literature to suggest that health outcomes and healthcare utilization differ between migrants and non-migrants, little is known about migrant parents' use of EDs. The main objective of this study was to gain insight into ED healthcare providers' perceptions of migrant parents' use of EDs for their children, particularly which characteristics are helpful in understanding the determinants of paediatric ED utilization by migrant parents.

Methods: Semi-structured qualitative interviews were conducted with 15 ED healthcare providers at two EDs in an English region. Interviews were coded and analysed by two researchers using thematic analysis.

Results: Participants perceived different trends in ED utilization between migrant and non-migrant parents. However, migrant status was not believed to be the main determinant of ED use. ED staff perceived that parents' experiences of accessing healthcare, their individual risks as well as the contextual factors during the process of migration, influenced patterns of ED utilization for their children. Parents' understanding of the UK healthcare system, barriers to more appropriate services, and individual characteristics such as: English language competency, socio-economic and cultural factors, were all thought to influence their decisions to seek care in the ED.

Conclusion: These findings challenge the use of broad categorizations of 'migrant' versus 'non-migrant' in studies of ED utilization. ED healthcare providers suggested a complex, non-uniform mix of variables that may be important determinants of ED utilization for both migrant and non-

migrant parents. There is a need to develop improved, theoretically informed casual models when seeking to explain variations in patterns of ED use by migrant, as compared to non-migrant, parents for their children.

INTRODUCTION

The UK, like most countries in Europe, is home to a large, and growing migrant population. Many migrant women are of childbearing age. It is estimated that of the 304 thousand migrant females who entered the UK during 2018, with the intention of staying at least a year, 89% were aged 15-44 (Office for National Statistics, 2019c). In 2018, approximately 14% of the UK's usually resident population had been born abroad and the number of children born to migrant parents is increasing (Office for National Statistics, 2019f). In 2017, 28.4% of children born in the UK were born to a migrant mother (Office for National Statistics, 2018a). Children are dependent on the health, and health-seeking, practices of their parents or caregivers to access care. Migrant children may be particularly vulnerable to poor access, depending on their origins, their experiences during the process of migration (Jaeger et al., 2012), or due to barriers to healthcare many migrant parents, and families, experience when seeking healthcare (Markkula et al., 2018).

Migration is subject to much negative political and media attention. Migrants are often cited as creating additional burdens on public services in general, and the National Health Service (NHS) in particular. This sits alongside concerns about NHS emergency departments (EDs) facing additional service demand. EDs in the UK are facing unprecedented levels of service demand with ED attendances and emergency hospital admissions increasing annually (Care Quality Commission, 2018). Questions have also been raised about whether different patterns of ED use by migrant, as compared to non-migrant, parents in the UK may be adding to the increase in ED attendances and hospital admissions of children under five seen over the last decade (Credé et al., 2020). Although the body of research focussing on ED utilization by children born to migrant parents is small, a study in Italy showed different patterns of ED use by migrant as compared to non-migrant parents for their children (Ballotari et al., 2013). Compared to children of Italian mothers, those children born to immigrant parents were found to show higher use of the ED, and were at higher risk of ED use for non-urgent visits (Ballotari et al., 2013). The authors concluded that there were many potential explanations for their findings including the difficulties migrant parents may face in accessing primary healthcare (Ballotari et al., 2013). However, empirical evidence of migrant parents' use of EDs in the UK is lacking and high-quality qualitative studies that would help establish causation are absent. The only study of paediatric ED utilization by children born to

migrant, as compared to non-migrant mothers, in the UK has been conducted by ourselves and this study shows differential patterns of ED use between these populations (Credé et al., 2020). Migrant mothers were found to be less likely to visit the ED; however, among those who used the ED, migrant mothers attended the service more frequently compared to UK/ Irish born mothers (Credé et al., 2020).

These findings suggest that migrant parents may constitute a specific target for health promotion, education and policy. However, interpreting findings which use broad categorizations for migrant versus non-migrant parents is difficult and problematic. Researchers seeking to understand differences in patterns of ED utilization have previously categorized patients as 'migrants' versus 'non-migrants', and occasionally by migrant sub-groups such as, by geographical area of origin, national origin, citizenship, or legal status (Credé et al., 2018). There is also conflicting evidence across Europe on patterns of healthcare utilization by migrants, which suggests that migrant status itself is not the only criterion of difference. While an immigrant can be defined as someone who has moved away from their country of birth, there is diversity inherent in the migrant experiences as well as across other axes of difference including, but not limited to, differences in age, gender, socio-economic background, and ethnicity (Vertovec, 2007).

In the context of an increasingly diverse UK, and a mixed evidence base, and with a framing that problematizes the use of 'migrant' as a specific category of patient, this paper seeks a fuller understanding of how EDs are used by parents originating from outside the UK. This is explored through the lens of the ED healthcare practitioner. Previous qualitative research with emergency care providers (ECPs) has focussed on the beliefs and challenges of providing healthcare to migrant patients in the ED (Harrison and Daker-White, 2019). The key findings, synthesized in a review of international literature, identify that ECPs perceive that cultural, organisational and ethical barriers exist to providing care to migrant patients in the ED (Harrison and Daker-White, 2019). As far as we are aware, there is no previous published research that explores ED staff perceptions and experiences of migrants' use of EDs in the UK for paediatric care and how patterns of ED use are perceived to differ between migrant and non-migrant populations.

This paper presents a detailed exploration of healthcare providers' perceptions and experiences of migrant parents' utilization of EDs for their children. Providers are important agents of service delivery whose views could identify the characteristics of migrant ED users and whose perceptions may point to where disparities in patterns of ED utilization exist when compared to non-migrants. While previous research has focused on ECPs only, our study includes the

perspectives of administrative staff who are often the first point of contact with patients in the ED. Through this paper we critically examine which patient characteristics inherent to experiences of migration are more or less helpful in understanding the determinants of migrant parents' paediatric ED use, and seek to attain a more in-depth knowledge of the characteristics of migrant ED users.

For the purposes of this research, a migrant is defined as a person born outside of the UK. However, in the research, participants were allowed to examine what constituted a 'migrant patient' and were given time to explore what range of experience and background might be embedded in this socially ascribed label.

METHODS

We used in-depth qualitative methods to explore ED service providers' perceptions, and experiences of, migrant parents' use of paediatric EDs for their children. We were interested in how providers perceive the utilization of the ED by migrant and non-migrant parents and whether/in what way migrant background determines any differences. Qualitative methods enabled in-depth exploration of the observations, views, perceptions and meaning attributed to those experiences of ED providers in direct and frequent contact with the population of interest. The initial question that the research sought to address was: what are healthcare providers' perceptions and experiences of migrants' use of the emergency department for paediatric care?

Ethical approval for the study was obtained from the School of Health and Related Research, University of Sheffield (ref number 013510) and Health Research Authority approval was given to conduct the study (IRAS project ID: 231220).

Participants

We conducted 15 individual, semi-structured interviews with a range of ED service providers, including nurses, doctors and clerical staff at two EDs in the UK.

Settings

Participants were recruited from two EDs. These EDs are situated in demographically diverse cities with a high proportion of people born outside the UK. One city has a very well-established migrant population largely from the sub-continent, while the other has a range of new migrant populations originating from a broad range of countries over the last few years. As migrant populations differ between cities, and the use of ED services may differ between these populations, we chose providers from two different EDs to enable the development of a greater depth of understanding of providers' perceptions of migrants' use of ED services. We intentionally sought the experiences of a broad range of ED staff attending to, treating and managing patients in the ED.

Recruitment and sample

Recruitment took place between October 2017 and November 2018. An ED consultant (gatekeeper) at each facility undertook purposive sampling. The gatekeeper was asked to identify a range of staff undertaking different roles with a least one years' experience working in the ED. We included both healthcare and administrative staff (receptionists). We used purposive sampling to ensure that participants reflected all features of interest (job role, grade and migrant background) to enable a detailed understanding from a range of perspectives. Participants were initially approached by the gatekeeper, informed about the study, and asked if they would be willing to participate. Those who were willing to participate were asked to email SC and were subsequently invited for an interview. To encourage greater uptake of interviews, the lead researcher also visited one of the EDs, and staff who had been approached by the gatekeeper could express an interest in participating directly to the lead researcher. Participants were informed that participation was voluntary, that they could withdraw from the study at any time, and that their name would remain anonymous in any publications. Written informed consent was obtained from all participants prior to the interviews.

An initial sample was chosen at each hospital site and further sampling was guided by data analysis. This iterative approach of data analysis and further sample selection was continued until data saturation was achieved and no new themes emerged (Ritchie et al., 2014). Data collection incorporated semi-structured interviews with 15 ED staff: 3 administrative staff, 4 nurses, and 8 senior doctors (2 specialist registrars and 6 ED consultants). Two participants were born abroad.

Topic guide

A semi-structured topic guide was used in the interviews. This covered a range of topics including: providers' perceptions of migrants' use of the ED, particularly whether providers perceived any differences in patterns of ED utilization between migrant and non-migrant families, challenges in providing care to children from migrant populations, and potential changes in the ED required to respond to the needs of migrants. The guide was initially developed using existing literature, reviewed by all authors, and piloted with two healthcare providers working at the respective study sites. The interview guide was amended after piloting and was allowed to develop as the study progressed, as new themes emerged during the interviews. Prompting questions were used to encourage participants to expand on their thoughts and understandings. At the start of the interviews, respondents were provided with the following working definition of a 'migrant':

"By migrants I mean people who are born outside of the UK so this can include people from Europe or further afield as well as people who may have arrived in difficult circumstances such as asylum seekers and refugees. Also, it's worth saying that non-UK born patients may have also lived here for a long time. For the purposes of this work, I'm mostly interested in your experiences with parents and families who are relatively new to the UK."

Data collection and analysis

Interviews were conducted by SC and were either face-to-face (n=14) at the hospital sites at a time that did not affect clinical working, or by telephone (n=1). The interviews varied in length between 20-48 minutes. All interviews were audio recorded and transcribed verbatim. Following transcription, the first author listened to, and familiarised herself with, the data. Thematic analysis was used to analyse the data. A sample of the transcripts was read and coded separately by a co-author (ES) to ensure that the themes generated accurately reflected participant narratives (Pope et al., 2000b). Subsequent coding was based on an agreed set of themes, allowing additional themes to be added as they emerged.

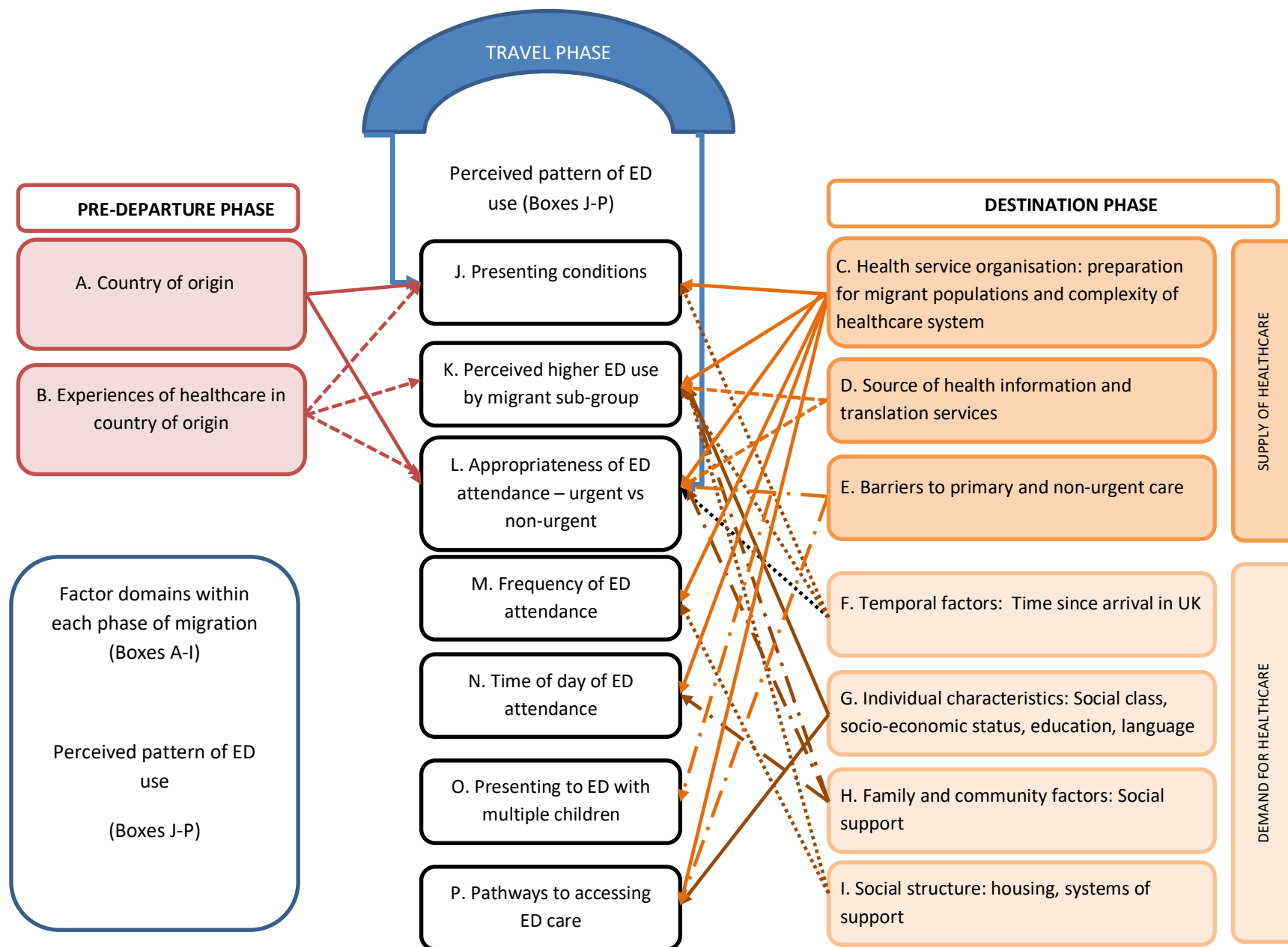
RESULTS

In this section we firstly present the findings of ED staffs' constructed views of migrants. Understanding these constructed views is important when interpreting staffs' perceptions of ED utilization by migrant parents. Secondly, we present the themes that emerged from the interviews that contribute to understanding the characteristics of migrant ED users, and the

determinants of patterns of ED utilization between, and within, migrant populations. To present the main themes that emerged through the interviews, we propose a framework of factors that healthcare providers perceive to influence migrant parents' patterns of ED utilization for their children (Figure 7). These factors have been framed according to the migration phases framework developed by Zimmerman et al., 2011.

The migration phases framework includes the pre-departure, travel and destination phases, and, for a small proportion of the migrant, population, the interception phase (Zimmerman et al., 2011). The factors healthcare providers perceived to influence ED utilization mapped onto three (Pre-Departure, Travel and Destination phases) of the five phases of the Migration phases framework. The Zimmerman et al., 2011, framework demonstrates that the multi-staged and complex process of migration does not stop after arrival but instead is under constant negotiation between the person, the society and the systems of nation-states. The responses from participants align with the Migration phases framework and reflect how ED staff perceive patients' and parents' experiences and their individual risks, as well as the contextual factors during the phases of migration to influence patterns of ED utilization. The factors presented in our proposed framework need further modelling to establish causal relationships. Furthermore, these factors can only be considered to be partial, and other factors could be theorized to contribute to patterns of ED utilization by migrant populations. However, this framework demonstrates how factors beyond 'migrant' status, and individual characteristics of migrant parents, are perceived by healthcare providers to influence patterns of ED utilization.

Figure 7: Framework for understanding the factors healthcare providers perceived to influence ED utilization by migrant parents



Healthcare providers constructed view of 'migrants'

ED services in the UK are free to any person, irrespective of migrant status or time since arrival in the UK (Public Health England, 2019), and as such migrant status is not routinely collected from patients attending EDs in the UK. However, individuals who are not normally resident in the UK may be required to pay for secondary care services and for these individuals the NHS body providing treatment is duty bound to assess a patients' eligibility for treatment (Public Health England, 2019). At the start of this research, it was not clear how staff in the ED might identify people of migrant origin, and whether staff perceive there to be value in collecting this data. Through these interviews ED staff revealed their different constructions of the term 'migrant' which related to movement across borders, the process of migration and individual circumstances.

1. Movement across borders

For many staff working in the ED, the movement of a person across international borders, was a defining characteristic of a 'migrant'. While originating from a country outside of the UK could be used to identify a 'migrant', it was acknowledged by a few doctors that where a child, or a child's parent, is from was often not covered in the clinical history taken during consultation. Knowledge of a child's, or their parent's, migration status was felt by clinicians to rarely be important in assessing, diagnosing or delivering medical care to these children.

*Sometimes it's [migration history] not relevant, or I don't care, because it's not going to affect what we do and it's all pretty non-serious stuff [non-urgent clinical presentations].
(P5, Senior Doctor)*

Migration history was sometimes asked by reception staff. These staff members asserted that emergency care was free to all users and knowing a person's country of birth was not required for patients attending the ED, but that this information may be required by other healthcare services, particularly if a patient was admitted or referred to a different service from the ED. Reception staff spoke about migration, not in substantive terms, but rather as an administrative category used by hospitals to ascertain who should be charged.

It's not our job to assess whether they're eligible for treatment but it's our job to identify those who might not be. It doesn't apply to A&E currently but it does apply to any other services. (P13, Receptionist)

With an understanding that a 'migrant' could be defined as someone who had moved across borders, ED staff acknowledged that migrant parents, and their accompanying children, will have experienced unique migratory journeys. This widely held perception aligns with the Zimmerman framework which demonstrates that experiences during the travel phase of migration are unique, and these experiences may influence health in different ways (Zimmerman et al., 2011). Staff reflected empathetically on the migration journeys of some of the patients.

Quite recently I spoke to a mum of a four year old and they'd lived underground, in a basement, for the entire four years of the little boy's life and coming to the UK was the first time that he'd been outside. I think sometimes that when you do get to speak to them, then you actually realise the background and what they've been through. It's actually quite touching to speak to them. (P1, Senior Doctor)

2. Process of migration

To many staff being a 'migrant' also implied a status— legal and/ or social - that was assigned as a consequence of the process of migration. A few senior clinicians at both hospital sites spoke about vulnerable migrants such as asylum seekers and refugees, although it was acknowledged that this was a small proportion of patients who attended the ED.

I think the kind of 'people smuggled, asylum seeker' group is tiny amount in [city name] that we see. And we also don't see kids who look 25 and are pretending to be 15 very often – I know that happens in some other places. (P4, Senior Doctor)

Migration was also recognised as a continuous, dynamic process and staff described how, from their interactions with migrant parents, they understood that some foreign-born parents, particularly those of European origin, go back and forth between the UK and their countries of origin - sometimes seeking healthcare for their children outside of the UK. In this context, migration has no beginning or end but is a constant dynamic state, presenting challenges to continuity of healthcare between nations.

The Eastern Europeans, there are some kids that have split-care. So they'll say "I've just come back from Poland and we did this last week and I need you to continue this" and you're like well that's not brilliant healthcare but that's happening. (P3, Senior Doctor)

3. Circumstances and social 'vulnerability'

Participants, across all job roles and at both hospital sites, spoke about 'migrants' in the context of deprivation or as people with an increased level of vulnerability within the healthcare service. This vulnerability was related to disadvantage, lower socio-economic status, lower levels of education and how recently the person had arrived in the UK. Few staff recognized more advantaged populations such as University staff and professionals as being 'migrants', despite these migrant groups using the ED. The perception among ED staff was that these groups were in some way different to other migrants and overall were less vulnerable.

We don't think of migrants as people from affluent countries. We think about migrants as people from not so affluent countries. (P14, Senior Doctor)

Through these interviews both administrative and clinical staff reported how many people from non-English speaking backgrounds were attending the EDs, and how a parent's ability to speak English was often a way he, or she, was identified by providers as being from overseas.

I suppose the language gives it away a little bit. We still do have older adults who've lived here a long time who don't speak great English but that's usually grandparents' generation. (P10, Senior Doctor)

Participants also referred to people by a mix of national and/or ethnic classifications such as: Roma/ Slovak, Pakistani, Chinese or African and compared these to the 'White British population'.

So, there's quite a big Pakistani community, I think, so we see a lot of those guys. Definitely some Somalian sort of groups. And then I guess the sort of the newer group is the Slovakian/ Roma who we see quite a lot of as well. (P5, Senior Doctor)

Without data that captures migrant status in the ED, healthcare providers' perceptions of a parent's migration status appear to be informed by individual characteristics, such as a parent's language, perceptions of their socio-economic status, ethnicity and occasionally by taking a

history of country of origin. Importantly, staff had strongly held views that a person's migrant status did not impact on their entitlement to care and was not perceived to impact on the medical care children received in the ED.

Every population that comes in [migrates] has a similar experience of coming into a new country. It's them coming into our country. But in terms of accessing healthcare for children that's not our...the politics of who moves round the country is not our problem. Our problem is to deliver care to our local population. And if you're within the boundaries of [city name] you're our population. It's our job to ensure equity of access. (P7, Senior Doctor)

Thematic synthesis of the factors ED healthcare providers perceive to influence patterns of ED utilization by migrant parents.

Analyses revealed nine factor domains (Figure 7 Boxes A-I) that ED staff perceive to influence patterns of ED utilization. The perceived links between these factors and patterns of ED utilization (Boxes J-P) are presented in this framework. Some of the links in this framework are more speculative and were identified by just a few interviewees while other factors, and the links between these, were seen to be stronger with more evidence in the data to support these links. Within the pre-departure and travel phases, individual characteristics of migrant users, their experiences of healthcare in their countries of origin, as well as individual experiences during the migratory journey, were perceived by staff to influence patterns of ED utilization. During the destination phase, healthcare providers perceive that both factors related to the supply of healthcare services (Boxes C-E) as well as those related to the demand for healthcare including (Boxes F - I) influence patterns of ED use by migrant parents.

Pre-departure

Country of origin and previous experiences (Boxes A & B)

Staff perceived that patterns of ED utilization can differ according to the region of origin of the parents attending the ED with their children. Parents' region of origin was perceived to influence ED use, due to: differences between healthcare systems in the home and host countries; differences in parents' experiences of healthcare; and differences in parents' cultural and health beliefs.

Parents from specific global regions were understood by staff sometimes to worry about specific illnesses or symptoms in their children. This was thought by a few clinicians to possibly explain patterns of ED use for certain conditions and to justify why migrant children might attend the ED more for conditions deemed non-urgent, or 'inappropriate', in the UK (Boxes J & L).

I think what you worry about is different. Chinese families worrying about fever makes perfect sense if you live in China because most of the things their generation, and the generation above them would have died of would have been febrile illnesses. And if you come from a country like anywhere in West Africa, where one in five children dies before they're five. Of course, you're far more worried about infectious diseases there, so that's why they can be kind of fever 'phobic'. (P4, Senior Doctor)

Migrant parents' previous experiences of healthcare access in their countries of origin were also perceived by providers to influence patterns of ED utilization, and parents' expectations of ED care (Boxes J-L). When migrant parents arrived in the UK with children, or had children in this new system, they were thought to try to adapt or 'map' the existing health services to their own understanding of how healthcare systems and services operated in their experience. Some migrant parents, particularly those most recently arrived in the UK, were perceived by staff to use ED services as these were the most visible healthcare services in an unfamiliar healthcare system.

So, I think that the reason people come here [to ED] as a default, is because there is no knowledge of the system. And they'll go, based on where they're accustomed to in their native countries. So, they'll go to hospital in general. (P14, Senior Doctor)

As many providers had a constructed view of migrants as being people with lower levels of education, this is likely to have shaped their perceptions that migrant parents attending the ED might be characterised as those who lack an understanding of the UK healthcare system.

ED staff at both hospital sites noted how families from Eastern Europe were considered to be 'current heavy users' and were thought to use the ED differently to other migrant populations (Box K). These parents were felt to lack an understanding of the UK healthcare system and, for them, the ED was understood by participants to most closely to resemble the point of access into the healthcare setting with which they were most familiar.

It [the health system in Romania] tended to work around a poly-clinic... which was a small hospital ... you know if I need to go, I go to the clinic and I get seen. And they've got an A&E department there. That looks like how we deliver healthcare at home, so I'll go that way. (P7, Senior Doctor)

Travel phase

The diverse experiences of people with different migration or national backgrounds, during the process of migration and when arriving in the UK, were factors that were perceived by staff to affect the vulnerability of different migrant populations. ED staff perceived that individual experiences of migrant parents, or migrant children, are likely to shape the patterns of ED service utilization observed, particularly with regard to the clinical conditions with which some children attend, and the urgency of these attendances (Boxes J & L).

The perception among clinicians was that for particularly vulnerable migrants, including those travelling from conflict areas, or those most recently arrived in UK, their child's presenting condition, or the appropriateness of attendance, could be related to the travel phase of their migration.

If they've literally arrived the next day from Syria there's a whole load of sort of health-relevant healthcare issues that that may pertain to it. So, we do ask sometimes, just generally to get a feel for what is going on. I might ask the question 'how long have you been in the UK?' Or 'where are you from originally?' We do see a group of people who have just arrived here who are floundering in the world of, a new country. And they're desperately worried about their child. (P5, Senior Doctor)

From the above quote it can be seen that staff perceived a parent's origin and their time since arrival in the UK as important factors in understanding the clinical needs of some migrant patients. Recent arrival in the UK was perceived to be a factor that explained the use of ED by some migrant parents.

There was mention of a few situations at both hospital sites where vulnerable migrant children had presented to the ED with conditions, or in circumstances, that directly related to their migration journey. Presentations as a result of human trafficking were not seen to be an 'everyday' occurrence but demonstrate that EDs are a place where migrant children, or children

born in the UK to migrant parents, can present with complex and challenging issues relating to their/their parent's migration journey.

There was a situation where two teenagers were brought in by a social worker. Incredibly unexpected, actually. These kids had apparently, or so the story went, were dumped out of the back of a van in the middle of [city name] that day, being told that they were in London. And they'd been smuggled. One was from Ethiopia, and I think the other one was Eritrean. One of them clearly had a chest infection, slash TB - just sick, medically sick. And the other one had had multiple injuries of multiple ages and had reported that he'd been assaulted in Turkey on his way, and the kind of people-smugglers thing. (P4, Senior Doctor)

Although the above quote could be considered an 'exceptional' case, it highlights how experiences during the migration journey can result in the need for urgent and emergency care.

Destination phase - Arriving in the UK

Migrant parents were perceived to encounter new contexts and changing circumstances when they arrive and settle in the UK. Our data highlighted that staff, across all job roles and at both hospital sites, perceive there to be a multitude of factors that may influence patterns of ED use by migrant parents for their children when arriving in the UK. These factors related to both supply side factors within the healthcare service (Figure 7. Boxes C-E) and demand side factors (Figure 7. Boxes F-I).

Supply side factors

Service organisation – preparation for migrant populations (Box C)

As shown in Figure 7, factors relating to the organisation of NHS healthcare services (Box C) were perceived to influence which migrant populations accessed the ED most, how they accessed care, how they presented, and the appropriateness of these attendances (Boxes J-N & P).

Staff perceived that ED use by different migrant populations was not static and that over time the use of the ED by certain migrant populations was seen to 'ebb' and 'flow'. Patterns of ED utilization by different migrant populations were thought by staff to be explained by different migration patterns, and also by how proactive the healthcare system, or parts of the system, was

in anticipating the needs of different new arrivals. Senior clinicians described how healthcare services tended to be informed in advance of the arrival of some migrant populations. Proactive planning for newly arriving groups such as asylum seekers and refugees was thought to minimize the use of the ED by these new arrivals, as the system was set up to provide for their healthcare needs. In contrast, other new arrivals, particularly migrants from Europe who are able to move freely around Europe, for example Roma Slovak populations, are unanticipated and unplanned for, and thus services are unaware of, and relatively unprepared to cater for, their diverse healthcare needs when arriving. At both sites, and by both clinical and clerical staff, families from Eastern Europe were perceived to be the current 'heavy users' of the EDs. Staff understood that for these families the ED was a facility where they could have their needs immediately met and that this could, at least in part, explain the perceived heavy use of the ED by these migrant-sub groups.

Unless they're asylum seekers we don't know they're coming. They're funded to come in. The Roma/ Slovaks just came. We knew nothing about them, we don't know how many have come in because obviously they're within Europe and therefore they have free movement. So, we've had to set up a whole infrastructure. But actually, do it on the back foot, not do it as a planned process. (P7, Senior Doctor)

Service organisation - Complexity of healthcare system (Box C)

As shown in the framework in Figure 7, providers perceived there to be a link between the complexity of the healthcare system in the UK (Box C) and the use of the ED for inappropriate conditions (Box L). Parents' lack of understanding of the complex healthcare system was also perceived to drive frequent attendance by some migrant parents (Box M). Both clinical and clerical staff thought that some migrant parents use the ED for primary care related conditions because they don't know what services to access when, and how to access these services. Not only was it parents' understanding of the services general practitioners (GPs) offer, but also their understanding, or lack of understanding, of the services offered through NHS 111 and other primary care settings, such as pharmacies, that were perceived to influence patterns of ED utilization.

Basically, we see a lot of, what should be, primary care these days – they seem to come through the ED. No fault of their own. It's their understanding of what is available out there for them. Or lack of understanding, of what is available to them out there. So,

they'll see the emergency department, as that's where they can go for help and guidance on their child being ill. They don't realize that there's other options for them in the UK.
(P15, Senior nurse)

Information sources (Box D)

Numerous ED staff mentioned the lack of health services information provided to migrants newly arriving in the UK. These ED providers strongly believed that without being adequately informed about the healthcare system, and what is available to them when newly arrived in the UK, parents simply access the service that they think they should access and the service that best accommodates their needs. This again suggests that staff perceive time since a parent's arrival in the UK to be an important factor to consider, and one that staff feel is helpful, in understanding migrant parents' patterns of ED use.

I think they're probably not aware of what's in place. They're not aware that they can go to the pharmacy and get some advice. They're not told anything. There's no one there to tell them what the roles are and what each organisation does. So they're not going to be given our a leaflet that says 'this is A&E and this is your doctors and this is your pharmacy' so there probably isn't anything to help them so they probably do come in a little bit more than they should. (P3, Receptionist)

Emerging from the data, was the perception among staff that the healthcare system was seen to be complex for both migrant and non-migrant families. While the complexity of the system organisation may influence patterns of ED use for, migrant and non-migrant populations, being able to navigate the system and avoid ED attendance was thought to be particularly difficult for migrant users who were often referred to by staff as those most recently arrived, and those who are more socially vulnerable.

Barriers to primary and non-urgent care (Box E)

Clinicians perceived that some migrant parents use the ED more for low acuity conditions for their children as compared to non-migrant parents (Box L). It was suggested that this difference in ED utilization might be due to barriers some migrant parents face when accessing primary care services. Key characteristics of migrant parents that appeared helpful in understanding this pattern of use were: time since arrival in the UK, proficiency in English and availability of social

support. Systems barriers, such as a lack of interpreter services in alternative settings and services (e.g. NHS 111) were perceived to be further factors driving ED use.

If you're not from the UK and you're recently arrived and have a health need and you're not registered with a GP, then your options are very limited. No one will know about 111 and if you speak a foreign language then that's pointless phoning 111 because they won't understand what you're saying. But I think if you ask anyone, and that includes family, the last thing that anyone says is 'if you're worried, or things get worse, then you should go to A&E'. So actually, the only accessible place for people, in [city name], is the emergency rooms because we don't ask for your passport when you come, emergency care is free. (P14, Senior Doctor)

One pattern of utilization that was perceived by clinicians to be different for migrant, as compared to non-migrant, families was the trend for migrant parents to bring multiple children to be seen at the ED at any one time (Box O). One provider explained that the reason for this pattern of use might be because of the organization of services in primary care and the barriers to care that exist. In the primary care system, to have each child seen the parent would need to have multiple interactions with multiple staff in order, firstly, to make appointments, and then for the children to be seen. These multiple interactions were perceived, most likely, to prove challenging for parents – particularly when language barriers exist. In contrast, the organization of the ED was perceived to enable migrant parents to attend the service just once with several children, thus reducing the number of interactions they need to have with healthcare providers.

That may be just resisting the number of interactions you have to have with somebody. Because if I find it difficult to speak to my GP or speak to my doctor I'd go for a 'one hit': get everything covered in one day. If I find transport difficult, if I find checking in with a receptionist difficult, I would only do it the once. And you know, kind of, get two for the price of one. (P4, Senior Doctor)

Demand side factors

Temporal factors (Box F)

Time since arrival in the UK was perceived as not only a factor that influenced ED use, with higher ED utilization perceived for children whose parents had most recently moved to the UK, but also a factor that moderated service use. Recently arrived migrants were described as being more 'vulnerable', particularly as they may not know how to access services or where to seek care and this was thought to influence the nature of the child's presentation and the frequency with which they attended.

I'd say, amongst the Eastern European, probably because they're our newest migrant group. They're young adults, they have young children who get poorly and they don't speak very much English. They use us repeatedly and you look back and go 'gosh you've been here you know six times this year and they've all been quite minor things that could have been sorted out elsewhere'. (P10, Senior Doctor)

Clinical staff also reflected that sometimes very new migrant parents brought very unwell children into the ED (Box J). These children, staff thought, should have received more urgent care, but due to a lack of understanding of the healthcare system, and where to seek care, did not present to the ED timeously. This again suggests that healthcare providers perceive there to be a problem with the complexity of the healthcare system and how information about it is communicated to new migrant arrivals in the UK.

And you do occasionally get really poorly children that the parents have just walked in with them. Well, why didn't you call an ambulance? Well, I didn't know I could, I didn't know how to, or I didn't know if I'd have to pay for it. So, sort of the very new migrants ... um ... there's definite problems there where they've just got no idea where they could ask for help. (P10, Senior Doctor)

Patterns of ED utilization, and expectations of care, were described by staff as changing over time the longer people lived in the UK. New arrivals were often perceived to be heavy users of the ED (Box K). Over time, as these groups became accustomed to how the healthcare system was organized, their health-seeking behaviour was thought to adapt to fit within the existing system, and their ED use was perceived to decrease. As the time in which parents lived in the UK

extended, their use was perceived by providers to mirror more closely the utilization patterns of UK born parents.

We have certain migrant populations who are heavier users. Often for a period of time and then not. At the moment, the Roma/ Slovak population are that heavy user group. But in the time I've worked here I've seen that change. There was a time when there was quite a big influx of the Somali population to [city name]. When that population first arrived in the country they were heavy users of the ED. And we noticed it. But they, now, I wouldn't say are using the ED any more than anybody else in [city name]. They've just assimilated, if you like, in terms of how they use the ED anyway. I think, it's related to their understanding of how to access services. (P6, Senior Doctor)

Social characteristics: Social class, education, language and socio-economic status (Box G)

Social characteristics of migrant parents, such as social class, education and socio-economic status, were perceived to be important in understanding patterns of ED use. ED utilization was viewed to be highest for migrant parents who had lower levels of education. In contrast, migrant parents with higher levels of education were thought to use the ED in ways more similar to those of UK-born parents.

I suppose, if there's higher education level, and particularly if there's a mother who speaks English, I think that makes a difference. So, it feels to me that ... without being judgmental about it ... but it feels to me that people in those groups would probably use the services a bit more closely compared to the rest of the [city name] population. (P6, Senior Doctor)

Migrants who were seen to be socio-economically advantaged were perceived to access services differently and to have different expectations of the care they were seeking for their children. The social class or professional status of parents was also thought to influence the pathways parents take when seeking healthcare for their children (Box P). Those parents with a more professional background were thought by clinicians to be able to exercise more choice when accessing healthcare and sometimes seek advice from healthcare professionals in their home country and came to the ED expecting the care that had been suggested.

It's also about what 'class' they started out as. So, if they come from overseas as professional class, so a lot, particularly Indian and Arab and Middle Eastern, will have

contacted their family doctor, or their specialist somewhere else, and they will bring that to the table as well.... And it's funny that the Spaniards and the Germans and the Scandinavians are almost always middle class, educated people who work at the University or are professionals, and, um, they're pretty anti-antibiotics and then [go on] to be anti X-ray on occasion as well. (P4, Senior Doctor)

A common theme to emerge across the interviews was that of English language proficiency. Ability to speak English well was perceived to influence parents' understanding of the healthcare system; was identified as a barrier to receiving care and was seen by staff across all roles as a key component of good access to healthcare. There was a strongly held perception among staff that language barriers were a factor that determined some migrants' use of the ED and could explain some of the patterns of use observed by staff. While clinicians asserted that where a person was from was often not important in delivering care, clinical staff judged that a parent's proficiency in English was important in determining their individual ability to understand information and advice provided by the healthcare team.

The big issue is not where you're from. It's how good your English is. Because so much of what we do is talking and listening. I can count on one hand the number of stitches I've done in a year. And so for pre-school children so much of it is explanation, reassurance, advice, instructions and when that is hard the whole thing gets hard. So it doesn't matter where you're from or how long you've been here. It just matters how good your English is. (P4, Senior Doctor)

Family and community factors -Social support (Box H)

ED staff also perceived the lifestyle of some migrant families, or the social situations that they live in, to influence the time of day they sought healthcare for their children (Box N) and their frequency of attendance (Box M). Different patterns of ED utilization, particularly higher ED use by some migrant sub-populations (Box K), was perceived by staff to be influenced by social, family and community factors within different migrant populations (Box H). What emerged from these findings is that the influence of social structures on patterns of ED use were perceived to pertain to both migrant and non-migrant families. Although these links were more speculative some staff revealed that there may be subtle differences in the time of attendance by migrant parents from different communities. However, this was felt to be related to patterns of behaviour within communities rather than the parents' migrant status. These differences related to differing bed

times that were considered 'normal' within different communities and due to factors, such as the, availability of transport, which was often related to the occupations of the parents – particularly fathers. This pattern of having the ability to seek care after standard working hours was seen to be better accommodated by EDs as compared to primary care services.

The Roma/ Slovak population, as an example, a lot of the fathers have ad hoc work where they'd go for sort of gang masters and they'd go off picking vegetables down in Lincolnshire or they'd go and work in a chicken factory cleaning in Birmingham. They'd be away all day so when they'd come back they'd come up to the ED. (P7, Senior Doctor)

Everybody comes to the emergency department in the afternoon and evening...Uh...is it any different?...maybe. Maybe later at night. I think different cultural bed times. I think we put our kids to bed at 7, 8 o'clock when they're small. They put them to bed when they go to bed. There's lots of co-sleeping ... but I think that's the same amongst non-migrants (?). I think that's, you know, the Asian population that aren't migrants, they've been here for years, they still live a lot like that. (P10, Senior Doctor)

Social structure: housing (Box 1)

Staff reported that both migrant and non-migrant parents who lived closer to the hospital were perceived to attend the ED more, both in terms of volume and frequency. However, some staff identified that migrant families often lived in closer proximity to EDs, which were described as being situated near city centres, in more deprived areas. The relatively short distance between the hospital and the areas where some migrant families lived was perceived as a factor that is likely to increase the accessibility of the ED as a place of healthcare. The quote below demonstrates how staff consider factors other than migration to be consistently related to ED use.

I think people who live near a hospital will behave massively different from someone who doesn't live anywhere near a hospital, and proximity is far more important. And, of course, that fits, because if you're a migrant you're almost definitely going to be in the city centre, particularly in a city like this. It's where the cheap housing is, and it's where the neighbourhood of other migrant families are, so that all fits like a perfect little jigsaw. (P4, Senior Doctor)

DISCUSSION

ED healthcare providers in this study perceived that being a migrant implies diverse past experiences in one context, individual experiences during the process of migration, and newly encountered contexts when entering the UK. These narratives fit well within the Zimmerman et al., 2011, Migration Process Framework and highlight that being a migrant is a dynamic status, which cannot logically be disconnected from individual experiences encountered in the process of migration. Using three of the five phases of migration proposed by Zimmerman et al., 2011, the framework we present demonstrates that while people may share a country of origin and destination, or may share a 'migrant' locus of identity, ED healthcare providers perceive that many migrant parents will have had different experiences in accessing healthcare in their country of origin; will have diverse health beliefs and anxieties; and will have different levels of vulnerability depending on how, and for what reasons, they migrated. Each of these factors are perceived by staff to potentially influence ED utilization by migrant parents for their children.

While understanding patterns of healthcare utilization by different populations is important for health policy and planning (Rechel et al., 2012), our findings question the extent to which research that uses broad categorizations of migrant versus non-migrant can be. This research reflects wider literature which suggests that broad categorizations ignore the diversity that exists within, and between migrant groups and the migration experience (Rechel et al., 2013). Binary categorizations risk over-generalisation, making the needs for urgent and emergency care for some migrants invisible, particularly those newly arrived and in vulnerable circumstances. Also, migrant/non-migrant distinctions may overplay what are shared population-level challenges of ED demand and contribute to essentialisation and unhelpful stereotypes about migrant groups.

Many factors that influence patterns of ED use are shared across whole populations. These include sociodemographic factors such as: patient ethnicity (Hull et al., 1998, Forbes et al., 2007) and levels of deprivation (NHS Confederation, 2014, NHS Digital and NHS England, 2018, Scantlebury et al., 2015, Rudge et al., 2013, Kossarova, 2017). In addition to health service factors, such as proximity to the ED (Giebel et al., 2019, Baker et al., 2011), problems patients face in accessing other healthcare services (Tammes et al., 2017, Turnbull et al., 2019) or people's individual perceptions that EDs are best suited for their, or their children's, healthcare needs (Coster et al., 2017). Many of these factors, as with the use of the ED by non-migrant parents, were perceived by staff to contribute to migrant parents' use of the ED for their children.

However, through these interviews staff revealed a number of factors that they believe influence ED utilization by migrant parents which are specific to migrant populations.

ED healthcare providers in this study perceived that patterns of ED use by migrant parents are influenced by parents' global region of origin and time since arrival in the UK. Time since parent's arrival in the UK was seen as a factor that influenced the conditions with which children present, the appropriateness of attendance as well as parents' expectations of care. Patterns of ED use by new arrivals were perceived to be driven by a lack of knowledge of the UK healthcare system and barriers to primary care. Previous literature supports the idea that EDs may be the first point of healthcare contact for migrants unfamiliar with the healthcare system in their host country or for those who face barriers to other forms of healthcare (Norredam et al., 2004). For newly arriving parents, language barriers were felt to further exacerbate barriers to healthcare and increase parents' vulnerability when accessing care. Yet there are few studies that consider how long a migrant parent has lived in the country, or any of these other indicators, when seeking to understand patterns of ED utilization. Our recent study suggests that with increasing time in the host country, patterns of ED utilization mirror, more closely, the use by UK born parents (Credé et al., 2020). These findings imply that to ensure equitable access to healthcare, health services and social policies may need to promote, and expedite, the process of new arrivals becoming embedded in the health system. Alternatively, the design of a more straightforward and flexible health system that is better able to adapt to changes in the population may promote access to healthcare. Equitable access may be achieved through careful service design, or by developing interventions that aim to promote access to the most appropriate healthcare service, while ensuring that paediatric patients at the highest risk, such as undocumented migrants, have their urgent and emergency care needs met. Providing information about the health system to new arrivals in their own language may play an important role in increasing accessibility to services for new arrivals (Rechel et al., 2013). As might the use of health navigation services such those used to promote healthcare access among immigrant and ethnic minority populations in Canada and the United states (Shommu et al., 2016).

The narratives of ED professionals seem to contrast with healthcare utilization evidence. Instead of migrants' use of services being problematic and needing to be solved, our findings highlight the diverse patterns of use among migrant users, and the importance of understanding factors beyond migration status that are perceived to influence ED utilization if equitable access to healthcare is to be facilitated. We found some evidence that very new arrivals might delay emergency treatment because they don't know which healthcare service to access, but, in

general, migrant children, or children born to migrant parents were not perceived to be a population in greater need of urgent or emergency care. Clinical staff revealed that some factors relating to migration are occasionally helpful in understanding the child's presentation to the ED – e.g. country of origin for screening for infectious diseases and time since arrival (e.g. recent exposure to infectious disease). What emerged from these interviews is that people with some shared characteristics – e.g. region of origin, migrant status, socio-economic background, ethnic group and language needs – may have some common patterns of health-seeking behaviour.

Providers identified that the healthcare system was often insufficiently prepared and inflexible to the diverse needs of newly arriving migrant populations. Providers at both hospital sites identified this problem which suggests that this problem may be a system-wide. While senior staff described how the health system was sometimes prepared for the arrival of certain migrant groups such as asylum seekers and refugees, many other migrant groups, and communities, have entered the UK and presented to the health system without the service being adequately prepared to meet their diverse needs. The Roma population – one of Europe's most disadvantaged minority populations - were, in particular, thought to have arrived to an unprepared service that encountered difficulties in meeting healthcare needs. The perception of higher use of the ED by the Roma population reflects current evidence which suggests that, for this population, the patterns of healthcare utilization in Europe differ from other populations – particularly higher utilization of acute hospital services due to barriers to preventative care (European Commission., 2014). Given the extensive discrimination Roma populations face across Europe, this is an important finding. As people of Roma background are perceived to use ED services in different ways to other migrant groups, this indicates that general policy recommendations to improve healthcare access for migrants are insufficient. The views of these providers support the notion that there is a need for early recognition of the vulnerabilities and health needs of migrant groups to enable effective health-promotion and equitable healthcare utilization (Gushulak et al., 2009). Tailored services and interventions that are designed for the healthcare needs of migrant populations, which include provision for linguistic needs, may promote access to and utilization of healthcare services (Gushulak et al., 2009), and appropriate use of primary care and EDs.

Rather than using migrant status as a single category of difference in understanding ED utilization, we suggest that there is a need to explore the complex factors that may contribute to ED utilization using an intersectional approach (Corus and Saatcioglu, 2015). An intersectional approach to immigrant health research seeks to understand how migration status interacts with

multiple axes (e.g. language, socio-economic status, ethnic identity and education) to influence health outcomes (Viruell-Fuentes et al., 2012). Service design may also benefit from understanding the needs of individual migrant groups with a view to being able to create tailored services that recognize the multiple factors that interact to result in migrants resorting to ED use. Guided by the framework that we have presented, we believe that it will be possible to develop further qualitative, mixed methods, participatory and evaluative studies that seek to explore, and understand, how some of these complex determinants of use may interact. Further research is also necessary that explores the healthcare needs and patterns of ED utilization by individual migrant groups in depth, while recognizing the diversity within migrant populations, and how this diversity impacts on patterns of ED use.

In interpreting the findings from this study, it is important to comment on the participant sampling used. Participants were purposefully sampled to represent different job roles, and grades, from two ED sites to enable a deeper understanding of the topic to be explored. Despite the EDs providing care to diverse migrant communities, the themes that emerged from the interviews were evident in data from across both hospital sites. ED staff shared many of the same perceptions and experiences of providing healthcare to children of migrant parents in the ED setting. Participants in this study were also chosen to represent different migrant backgrounds as we believed that participants from migrant origins may respond differently to migrant patients. Although the direct quotations do not reveal the origin of the participant (to maintain anonymity) the findings from this study suggest that perceptions of these staff members did not differ greatly from others.

Strengths and Limitations

This research is the first of its kind that describes ED staff perceptions of migrant parents' patterns of ED utilization for their children. This is the first study to include the views of both clinical and non-clinical ED staff and this is a further strength of this work. Through this work, we have moved beyond understanding the challenges and barriers of providing urgent and emergency care to migrant populations, as reported in previous literature, and have provided an in-depth understanding of the characteristics of migrant users and the determinants of their ED use.

The study is not without limitations. While qualitative research does not seek to be generalizable, the sampling used in this study may be seen as a limitation. This research was conducted in two cities within the UK and with staff from two EDs. While these cities have diverse migrant groups,

it is possible that NHS staff perceptions of ED use by migrant populations in other regions may differ. Furthermore, the use of a gatekeeper to access potential participants may have been a further limitation. It is possible that staff with more divergent views were not selected to participate and this may limit our understanding of providers' perceptions of the use of EDs for paediatric care by migrant populations.

CONCLUSION

Our findings suggest that ED service providers perceive that parents' migrant background is one driver among many that influence patterns of ED use. To understand migrant parents' patterns of paediatric ED utilization fully, we observe that there is a need to move beyond broad categorizations used in quantitative research to in-depth and mixed methods research that explores the processes and contextual factors that influence health-seeking practices and patterns of ED use by migrant parents. This shift is necessary given the multiple individual, social and contextual factors that staff perceive to influence ED utilization. Until we recognize the role of the multiple factors that influence ED use for migrant populations, and the interrelationships between these factors, it will not be possible to design interventions or appropriate services that meet the needs of diverse migrant groups.

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Chapter 8. Study 3 (Paper 4)

This chapter presents the study findings from study 3 in the format of a paper ready for submission to an academic journal. As the first author, I was responsible for the study design, data analysis and wrote the first draft of the paper. Detail of the co-authors contributions to this paper can be found in Appendix 1.

8.1 Paper 4: Patterns of paediatric emergency department utilization in Sheffield, UK: a comparison of Roma and White British children

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ABSTRACT

Objectives: Roma populations are among the most disadvantaged minority groups across Europe, often experiencing poor health outcomes. Evidence suggests that Roma populations may use emergency departments (EDs) in preference for other healthcare services. We aimed to identify whether patterns of ED utilization differ between Roma and White British/ Irish children in Sheffield, UK.

Methods: Using data from 'The University of Sheffield Connected Health Cities: Urgent and Emergency Care' research database we compared ED utilization at Sheffield Children's hospital (SCH) between Roma, and similarly deprived, White British/Irish children. Children were identified as 'likely' Roma using a surname-based ethnicity classification system. Time of ED attendance, source of referral, diagnosis, urgency of attendance, ED consultation time and attendance disposals were compared between the two groups.

Findings: 14,156 ED attendances were made by children of Roma (1,228 (8.67%)) and White British ethnicity (12,928 (91.33%)) during 2016-17. The majority of children self-referred to the ED, this is particularly true for Roma children (OR 1.67 (95% CI 1.37 to 2.10)). Roma children were more likely to attend the ED with a non-urgent presentation (OR 1.45 (95% CI 1.29 to 1.64)); less likely to be admitted (OR 0.79 (95% CI 0.66 to 0.94) and less likely to attend the ED during the day (OR 0.82 (95% CI 0.73 to 0.92)).

Conclusions: Children of probable Roma ethnicity show different patterns of ED utilization compared to White British/ Irish children. These findings suggest that Roma children may not be accessing the most appropriate services for their healthcare needs.

INTRODUCTION

The Roma, comprising a heterogeneous population with varying backgrounds, ethnicity and linguistic diversity (Orton et al., 2019), are considered to be the largest minority ethnic group in Europe (European Union Agency for Fundamental Rights., 2012). Migrating mainly from Central and Eastern Europe, migrant Roma populations have spread across Europe since the Accession of new EU Member states between 2004-2013 (European Commission., 2014). In the UK, the children of Roma migrants are a rapidly growing group, many of whose parents have moved to the UK seeking improved lives for their children (Brown et al., 2013). Roma populations originate from a range of nation states (European Commission., 2014) and in the UK, migrant Roma populations are concentrated in London and the North West, with significant populations residing in Yorkshire and Humber (Brown et al., 2013). In Sheffield (a large city in the north of England) the largest group of Roma are the Slovak Roma who are of Slovakian origin (Willis, 2016).

The Roma have suffered a history of institutionalised discrimination, are often socially disadvantaged and tend to experience poorer health outcomes compared to non-Roma populations (European Commission., 2014). Roma populations across Europe are also more likely to report unmet health needs compared to non-Roma populations (Arora et al., 2016). Roma children are at particular high risk of poor health. Many Roma women begin having children at a young age and on average are more likely to have low birthweight babies (Sepkowitz, 2006). Evidence also suggests that Roma children have low, or variable, levels of immunisation and high infant mortality rates, as compared to non-Roma populations, highlight the health risks experienced by this paediatric population (European Commission., 2014). Given these poor health outcomes it is of concern that some Roma people have been identified as lacking access to, and showing differential utilization of, healthcare services (McFadden et al., 2018, Hajioff and McKee, 2000, Földes and Covaci, 2012). Studies have found that Roma people use emergency departments (EDs) more than the general population because of barriers to care, particularly primary care (Fundacion Secretariado Gitano., 2009, Aspinall, 2014). However, there is a paucity of detailed research on the patterns of ED utilization by children of Roma background in a UK

context and the extent to whether these children use EDs, and their patterns of ED use, are not widely evidenced.

Addressing the health needs, and improving health outcomes, for Roma children across Europe has been recognised as increasingly important (European Commission., 2014). Alongside understanding healthcare access overall, it is important to drill down to specific services so that fuller systems responses can be appropriately designed. This paper focuses on ED access, and the patterns of paediatric ED utilization among this population. It examines the patterns of ED use among Roma children, whether patterns of paediatric ED utilization differ between Roma, and White British children living in equally deprived areas in Sheffield.

METHODS

Cross-sectional study comparing patterns of ED utilization between children of Roma, as compared to children of White British/ Irish origin, at Sheffield Children’s Hospital (SCH) – a dedicated children’s NHS Trust in the UK.

Data

There is a lack of healthcare data in the UK, and across Europe, that can identify patients by national and/ or ethnic origin, which limits the ability of the health services to understand, or adapt to, differing healthcare needs in migrant populations (Rechel et al., 2013). Guided by previous studies that have used patient surname to identify individuals from particular ethnic and minority groups (Mateos, 2007, Royle et al., 2012, Shah et al., 2010), this study chose to assign the feature of likely ‘Roma background’ to children attending SCH based on the child’s surname.

A pseudonymised data set was requested from the ‘University of Sheffield Connected Health Cities (CHC): Urgent and Emergency Care’ research database for all children attending SCH ED between 1st April 2016 and 31st March 2017. The research database contains routine National Health Service (NHS) patient data, linked across the urgent and emergency care system in Yorkshire and Humber. Using a list of 100 Roma/Slovak surnames provided by the research team, each child was classified as likely Roma/ non-Roma by CHC the project data manager prior to anonymising the data.

The CHC study was approved by the Health Research Authority Ethics Committee (18/YH/0234) and Confidentiality Advisory Group (CAG/18/0126).

Identifying the Roma population

The list of common Roma Slovak last names was collated from a health service in Sheffield to identify patients with a Roma background. This list, based on the caseload of Roma Slovak patients, was generated by the health service for teaching purposes, particularly to raise awareness among healthcare providers about the Roma community in Sheffield. Permission to use this list of surnames was given by the health service on condition that the service was not named and that the list of names remained confidential.

After each child had been classified a Roma/ non-Roma, a surname validation exercise was undertaken using a two-step process. Firstly, the ethnicity data of children identified as 'likely Roma' were scrutinised. Roma status is not recorded in routine hospital data and these groups are often concealed in ethnic categories such as 'any other White background' (Aspinall, 2014). Through the validation process 94.38% of children identified as likely Roma matched to ethnic categories of: 'any other White', 'any other' or 'not stated' which suggests accurate classification of these children. The second step of validation involved cross-checking Roma surname with levels of deprivation using the Index of Multiple Deprivation (IMD). In many European countries Roma populations are concentrated in the most deprived areas (European Union Agency for Fundamental Rights., 2012). Given that 98.24% of children identified as 'Roma' in the full data set were found to be in the two most deprived deciles, we believe these results suggest that, in this study the use of surname is a good proxy for Roma origin.

Identifying the non-Roma population

For this study we sought to identify a comparison group of non-migrant children. As migrant status is not collected in routine data, our comparison group was chosen as children of White British/ Irish ethnicity, as this ethnic group contains the highest percentage of people born in the UK (93%) (Office for National Statistics., 2018). The comparison group was restricted to children with similar levels of deprivation to account for the high levels of deprivation in the Roma population. The final data set included all children (≤ 16 years) of Roma and White British/Irish ethnicity, IMD decile 1 or 2, who had a valid postcode within Sheffield local authority and who were live attendances to the ED.

Outcomes of interest and other variables

The main outcomes of interest were: Accident & Emergency (A&E) arrival mode; source of referral; A&E diagnosis category; A&E attendance disposal; time of day and day of week of attendance; average time spent in A&E; and urgency of first A&E attendance. These data items were provided as per Hospital Episode Statistics (HES) A&E data.

Sociodemographic variables

In addition to Roma/ non-Roma status our variables included: gender, and age at ED attendance (categorised as <1 year, 1-4 years, 5-9 years, 10-14 years, ≥15 years). English Indices of Deprivation (IMD) 2015 deciles were used to categorise relative deprivation (relative to people living in other neighbourhoods in the country) (Department for Communities and Local Government, 2015).

ED attendance variables

From the CHC data the following additional variables were generated.

Time of day of admission was categorised as week/weekend day shift, or week/weekend night shift. The timing of 'night shifts' was chosen as it coincides with the out-of-hours period of many GP practices. HES A&E diagnosis codes were grouped into broad diagnostic categories through consultation with two A&E consultants (Table 12).

Table 12: HES A&E attendance categories

A&E attendance category	HES codes included in attendance category
Injury	Musculo-Skeletal - dislocation, fracture, joint injury, sprain, ligament injury, Wounds - laceration, contusion, abrasion, bites, stings, burns, scalds Other - head injury, foreign body (FB), soft tissue inflammation
Medical	Respiratory - asthma, non-asthma Neurology - epilepsy, non-epilepsy Cardiology - cardiac condition non-ischaemia Endocrinology - diabetes Poisoning Other – dermatological conditions, allergy, haematological conditions Other infectious disease – infectious disease, local infection, septicaemia
Surgical	General – acute abdominal pain, GI other ENT – ENT conditions Eyes - ophthalmology Genito-Urinary - urological condition
Psychiatry	"Psychiatric conditions"
Social problems	"Social problems"
No abnormality detected	"Nothing abnormal detected"
Non-Specific	"Diagnosis not classifiable"
Missing	No diagnosis recorded

Definition of non-urgent attendance

We defined a non-urgent attendance as a first attendance to the ED where the child either received no investigation or treatment, or the child received investigations, treatment or a referral that may reasonably have been provided in a non-emergency care setting, such as at a Walk in Centre, GP surgery or pharmacy. This definition of a ‘non-urgent’ attendance was adapted from a previously published definition (O’Keeffe et al., 2018), and all investigations, treatment and disposal codes were categorised according to this definition. To be considered a ‘non-urgent’ attendance all investigation, treatment and disposal codes had to be considered non-urgent. For codes used at SCH that did not appear in the O’Keeffe et al. 2018 definition these were categorised as urgent or non-urgent through consultation with two ED clinicians.

Table 13 shows the HES A&E codes present in the SCH data that were categorised as ‘non-urgent’. All other investigations, treatment and disposal outcomes were considered ‘urgent’. In the case of missing data, this was considered ‘urgent’. If any one of the investigations, treatments or disposal outcomes recorded for a child’s ED visit was considered ‘urgent’ this was considered an urgent attendance.

Table 13: HES A&E codes categorised as non-urgent or urgent

	Investigation	Treatment	Disposal
Non-urgent	None, urinalysis, pregnancy test	No treatment, dressing, wound clean, verbal advice, none, TTO, ear drops, eye drops, removal of suture, recording of vitals, medication administered: skin cream	Discharged, discharged to GP, did not wait
Urgent	Any other, including missing data	Any other, including missing data	Any other, including missing data

Data analyses

Summary descriptive statistics were used to describe the socio-demographic characteristics of the children attending SCH. To compare socio-demographic characteristics and ED utilization between Roma, as compared to White British/ Irish children, univariate comparisons of outcomes of interest were made using Pearson’s Chi squared statistics with odds ratios (OR) and 95% confidence intervals reported for ED utilization. Age (years) and Time in ED (minutes) were compared using a Mann-Whitney U test and a Mood’s median test respectively. All analyses were undertaken using Stata SE V.14.2 (StataCorp, 2015).

RESULTS

Description of the cohort

During the 12-month study period there were 14,156 ED attendances to SCH made by Roma or White British/Irish children. Demographic data are summarised in Table 14. Compared to White British children, Roma children attending the ED were significantly more likely to live in the most deprived areas of Sheffield.

Table 14: Socio-demographic characteristic of Roma and White British children attending SCH

		Roma n= 1,228	White British/ Irish n = 12,928	p
Gender	Male	678 (55.21%)	6,923 (53.55%)	0.265
	Female	550 (44.79%)	6,005 (46.45%)	
Age (years)	Mean (SD)	5.35 (4.88)	5.48 (4.89)	0.120
	Med (IQR)	4 (1; 10)	4 (1; 10)	
IMD Deciles	1	990 (80.62%)	9,054 (70.03%)	<0.001
	2	238 (19.38%)	3,874 (29.97%)	

ED utilization

We found differences in ED utilization between Roma and non-Roma children (Table 15). Compared to White British/ Irish children, Roma children were more likely to attend the ED during the night. The majority of children attended the ED without referral, this was particularly true for children of Roma origin. No differences in frequency of attendance were identified between Roma and non-Roma children.

Roma children presented to the ED for different reasons compared to White British children. Roma children were significantly more likely to be given a 'surgical' diagnosis e.g. gastrointestinal or conditions relating to the ear, nose and throat; whereas a higher proportion of British/ Irish children presented to the ED with injuries.

Children of Roma origin were significantly more likely to be discharge to a GP for follow up as compared to non-Roma children and were less likely to be admitted after ED attendance. Looking at the urgency of ED attendance, a greater proportion of Roma children attended the ED with a non-urgent presentation that did not require the services of an ED. On average, Roma children spent longer in the ED.

Table 15: Comparison of ED utilization between Roma and non-Roma children

Outcome	Roma vs White British/Irish (n=1,228 vs. n=12,928) %	OR	95% CI	P Value
More than one ED visit in year (per child n=8,514)	33.7% vs. 36.0%	1.10	0.94 to 1.30	0.228
Ambulance arrival	9.7% vs. 9.3%	1.00	0.81 to 1.23	0.957
Time of day of attendance				
Attend during day	53.0% vs. 57.9%	0.82	0.73 to 0.92	<0.0001
Week day shift (08:00-17:59)	33.9% vs. 43.0%	0.82	0.73 to 0.93	0.002
Week night shift (16:00-07:59)	33.5% vs. 30.7%	1.29	1.14 to 1.47	<0.05
Weekend day shift	14.7% vs. 14.9%	0.98	0.82 to 1.15	0.771
Weekend night shift	13.5% vs. 11.2%	1.22	1.03 to 1.47	0.019
Source of referral				
GP referral	6.23% vs. 7.6%	0.82	0.64 to 1.04	0.103
Self-referral	92.7% vs. 88.34%	1.67	1.33 to 2.10	<0.0001
Diagnosis category				
Injury	19.1% vs. 39.2%	0.37	0.32 to 0.43	<0.0001
Medical	23.6% vs. 20.9%	1.17	1.02 to 1.35	0.023
Surgical	34.2% vs. 18.1%	2.35	2.07 to 2.67	<0.0001
Psychiatry	0.2% vs. 0.3%	0.60	0.07 to 2.34	0.479
Social problems	0.0% vs. 0.3%	-	-	-
No abnormality detected/ non specific	22.8% vs. 21.2%	1.15	0.97 to 1.73	0.507
Attendance disposal				
Admitted	13.4% vs. 16.5%	0.79	0.66 to 0.94	<0.05
Discharge to GP	7.6% vs. 3.9%	2.01	1.58 to 2.53	<0.0001
Discharge no follow up	70.3% vs. 70.3%	0.99	0.88 to 1.14	0.979
Urgency of attendance				
Non-urgent attendance	45.2% vs. 36.2%	1.45	1.29 to 1.64	<0.0001
Time in Minutes from Arrival at ED to Departure Median (IQR)	110 (67-160) vs 102 (61-158)			<0.001

Significant p-values (p<0.05) are bolded

DISCUSSION

The key finding of our study is that children of likely Roma origin show different patterns of ED utilization as compared to White British/ Irish Children. Importantly, Roma children were significantly more likely to self-refer, less likely to be admitted and a greater proportion of these children attended the ED with a non-urgent presentation as compared to White British/Irish children. Ethnic disparities in health service utilization and health outcomes have been extensively studied in the UK and elsewhere. In the UK, rates of ED utilization have been found to be higher for similarly disadvantaged Traveller and Gypsy communities (Beach, 2006, Peters et al., 2009), yet no previous studies have looked specifically at patterns of ED utilization by Roma children. The findings from this study have important implications for EDs and health services working with Roma populations in their area.

Given the current pressures on ED services in the UK, the finding that a large proportion of ED visits by all children in this cohort were identified as clinically unnecessary is important. Almost

half of the ED attendances by Roma children, and significantly more of their attendances when compared to White British/ Irish children (45.2% vs 36.2%), were identified as clinically unnecessary. The higher use of the ED for non-urgent presentations, coupled with the high proportion of children self-referring to the ED, may indicate barriers Roma parents face when seeking appropriate healthcare for their children- despite eligibility for NHS services. Roma populations, particularly Roma children, are known to face significant barriers to healthcare throughout Europe (Földes and Covaci, 2012, McFadden et al., 2018), and for these parents the ED might be the most accessible healthcare service. Reported barriers to healthcare among Roma and similarly disadvantaged groups include: a lack of familiarity of the healthcare system; difficulties registering with, or securing, GP appointments; language difficulties and discrimination (Cheng et al., 2015, O'Donnell et al., 2007). Specific barriers to care for Roma children include poverty, geographical isolation, low parental education and negative attitudes of healthcare providers (Rechel et al., 2009). These barriers to care experienced by Roma parents, may be a legacy of historic stigmatisation, widespread discrimination, and segregation which play out in the provision of health services that have not been designed, or set up, to meet the complex healthcare needs of Roma people (European Roma Rights Centre., 2006).

Despite Roma children in this study being more likely to attend the ED with non-urgent presentations, findings show that these children were more likely to be discharged to the GP for follow up. This suggests that for these children there is a clinical, or non-clinical, healthcare need despite their non-urgent ED attendance which has implications for GP practice workload. A further consideration is that referring a patient to a GP may be a safety netting response from ED clinicians, if there are difficulties with ED consultation – this too may increase GP workload. Non-urgent presentations may also suggest that these parents, like many parents of young children, are more risk averse and may attend the ED for reassurance (Petersen et al., 2011). However, our findings suggest that the health needs of Roma children could be better met outside the ED where community and family services can provide continuity of care which is beneficial for long term health outcomes. However, barriers to such contact persist (McFadden et al., 2018, Hajioff and McKee, 2000).

Roma parents may also choose to access the ED in preference to more appropriate care if their specific cultural and language needs are not accommodated in other healthcare services and settings (Rechel et al., 2009). Penchansky and Thomas's model of access to care (Penchansky and Thomas, 1981), suggests that patterns of healthcare utilization may reflect the extent to which patients' needs are accommodated by the health system. Roma children were found to spend

longer in the ED. This may be suggestive of complex healthcare needs, as well as language and translation complexities which may be better accommodated within ED services than in the community. The higher use of ED services by Roma parents for their children during the out-of-hours periods may also demonstrate Roma parents' desire for accessible healthcare at a time that suits them. High rates of illiteracy, poor education and discrimination in the labour market (United Nations Development Programme., 2003) mean that many Roma, like other migrant groups in the UK, may be employed in more precarious working situations (Jayaweera and Anderson, 2008); working long and non-standard hours. Thus, for some Roma parents accessing care for their children during normal working hours may not be possible, and the pattern of seeking care after hours again may be best accommodated by EDs.

The factors underlying these differences in ED utilization by Roma as compared to White British/Irish children are complex and may include factors within the delivery of primary care, and the extent which Roma parents are able to make use of primary care services. While these healthcare services are present in the community, it is important to understand the extent to which parents understand these services; how physically accessible they are; and the extent to which they are non-discriminatory (McFadden et al., 2018). To fully understand these patterns of ED utilization it will be important that future work seeks to understand the pathways to accessing care through the healthcare system in general and the ED and primary care in particular. Furthermore, as highlighted by Rechel et al., 2009, understanding access to healthcare for Roma children cannot be considered in isolation from the complex problems experienced by this population such as poverty, poor access to education and social exclusion (Rechel et al., 2009). Collaborative working between primary and emergency care services, along with outreach programmes, guided by existing evidence (Carr et al., 2014, McFadden et al., 2018), may facilitate use of healthcare services best suited to meet the diverse needs of Roma children.

Strengths and limitations

This study is the first of its kind to identify differences in ED utilization for Roma as compared to White British/Irish children. The findings of this study are important, both for Roma populations who experience widespread discrimination and disadvantage throughout Europe, and to healthcare services. The findings of this study can be used to inform the delivery of appropriate health services that seek to ensure equity in healthcare access.

The name-based classification used in this study has provided a unique opportunity to measure the differences in patterns of ED utilization for Roma as compared to White British children. This method has been identified to be a valid technique for ascribing individuals to particular ethnic groups when self-identification is not possible (Mateos, 2007) and is the first such study to use this method for ED utilization in the Roma population. However, there are limitations to this method. It is possible that children have been inaccurately identified as a result of inaccurate data entry or as a result of Roma surnames not captured on our list of common surnames. The strength of associations identified in this study may be affected by any misclassifications.

We also recognise that the Roma are a diverse group and even an accurate name-based classification system cannot account for the heterogeneity, migration history and varying vulnerabilities within the Roma population that may influence the patterns of ED utilization observed. This study also only looked at use of a single paediatric specific ED in the UK and focused on the Roma Slovak population in Sheffield. Patterns of ED utilization may differ between Roma communities, as might patterns of utilization to dedicated children's, as compared to mixed, ED facilities.

CONCLUSION

This study identified different patterns of ED utilization by Roma as compared to White British/Irish children in Sheffield. These patterns of utilization reinforce others' findings on Roma relatively high use of emergency care and comparatively lower use of primary care (European Roma Rights Centre., 2006) , while providing new insights into patterns of healthcare utilization for Roma children. The findings suggest complex individual, family, community and structural issues that face Roma populations in Europe, many of which are poorly understood in a UK setting where European Roma populations are relatively 'new'.

Given the heterogeneity within the Roma population delivering healthcare that meets their complex needs will be challenging (Brown et al., 2013). It is important both that future research seeks to understand the reasons for the patterns of ED utilization observed, and that healthcare services work with Roma families to explore ways to address their healthcare needs while facilitating appropriate ED service use. Improving access to healthcare, and patterns of healthcare utilization, for a population that has been historically marginalised and abused will be challenging. However, there are opportunities to learn from successful health programs and services working

with disadvantaged communities in other contexts and build evidence about how health services can adapt to emerging population needs (Such et al., 2017).

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A competing interest's statement

None declared

Chapter 9. Discussion and conclusion

9.1 Introduction

The overall aim of this thesis was to explore whether emergency department (ED) utilization differs between migrants and non-migrants in the United Kingdom (UK). Guided by the findings of a systematic review (conducted as the first study in this thesis) the aim of this PhD project was narrowed down to focus specifically on ED use by migrant parents for their children. This focus was chosen as a clear gap was identified in existing evidence relating to ED use for paediatric care by migrant populations. Three specific research questions were addressed in the empirical work, and each provides a novel contribution to our understanding of migrant parents' use of EDs for their children in the UK. Each study undertaken in the empirical work has been presented in the format of an academic publication in Chapters 6-8.

This discussion chapter summarises the main findings of each piece of empirical work, as well as presenting the main findings of this thesis as a whole. The findings of each study are drawn together around the original research question using a method of triangulation. Guided by the 'Triangulation protocol', developed by Farmer et al., 2006, the findings from each of the empirical studies are presented as themes with descriptive and explanatory components (Table 16). Within each of these themes, the findings are compared between the studies and consideration is given to how the findings of each study converge, complement each other and in which area/s there is disagreement or silences between the findings (Farmer et al., 2006). The unique contribution of this work in relation to existing evidence is highlighted within this chapter. Towards the end of the discussion the main strengths and weakness of the study are summarised. The clinical and service implications of the study findings are also discussed and avenues for future research presented.

9.2 Summary of main findings

9.2.1 Systematic review

The systematic review (Chapter 3) was the first review that I am aware of, to synthesize evidence of migrants' use of EDs in European Economic Area (EEA) countries. Twenty-two papers, from six European host countries (two papers from the UK), were included in the review. The review

identified that adult migrants in EEA countries show higher ED utilization than non-migrants, and that ED utilization differs by immigrant sub-group. Higher ED utilization was seen to be mainly from immigrants from the 'global South' and findings pointed towards a trend for lower utilization of the ED in some countries by migrants from European countries. The findings of this review showed a trend towards greater use of EDs during unsocial hours by migrants, as compared to non-migrants, as well as a trend for migrants to utilize the ED more for low-acuity presentations. However, due to the varying methodological quality, and the diverse range of contexts of the included studies, drawing general conclusions from the review findings was difficult.

The review findings highlighted not only a lack of understanding of migrants' use of EDs in the UK context but particularly a lack of evidence of migrant parents' use of EDs for their children. Only three studies were identified for this review that included a paediatric population (Ballotari et al., 2013, De Luca et al., 2013, Grassino et al., 2009). Findings from these studies pointed towards higher utilization of the ED for migrant children (De Luca et al., 2013) and those born to migrant mothers (Ballotari et al., 2013); different patterns of ED use by mother's geographic regions of origin (Ballotari et al., 2013); and higher ED use for non-urgent presentations by children born to migrant, as compared to non-migrant, parents (Ballotari et al., 2013, Grassino et al., 2009). Evidence from one study included in the review found that children born to migrant and non-migrant parents alike attend the ED for similar conditions and at similar times of the day (Grassino et al., 2009).

This review highlighted both the need for further research that quantifies migrant parents' ED use for their children, and the need for further evidence that explores the reasons for different patterns of ED utilization between migrant and non-migrant populations. However, across Europe there are limited existing healthcare data sets that capture migrant status, and there is very little existing work that critically accounts for the ways in which ED front line workers perceive the issue of migrants' utilization of EDs. The empirical phase of this PhD developed from these review findings and sought an increased understanding of migrants' use of EDs for paediatric care in the UK context. After considerable exploration of datasets that might be able to help develop the evidence base the following three research questions were proposed:

- 1) What are the differences/ similarities in the use of the ED between children born to migrant as compared to UK/ Irish-born mothers in BiB cohort?

2) What are healthcare providers' perceptions and experiences of migrants' use of the emergency department for paediatric care?

3) What are the differences/ similarities in the use of Sheffield Children's Hospital ED by Roma as compared to White British/ Irish children?

9.2.2 Study 1 – Secondary analysis of Born in Bradford cohort data

The analysis of the BiB cohort data aimed to establish whether, in a UK context, there are differences in paediatric ED utilization in the first five years of life for children born to migrant, as compared to non-migrant, mothers.

The findings from the BiB study (Chapter 6) found that children born to migrant mothers were less likely than those born to UK/Irish-born mothers to make a first attendance to the ED. Both children born to migrant mothers, and those born to UK/Irish-born mothers, were found to attend the ED with similar conditions and at similar times of the day. However, the findings showed that among those who had used the ED at least once, children born to migrant mothers attended the ED more frequently than non-migrant users.

Mother's time since arrival in the UK was found to be an important factor in understanding patterns of ED use. With increasing time since mother's arrival in the UK the likelihood of ED use between children born to migrant, and non-migrant mothers, was found to be more similar. Patterns of ED utilization were also found to differ by mother's region of origin. Higher rates of utilization were found for children born to mothers from Europe or Central Asia and those from Africa.

The findings of this quantitative study guided some of the questions asked in the qualitative interviews with ED healthcare providers (study 2).

9.2.3 Study 2 – Qualitative interviews with ED healthcare providers

The qualitative component of this thesis explored ED healthcare providers' perceptions and experiences of migrant parents' utilization of EDs for their children. The qualitative interviews

revealed a number of perceptions about differences in patterns of ED utilization between migrant and non-migrant parents for their children (Chapter 7). Some of these differences include: the perceived higher use of EDs by some migrant populations; a perception that some migrant parents were more likely to bring their children to the ED with low-acuity presentations; as well as a perceived trend for some migrant families to bring in multiple children to be seen at the ED in a single consultation. Children of Roma origin were viewed by many staff from both hospital sites as the 'current heavy users' of ED services. Importantly, children of migrant parents were not perceived to be a population in greater need of urgent or emergency care.

Despite these perceived differences, a common view held by many participants was that diverse patterns of ED utilization exist between people within migrant populations. However, it was suggested by some staff that there may be some common patterns of health seeking behaviour in people with some shared characteristics (region of origin, migrant status, socio-economic background, ethnic group and language needs).

A key finding from these qualitative interviews was that migrant status was not perceived by ED staff, who treat or interact with the children of migrant parents in the ED, to be the main driver for differences in perceived patterns of ED utilization between migrants and non-migrant parents for their children. Staff perceived that the diverse health beliefs, different levels of vulnerability, differing individual characteristics of migrant parents, and different experiences along the migration journey potentially influence the ways in which migrant families use the ED.

9.2.4 Study 3 – Quantitative analysis of Sheffield Children's Hospital ED data

The final piece of empirical work for this PhD developed during the course of the project. Findings from study 1 identified a higher rate of ED use by migrant mothers from Europe and these were supported by evidence from study 2 where families from Eastern Europe, particularly those of Roma origin, were perceived to be 'heavy users' of the ED. The analysis of Sheffield Children's Hospital ED data aimed to identify whether patterns of ED use differed between Roma and similarly deprived White British/ Irish children.

The results of this study show that children of Roma origin do show different patterns of ED use compared to similarly deprived White British/ Irish children in Sheffield. Patterns of utilization were different in terms of the time of day of attendance, the presenting pathology, the acuity of

presentation, and children's discharge destinations from the ED. Children of Roma origin were less likely to attend the ED during the day, were more likely to attend with a low-acuity presentation, and were less likely to be admitted to the hospital from the ED.

9.3 Synthesis of findings

The main findings from each component study have been compared to show how the findings converge, differ, or complement each other and how the findings enhance our understanding of migrant parents' use of EDs for their children. A matrix of study findings (Table 16) has been produced to show the results of the integration. To compare the findings from each study (component) four questions were addressed. These were: do the findings of the studies agree? (Convergence); do the findings complement or help to explain the findings from another study? (Complementarity); is there disagreement between the findings? (Disagreement) or are there areas of silence (Silence) where a theme is identified by one component but not present in another study? (O'Cathain et al., 2014).

The findings for the different components of this mixed methods study mainly provided complementary information (Table 16). Where the data is seen to be complementary, the findings from one study help to explain those of another and this has led to an increased understanding of migrants' use of EDs for paediatric care.

Table 16: Matrix of findings from each component study

Theme	Systematic Review (SR) - findings only for studies reporting paediatric ED utilization	BiB regression Study 1	Qualitative interviews with providers Study 2	Relationship between studies 1 & 2 and systematic review	Sheffield Children's Hospital (SCH) data - quantitative descriptive Study 3	Relationship between studies 1, 2 & 3 – do the findings hold for children of probable Roma origin specifically?
Patterns of ED utilization						
Likelihood of first ED use	Greater risk of ED visits for children of immigrant mothers than for Italian mothers (evidence from a single study).	Children born to migrant mothers less likely to make first use of ED.	Children of migrant parents not perceived to be a population in greater need of urgent or emergency care.	Complementarity studies 1 & 2. Disagreement with SR.	Unable to measure.	-
Frequency (among ever users of ED)	Higher rate of ED use by migrant, as compared to non-migrant mothers. Utilization differs by region of origin (evidence from a single study).	Higher rate of ED use by children born to migrant mothers who had made at least one ED attendance. Analysis by mother's region of origin show significantly higher rate of ED use for children born to mothers from Europe or Central Asia and those born to established migrant mothers. Children born to established migrant mothers more likely to use ED frequently.	Perception that some migrant groups use the ED more frequently than non-migrants. Families from Eastern Europe, particularly those of Roma origin, perceived to be current 'heavy users'.	Convergence and complementarity. Perceptions among staff agree with quantitative findings of higher frequency of use by some migrant users and different patterns of use by mother's region of origin.	No difference in frequency of attendance.	Disagreement between this study and studies 1&2 but consistency across studies 1 & 2. As study 3 was a descriptive study with some limitations these findings suggest the need to further explore these issues for Roma populations and service providers.
Low acuity presentations	Higher use of ED for non-urgent conditions by children of migrant origin.	Unable to measure.	Perception of higher use of ED for low-acuity presentations but this pattern of use perceived to be influenced by parents' global region of origin, their experience of healthcare in home country and their understanding of a complex healthcare system.	Convergence and complementarity – not measured in BiB analysis but findings of study 2 converge with SR and add complementary information. The qualitative findings provide possible reasons for higher use of ED for low acuity presentations and why this pattern of utilization may be common to some migrant populations.	Roma children more likely to attend with a non-urgent presentation.	Convergence.

Presenting pathology	No difference in presenting pathologies between migrant and non-migrant children (evidence from single study).	Most children present with respiratory conditions and infectious diseases. Similar for both groups.	Migrant children not perceived to be population in greater need of emergency care. Presenting pathology perceived to be similar between groups. However, where presenting pathology may differ between migrants and non-migrants this was perceived to be related to individual migratory journeys, parents' time since arrival in UK and parents' global regions of origin.	Convergence and complementarity. Qualitative interviews support the quantitative findings that presenting pathologies similar between groups. Staff perceptions highlight that where differences in presenting pathologies may be evident these are unlikely due to 'migrant status' but are perceived to be influenced by diverse experiences of children and parents during their migration journeys.	Roma children more likely to attend with a 'surgical diagnosis'. White British more likely to attend with injuries.	Disagreement.
Time of day and day of week	Evidence from a single study showed no difference in time of day of attendance (although not tested for significance).	Patterns of ED utilization across weekends and weekdays similar for both groups.	Perceived that some subtle differences in time of day of ED attendances and this was related to patterns of behaviour within communities and the social situations that some migrant families live in. Parents from Roma Slovak and Asian populations were perceived to be possibly using the ED at different times of day when compared to other migrant populations.	Convergence and complementarity.	Roma children more likely to attend during the night.	Convergence and complementarity. Qualitative interviews provide possible explanations for different patterns of ED use.
Multiple children attending for single consultation	Not reported	Unable to measure	Perceived trend for migrant families to bring multiple children to be seen at the ED at any one time. Due to barriers in primary care and parents resisting multiple interactions.	Silence. Qualitative interviews identify a pattern of ED utilization for which there are no quantitative data.	-	-
Source of referral	Not reported for paediatric population.	Unable to measure	Not reported	-	Majority of parents self-refer their children to the ED, this was particularly true for Roma children.	Silence. Study 3 identifies a pattern of use for which there was no quantitative data from BiB. These findings may help to explain higher ED use for low acuity presentations and more frequent ED use.

Admission to hospital	Probability of hospitalization after ED visit higher for immigrants (not reported in SR but data extracted during review process see appendix 3).	Proportions of children admitted similar for those born to migrant and non-migrant parents (not tested for significance).	Not reported	Disagreement.	More likely to be discharged to GP and less likely to be admitted (suggests low acuity problem).	Disagreement.
Factors influencing patterns of ED utilization						
Factor	Systematic Review (findings only for studies reporting paediatric ED utilization)	BiB regression Study 1	Qualitative interviews with providers Study 2	Relationship between studies 1 & 2 and systematic review	SCH quantitative descriptive Study 3	Relationship between studies 1, 2 & 3 – do the findings hold for children of probable Roma origin specifically?
Migrant status	ED utilization differs by parents' migrant status.	Children born to migrant mothers less likely to use ED, but among the sub-population who attend the ED, children born to migrant mothers have higher rate of use.	Migrant status not perceived to be the main determinant of ED use.	Convergence (SR and study 1), complementarity (study 2). Qualitative interviews show it is not as simple as 'migrant status' determining patterns of ED utilization.	-	-
Mother/parents' region of origin	Utilization differs by region of origin. Evidence from a single study showed higher use mothers from all geographic regions but twice as high mothers from Sub-Saharan Africa.	Children born to mothers from Europe/ Central Asia and Africa less likely to make first ED use. Children born to mothers from Europe more likely to utilize ED more frequently.	Families from Eastern Europe, particularly children of Roma origin, perceived as heavy users. ED use by different migrant groups not static and at times ED use by different populations 'ebbs' and 'flows'. Heavy use of ED perceived to be due to some parents' lack of understanding of the healthcare system, previous experiences of healthcare in home country, time since arrival in host country and whether healthcare service set up to meet needs of migrant populations.	Convergence and complementarity. Interviews highlighted that people with some shared characteristics may have some common patterns of health seeking behaviour.	-	-

Parents time since arrival in UK	Not adjusted for in studies included in review	Likelihood of use: irrespective of time since arrival, children born to migrant mothers less likely to use ED. Frequency of ED use: higher rates of ED use by children born to migrant mothers (once ED had been used once) irrespective of time since arrival (although not statistically significant). With increasing time since mother's arrival, children born to migrant mothers show increasingly similar patterns of ED as compared to children born to non-migrant mothers.	Perceived higher utilization for children whose parents most recently moved to UK. New arrivals perceived to be heavy users and, over time, use perceived to decrease and become more similar to UK born parents. New migrant parents may bring in very unwell children.	Convergence in that time since arrival an important variable to consider. Disagreement in quantitative findings and qualitative perceptions. And complementarity . New migrant mothers (short-term migrants) significantly less likely to make use of ED. This may explain why some new migrant mothers perceived to bring in very unwell children to ED (qualitative finding). Although not statistically significant, some evidence of higher frequency of use by new migrant mothers.	-	-
Socio-economic status (SES) and levels of education.	Adjusted for in one study included in review	Controlled for in regression	Perception that more socio-economically advantaged migrants may use ED differently. ED use perceived to be highest for parents with low levels of education.	Complementarity . Qualitative findings support the inclusion of SES as a factor to control for in regression analysis.	-	-
Language	-	Unable to measure	Language perceived to be a barrier to healthcare and a factor that determined some migrants' use of the ED.	Silence . Qualitative interviews identify a factor for which there is no quantitative data.	-	-
Distance from home to hospital	-	Migrants lived closer to hospital. Controlled for in regression.	Migrant parents who live closer to hospital perceived to attend ED more in terms of volume and frequency.	Complementarity . Qualitative interviews highlight the need to control for distance from home to hospital in regression.	-	-

<p>Health service organisation and access to healthcare.</p>	<p>-</p>	<p>Unable to measure</p>	<p>Patterns of ED utilization thought to differ according to how prepared the health service is for migrant populations. Where services don't cater for needs of migrants, these people may use EDs over other healthcare services.</p> <p>Complexity of healthcare system drives ED use. Perception that poor access to primary care causes people to attend ED</p>	<p>Silence. Qualitative interviews identify a factor for which there is no quantitative data.</p>	<p>-</p>	<p>-</p>
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The process of integration, using a matrix of study findings, has helped to identify the main thesis findings. The following can be claimed with confidence:

1. Patterns of ED utilization for paediatric care differ between migrant and non-migrant populations. This thesis identified a consistent, high burden of evidence to show that patterns of ED utilization between migrant, and non-migrant, populations differ with regard to: the likelihood of first ED use, the frequency of ED use, and the acuity of presentation to the ED.
2. Children of migrant and non-migrant parents attend the ED with similar conditions and at similar times of the day.
3. People with different regions of origin utilize EDs differently.
4. Broad categorizations of 'migrant versus non-migrant' do however, have limited use in understanding patterns of ED use, as these differ within migrant populations.

Further to these four conclusions that can be drawn confidently, it can also be concluded rather more tentatively (in that there are some areas of agreement, but the findings are not wholly clear) that time since arrival in the host country is an important consideration in understanding patterns of ED use by migrant populations.

Through integration of the study findings it is clear that there are some areas of silence or disagreement across themes and drawing general conclusions from these themes is not possible. The following are areas for which there is insufficient evidence:

1. Perceived trend for migrant families to bring multiple children to be seen at the ED at any one time.
2. The source of referral to ED, and discharge destination (hospital admission or discharge) for children of migrant, as compared to non-migrant, parents.
3. The influence of parents' and children's language on patterns of ED utilization.
4. The extent to which the way the health service is organised impacts on migrants' access to, and use of, EDs.

From these findings it is clear that there is a need to explore the complex, individual, family, community and health system factors that may contribute to patterns of ED utilization using an intersectional approach.

9.4 Discussion of main findings and how these compare with wider literature

Within this section the main findings of this thesis are explored in relation to the wider literature. Through this discussion the contribution of this thesis to current understanding of migrants' use of EDs for paediatric care is highlighted and the avenues for future research are identified.

In order to put the findings of this thesis into context, and to enable comparison of these results to the wider literature, an updated literature search was conducted in October 2019. The search strategy used in the systematic review (Chapter 3) was rerun in Medline via Ovid and the search was limited to publications from 2016-current. Only articles pertaining to paediatric ED utilization were identified and reviewed. The search identified 377 papers published since 2016, 46 of these were reviewed. Relevant recent evidence is included in the discussion below where the main findings of this thesis are discussed in relation to the wider literature.

9.4.1 Patterns of ED utilization for paediatric care differ between migrant and non-migrant populations

A key finding of this thesis is that patterns of ED utilization for paediatric healthcare differ between migrant and non-migrant populations. Differences in patterns of ED utilization for the healthcare needs of children of migrant parents are evident in the wider literature (Ballotari et al., 2013, De Luca et al., 2013, Grassino et al., 2009) and these findings also appear to be supported by those from a recent systematic review of health service use among international migrant children (Markkula et al., 2018). The systematic review by Markkula et al., 2018 found that patterns of hospital and emergency room use differ between migrant, as compared to non-migrant children, particularly 'higher utilization' of these services (Markkula et al., 2018). However, in their review the authors included within the theme 'hospital and emergency room use' studies that report on the use emergency primary care (Sandvik et al., 2012), those that report on hospitalisations (Hernando Arizaleta et al., 2009), as well as including literature that reports on hospitalizations for specific conditions (e.g type 1 diabetes) (Bachle et al., 2010, Icks et al., 2007, Karges et al., 2015), or the use of paediatric intensive care (Tritschler et al., 2011). By grouping studies that report on in-patient hospital services together with those that report on ED use, the findings of the review by Markkula et al., 2018, may be misleading when seeking to understand specific patterns of ED utilization by migrant, as compared to non-migrant, children. The use of ED services, and the reasons for these patterns of use, are likely to differ to patterns of

use for in-patient hospital care. Only one study that reported specifically on ED use for migrant children, was included in the review by Markkula et al., 2018, and this evidence was included in our systematic review (Chapter 3). Thus, the evidence generated through the empirical phase of this PhD offers a unique contribution to existing evidence, particularly increasing our understanding of patterns of ED use in a UK context for children born to migrant parents.

9.4.1.1 Differences in the likelihood and volume of ED utilization

This thesis extends previous research and presents evidence of the importance of examining both the likelihood of ED use, and the volume (rates) of ED use separately. Evidence from the wider literature regarding the likelihood and volume of ED utilization in Europe is conflicting. In Italy, children of immigrant origin have been found to be at greater risk of ED visits and to have higher rates of ED utilization (Ballotari et al., 2013). While, in contrast, recent evidence from Spain found that a lower proportion of immigrant children visited the ED and that overall these children made fewer visits to the ED (Gimeno-Feliu et al., 2016). After adjustment for socio-demographic factors, and in one study morbidity burden (Gimeno-Feliu et al., 2016), these differences in ED utilization, although slightly diminished, remained and show the effect of being a migrant on ED utilization in these settings (Ballotari et al., 2013, Gimeno-Feliu et al., 2016).

The findings from the empirical phase of this thesis show that children born to migrant mothers in the BiB study were less likely to make first use of the ED, and the perceptions of ED staff complement this finding (Table 16). ED staff did not perceive children of migrant parents to be a population in greater need of urgent and emergency care and, without any perceived greater need, this suggests that migrant parents have no clinical reason to be more likely, as a population, to use the ED for the first time when compared to non-migrant populations. Although in this setting children of migrant parents were not more likely to make first use of the ED, this thesis identified that migrant families had a higher rate of return to the ED once the service had been accessed. ED staff in the qualitative interviews perceived that some migrants who share similar characteristics use the ED more frequently, and thus the findings from the component studies can be seen to converge (Table 16).

By examining the volume and frequency of ED use separately these findings reveal important information which challenges the notion that migrants, as a population, are heavy users of the ED. Instead, these findings suggest that this 'heavier use' is more common among migrant parents once they have had contact with the ED, and by some migrants who share similar characteristics

(region of origin). Thus, broad categorisations of migrants versus non-migrants may not represent the circumstances of individual families, and may risk stereotyping ED use by migrant populations.

The weight of evidence across the systematic review and studies 1 and 2 (Table 16) support the suggestions in other studies that high frequency ED usage among some migrant families may be influenced by the specific healthcare needs of their children, by barriers to primary care, or by the convenience of ED services (Butun et al., 2019). For some parents, barriers to other care may exist and these findings, coupled with the finding of higher use of the ED for low acuity presentations, may suggest that the use of the ED for some children is at the expense of other primary care services. Previous research, which has suggested that barriers to primary care may increase the use of emergency healthcare services by migrants, would support this finding (Ballotari et al., 2013, Sandvik et al., 2012). Barriers to primary care services may result in disrupted provision of important preventative primary healthcare services such as childhood immunisations, and this has implications for the children and their immediate contacts (adverse health outcomes), as well as increasing pressure on hospital services from unplanned admissions (Freeman and Hughes, 2010). Therefore, it is important that future research seeks to understand the pathways parents take to accessing ED care, including whether, and how, migrant parents access and use primary healthcare services and whether barriers to these services exist.

9.4.1.2 Presenting pathologies and differences in the acuity of patient presentations

This thesis makes an original contribution to knowledge by revealing further evidence of different patterns of ED use, beyond the volume and frequency of ED use, by migrant as compared to non-migrant children. Complementary evidence was found across the systematic review and studies 1 and 2 showing that both children of migrant and those born to non-migrant parents present to the ED with similar conditions (presenting pathology Table 16). This finding is in line with the wider, although limited, literature that reports specifically on differences in presenting pathologies between migrant and non-migrant infants and children within Europe (Grassino et al., 2009).

However, differences in presenting pathologies were seen in this thesis when comparing ED utilization between Roma and White British/ Irish children in study 3 (Chapter 8). Across Europe Roma populations experience poorer health outcomes compared to majority populations (European Commission., 2014, Kovats, 2004, Hajioff and McKee, 2000) and the difference in presenting pathologies observed in study 3 may reflect prevalence differences and poorer health

experienced by Roma populations. The findings that point to specific patterns of ED use by Roma populations may also reveal the specific health needs of children of Roma background in this setting, which may not be apparent when choosing broad categorisations of migrant as compared to non-migrant populations. Given the discrimination and negative health effects experienced by Roma populations, it is important to understand their specific health needs and to act to promote health amongst these populations (European Commission., 2014). Differences in patterns of utilization, and reasons for these patterns of utilization, may be apparent for other migrant populations in this and other healthcare settings. Therefore, it is important that future research seeks to identify the individual health needs of diverse migrant populations and to understand variations in patterns of ED utilization between populations where they exist.

Although the presenting pathologies of migrant and non-migrant children were found in this thesis to be similar, migrant children were found to present to the ED more often with low acuity presentations. The findings of the systematic review, and studies 2 and 3, can be seen to converge around this theme (Table 16). Both the systematic review and study 3 provided quantitative evidence of greater use of the ED for non-urgent conditions by children of migrant origin. ED healthcare providers perceived that some migrant parents were more likely to use the ED for low acuity presentations and this perception from staff working with migrant parents in the ED adds credibility to the overall thesis findings. Evidence from the wider literature supports this finding, as migrant children have been found to be more likely to attend the ED with non-urgent presentations (Gimeno-Feliu et al., 2016, Grassino et al., 2009, Ballotari et al., 2013). Given the high number of non-urgent presentations to EDs in the UK, and the implications that non-urgent presentations have on healthcare services (as discussed in Chapter 2), this is an important finding for health services. The qualitative interviews not only support the quantitative findings of higher use of EDs for non-urgent conditions by migrants, or some migrant populations, but the perceptions of staff also add complementary information. ED staff suggest that a myriad of factors, beyond migrant status, influence this pattern of ED use. Presentations to the ED for low acuity conditions may indicate barriers faced by migrant parents when seeking healthcare services, a lack of understanding of the healthcare services, or may be explained by the accessibility of EDs in comparison to other healthcare services (Ballotari et al., 2013, Norredam et al., 2007, Carret et al., 2009).

Where contradictory evidence regarding the acuity of patient presentation has been found in the wider literature, this has been in relation to ED use by refugees and their children who have been found to attend the ED with more urgent presentations (Kiss et al., 2013). Although the

systematic review (Chapter 3) found limited numbers of studies that reported specifically on the use of the ED by refugee populations, and the BiB study could not identify mothers of refugee origin, some staff in the qualitative interviews did perceive that where differences in presenting conditions may be evident this may be for more vulnerable migrant children, such as asylum seekers and trafficked migrant children. Staff perceived that some children may present to the ED with health conditions, or specific healthcare needs, related to their migration journey and the circumstances of their arrival in the UK, and in these situations, presentations have been seen to differ from those of non-migrant children. This insight is useful in interpreting the quantitative findings and understanding in what situations migrant children may present with differing presentations to non-migrant, or even other migrant, children. As suggested by Norredam et al., 2009, and supported by the findings of the qualitative interviews in this thesis, understanding a person's specific type of migration is important where it affects their patterns of healthcare utilization, or their healthcare needs (Norredam et al., 2010).

9.4.1.3 Additional differences in patterns of ED utilization

Through the inclusion of a qualitative element in this thesis, additional perceived differences in patterns of ED use between migrants and non-migrants have been suggested by healthcare providers who treat and manage children within the ED. Staff perceived that migrant parents were more likely to attend the ED with multiple children at any single consultation. No studies have been identified that report on this pattern of utilization and this finding has important implications for health service planning. This pattern of use may be due to barriers that some families face in accessing other healthcare services, particularly primary care. Although this explanation is plausible, it is not well supported by the studies reviewed and further research is needed to understand this perceived pattern of ED utilization.

A further silence is apparent in the theme *source of referral* (Table 16) and this requires further investigation. Study 3, identified that children of Roma origin were more likely to have been self-referred by their parents to the ED when compared to White British/ Irish children. Information on the source of referral to the ED was not reported in the systematic review for the paediatric population and could not be quantified in the BiB data (study 2). Patterns of healthcare utilization by Roma populations have been found to differ from those of the general population with Roma populations having less access to preventative care and greater use of acute services (European Commission., 2014). It is a strength of this PhD that by using an iterative approach, and by designing study 3 to address a specific research question that emerged, a particular pattern of use

by the Roma population in this setting has been identified which needs to be considered in future research. Patterns of ED use, and sources of referral to the ED, may not be homogeneous across migrant populations, and these findings may imply differences in health seeking behaviour, and experiences of healthcare, by particular migrant populations. Understanding patterns of health seeking behaviour and pathways to care by migrant families who use the ED is important for the planning of service delivery in this, and other, healthcare settings.

This thesis revealed disagreeing findings in relation to the theme 'admission to hospital'. Although there is disagreement within this theme, it must be noted that the evidence that was synthesized included: findings from a systematic review which only included a single study reporting this theme; a finding in the BiB study that was not tested for significance; and evidence from a single descriptive study with limitations (study 3). Therefore there is insufficient evidence within this thesis to make claims about differences in the patterns of hospital admission between children born to migrant, as compared to non-migrant, parents, and this requires further investigation.

9.4.1.4 Similarities in ED use

Although this thesis identified differences in ED utilization for children of migrant, as compared to non-migrant, parents, the findings also show some similarities in ED use between these populations.

There was strong evidence across the systematic review and studies 1 and 2 that children of migrant, and those born to non-migrant, parents use the ED at similar times of the day (Table 16). These findings align with those reported by Grassino et al., 2009, where no differences in time of patient arrival between children of migrant and non-migrant origin were found. While staff in the qualitative interviews perceived that the times of day of ED attendance were similar between migrant and non-migrant populations, their perceptions suggested that some parents within migrant communities might attend the ED at times that differ from most other families. Staff perceived that this difference in the pattern of ED utilization was likely to be related to the social situations that people live in, rather than a parent's 'migrant status'. When looking specifically at ED use by children of Roma background, the findings of study 3 converged with staff perceptions of different times of ED use for children from Roma communities. Children of Roma origin were found to be more likely to attend the ED at night when compared to White British/ Irish children. There is evidence in the wider literature that reports on the differences in times of adult patient

arrival; with a trend towards greater ED use during unsocial hours by migrant patients but differences between migrant sub-groups (Buja et al., 2014, Lopez Rillo and Epelde, 2010, Clement et al., 2010). Different patterns of attendance by different migrant populations may reflect the difficulty some migrant populations have in understanding the health system and the difficulties some adults may face in taking time off work to see a doctor (Buja et al., 2014, Clement et al., 2010). The consistency of evidence across the studies in this thesis suggest the need for future research that explores why parents from different communities may attend the ED at different times of the day. Again, the findings of this thesis highlight the importance for health services to understand the different patterns of ED use, and the reasons for these patterns of ED utilization, by different migrant populations. In striving to provide equal access to health services for all patients, it is important that the different needs of different populations are taken into consideration.

9.4.2 People with different regions of origin utilize EDs differently and time since arrival in host country is important consideration in understanding patterns of ED use

This thesis confirmed that people with different regions of origin utilize EDs differently and that country of origin is an important variable to consider when understanding healthcare utilization by migrant, as compared to non-migrant, populations. Differences in ED utilization by migrant children across areas of origin have been discussed earlier and reported elsewhere (Ballotari et al., 2013, Gimeno-Feliu et al., 2016). This trend for different patterns of ED use by people from different global regions of origin is also evident in the literature reporting on the use of EDs by adult migrants (Credé et al., 2018). It is clear that the findings from this thesis add strength to the argument that patterns of ED utilization differ across immigrant populations, depending on their area of origin, their diverse backgrounds, and their migratory experiences. Consistent evidence was found across studies 1 and 2 that mothers from Europe or Central Asia, particularly those of Roma origin, used the ED in different patterns when compared to non-migrant, and even other migrant, populations in this region. Although there was some disagreement between these findings and that of study 3, which found no difference in frequency of ED attendance between Roma and White British Irish children, it must be noted that study 3 was a descriptive study with some limitations. The consistency of evidence across studies 1 and 2 points to the need for future research that seeks to understand the basis for these patterns of paediatric ED use and seeks to understand why patterns of ED use differ between immigrant groups from different global regions.

While country of birth is an objective measure and can encourage comparability of results across studies (Stronks et al., 2009), there are limitations to the use of country of birth data that need consideration. Firstly, data on migration are among those considered most sensitive (Bhopal, 2014, World Health Organization, 2010) and this will challenge the feasibility of collecting such data for the purposes of health research. Secondly, within broad geographical categorizations heterogeneous migrant populations exist and broad categorizations based on country of birth will not completely capture the diversity within these categories (Norredam et al., 2010). While this thesis has identified that country of origin is an important factor in understanding patterns of ED use, one needs to consider the potential loss of important information through stereotyping migrants from broad geographical areas. Country of birth data do not cover ethnic identity, culture, and diverse migration experiences, and each of these dimensions may affect the health needs and patterns of health seeking behaviour by migrants (Stronks et al., 2009). Future research needs to consider the healthcare needs, and patterns of ED utilization, between and within migrant populations who originate from the same global regions, while considering the limitations of this data and the feasibility of collecting this data in healthcare settings. Broad social groupings have been described as a useful starting point for understanding the associations between country of origin and healthcare utilization and are important for identifying research priorities, even if these groups are heterogeneous (Bhopal, 2014).

Although the findings of studies 1 and 2 disagreed on the effect of parents' time since arrival in the UK on patterns of ED utilization, the findings highlight the importance of understanding how time since arrival influences patterns of ED utilization. Only one study in the systematic review (Chapter 3) adjusted for length of stay in the host country as an important confounder (Nielsen et al., 2012). However, many studies note that being unable to adjust for length of stay in the host country is a limitation to the design of their study (Ballotari et al., 2013, Buron et al., 2008, Carrasco-Garrido et al., 2009, De Luca et al., 2013, Sanz et al., 2011). The findings from study 1, using data from a prospective birth cohort study, have enabled us to identify useful information on patterns of ED utilization by mother's time since arrival in the UK. Irrespective of length of stay in the UK, children born to migrant mothers were found to be less likely to make a first attendance to the ED (Chapter 6). However, for those that used the ED, children born to mothers who had lived in the UK for at least five years had greater use of the ED compared to non-migrants. These findings are in contrast to those of a Spanish study which showed decreased use of the ED for children with increasing length of stay in the host country (Gimeno-Feliu et al., 2016). The findings of the study by Gimeno-Feliu et al., 2016, align more with staff perceptions

that were revealed during the qualitative interviews. The perception among many ED members of staff was of higher ED utilization for those parents most recently arrived in the UK and that over time this use decreases to rates more similar to those of UK-born parents (Chapter 7). While time appears to be an important variable that can be used as an indicator of integration (Norredam et al., 2010), the findings of this thesis present a partial understanding of how time since arrival may influence patterns of ED use. It is clear that further research is needed to understand both the different patterns of ED use identified here – and those within the wider literature – and the complex factors underlying these differences.

9.4.3 Broad categorizations of migrant vs non-migrant have some, but limited, analytical utility

The consistencies found across the empirical studies and within the literature indicate that there is some utility in comparing patterns of ED utilization by migrant, as compared to non-migrant populations. Demonstrating differences and similarities in ED utilization between migrants and non-migrants is important for improving understanding, for informing health policy and planning and for directing healthcare resources (Bhopal, 2014). However, a key finding of this research is that broad analytical categorizations of ‘migrant versus non-migrant’ have limited use in understanding patterns of ED utilization. Table 16 shows some important consistencies across the studies where claims can be made about the patterns of migrant ED use. There are many other areas, however, where research findings are inconsistent. These require further interrogation. It is important to be mindful that broad categorisations can be unhelpful and lead to discrimination and the generation of negative stereotypes (Dahinden, 2016). One needs to be acutely aware of this, given the highly politicised nature of migration in the UK context.

I was aware, from the inception of this study, that a number of other factors might influence the relationship between migrant status and ED use. While the regression analyses in the BiB study, adjusted for important confounders that were identified in the systematic review, show the effect that being a child born to a migrant mother has on ED utilization, the qualitative findings challenge the use of migrant versus non-migrant as categories of difference, and suggest that additional factors may influence patterns of utilization. Findings that use broad categorisations of migrant as compared to non-migrant generate limited understanding of the factors underlying these patterns of use and they can only be seen to be a useful starting point (Bhopal, 2014).

Research needs to work within as well as beyond social ascribed categories of difference, whilst acknowledging that these migrant categories are social constructs (Salway et al., 2020).

Within migrant populations heterogeneous groups exist and patterns of, and reasons for, ED utilization are likely to differ between, and within, these groups. The heterogeneity within migrant populations is a major limitation of migration status as a category (Bhopal, 2014, Abubakar et al., 2018). Grouping people as 'migrant' versus 'non-migrant' ignores the diversity within groups and risks stereotyping patterns of behaviour when they may not exist. According to Bhopal (2014, p.18), the problem with definitions that ignore the diversity within migrant populations is that: "Even the (improbable) finding of no difference would not be trustworthy as subgroups within these populations may well differ". In designing the analysis of the BiB study, some of the heterogeneity within migrant populations was taken into consideration and the analysis was conducted by sub-group (mothers' time since arrival in the UK and region of origin) and by adjusting for important confounders. The sub-group analyses reveal different patterns of use by different groups and highlight the importance of looking at patterns of utilization by migrant sub-group separately to identify which groups may have different, and specific, healthcare needs and patterns of ED utilization.

The qualitative interviews have added a novel contribution to knowledge and strengthen the evidence supporting this key PhD finding that broad categorisations of migrant versus non-migrants have limited utility. ED staff perspectives on migrants' use of the ED increase our understanding of the importance of seeking to understand the factors underlying different patterns of ED use between, and within, migrant populations. Factors that ED staff considered to be important included: parents' global region of origin; previous experiences of healthcare; the organisation of the healthcare service; barriers to primary and non-urgent care; time since parents' arrival in the UK; parents' level of education, language, and socio-economic status; family and community factors; and social structure. While some of these characteristics were controlled for in the BiB analysis, many of these characteristics of populations are not routinely collected in healthcare data and could not be controlled for.

The findings of this thesis which show different patterns of ED utilization for paediatric healthcare by migrant as compared to non-migrant families are important as they may indicate inequalities in healthcare access, differential health needs and barriers to healthcare faced by these families. However, through this mixed methods study, this research challenges the notion that migration status may be the central criterion of difference. The challenge in using migration status in health

services research has been described in the wider literature (Gazard et al., 2015, Abubakar et al., 2018, Rechel et al., 2013). It is important that research avoids essentializing migrant populations by assuming that they are homogenous as a population and in their experiences (Corus and Saatcioglu, 2015). Migrants relocate for different reasons, at different times in the life-course, and the experiences of migrants will be diverse (Gazard et al., 2015). It is this heterogeneity between, and within; migrant groups that creates challenges in understanding the relationship between migrant status and ED utilization.

9.4.4 Summary of unique contributions of this thesis

This thesis presents the findings of the first mixed methods study, and the only study reported within a UK context, that seeks to explore patterns of ED utilization for paediatric care by migrant populations. While there is some limited evidence from other European countries, contextual differences between countries make UK based research unique. Unlike much of the existing literature, the focus of this work is on the paediatric population. This thesis provides a unique contribution to knowledge through the presentation of research evidence in an under-researched area.

Evidence from this thesis shows that patterns of ED utilization for paediatric healthcare differ between migrant and non-migrant populations. These findings are congruent with existing European literature (Ballotari et al., 2013), but the insight gained through the use of a mixed methods study provides a more detailed insight and understanding of these patterns of ED utilization, particularly through the development of a greater understanding of differences in patterns of utilization beyond the volume and frequency of ED service use only. Through seeking to understand differences in the time of day of ED attendance, children's presenting conditions, the acuity of presentation, and the source of referral to ED, this work adds to our understanding. A further contribution to knowledge is the finding which highlights the importance of understanding how factors beyond migrant status, such as parents' time since arrival in the UK, influence patterns of ED utilization. My systematic review highlighted the fact that the relationship between ED use and time since arrival in the host country has not been fully explored in previous research.

My qualitative research aimed to understand ED staff perceptions and experiences of migrants' use of ED services for paediatric care. No previous research had focussed on service providers' perspectives of migrants' use of ED services. The findings of this study enrich our understanding of patterns of ED utilization by migrant populations and the perceived typical characteristics of migrant users in the north of England. The in-depth qualitative interviews revealed patterns of ED use that were not quantifiable in existing data, and service providers were able to describe important characteristics of ED services users. These insights contribute to our understanding of what is a very complex topic area. Importantly, through these qualitative interviews, healthcare providers revealed their perceptions of the limitations of migrant versus non-migrant categorizations in understanding patterns of ED utilization. Future research should be guided by the additional insight and understanding this research offers and should seek to explore the complex network of factors that influence ED utilization by parents, or caregivers, from a migrant background.

This thesis makes an original contribution to knowledge by revealing that complex, individual, family, community and health system factors contribute to patterns of ED utilization by migrant parents for their children. In Study 2 (Chapter 7) a framework of factors that healthcare providers perceive to influence migrant parents' patterns of ED utilization for their children has been proposed (Figure 7). These factors have been framed according to the migration phases framework. Although previous research recognised that factors exist through each phase of the migration journey that will influence a person's health and patterns of healthcare utilization (Abubakar. 2018), this is the first study to propose the use of a framework to demonstrate how the complex process of migration, and factors within each phase of migration, influence how, and when, parents use EDs for their children. The conceptual framework that has been presented in Chapter 7 provides an evidence-based foundation for service level improvement and a foundation from which to guide future research.

9.5 Strengths and limitations of this thesis

Previous research across Europe and elsewhere has, in line with this study, identified the challenges in researching migration status and patterns of healthcare utilization (Gazard et al., 2015, Norredam et al., 2010, Gimeno-Feliu et al., 2016, Graetz et al., 2017, Sandvik et al., 2012, Markkula et al., 2018, Ballotari et al., 2013). Limitations of previous research have included:

inconsistencies in the definitions of migrant and non-migrant populations; analyses that haven't fully accounted for potential confounding factors; a focus on particular patient groups (adult migrant populations); and the high risk of bias and lack of external validity in many studies (Credé et al., 2018). In particular, there is a scarcity of research that examines patterns of ED utilization for children of migrant parents. This study is the first in-depth look at patterns of ED utilization for paediatric healthcare by migrants in a UK context.

Using a mixed methods approach, each component study has made a unique contribution to existing evidence, and the integration of these studies has created a deeper understanding of the patterns of ED utilization by migrant and non-migrant populations for their children than that offered by existing quantitative or qualitative studies alone. The systematic review was the first review to synthesise evidence on migrants' use of EDs in European Economic Area countries and the findings of this review informed the development of the empirical phase of this PhD.

Migration status linked to healthcare data is rarely available (Bhopal, 2014, Abubakar et al., 2018, Salway et al., 2020). Many countries in Europe do not have this data so many of the problems migrants have in accessing healthcare, and their patterns of healthcare utilization, are unknown (Rechel et al., 2013). The use of BiB cohort data, linked to healthcare data, has provided a unique opportunity to examine patterns of ED utilization by children born to migrant, as compared to non-migrant, mothers in a UK context. Although similar studies have been undertaken in other European countries, there are contextual differences that may affect patterns of ED utilization by migrant parents for their children. This makes this UK-based research a novel contribution to evidence. The use of cohort data has also enabled patterns of ED utilization to be examined over the first five years of children's lives. A further strength of this study was that the analysis moved beyond previous research that has generally only considered volume of service use, to examine other patterns of utilization. The main limitations with the BiB study relate to missing data and the lack of availability of data on some variables of interest. These limitations have been discussed in Chapter 6.

The qualitative component of this thesis offers particular in-depth insights into healthcare providers' perceptions of migrant parents' patterns of ED utilization. Through interviews with a diverse range of providers, important perspectives of healthcare staff have been uncovered, and an enriched understanding of patterns of ED utilization by migrant parents for their children has been developed. The focus of this PhD was to understand patterns of ED service utilization by migrant users. Understanding patterns of ED use, and the characteristics of migrant users,

particularly the identification of patterns of ED use that are not easily quantifiable, e.g. use of ED services for multiple children in a single visit, are important to enable the development of the right system responses. Qualitative interviews with ED service providers have enabled the generation of greater insights into these patterns, and a more detailed understanding of the characteristics of migrant service users. The insights gained from understanding staff experiences of treating and managing children of migrant parents in the ED will enable future research to be developed that is sensitive, tailored and responsive to the specific patterns of ED use by some migrant parents.

There are, however, limitations to the use of healthcare providers' perspectives when seeking to understand patterns of healthcare utilization. Healthcare providers are unable to provide a great deal of insight into why migrant parents use ED services, or shed much light on the pathways that these parents, or caregivers, take to access emergency care for their children. Without a comprehensive understanding of parents' reasons for the use of ED services, it is not possible to fully understand their healthcare needs and we are accordingly unable to begin developing plans to address the specific needs of migrant parents. The patterns of utilization identified by ED staff provide some indication of where migrants may face barriers to accessing services, and which migrants may face these barriers, although, again, to interpret this data fully, information about migrant children's health needs is also necessary. It is clear that having developed an increased understanding of patterns of ED utilization by migrant parents through interviews with ED service providers, further research and more analysis of migrant parents' experiences of accessing ED services in these settings is now needed to develop a fuller understanding of the patterns of ED use observed. Understanding service users' perspectives as to why, and how, they use EDs for paediatric care, in the patterns that they do, is necessary to improve service provision and for service redesign.

A key strength of this PhD is that by including the qualitative element the findings have challenged research that categorises children as migrants versus non-migrants and has identified additional factors that may be important in understanding differences in ED utilization between migrant and non-migrant parents for their children. These insights help to interpret the findings of the quantitative studies.

A strength of this PhD's mixed method design, and the use of an iterative approach, is that the data generated by the quantitative and qualitative components enabled the identification of a particular population (Roma) with different patterns of ED utilization. Through the qualitative

interviews, which used 'migrant' status as a key topic for discussion, the Roma population was identified as deserving of more detailed study. I endeavoured through this work to answer the challenging questions that emerged which others have previously avoided. However, further research is needed to understand these different patterns of ED use by parents of Roma background for their children, as the health needs are likely to relate to Roma populations' specific socio-economic, cultural and environmental position as well as specific barriers to care, low health literacy and discrimination (European Commission., 2014).

Including participants from two settings, and having a relatively small number of participants in the qualitative study, may be seen as a study limitation. It is possible that in other settings, with different migrant populations, the views and experiences of ED staff may differ. However, the sample of participants represented a number of different job roles and grades, including both clinical and non-clinical ED staff, and this has helped me to develop a greater understanding of patterns of ED utilization in this context.

It might be considered a limitation that this study did not include the migrant voice although the findings of this thesis present opportunities for a future research agenda. To understand migrants' access to, and use of, EDs in the UK, it is important firstly to understand whether differences in utilization exist, what these differences are, and whether these differences pertain to specific migrant groups or sub-groups. This is what my thesis has focussed on. Without this initial understanding it is not possible to identify which migrant groups one needs to involve in research exploring 'why' any differences may be apparent. Following on from the findings of this PhD, it is important that migrants be included in the future research that seeks to understand the factors influencing patterns of ED utilization, and how these factors may differ within and between migrant populations.

It is important to reflect further on the lack of migrant voice in Patient and Public Involvement (PPI) in the design of the empirical work for this PhD. While a PPI group was involved at the inception of this thesis, the PPI group did not include participants from diverse population groups, and it is a limitation of this work that migrant voices were absent in the design of the empirical work. The PPI involvement in this study did bring a different perspective to the research process, but, on reflection, this work could have benefited from the involvement of migrant voices, during both the design stage of this work and as the thesis progressed. In particular, gaining the opinions and perspectives of people of migrant background in the development of study 3 (Chapter 8) would have strengthened this work. The study would have benefited from the opportunity to test

the acceptability of using Roma surnames in routine data analysis when comparing Roma with White British/ Irish children. Including the migrant voice at this stage of the empirical work might have strengthened its impact. While PPI involvement in this thesis was modest, the experience gained in using PPI in this work will be built on in further projects, and research, in this topic area, which will seek greater involvement and collaboration with PPI groups, particularly those from migrant or minority groups.

9.6 Research recommendations and priority research questions

This PhD thesis has significantly added to the knowledge base by exploring migrants' use of EDs for paediatric care through the use of healthcare data, and by exploring the perspectives of ED service providers who attend to these children. The findings of this research have identified a number of avenues for future research that will further enrich and broaden our understanding of this complex area and, as such, the research recommendations emerging from this work are as follows.

9.6.1 There is a need to explore the complex, individual, family, community and health system factors that may contribute to patterns of ED utilization using an intersectional approach

As discussed by Dahinden., 2016, migration can be an important criterion of difference but it is important that researchers understand in what contexts these categories are important, and how they interact with other categories of difference such as age, gender, and social class (Dahinden, 2016). While analysis by migrant sub-group in this thesis has enabled some further understanding of the contexts in which migrant status may be important, it is clear from the findings of the qualitative interviews that further research is needed to understand how migrant status intersects with other potentially important factors such as language proficiency, ethnicity and reason for migration, using an intersectional approach. This takes into consideration the effect of multiple individual and structural factors that co-exist and influence the experiences of different social groups, including migrants (Corus and Saatcioglu, 2015). For example, the experiences of forced migrants are likely to be very different to those who arrive in advantageous circumstances (e.g. professionals, international students). There is some evidence in the existing literature of the importance of disaggregating migrant status and using intersectional theory in health research

(Gazard et al., 2015). An intersectional analysis of a South London community identified that migrant status was found to have different effects on health and healthcare use across different ethnic groups, by language proficiency, socio-economic status, time since arrival in the UK and reasons for migration (Gazard et al., 2015). The authors note that they were unable to measure the impact of the pre-migration period and the migration process on health and health seeking behaviour, and capturing this may also be important in understanding how migration status impacts on health and healthcare utilization (Gazard et al., 2015).

An intersectional approach does not treat migrant categories as discrete and non-interacting but as categories that operate together (Gazard et al., 2015). In designing future research, methodological approaches are needed that enable the influence of cultural, language, and economic, as well as family, community and geographical factors on patterns of healthcare utilization to be examined. This will contribute to understanding why patterns of use differ within, and between, migrant populations (Sanz et al., 2011). Recent qualitative evidence supports the view that numerous factors act together to influence urgent care utilization (Turnbull et al., 2019). Patterns of ED utilization, as described by service users, are influenced by, among other factors, work commitments, access to transport, and language (English proficiency) (Turnbull et al., 2019). The study by Turnbull et al., 2019, highlighted the point that recent migrant populations face challenges when navigating urgent and emergency care in the UK including: language barriers, a lack of cultural understanding of the urgent and emergency care system, fragmented social networks and each of these, among others, influences decision-making about urgent care needs (Turnbull et al., 2019). This reinforces the point that there is a need to further explore how the effect of migration status changes when disaggregated by language, family and community factors, and underlying morbidity.

9.6.2 Data gathering

- This thesis highlights that in order to understand patterns of ED utilization by migrant populations it is essential that healthcare data be able to identify people of migrant background. It is important that standardised data categories and definitions be used in data collection to enable comparability of study findings across settings. The collection of migration-related data that includes country of birth, nature of the migration process and time since arrival would aid in generating standardized and comparable research findings

(World Health Organization, 2010). Collecting this data will be challenging, especially if migrant populations are undocumented or have experienced trauma and so are likely to mistrust agencies collecting data.

- This study highlighted that many factors beyond migrant status may influence patterns of ED utilization and future research should consider the limitations of migrant versus non-migrant categorisations. Research data collected through surveys and questionnaires should ideally not only include important indicators of migration but also other social determinants of health such as ethnicity, socioeconomic status and employment, as well as seeking to understand socio-cultural factors such as social support, health literacy and people's previous experiences in accessing healthcare service. There is also a need for sophisticated and defensible analyses of these data so that the ways in which migration interacts with other population characteristics is better understood.
- It is important that future research data include clinical information about children's presentation to the ED to enable a greater understanding of whether underlying morbidity drives both first and subsequent ED use.
- Migrant populations will vary across settings and there is a need for further research, and better data, in different healthcare services across the UK to understand the local patterns of ED utilization by migrant populations.

9.6.3 Interrogating patterns of ED utilization by migrant populations

The different patterns of ED utilization by migrant populations, and the variations between people of different backgrounds, identified in this thesis give rise to a number of specific and more focussed avenues for future research:

- Further research is needed that seeks to understand how migration status interacts with multiple axes and how complex factors, beyond migrant status, contribute to different patterns of ED utilization between people of different backgrounds.

- Mixed methods approaches are needed in future research to develop a more detailed understanding of the patterns of ED utilization observed in this thesis, the variations between, and within migrant populations, and the reasons for these differences.
- It is essential that future research engages with migrant parents to understand their reasons for ED utilization for their children, their children's healthcare needs, and whether the established ways of delivering urgent and emergency care services meet the needs of the diverse migrant populations in the UK.
- Future research should continue to engage with healthcare providers in understanding patterns of ED utilization as a strength of this PhD was the more detailed insight provided by healthcare providers.
- Because the findings of this thesis suggest that there is a need for a whole-systems approach to understand migrant parents' pathways to accessing ED care, future research should seek to understand how parents use primary care services, whether barriers to these services exist and, if they do, what these barriers to care are and how to these influence patterns of ED utilization. To generate this understanding data collection should include:
 - Routine healthcare data (that identifies people of migrant background) which is linked to GP and primary care records.
 - Qualitative research that focuses on the experiences of primary care and ED utilization from the perspective of migrant service users, the barriers they face in accessing care in different settings, and how these factors influence ED utilization.

9.6.4 Public Health policy implications

- Evidence from this thesis, which identified that migrant parents are more likely to attend the ED for low acuity presentations, suggests that there is a need for interventions that aim to promote access to the most appropriate healthcare service for children's healthcare needs.
- Interventions need to be tailored to individual migrant groups and may include:

- Improving the health literacy of those migrant parents most newly arriving, and unfamiliar with the UK healthcare service, by providing information to new migrant arrivals in their own language about the functions of the NHS healthcare service. This may facilitate access to primary care and reduce the use of EDs for low-acuity presentations.
 - Development of community navigator programmes, in which healthcare workers provide a link between patients and healthcare services by providing education to support patients, guiding patients in the use of healthcare services, and promoting access to the most appropriate services (Shommu et al., 2016).
- The findings of this thesis highlight the need for early recognition of the vulnerabilities and health needs of some migrant groups to enable effective health promotion and the provision of health services that meet the needs of new migrant arrivals.

9.7 Conclusion

As international migration increases globally, the importance of understanding patterns of healthcare use by migrant populations, as compared to non-migrant populations, has been increasingly recognised. Much of the existing literature has focused on the use of health services by adult migrants, and differences in health care utilization have been observed. However, these findings can't be generalised to the paediatric population as children have different healthcare needs and are often dependent on the health, and health seeking behaviours, of their parents or caregivers when accessing care (Markkula et al., 2018). Understanding healthcare utilization, and patterns of use, by children in immigrant families has been identified as a priority in order to improve their access to healthcare (Mendoza, 2009). This PhD thesis has focused on seeking to understand patterns of ED use by children of migrant, as compared to non-migrant, parents in the UK, and the findings of this thesis provide an original contribution to knowledge.

When reviewed in relation to existing evidence, the findings of this research suggest that patterns of ED utilization for paediatric care differ between migrant and non-migrant populations. Patterns of ED utilization also vary by setting and by migrant population. There are a myriad of factors beyond migrant status that may influence different patterns of ED utilization between populations, and it is important that migrant status is not considered as the only criterion of

difference. Different patterns of ED utilization may be due to the diversity across and within different migrant populations, different migration experiences, different health-seeking behaviours, language barriers and differences within the set up and structure of health systems in different settings as well as problems migrant parents face when accessing healthcare. What is clear, is that patterns of ED utilization do differ and that findings may not be generalizable across migrant populations and across healthcare settings. It is important for healthcare planning that healthcare services seek to understand the patterns of ED utilization by local migrant populations to ensure that they are set up to meet the needs of the migrant populations that they serve.

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Appendix 1: Author Contributions

Article	Study conceptualization	Data gathering/ investigation	Duplicate data extraction and screening	Data analysis and interpretation	Writing – original draft	Writing – review & editing	Supervision
Systematic Review Crede et al., 2018 Chapter 3	SC, SM, ES	SC	SC, ES	SC	SC	SC, SM, ES	SM, ES
BiB study Chapter 6	SC	SC	-	SC, RJ	SC	SC, RJ, ES, SM	SM, ES
Qualitative study Chapter 7	SC	SC	-	SC, ES	SC	SC, ES, EK	SM, ES, EK
Roma study Chapter 8	SC	SC	-	SC, RJ	SC	SC, RJ, ES, SM, EK	SM, ES, EK

SC – Sarah Crede; SM – Suzanne Mason; ES – Elizabeth Such; RJ – Richard Jacques; EK – Emma Knowles

Chapter 3

Credé, S.H., Such, E. and Mason, S. International migrants' use of emergency departments in Europe compared with non-migrants' use: a systematic review, *European Journal of Public Health*, Volume 28, Issue 1, February 2018, Pages 61–73

I, Sarah Credé contributed to the following sections:

- Study conceptualization
- Data gathering
- Data extraction and screening
- Data analysis and interpretation
- Primary writing and formatting of the manuscript
- Revisions to the manuscript

Signed:



Dated: 25.02.20 Print Name: Sarah Credé

Signed:



Dated: 25.02.20 Print Name: Suzanne Mason

Chapter 6

Credé, S.H., Mason, S., Such, E. and Jacques, R.M. 2020. Paediatric emergency department utilisation rates and maternal migration status in the Born in Bradford cohort: A cross-sectional study. *PLoS Med* 17(3)

I, Sarah Credé contributed to the following sections:

- Study conceptualization
- Data cleaning
- Quantitative data analysis and interpretation with support from statistician (RMJ)
- Primary writing and formatting of the manuscript
- Revisions to the manuscript

Signed:



Dated: 25.02.20 Print Name: Sarah Credé

Signed:



Dated: 25.02.20 Print Name: Suzanne Mason

Chapter 7

Migrants' use of emergency departments for paediatric care in an English region. A qualitative study of healthcare providers' perceptions.

Credé, S.H., Such, E., Knowles, E. and Mason, S.

I, Sarah Credé contributed to the following sections:

- Study conceptualization
- Data collection, including development of interview guide
- Qualitative analysis and interpretation with ES cross checking a sample of interview transcripts
- Primary writing and formatting of the manuscript

Signed:



Dated: 25.02.20 Print Name: Sarah Credé

Signed:



Dated: 25.02.20 Print Name: Suzanne Mason

Chapter 8

Patterns of paediatric emergency department utilization in Sheffield, UK: a comparison of Roma and White British children

Credé, S.H., Such, E., Knowles, E., Mason, S. and Jacques, R.M.

I, Sarah Credé contributed to the following sections:

- Study conceptualization
- Data cleaning
- Quantitative data analysis and interpretation with support from statistician (RMJ)
- Primary writing and formatting of the manuscript

Signed:



Dated: 25.02.20 Print Name: Sarah Credé

Signed:



Dated: 25.02.20 Print Name: Suzanne Mason

Appendix 2: Permission to include published materials

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Appendix 3: Additional detail to support systematic review methodology

Within this appendix the following additional detail on the methods used in the systematic review (Chapter 3) are provided:

- Defining the scope of the literature search (eligibility criteria for study inclusion)
- Detail on the development of the search strategy
- Detail on the process of data collection
- Detail on the quality assessment undertaken
- Commentary on the additional outcomes extracted

Rationale for the eligibility criteria for study inclusion

The review question “*Are there differences in international migrants’ use of emergency departments as compared to that of non-migrants in European Economic Area (EEA) countries?*” was devised according to an adapted PICOS (Population, Intervention, Comparison, Outcomes) format (O’Connor et al., 2011). The eligibility criteria for study inclusion were formulated according to the population, outcomes, comparison and study setting. While much of this is described in the publication, further detail is provided below. A summary of the inclusion and exclusion criteria are presented in Table 17.

Table 17 (Appendix 3): Summary of inclusion and exclusion criteria for the systematic review.

	Population	Outcomes	Comparison	Setting
	<i>International migrants in EEA countries including Switzerland</i>	<i>Difference in use of ED..</i>	<i>Non-migrants</i>	<i>Emergency department</i>
Inclusion criteria	All ages Clearly defined definition of ‘migrant’. Or foreigner. First or second generation migrant.	Quantification of use of services including: Volume of service use. Type of clinical presentation. Appropriateness of clinical attendance. Referral modality. Discharge destination.	Non-migrants/ natives/ group considered similar to native population Same source population	Urgent and emergency medical centres. Emergency department. EEA member countries
Exclusion criteria	Internal migrant. Studies reporting on differences in service use by different ethnic groups.	Quantification of the use of services for specific conditions (e.g. pregnancy, mental health or work related injuries).	Comparison group of ‘non-frequent users’	GP contact in an Emergency. Use of emergency PHC. GP Staffed emergency care setting.

Rationale for the inclusion of the outcome measures of interest

To understand healthcare utilization the volume of service use is frequently measured (Da Silva et al., 2011). This review primarily aimed to measure migrants’ utilization of EDs as compared to non-migrants’ utilization, measured by the volume of service. However, there might well also be difference in such matters as: the time of day patients present to the emergency service; clinical presentations; referral modality; discharge destinations; and whether the presentation to the ED was appropriate and the patient could not have been managed in a primary healthcare setting.

These differences in ED utilization may be due to patient-related factors (such as culture, relative newness to the country, health literacy) as well as due to barriers to, and in, the healthcare system. Therefore, it seemed necessary to understand, in addition to volume of service use, whether there is evidence to suggest differences in utilization between migrants and non-migrants when considering: referral modality, clinical presentation, appropriateness of attendance, and discharge destination.

Types of clinical presentation

Globally, migration drives changes in both infectious and non-infectious disease epidemiology thereby creating challenges for health services and systems in managing patients who present with clinical presentations that differ from the usually resident population (Gushulak et al., 2009). Thus the rationale for looking at differences in clinical presentation between migrants and non-migrants was to identify any differences in the epidemiological profiles between these groups of patients. This evidence can be used to identify whether migrants are presenting to the ED with conditions that differ to non-migrants that may indicate barriers to more appropriate healthcare. Furthermore, differences in utilization may suggest that changes are needed in emergency and primary care systems to ensure that these services are set up in such a way as to meet the healthcare needs of the changing population.

'Appropriateness' of clinical presentation

The appropriateness of ED attendance was captured as a further outcome in this review. Inappropriate use of EDs decreases the ability of the service to provide high-quality, timely care to patients who present with a genuine need for emergency care (Carret et al., 2007). There is a growing concern that a large proportion of visits to EDs are inappropriate and could be better managed in a primary healthcare setting (Sempere-Selva et al., 2001). Understanding which patients (or groups of patients) may be attending the ED unnecessarily is important if this problem is to be addressed. Including data in this review that captured the 'appropriateness' of the patient's clinical presentation was important to identify whether migrant patients are using the ED for conditions that could be better managed in primary care, which may suggest barriers to care within the primary care system, and whether their use differs to the non-migrant population.

Referral modality

Referral modality provides an indication as to whether a patient has consulted a general practitioner (GP) prior to presenting to the emergency services. GPs are often seen as gatekeepers to complex healthcare systems and it has been shown that patients who are not registered with a GP are more likely to use the ED for non-urgent conditions (Stein et al., 2002). A high percentage (30%) of patients that self-refer, bypassing GPs, have been shown to be using the ED inappropriately (Sempere-Selva et al., 2001). Thus, referral modality was thought to be an important outcome measure to aid in understanding the differences in the types of presentations between migrants and non-migrants and where barriers to care may exist.

Discharge destination

Discharge destination was included as an outcome of interest in this review as it has been interpreted by different authors to reflect differing healthcare needs. Hospital admission may reflect whether an ED attendance was appropriate (Brigidi et al., 2008) ; whether patients have social circumstances to facilitate discharge; or, alternatively, whether the patient has adequate access to primary care to provide follow up treatment for patients (Buja et al., 2014).

Rationale to include studies only set in European Economic Area countries

Studies were restricted to those conducted in European Economic Area (EEA) countries that operate a single market which allows free movement of goods, people, capital and services between member countries. The unique nature of the EEA's allowing free movement of people means that all countries within this region have a large number of migrants and face similar challenges in the provision of healthcare (Rudiger and Spencer, 2003). Studies from Switzerland were also included in this review. Although not belonging to the EEA, Switzerland is part of the single market which allows Swiss nationals to move freely between member countries. Understanding how migrants in these countries utilize ED services is important for health service planning to ensure that these services are set up to manage the healthcare needs of both non-EU migrants and those that are able to move freely between these member states.

Development of the search strategy

To develop the search strategy, a scoping search for key papers in the area was conducted. From the papers identified in this scoping search, and using the PICO format, a list of keywords and the associated MESH terms, used to index these papers, was used to develop the search strategy. Key words for outcomes and comparisons were excluded from the database searches to ensure that the search was broad and not limited by the inclusion of these terms.

The search strategy (Table 18) was developed by me and refined through consultation with an information specialist. As search strategies aim to be highly sensitive and include as many relevant studies as possible it was anticipated that this strategy would identify a large number of studies that would not meet the inclusion criteria (Centre for Reviews and Dissemination., 2009). The search strategy presented in below was created for MEDLINE (via Ovid) and translated for the other databases.

Table 18 (Appendix 3): Search strategy for MEDLINE (via Ovid SP)

1. exp "Transients and Migrants"/
2. exp "Emigrants and Immigrants"/
3. exp "Emigration and Immigration"/
4. exp "Refugees"/
5. exp "Minority Groups"/
6. (Migrant* or emigrant* or immigrant* or migrat* or emigrat* or immigrat* or (migrant adj2 work*) or foreigner* or foreign-born or (foreign adj2 born) or (country adj2 origin) or (country adj2 birth) or (born adj outside) or nationalit* or refugee* or (asylum adj2 seek*) or undocumented or (born adj overseas) or asylum).ti,ab.
7. exp "Emergency service, hospital"/
8. exp "Emergency medical services"/
9. exp "Ambulances"/
10. exp "Ambulatory care facilities"/
11. exp "Ambulatory care"/
12. ((emergency adj2 (room* or department* or service* or clinic* or facility*)) or casual* or ((urgent-care or Urgent care) adj2 (center\$1 or centre\$1 or service or clinic\$1 or assessment\$1)) or (ambulatory adj2 care) or (ambulance adj2 service*) or ambulance* or prehospital or pre-hospital or (out-of-hours adj2 services)).ti,ab.
13. ((walk-in or walkin or walk in) adj2 (center\$1 or centre\$1 or service or program\$ or assessment\$1)).ti,ab.
14. 1 or 2 or 3 or 4 or 5 or 6
15. 7 or 8 or 9 or 10 or 11 or 12 or 13
16. 14 and 15
17. limit 16 to (english language and humans)

Detail on the process of data collection

Table 19 summarises the data items extracted from each study. The data extraction form was piloted by two reviewers on a random selection of five included studies and amended following this. Piloting was undertaken to ensure that all relevant data was extracted and that unnecessary data was not (Centre for Reviews and Dissemination., 2009). Data extraction was undertaken by a single reviewer and 10% of the data extraction forms were checked for accuracy and completeness by a second reviewer. Inaccuracies were corrected and queries between the two reviewers were resolved through discussion. As the data from this review was unlikely to be used in a meta-analysis double data extraction of all papers was deemed unnecessary.

Table 19 (Appendix 3): Data items included in data extraction

Data item	Details
Study details	Author, year of publication, title, host country, publication type
Study design	Aims and objectives, setting, number of sites, study design, population, data source
Health system	Information provided about the health system in the host country
Study participants	Sample size, sample demographics, sampling strategy, definition of migrant, definition of comparison group
Outcome measures	Key findings (including measures used) for: differences in utilization (volume); differences in presentations or clinical conditions; differences in referral modality; differences in discharge destination; differences in 'appropriateness' of attendances.
Data analysis	Presence of potential confounders and whether any adjustment for confounders was undertaken.
Other notes	Other notes from the discussion which might influence the study's conclusion.

Expanding on the quality assessment undertaken in this review

Assessing the methodological rigor in the included studies was seen as an important step in this review - although this is a step that could not be fully presented in the publication. Quality assessment is important to identify strengths and weaknesses in the methodology of the included studies. In particular, quality assessment was seen as a means of identifying how any weaknesses in these studies might have impacted on the studies' findings and in turn might impact on the findings of this review and the recommendations that are developed from this review.

In assessing the validity of each of the included studies, both the external and internal validity were taken into consideration. External validity assesses the relevance of a study and how generalizable or applicable the study findings are to the setting that they will be applied to (Papaioannou, 2012). Internal validity, on the other hand, seeks to determine the 'truth' in the study findings and the extent to which study findings may be biased. Bias occurs in a study when there are systematic errors in the design or conduct of a study leading to results that differ from the truth and can act in such a way as either to overestimate or underestimate a true effect (Higgins and Green, 2011).

The Cochrane Handbook for Systematic Reviews of Interventions (2001) draws a distinction between assessing bias and assessing quality. Bias assesses the extent to which the results represent 'truth' and should be believed, while quality has to do with the way in which the study has been conducted. A high quality study may still be at risk of bias, for reasons of practicality and feasibility; what is important is the risk of bias in a particular study rather than how well a study has been reported (Higgins and Green, 2011). While assessing the quality of a study it may be difficult to differentiate between poor reporting of study methodology and poor methodology itself. Guidelines to improve study reporting -such as the CONSORT statement for reporting RCTs (Schulz et al., 2010), the TREND statement for reporting non-randomized trials (Des Jarlais et al., 2004) and the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement for reporting observational studies (Von Elm et al., 2007a) have been introduced to assist in determining study quality (Centre for Reviews and Dissemination., 2009).

Conduct of quality assessment for this review

A modified version of The National Institute for Health and Care Excellence 'Quality appraisal checklist- quantitative studies reporting correlations and associations' was used in this review (National Institute for Health and Clinical Excellence, 2012). This quality assessment tool was chosen as it is an appropriate tool for assessing the types of studies included in this review (Higgins and Green, 2011). The checklist method, which assesses individual components of study quality and how any biases may act to alter the study findings, was chosen for this review as it provides an overall quality assessment using a grading system and also allows for detailed comments against each criterion to ensure a transparent grading system (National Institute for Health and Clinical Excellence, 2012). Using this checklist, it was possible to assess the quality of the included studies fully by assessing areas of potential bias in the key features of each study. The checklist consists of 17 items, five of which are used to summarize the external validity of the study and 12 to assess the internal validity.

One item in the checklist (item 2.5) was changed from 'Is the setting applicable to the UK?' to 'Is the setting applicable to other EEA countries?' This change was made as the review seeks to understand migrants' use of EDs in EEA countries as a whole, and understanding differences in study settings aids in explaining the heterogeneity between the findings of studies conducted in this region. An overall grading for study was given to each study for the overall internal and external validity of the study.

Quality assessment was undertaken by SC, and a second reviewer (Elizabeth Such) checked the quality assessment on a random sample of 20% of the included studies. This is greater than the recommended 10% minimum of studies that should be double assessed (National Institute for Health and Clinical Excellence, 2012). It is recognized that the judgement of risk of bias in any study may be influenced by the review authors' level of training and experience (Higgins and Green, 2011) and it was with this in mind that a greater percentage of papers was reviewed by a second reviewer.

Use of quality assessment in this review

The results of the quality assessment can be used in varying ways in a systematic review. Quality assessment (using a scoring system) can be used to determine study inclusion criteria for the purpose of meta-analysis (Jüni et al., 2001). Other reviews, by contrast, do not exclude studies based on quality but rather use the results from the quality assessment to conduct sub-group analyses to fully understand how the study quality may impact on the overall findings (Papaioannou, 2012). In this systematic review, studies were not excluded based on their methodological quality but the reliability and quality of the studies is addressed in the review discussion.

Further detail on the risk of bias within and across studies

A summary table of the results of the quality assessment can be seen in Appendix 4. As stated when this review was published, the quality of the included studies varied greatly and the methodological flaws in these papers cannot be discounted in the review findings.

Studies which were assessed to lack internal validity were in many instances at risk of selection bias, as migrant status was self-reported or information was extracted from a patient register without a clear explanation of how migrant status had been assessed. By contrast, studies rated to have low levels of selection bias reported that nationality or country of birth had been determined on the basis of an identity card, passport or other official document (Clement et al., 2010, Nielsen et al., 2012, Norredam et al., 2004, Buron et al., 2008). Internal validity was also seen to be poor in studies that did not adequately adjust for factors that might confound the

study results. Eight studies made no attempt to adjust for confounding factors in their analyses (Lopez Rillo and Epelde, 2010, Grassino et al., 2009, Brigidi et al., 2008, Diserens et al., 2015, Carrasco-Garrido et al., 2007, Zinelli et al., 2014, Clement et al., 2010). By contrast, a number of studies made some attempt to adjust for covariates as shown in Table 3 in the published paper, although unmeasured confounding may still be present in the study results. Only one study (Nielsen et al., 2012) adjusted for length of stay in the host country, and this could be an important confounder. With increasing length of stay, migrants may have access to additional health care resources, may be better integrated into the society and have a greater understanding of the healthcare system, and this in turn may impact on how they use healthcare services. Although no great difference in the overall direction of the observed associations and the size of these associations was apparent between the studies that adjusted for confounders and those that did not, drawing general conclusions across these study findings is made more difficult because of the methodological inconsistencies between studies.

The risk of bias in many of the included studies was also affected by the outcome measures used and the reliability of the procedures for measuring these outcomes. In many instances study outcome measures were self-reported. For example, many patient surveys measured self-reported ED utilization and the risk of recall bias or social desirability bias cannot be ignored in these findings (Carrasco-Garrido et al., 2009, Shah and Cook, 2008, Ruud et al., 2015, Sanz et al., 2011). Furthermore, many studies provided insufficient information regarding how the outcome measures were assessed or whether any attempt was made to reduce biases in these measurements. By way of example, little information was provided on how triage scores were assigned to patients and whether these assessments might have varied between the members of staff assigning these scores (Brigidi et al., 2008, Grassino et al., 2009, Clement et al., 2010).

The generalisability of the study findings was limited across the included studies. Overall, studies described the source population, population demographics and healthcare systems well and the selected participants were representative of these source populations. However, in many studies the results were specific to a source population that attended a particular hospital ED or was resident in a particular region, and these results cannot be generalised across that country or across Europe as a whole.

Only one paper (Lopez Rillo and Epelde, 2010) included in this review provided a formal sample size calculation. While reporting a formal sample size calculation improves the quality of a paper, many papers in this review were based on pre-existing data sets and the importance of sample size calculations, for this type of observational study, is less important than the statistical precision achieved in the data analysis (Vandenbroucke et al., 2007). Confidence intervals reflect the precision around a point estimate with wide confidence intervals suggesting that the results are imprecise and may not make a significant contribution to current knowledge (Vandenbroucke et al., 2007). Overall, the majority of the studies were judged to have adequate sample sizes and this is reflected in the size of the confidence intervals. However, in the studies that undertook sub-group analyses it is evident that there is greater statistical uncertainty in the estimates with smaller samples, as evidenced by the wider confidence intervals.

In migration research it is important to explore these sub-group analyses with a view to identifying whether overall associations are consistent across migrant sub-groups. When sub-group analysis is undertaken, the STROBE guidelines also recommend that authors should clearly indicate if these sub-groups were of prior interest or whether the interest arose during data analysis (Vandenbroucke et al., 2007). The problem of multiplicity (finding a statistically significant result by chance) increases as the number of statistical tests increases (Streiner and Geoffrey, 2011). A number of studies undertook sub-group analyses with no clear indication of their authors' prior intentions. Clarity about prior intentions enables the reader to assess whether

selective reporting has taken place and is able to judge the possibility of multiplicity (Vandenbroucke et al., 2007).

Furthermore, a number of studies included in this review undertook analyses on existing data sets. The quality of the reporting of these studies would have been improved with a clearer description of the original studies, the original research aims and potential limitations that arise when using the named data set for secondary analyses (Vandenbroucke et al., 2007).

Methodological issues in the included studies

The majority of the included studies were cross-sectional. Not only are cross sectional studies prone to bias but they also provide only a snap-shot of healthcare utilization. Thus these studies are unable to demonstrate how healthcare service utilization for migrants may change over time. Ideally, prospective cohort studies would show these changes over time but, where this is not possible, capturing length of stay in the host country is important.

The quality of the included studies also varied greatly and this may be related to the study outcomes. Overall, studies rated to have low risk of bias were more likely to show significant differences in their study findings. While the overall trend appears to be for higher utilization of EDs by migrants, it must be noted that a number of studies showing higher use of EDs are not tested for significance and no attempt is made to adjust for confounding factors in these studies. While these results offer insight and provide further evidence to suggest a trend towards differences in utilization of ED services, these results may be spurious as a result of poor methodological quality. What is clear is the need for high quality research using appropriate analysis that adjusts for key confounders such as health status and length of time in the host country.

The sample sizes of the included studies also varied greatly and the study conclusions should have taken this into consideration. Sample size, may in theory, be an issue for some studies if the study is underpowered to detect a difference in healthcare utilization between the two groups. However, in the studies which found no significant difference, the sample sizes (including migrants) were seen to be adequate to detect a difference.

The definitions used for migrants in the included papers varied. Furthermore, in some instances the definitions provided for the comparison groups were vague. Brigidi et al., 2008, for example, compared migrants to 'Italian nationals', and the lack of clarity provided for this comparison group is a potential weakness of their paper. Without standard definitions, comparing these studies to one another is a problem. Universally accepted definitions for migrants and migration research do not exist, and, as a result, the terms used differ between studies. What is clear is that common definitions need to be used to ensure comparability across studies. Attempts have been made to create glossaries for this purpose (Bhopal, 2004, European Migration Network., 2014, International Organization for Migration, 2011), although, to date, these are not routinely used in migration research.

Furthermore, nationality is not a static concept and migrants, through a process of naturalization, may be granted nationality of a country that was not their country of birth. Thus it is possible, and likely, that some long-term migrants may have been included in the comparison groups as they are considered 'nationals' or citizens of the relevant country. While these naturalized citizens may exhibit healthcare utilization behaviour similar to that of individuals who are citizens by birth, what is missing from the information collected is their immigration history and how their healthcare utilization may have changed with length of stay in the host country. In collecting data, country of birth, citizenship and length of stay are important variables to allow trends in healthcare utilization to be seen.

The lack of consistency in the definitions of variables collected in these studies extends to those used to measure healthcare utilization and how these outcomes were analysed and reported in these studies. Thus pooling the data was not possible, making comparisons more difficult.

Previous reviews looking at migrants' use of healthcare services, as compared to non-migrants, have excluded studies exclusively of undocumented migrants, refugees and asylum seekers as the authors believe that their situations imply access restrictions to healthcare services (Uiters et al., 2009, Norredam et al., 2010). As these migrants are high on the political agenda, it was deemed important, in this current review, to synthesize the evidence of their use of EDs. This evidence would enable a greater understanding of whether this group of patients does use EDs differently to non-migrants and why any differences in service use might be apparent. However, no studies in this review were found that included this sub-group of migrants and thus the evidence in this review was insufficient to present any discussion regarding the use of EDs by undocumented migrants, refugees and asylum seekers.

Commentary on additional outcomes extracted

Due to word count limitations, the published systematic review did not report on all the outcomes measures of interest that the review covered. In addition to: volume of ED utilization, arrival time, presenting condition and 'appropriateness' of ED use, this review included studies that report on referral modality (GP, self-referral or ambulance referral) and discharge destination of patients. The findings that report on these two outcomes of interest are detailed within this section. It is important to note that the data extracted regarding referral modality, time of ED attendance and discharge destination came from the same 22 papers included in the published review. No additional papers were found that reported solely on these outcomes of interest.

Utilization of ED by referral modality

Five papers included details of the referral modality to the ED (Table 20). The referral modalities presented in these papers included: ambulance referral, GP referral and self-referral to the ED. Significant differences in mode of referral to the ED were seen in three papers; all three showed that migrants were significantly more likely than non-migrants to self-refer to the ED (Buja et al., 2014, Clement et al., 2010, Zinelli et al., 2014). By way of highlighting this apparent trend for more self-referrals among migrants, two studies found non-migrants significantly more likely to be referred by their GP (Buja et al., 2014, Zinelli et al., 2014). In contrast, one study, conducted at an inner-city ED in London, found that the majority of patients from all migrant groups self-referred and that there was no difference in referral modality or prior GP use between migrants and non-migrants (Hargreaves et al., 2006). This finding may be a reflection of the mobility of the migrant population living in London. Furthermore, many migrants in London are young adults who may not register with a GP.

One paper reported on ambulance use to access the ED (Buja et al., 2014). Buja et al., 2014, report that most patients use private transport to attend the ED; however, of those that use the ambulance a significantly higher proportion are temporarily present foreigners.

Utilization of ED by discharge destination

Five studies report on the discharge destination of patients after utilization of the ED (Table 20) (Ballotari et al., 2013, Brigidi et al., 2008, Buja et al., 2014, Grassino et al., 2009, Rue et al., 2008). Two studies report on the discharge destinations for paediatric patients and the results differ (Ballotari et al., 2013, Grassino et al., 2009). Ballotari, et al., 2007 showed a significantly higher risk of hospitalization following an ED visit for immigrant children as compared to native children, even when adjusted for level of urgency of patient presentation in the ED. In contrast, no difference in discharge destination was found in the study by Grassino et al., 2009. This reflects the findings that a high proportion of both migrants and non-migrants in this study presented to the ED with non-urgent and semi-urgent conditions.

The findings from the three studies that look at the discharge destinations of adult migrant patients attending the ED as compared to non-migrants vary and appear to differ by gender as well as by immigrant sub-group. Buja et al., 2014, found that “temporarily present foreigners” were more likely to be hospitalized as compared to Italian patients. In addition, in this study, patients from high migratory pressure countries were found to have a higher likelihood of discharge to ambulatory care and were less likely to be discharged home than Italian patients (Buja et al., 2014). In contrast, although not tested for significance, fewer foreign patients were hospitalized with more being discharged home when compared to native patients in Italy (Brigidi et al., 2008). The third study looked at differences in discharge destinations by gender sub-groups. In this study, women from Maghreb, Sub-Saharan Africa and other low-income countries (except Latin America), after excluding obstetric and gynaecology diagnoses, were found to be at higher risk of hospitalization than Spanish women (Rue et al., 2008). Male immigrants were found to be less likely to be admitted as compared to Spanish men (Rue et al., 2008).

The difference in discharge destinations between these two populations further highlights the complexity surrounding migrants’ use of EDs. Despite finding that migrants used the ED for more visits that could be considered ‘inappropriate’ Ballotari et al., 2013, also found that immigrants had a greater risk of hospitalization after an ED visit than Italian patients. This is likely to be because migrant patients, in this study, were also found to be at greater risk of higher urgency accesses as compared to non-migrants. Similarly Buja et al., 2014, found that “temporarily present foreigners” had a higher risk of ‘red’ triage codes and higher odds for hospitalization. In contrast, the higher rates of discharge for migrants as compared to non-migrants seen in Italy, are likely to reflect the high proportion of patients who use of the ED for non-urgent conditions which do not require admission (Brigidi et al., 2008).

Table 20 (Appendix 3): Summary of key findings by Referral modality and Discharge destination

Referral modality						
Reference & host country	Study design (sampling method)	Sample and number of migrants	Migrant definition	Quality assessment (IV) and external		Key findings
				IV	E	
				V		
Buja et al., 2014, Italy	Cross-sectional (<i>not stated in paper</i>) (Record linkage database)	Patients (18-65 years) attending A&E. N=35,541 (migrants N=5,385)	'Citizenship'. Nationality assumed to be that of country of birth if not born in Italy.	++	+	Significant differences in mode of referral to A&E. Most patients self-refer to A&E but particularly true for foreigners. Greater proportion of Italians referred by a GP as compared to other migrant populations.
Zinelli et al., 2014, Italy	Cross-sectional (ED database)	Visits to the ED by Italian-native and foreign born patients during 2008 to 2012. N=424,466 visits. (migrants 64,435 visits)	Country of birth. 'Foreign-born' persons born outside Italy, whose parents were either foreign citizens or born outside the national territory. (<i>first generation</i>)	+	+	Significant difference in modality of referral to A&E. Self-referral: migrants 82.3% vs Italians 71.4% and physician referral migrants 17.6% vs Italians 28.6%.
Clement et al., 2010, Switzerland and	Cross-sectional (ED database)	Patients attending the ED with non-urgent problems N=11258. Migrants (n=2948)	Nationality.	+	+	Significantly more foreigners self-referred compared to Swiss patients. (Stratified by gender, nationality and time of admission)
Hargreaves et al., 2006, England	Cross-Sectional (Patient survey)	Walk-in patients attending the A&E N=1611. Migrants (n=720).	Country of birth and Nationality.	+	+	Majority of respondents from all groups self-referred no difference across nationality groups. Compared to the UK/Irish group there was no difference in prior GP use by migrants from refugee generating countries (RGC). However, RGC group significantly more likely to have prior consultation with GP than the Australian, New Zealand or South African migrant group.

Discharge destination						
Reference & host country	Study design (sampling method)	Sample and number of migrants	Migrant definition	Quality assessment (IV) and external		Key findings
Ballotari et al., 2013, Italy	Cohort (Record linkage of three databases)	Healthy singleton live births in the years 2008-2009 followed for the first year of life. N=8788 (migrants n=2383)	Maternal citizenship. Mothers who were citizens of High Migration Countries (HMC).	++	++	The risk of hospitalization after ED visits higher for immigrants than Italians. ^g
Grassino et al., 2009, Italy	Cross-sectional. Survey of paediatric ED clinical notes.	Patients (0-adolescent) admitted to the emergency department N=4874. (Foreign n=2437)	Parents' country of birth. One or both parents born outside Italy and the EU.	-	+	No difference in discharge destination between migrants and non-migrants.* Hospitalized: migrants 11.9% vs 12.6% Italians*
Buja et al., 2014, Italy	Cross-sectional (not stated in paper) (Record linkage database)	Patients (18-65 years) attending A&E. N=35,541 (migrants N=5,385)	'Citizenship'. Nationality assumed to be that of country of birth if not born in Italy.	++	+	Discharge home was less likely for patients from high migratory pressure countries (HMPC) than for Italians. ^{a,b,f} Discharge to ambulatory care was slightly higher for HMPC than Italians. ^{a,b,f} Hospitalization more likely for temporary present foreigner (TPF) patients than for Italians. ^{a,b,f}
Brigidi et al., 2008, Italy	Cross-sectional (ED patient database)	Patients attending ED. 51,000 patients treated (Latin Americans N=3832)	Country of origin: Latin America.	-	+	Greater proportion of foreigners discharged compared to overall patient population. Greater proportion of foreigners walked out compared to overall population. Smaller proportion of foreigners hospitalized compared to overall patient population overall patient population.*
Rue et al., 2008, Spain	Cross-sectional (Hospital database)	Emergency visits in patients (15-64 years) during 2004 and 2005 (N=	Country of birth.	+	+	Male immigrants less likely to be admitted to hospital as compared to Spanish-born residents. ^a

96,916 visits).
Migrants
n=20,663
visits.

After excluding obs and gynae diagnoses, hospital admission for immigrants (except high income countries) and Spanish-women were similar.^a

After excluding obs and gynae diagnoses women from Maghreb, Sub-Saharan Africa and other low income countries (except Latin America) still at higher risk of being admitted.^a

Appendix 4: Supporting documents for systematic review (Chapter 3)

Online supplementary tables for systematic review

Table 21 (Appendix 4): Utilization of healthcare services by review outcome: volume of service use (reported in 18/ 22 included studies)

Reference	UTILIZATION INDICATOR: Volume of service use	
	Overall study findings	Sub group analysis
Ballotari et al., 2013 (paediatric)	Higher use of ED in the first year of life by immigrant mothers compared to those with Italian mothers. Adjusted rate ratio: 1.51 (95% CI 1.39-1.63). ^g	Higher use of ED by mothers from all geographical areas compared to Italian mothers (not significant for mothers from Asia). Risk doubled for Sub-Saharan Africa RR: 2.12 (95% CI 1.75-2.59).
De Luca et al., 2013	Immigrants have a higher probability of using emergency services than natives (0.7% p<0.05). ^{a,b,c,d,f}	Moroccan immigrants showed greatest probability of using emergency services than natives (2.8%) p<0.05. Africans (1.7%) and Albanians (1.5%) also showed greater use of ED p<0.01. ^{a,b,c,d,f} EU 25 nationals have a non-significant decreased probability of using the ER.
Zinelli et al., 2014	Higher rate of ED utilization by immigrants as compared to Italian-natives OR: 1.23 (95% CI 1.01-1.48 p=0.034).	
Clement et al., 2010	Significantly higher proportion of visits by non-Swiss nationals as compared to the non-Swiss population of Bern (26.18% vs 22.1%) p<0.001	
Diserens et al., 2015	Higher proportion of ED visits by non-Swiss nationals (44.5% compared to proportion of non-Swiss residents in the region (32.8%).	
Ruud et al., 2015	1 st and 2 nd generation immigrants visited the ED significantly more in the preceding 12 months than Norwegians IRR 1 st generation: 1.34 (1.21-1.49) p<0.001 and 2 nd generation: 1.58 (1.36-1.84) p<0.001 ^{a,b}	Compared to Norwegians patients from Sweden (IRR 1.32 p<0.05), Pakistan (IRR 1.62 p< 0.001) and Somalia (IRR 1.55 p<0.001) reported significantly more visits to the ED. Poland was the exception with no significant difference in frequency of visits 1.01 (0.75-1.37). ^{a,b}

Shah and Cook, 2008	No significant difference in use of casualty by immigrants versus UK born person. OR 0.83 (0.62-1.10). ^{a,b,d,f}	
Hargreaves et al., 2006	Overseas born were over-represented in comparison to local estimates (44.7% vs 33.6%; p<0.001; proportional difference 0.111 95% CI 0.087-0.136.	
Nielsen et al., 2012	Different use of ER for different immigrant and descendent sub-groups.	<p>All Immigrant groups had increased use of ER compared to Danish citizen. (except Lebanese OR 1.14 (95% CI 0.87-1.15)). The greatest use was found in immigrants from Pakistan OR 2 (p<0.0001); former Yugoslavia OR 1.65 (p<0.0001) and Iran OR 1.65 (p<0.0001)^{a,b,f}</p> <p>Second generation immigrants: Descendants from Turkey had increased use of ER OR 2.09 p<0.0001.^{a,b,f} No difference in service use for decedents from Pakistan (p=0.077).</p> <p>Increased use of ER with increased length of stay multiplicative effect 2.32-3.03 (except for Iraqi and Turkish immigrants where the opposite was found).^{a,b,c,d,e,f}</p>
Norredam et al., 2004	Significant difference in use of ER by country of birth (p<0.0001).	<p>Higher ER utilization found in persons born in Somali (RR 1.46), Turkey (RR 1.36) and ex-Yugoslavia (RR 1.23) compared to Danish-born residents.^{a,b,c}</p> <p>Lower ER utilization for persons born in other Nordic countries, the European countries and North America (RR 0.81).^{a,b,c}</p> <p>No difference in utilization rates for persons born in Iraq (RR 0.95), Pakistan (RR 1.0), the 'rest of Europe' (RR 0.87) and 'other countries' (RR 0.99).^{a,b,c}</p>
Carrasco-Garrido et al., 2009	Higher use of emergency services in preceding 12 months by economic migrants as compared to non-economic migrants (OR 1.31, 95% CI 1.12-1.54). ^{a,b,d}	
Carrasco-Garrido et al., 2007	No significant difference in the percentage of patients who used of emergency services in preceding 12 months between Migrants (29.9%) and Spanish persons (27.4%) p>0.05 ^{a,b}	

Hernández-Quevedo and Jiménez-Rubio, 2009	Non-Spaniards have a higher probability of using hospital emergency services than Spanish population OR: 1.16 p<0.001 ^{a,b,c,d,f}	Latin-Americans and Africans have higher probabilities compared to Spanish (OR 1.44 p<0.001 and OR1.26 p<0.05). Patients from EU and Europe report significantly lower probabilities of using the ED (OR 0.85 p<0.05 and OR 0.66 p<0.1). No significant difference between those from Asia (OR 0.92), North America (OR 0.51) and Oceania (0.34) compared to Spaniards. ^{a,b,c,d}
Antón & Muñoz de Bustillo, 2010	Non-EU15 migrants show higher use of emergency services in previous 12 months (p<0.001). Non-EU15 migrants visit the ED 15% more than non-migrants. EU-15 immigrants show lower rates of emergency service use in preceding 12 months (p<0.001). ^{a,b,c,d,f}	
Sanz et al., 2011	Higher, equal and less use by different sub groups. ^{a,c,d,f}	Most immigrant men use ED with less frequency as compared to Spanish except for North and Sub-Saharan Africans (same frequency) and Latin American men who use services more frequently: OR 1.68 (95% CI 1.14-1.99). ^{a,c,d,f} Most immigrant women use ED with same frequency as Spanish women, except Sub-Saharan Africans who use the services more frequently: OR 2.92 (95% CI 1.49-5.72). ^{a,c,d,f}
Buron et al., 2008	Significantly lower utilization of ED by foreign born versus Spanish born (Adjusted rate ratio 0.62 (95% CI: 0.52;0.74%). ^{a,b,f}	
López Rillo & Epelde, 2010	No significant difference in percentage of immigrants attending the ED (14.2%) compared to percentage of immigrants in the population (14%).	
Rue et al., 2008	Immigrants (excluding high income countries) showed higher use of emergency health services than Spanish born individuals. Men: RR 1.42 (1.38-1.47). Women RR 2.19 (2.13-2.26). ^a	Women from Maghreb (RR 3.52 95% CI 3.34-3.71) and Sub-Saharan Africa (RR 2.64 95% CI 2.48-2.81) had the highest emergency room utilization compared to Spanish population. Women from Latin America (RR 1.89 95% CI 1.81-1.98), Eastern Europe (RR 1.73 95% CI 1.63-1.83) and HIC (RR 2.27 95% CI 2.01-2.57) also had higher use than Spanish. Rates for LIC were not precise due to the low number of visits from this group (RR1.15 95% CI 0.95-1.39).

		<p>Men from Maghreb showed highest utilization rates compared to Spanish born (RR 2.07 95% CI 1.97-2.16). Rates also higher in men from HIC (RR1.83 95% CI 1.62-2.07), Latin America (RR1.44 95% CI 1.35-1.54) and Eastern Europe (RR1.12 95% CI 1.04-1.22). Rates were lower for other LIC (RR 1.09 95% CI 0.92-1.30) and Sub-Saharan Africa (RR 0.98 95% CI 0.92-1.04).^a</p>
<p>*Not tested for significance</p> <ul style="list-style-type: none"> g. Adjusted for age h. Adjusted for gender i. Adjusted for socio-economic status j. Adjusted for health status k. Adjusted for time in host country l. Adjusted for other factors (region, marital status, attending speciality, Triage colour) m. Adjusted for mother's age at delivery, mother's educational level, child gender, previous live births 		

Table 22 (Appendix 4): Utilization of healthcare services by review outcomes of interest: arrival time, presenting conditions and appropriateness of ED presentation (outcomes reported in 11/22 included studies)

Reference	UTILIZATION INDICATOR		
	Arrival time at ED	Presenting conditions	Appropriateness of ED presentation by severity of presenting condition.
Ballotari et al., 2013 Italy (paediatric)			Immigrants more likely to visit the ER inappropriately. Relative risk (RR) of white triage codes: RR 1.72 (95% CI 1.48-2.00) [§]
Grassino et al., 2009 Italy (paediatric)	No Difference in groups. 76.4% immigrant and 78.8% Italian visits between 8am-8pm*	No difference in presenting pathologies.*	Both immigrant and Italian patients access ED mostly for non-urgent or semi-urgent conditions. Higher proportion white (low acuity) triage codes among foreigners (25.2%) vs Italians (9.8%).*
Buja et al., 2014 Italy	Patients arriving at weekends and bank holidays mainly Temporarily Present Foreigners (TPF) (17.65%) and those from High Migratory Pressure Countries (HMPC) (15.55%) compared to Italians (13.65%) p<0.001. Most patients arrive at A& E between 08h00-16h00, patients arriving between 16h00 and 24h00 mainly from HMPC group (p<0.001).	Significant difference in presenting conditions. TPF and those from HMPC present with significantly higher proportion of digestive diseases than Italians (males, p=0.002 and females p= 0.017). Higher obstetric and gynaecology diagnoses in TPF women (13.43% vs Italian women 3.25%, p<0.001).	Higher proportion of white triage codes in foreign population (HMPC 62.56%, TPF 58.82% versus Italian 56.91%) p<0.001.
Brigidi et al., 2008 Italy			Higher percentage of white triage codes among Latin Americans (19.75%) vs Italians (7.74%).*
Zinelli et al., 2014 Italy	No significant difference between the percentage of Italians and migrants seen during the day (85.4% natives vs 14.6% immigrants) and night shifts (84.1% natives vs 15.9% immigrants (p not significant).		Higher rate of low-acuity (white) triage codes between migrants (13.7%) vs Italians (7.74%) p<0.0001.

Clement et al., 2010 Switzerland	Swiss nationals significantly more likely to present to ED during social hours compared to non-Swiss nationals (69.4% vs 63.2%, p<0.0001).	No significant difference in admission reason (trauma or other) p=0.31.	Percentage of non-Swiss attending ED with green and blue triage codes (26.18%) significantly higher than non-Swiss population in hospital catchment area (22.1%) p<0.001.
Diserens et al., 2015 Switzerland			Percentage of non-Swiss attending ED for non-urgent conditions greater than non-Swiss citizens in hospital catchment area (44.5% vs 32.8%).*
Ruud et al., 2015 Norway		Higher use of general emergency clinic for migrants 56.3% vs 42.2% Norwegians, p<0.05. Greater use of Trauma clinic for Norwegians (57.8%) vs 43.7% immigrants, p<0.05	
Buron et al., 2008 Spain		Lower utilization rates of surgery (0.51 p<0.001), traumatology (0.47 p<0.001), medicine (0.48 p<0.001) and psychiatry (0.42 p<0.05) among foreign-born compared to Spanish ^{a,b,f} No significant difference In gynaecology, utilization among foreign-born women. ^{a,f}	
López Rillo & Epelde, 2010 Spain	Immigrants significantly more likely to present during unsocial hours (20h00-08h00) (immigrants 43.1% vs natives 23.4% p<0.001). No significant differences in day of week patients attend. Most patients attend on weekdays (immigrants 74.4% vs natives 76.0%)	Significant differences in disease presentation (p<0.001) Higher rates of presentation with obstetric and gynaecological disease among migrant women (17.6% migrants' vs 10.7% natives). Higher presentation with digestive tract disease among migrants (8.3% vs 6.6% natives).	No significant difference in severity of triage scores between migrants and natives. Both groups consult mostly for non-urgent conditions (migrants 60.6% vs natives 55.8%).
Cots et al., 2007 Spain		Higher use of gynaecology and obstetric services among migrant women (25.7% migrant vs 11.5% natives).*	Lower cost of treating migrants in ED compared to Spanish patients reflects lower complexity of emergency care and workload. ^{a,b,f}

		Migrants show lower use of medicine (30.8% vs 38.2%) and traumatology (17.8% vs 22.2%) compared to natives.*	
<p>*Not tested for significance</p> <ul style="list-style-type: none"> n. Adjusted for age o. Adjusted for gender p. Adjusted for socio-economic status q. Adjusted for health status r. Adjusted for time in host country s. Adjusted for other factors (region, marital status, attending speciality, Triage colour) t. Adjusted for mother's age at delivery, mother's educational level, child gender, previous live births 			

Example data extraction form

Data extraction form

Review author: SC

Review date: 29.02.2016 revised 18.03.16

Study features

Author:	Norredam et al.,
Title:	Emergency room utilization in Copenhagen: a comparison of immigrant groups and Danish-born residents
Country:	Denmark
Date of publication	2004
Publication type	Journal article

Inclusion criteria

Receiving country	EEA (Y/N): Y	Specify: Denmark
Definition of an 'international migrant?'	Yes	
Study set in ED or urgent care?	Yes	
Does the study quantify the use of urgent or emergency care services?	Yes	
Is a comparison group included?	Yes	
Decision (INCLUDE/ EXCLUDE)	INCLUDE	

IF THE STUDY DOESN'T MEET THE ABOVE 5 CRITERIA SHOULD NOT BE CONSIDERED FURTHER.

Study design:

Aims and objectives (any hypothesis)	Aim of this study was to investigate whether utilization of the emergency room differed between immigrant groups and Danish-born residents in Copenhagen, Denmark. Hypothesis: even in a free-care context like the Danish, immigrants use the emergency room more often than Danish-born residents. Study focuses on first-generation immigrants (not born in Denmark)
Setting (Urgent or Emergency care): ambulance, urgent care centre, ED	ED
Number of sites	1
Study design (cross sectional, cohort, etc..)	Cross-sectional
Population	All citizens residing in the catchment area of Bispebjerg Hospital (183,478 citizens).
Data source (registry, survey, both or other)	Data set: Statistical Office of the Municipality of Copenhagen. For the year 1997.
Prospective/ retrospective	retrospective

Health system:

Any information provided about the health system in the receiving country

The Danish healthcare system is a "free access" system regarding the primary, secondary, and tertiary health sectors. Private hospitals are not prevalent and the few existing ones do not include emergency room functions. Every person residing in Denmark is assigned a primary care physician. To get an

appointment with one's primary care physician one has to make contact by phone. Free non-acute specialist service is available only after referral by a GP.

Participants

Characteristics	Sample										Citizens aged 20 years of more residing in the catchment area of Bispebjerg Hospital.									
	Sample Size										152,253									
											Migrants n(%)					Non-migrants n(%)				
	Denmark										127,820									
	Ex-Yugoslavia										2,892									
	Iraq										1,103									
	Nordic countries, EC, North America										6,152									
	Pakistan										1,718									
	Somalia										590									
	Turkey										1,966									
Rest of Europe										1,693										
Other countries										8,319										
Age																				
										Migrants					Non-migrants					
Age	Denmark	Ex-Yugoslavia	Iraq	Nordic countries, EC, North America	Pakistan	Somalia	Turkey	Rest of Europe	Other											
20-29	28.2	25.2	25.0	26.5	24.0	39.2	36.6	18.3	27.8											
30-39	21	29.4	43	28.1	27.1	43.1	32.9	21.4	41.0											
40-49	12.8	20.6	23.1	15.2	24.3	8.8	15.0	20.1	17.0											
50-59	11.4	13.3	4.4	11.5	18.2	4.1	9.4	14.5	8.6											
60-69	8.2	7.9	2.6	5.8	5.0	3.6	4.8	7.4	3.7											
>=70	18.9	3.6	1.8	12.9	1.4	1.4	1.2	18.3	1.9											
Gender					Male		See below													
					Female															
Sex	Denmark	Ex-Yug	Iraq	Nordic countries, EC, North America	Pakistan	Somalia	Turkey	Rest of Europe	Other											
F	53.6%	48.6%	37.2%	50.2%	44.1%	50.7%	45.9%	62.1%	46.3%											
M	46.4%	51.4%	62.8%	49.8%	55.9%	49.3%	54.1%	37.9%	53.7%											
						Migrants			Non-migrants											
					Male		See above													
					Female															
SES										-										
Sampling	How patients recruited										Identified through dataset.									
	Inclusion criteria										Persons aged 20 years or more. Only persons residing in the hospital catchment area									
	Exclusion criteria										Asylum seekers (the Red Cross centres where they live are not in the hospital catchment area).									
Does the sample include?	Mental health										-									
	Frequent users										-									

	Children	x
Migrant information	Definition of migrant:	Persons born abroad, whose parents are either foreign citizens or born abroad themselves. If information on parent-hood is not available and the person is born abroad, he or she is also defined as an immigrant. Study focuses on first-generation immigrants (not born in Denmark)
	Specific country of birth	✓
	Specific region of birth	-
	Non-specific origin	-
	Type of migration	-
Control group	Definition	Danish born
Migration information	Type of immigrants included:	
	Asylum seekers and refugees	x
	Migrant workers	-
	Economic migrants	-
	Other? (specify)	-
	Length of time since arrival in host country	-

Outcome measures

Primary outcome measures

1. Emergency room contacts

Unit of assessment

1. Crude utilization per 1,000 person years
2. Rate ratios

Results

Key findings. Migrants as compared to non migrants	<ol style="list-style-type: none"> 1. Persons born in Somalia, Turkey and ex-Yugoslavia had higher utilization rates of emergency room than Danish-born residents. 2. All other non-Western born residents (including Pakistan and Iraq) had utilization rates similar to Danish-born residents. 3. Persons born in other Western and European countries showed a tendency towards less utilization. 				
	Foreign-born population is younger than the Danish-born population apart from immigrants from "other Nordic countries", the EC, North America, and the "Rest of Europe"				
Are there differences in the utilization of urgent or emergency care services between migrants and non-migrants?					
Is there a difference? (Yes/ NO/ other)			Yes		
Definition used in study			Emergency room contacts		
Measurement used in assessment			Crude utilization rate per 1,000 person years		
Result (OR, RR etc)					
	Emergency room contacts		Study population		
Country of birth	N	%	N	%	Crude utilization rate per 1,000 person years
Denmark	15,453	85%	127,820	84%	121
Ex-Yugoslavia	396	2.2%	2,892	1.9%	137
Iraq	116	0.6%	1,103	0.7%	105
Nordic countries, EC, North America	586	3.2%	6,152	4.0%	95
Pakistan	196	1.1%	1,718	1.1%	114
Somalia	87	0.5%	590	0.4%	147
Turkey	272	1.5%	1,966	1.3%	138
Rest of Europe	193	1.1%	1,693	1.1%	114

Other countries	884	4.9%	8,319	5.5%	106
Total	18,183	100%	152,253	100%	119
Discussion points	When not adjusting for age, gender, and income, persons originating from ex-Yugoslavia, Turkey, and Somalia give rise to the highest rates of emergency room contact and those born in the <u>Nordic countries, the EX and North America the lowest.</u>				
Is there a difference? (Yes/ NO/ other)	YES				
Definition used in study	Emergency room utilization				
Measurement used in assessment	Rate ratios. Controlling for age, gender, income, and the interaction between age and gender.				
Result					
			Rate ratios	95% CI	
	Denmark		1		
	Ex-Yugoslavia		1.229	1.111-1.359	
	Iraq		0.952	0.792-1.144	
	Nordic countries, EC, North America		0.813	0.748-0.884	
	Pakistan		1.007	0.873-1.161	
	Somalia		1.457	1.175-1.806	
	Turkey		1.357	1.202-1.531	
	Rest of Europe		0.873	0.757-1.007	
	Other countries		0.995	0.927-1.067	
Discussion points	An overall highly significant association between rates of ER contacts and country of birth ($p < 0.0001$). Persons born in Somalia, Turkey, and ex-Yugoslavia had the highest utilization rates (RR=1.46, 1.36, and 1.23 respectively) compared with Danish-born residents. Persons born in the four other Nordic countries, the EC and North America had the lowest utilization rates (RR=0.81). Persons born in other countries, Iraq, and Pakistan showed utilization rates similar to Danish-born residents with ratios of respectively 0.99, 0.95 and 1.0.				
Are there differences in disease profiles or presenting conditions between migrants and non-migrants?					
Is there a difference? (Yes/ NO/ other)					
Definition used in study					
Measurement used in assessment					
Result					
Discussion points					
Are there differences in the discharge destination of migrants and non-migrants?					
Is there a difference? (Yes/ NO/ other)					
Definition used in study					
Measurement used in assessment					
Result (OR, RR etc)					
Discussion points					
Are there difference in length of stay in the ED between migrants and non-migrants?					
Is there a difference? (Yes/ NO/ other)					
Definition used in study					
Measurement used in assessment					
Result (OR, RR etc)					
Discussion points					
Does the management of migrant patients differ to non-migrants?					
Is there a difference? (Yes/ NO/ other)					
Definition used in study					
Measurement used in assessment					
Result (OR, RR etc)					
Discussion points					
Are the ED or urgent care attendances of migrants considered avoidable as compared to non-migrants?					
Is there a difference? (Yes/ NO/ other)					
Definition used in study					

Measurement used in assessment	
Result (OR, RR etc)	
Discussion points	
QUALITATIVE INFORMATION PRESENTED IN PAPER	
Foreign born population is younger than the Danish-born population. Apart from immigrants from “other Nordic countries”, the EC, North America and the “rest of Europe”.	
OTHER NOTES TO CONSIDER	
Could not control for health status because didn’t have that information available.	
Further research suggested: “the challenge remains for future research in this area to understand the basis of the utilization patterns observed and why they are apparent among some but not all immigrant groups. This can be done by both qualitative and quantitative methods of research such as questionnaires and interviews targeting immigrant patients as well as healthcare professionals working with this population.”	
CONCLUSIONS	
Some immigrant groups have higher emergency room utilization rates compared with Danish-born residents. Persons born in Somalia, Turkey, and ex-Yugoslavia had higher utilization rates of emergency room than Danish-born residents. All other non-Western born residents had utilization similar to Danish-born residents. Persons born in other Western and European countries showed a tendency towards less utilization. (shows the importance of looking at each minority group on its own instead of gathering them into one heterogeneous group.	

Data Analysis

Was data adjusted for? *#indicate in results which results adjusted for these.*

^a Age	✓
^b Gender	✓
^c Socio-economic status	✓ (income)
^d Time in host country	x
Health status	x
Other	✓ interaction between age and gender

Other notes about the structure of the article or comments from the discussion that may affect the conclusions of the study:

Example quality assessment form

This quality assessment form is a modified version of the NICE Quality appraisal checklist – quantitative studies reporting correlations and associations

Quality Appraisal of Correlation Studies			
++ = good, + = mixed, - = poor, nr = not reported, na = not applicable			
Cells are colour-coded to demonstrate the relationship with the summary questions below.			
	Study identification (include full citation details)	Norredam M, Krasnik A, Moller Sorensen T, Keiding N, Joost Michaelsen J, Sonne Nielsen A. Emergency room utilization in Copenhagen: a comparison of immigrant groups and Danish-born residents.	
	Study design:	Other	
	Evaluation criteria	Quality	Guidance topic:
		++ + -	
		nr na	Assessed by: SC
Population	Section 1: Population		
	1.1 Is the source population or source area well described?	++	Clear description of Danish health care system. Clear indication of demographics of population.
	1.2 Is the eligible population or area representative of the source population or area?	++	Clear random selection of participants from each immigrant group. Eligible population representative of source.
	1.3 Do the selected participants or areas represent the eligible population or area?	+	Well described selection of participants. High non-response rate. This was higher in immigrants which may have lead to bias. Non-responders more likely to be immigrants and also more likely to use ED more. Possible underestimation of effect of being foreign.

Section 2: Method of selection of exposure (or comparison) group			
Exposure (& Comparison)	2.1 Selection of exposure (and comparison) group. How was selection bias minimised?	++	Selection of immigrants and natives done according to Civil Personal Registration number which indicates persons right to residence in Denmark. Includes info on country of birth and citizenship.
	2.2 Was the selection of explanatory variables based on sound theoretical basis?	+	Good inclusion of variables but not clearly explained why these were included.
	2.3 Was the contamination acceptably low?	na	
	2.4 How well were likely confounding factors identified and controlled?	++	Good control for confounding. Adjusted for LOS which not many studies do.
	2.5 Is the setting applicable to the UK?	+	Similar health care setting.
	Section 3: Outcomes		
Outcomes	3.1 Were the outcome measures and procedures reliable?	+	Emergency room contacts from national health registry service database. Self-reported health and other variables less objective.
	3.2 Were the outcome measurement complete?	++	
	3.3 Were all important outcomes assessed?	na	
Time	3.4 Was there a similar follow-up time in exposure & comparison groups?	na	

	3.5 Was follow-up time meaningful?	na	
Section 4: Analyses			
Results	4.1 Was the study sufficiently powered to detect an effect if one exists?	+	Large sample size. Not clear what sample needed.
	4.2 Were multiple explanatory variables considered in the analyses?	++	yes, including length of stay and health condition.
	4.3 Were the analytical methods appropriate?	++	
	4.4 Was the precision of association given or calculable? Is association meaningful?	++	p values and 95% CI given.
Section 5: Summary			
Summary	5.1 Are the study results internally valid (i.e unbiased)?	++	
	5.2 Are the results generalisable to the source population (i.e externally valid)?	+	

Summary table of quality assessment of studies included in systematic review

	Ballotari, 2013	Grassino, 2009	Buja, 2014	Brigidi, 2008	De Luca, 2013	Zinelli, 2014	Clement, 2010	Diserens, 2015	Ruud, 2015	Shah, 2008	Hargreaves, 2006	Nielsen, 2012	Norredam, 2004	Carrasco-Garrido, 2009	Carrasco-Garrido, 2007	Hernandez-Quevedo, 2009	Anton, 2010	Sanz, 2011	Buron, 2008	Lopez, 2010	Cots, 2007	Rue, 2008
Population																						
1.1 Is the source population or source area well described?	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
1.2 Is the eligible population or area representative of the source population or area?	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
1.3 Do the selected participants or areas represent the eligible population or area?	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	nr	nr	+	+	+	-
Method of selection of exposure (or comparison group)																						
2.1 Selection of exposure (and comparison) group. How was selection bias minimised?	+	-	+	+	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+
2.2 Was the selection of explanatory variables based on sound theoretical basis?	+	+	+	-	+	+	nr	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+
2.4 How well were likely confounding factors identified and controlled?	+	-	+	-	+	-	-	-	+	+	-	+	+	+	-	+	+	+	+	+	-	+
2.5 Is the setting applicable to other EEA countries	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

Outcomes																						
3.1 Were the outcome measures and procedures reliable?	+	+	+	+	-	+	+	+	+	-	-	+	+	-	-	-	-	-	+	+	+	+
3.2 Were the outcome measurement complete?	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Analyses																						
4.1 Was the study sufficiently powered to detect an effect if one exists?	+	+	+	+	+	+	+	+	+	+	nr	+	+	+	+	+	+	+	+	+	+	+
4.2 Were multiple explanatory variables considered in the analyses?	+	-	+	-	+	+	-	-	+	+	nr	+	+	+	-	+	+	+	+	+	+	+
4.3 Were the analytical methods appropriate?	+	-	+	-	+	-	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
4.4 Was the precision of association given or calculable? Is association meaningful?	+	nr	+	nr	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Summary																						
5.1 Are the study results internally valid (i.e unbiased)?	+	-	+	-	+	+	+	-	+	+	+	+	+	+	-	+	+	+	+	+	-	+
5.2 Are the results generalisable to the source population (i.e externally valid)?	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
++	All or most of the checklist criteria have been fulfilled; where they have not been fulfilled the conclusions are very unlikely to alter.																					
+	Some of the checklist criteria have been fulfilled, where they have not been fulfilled, or not adequately described, the conclusions are unlikely to alter.																					
-	Few or no checklist criteria have been fulfilled and the conclusions are likely or very unlikely to alter.																					

Appendix 5: Additional detail to support design and analysis of study 1 (Chapter 6)

S1 Checklist

S1 Checklist. Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) checklist

	Item No	Recommendation	Page number
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	Title page
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	Abstract
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	Introduction para 1-4
Objectives	3	State specific objectives, including any prespecified hypotheses	Introduction para 4
Methods			
Study design	4	Present key elements of study design early in the paper	Methods
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Method: Participants para 1-3
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up	Method: Participants para 1-3
		(b) For matched studies, give matching criteria and number of exposed and unexposed	N/A
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	Method: Outcomes of interest para 1-4
Data sources/measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	Method: Outcomes of interest para 1-4
Bias	9	Describe any efforts to address potential sources of bias	Statistical analysis para 1-4
Study size	10	Explain how the study size was arrived at	N/A
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	Method: Outcome of interest Statistical analysis para 3
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	Statistical analysis para 1-4
		(b) Describe any methods used to examine subgroups and interactions	Statistical analysis para 1-4
		(c) Explain how missing data were addressed	Methods: Outcomes of interest para 4
		(d) If applicable, explain how loss to follow-up was addressed	N/A
		(e) Describe any sensitivity analyses	N/A
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	Results para 1
		(b) Give reasons for non-participation at each stage	N/A
		(c) Consider use of a flow diagram	N/A

Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	Results para 1, Table 1
		(b) Indicate number of participants with missing data for each variable of interest	N/A
		(c) Summarise follow-up time (eg, average and total amount)	Methods: Outcomes para 1
Outcome data	15*	Report numbers of outcome events or summary measures over time	Results: ED attendances para 1&2, Table 2&3
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	Results: Multivariable analyses para 1-3 Table 4
		(b) Report category boundaries when continuous variables were categorized	Method: Outcomes of interest para3, statistical analysis 4
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	Results: Multivariable analyses para and Table 4
Discussion			
Key results	18	Summarise key results with reference to study objectives	Discussion para 1-6
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	Discussion: strengths and limitations para 7-10
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	Discussion: para 10-11
Generalisability	21	Discuss the generalisability (external validity) of the study results	Discussion: para 10
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	Funding statement

S1 Table

	INCLUDED IN ANALYSIS N= 10,168	EXCLUDED FROM ANALYSIS ¹ N= 3,264	p-value ^{§,*}
	N (%)	N (%)	
N.of ED visits (first 5 years)			
No visits	7,064 (69.5%)	2,260 (69.2%)	0.16; p=0.685 [§]
At least one visit	3,104 (30.5%)	1,004 (30.8%)	
Mother's migrant status			
UK/Ireland born	6,548 (64.4%)	484 (51.8%)	58,8 (1); p<0.001 [§]
Migrant	3,620 (35.6%)	451 (48.2%)	
Missing	-	2,329	
Child gender			
Male	5,157 (50.7%)	1,696 (52.0%)	1.5 (1); p=0.217 [§]
Female	5,011 (49.3%)	1,568 (48.04%)	
Mother's age at recruitment			
Med (IQR)	27 (23; 31)	27 (23; 31)	Z=1.181; p=0.238*
Registerable parity			
No previous birth	4,179 (41.1%)	828 (33.5%)	47.32; p<0.001 [§]
At least one previous birth	5,989 (58.9%)	1,640 (66.5%)	
Missing	-	796	
Mother educated beyond A level or equivalent			
< A level or equivalent	5,286 (52.0%)	477 (52.7%)	114.18; p<0.001 [§]
A-level equivalent or higher	4,670 (45.9%)	406 (44.9%)	
Don't know or foreign unknown	212 (2.1%)	22 (2.4%)	
Missing	-	2,359	
Marital and cohabitation status			
Married and living with partner	6,642 (65.3%)	621 (68.62%)	4.31; p=0.116 [§]
Not married, living with partner	1,838 (18.1%)	143 (15.80%)	
Not living with partner	1,688 (16.6%)	141 (15.6%)	
Missing	-	2,359	
Residential deprivation IMD quintile 2010			
1 (most deprived)	6,712 (66.0%)	635 (68.7%)	8.41; p=0.077 [§]
2	1,838 (18.1%)	172 (18.6%)	
3	1,141 (11.2%)	77 (8.3%)	
4	302 (3.0%)	28 (3.0%)	
5 (least deprived)	175 (1.7%)	12 (1.4%)	
Missing	-	2,340	

S1 Table: Comparison of analytic cohort and cohort excluded from analysis due to missing data.

¹Distribution of those excluded from analytical cohort due to missing data (N=3,264) by available outcome, exposure and covariate data.

IQR: interquartile range

[§]Chi-square analysis

*Mann-Whitney U-test

Additional detail to support quantitative methods used in Study 1

This appendix provides additional detail on the quantitative methods used in study 1: “Paediatric Emergency Department Utilization Rates and Maternal migration Status in the Born in Bradford Cohort: A Cross-Sectional Study”.

Born in Bradford (BiB) Data

BiB baseline questionnaire data, linked to NHS ED medical records on an individual patient level basis, was requested from BiB. A dataset containing observations for n=13,432 children, born between April 2007 and June 2011, was received from BiB in May 2017. The data was transferred to STATA 14 (StataCorp, 2015) and all analyses were conducted using this software.

Data analysis

Data cleaning

The first stage of the analysis process involved extensive cleaning of the dataset. This process was undertaken to identify possible data entry errors that would produce unreliable results in the analysis. Data errors can occur in study design, data collection and data entry, and data cleaning was undertaken to minimise the impact any errors might have on the study results (Van den Broeck et al., 2005). A systematic approach to data cleaning was undertaken and each variable was checked to identify possible errors and missing data. The data errors I looked for included: duplicate data, data inaccuracies, inconsistencies or instances of missing data. No instances of duplicate data were identified and values out of the expected range where identified and where these could not be corrected they were treated as ‘missing’. 3,264 observations were excluded from the analytical cohort due to missing data on mother’s country of birth or missing data on one of the variables of interest.

Generating new variables

The second stage of data analysis involved the generation of new variables to aid the analysis. New variables were generated that captured the secondary outcomes of interest, including: the day of week of attendance, the type of discharge from the ED (discharged home or admitted), and the child’s presenting condition (ICD 10). New variables were also generated for the explanatory variables of interest. Further detail on how these variables were generated, that is not reported in Chapter 6, is provided below.

Day of the week of ED attendance

The date of ED attendance data were available from BiB. These data were coded to capture the day of the week of ED attendance, specifically whether this was a weekday or a weekend. As Bank Holidays in the UK are treated as weekends, additional analysis was undertaken to code all dates that were Bank Holidays and these were grouped with weekend days for analysis.

ICD-10 coding

Patient’s ED diagnostic and clinical information in this data set was available in the form of ICD-10 codes (World Health Organization, 2016). These codes are the international standard for reporting of health conditions and can be used to measure patients’ reasons for contact with the

ED. Within the ICD coding framework, ICD-10 codes are classified into twenty-one diagnostic chapters (World Health Organization, 2016). Each disease code is classified into one of these chapters/categories using established criteria, assigning similar diseases or conditions to the same category.

Between 1 and 14 ICD-10 codes, per child, were recorded for each ED attendance. Seven children had no codes recorded for their visit. Of these, four were discharged from the ED.

For the analysis it was decided that the detail provided in the diagnosis description for each unique ICD-10 code was not necessary for the purposes of this study: understanding the disease categories with which patients present, and whether there are differences between migrant and non-migrants, was sufficient. Thus, for this research the broader disease categories were used for analysis (Table 23). To create these new categories in the data a new variable was created to capture the ICD category and each ICD-10 code was coded to one of the categories shown in Table 23.

Table 23 (Appendix 5): ICD-10 disease category coding (World Health Organization, 2016)

Code Range	Description
A00-B99	Certain infectious and parasitic diseases
C00-D49	Neoplasms
D50-D89	Diseases of the blood and blood – forming organs and certain disorders involving the immune mechanism
E00-E89	Endocrine, nutritional and metabolic diseases
G00-G99	Diseases of the nervous system
H00-H59	Diseases of the eye and adnexa
H60-H95	Diseases of the ear and mastoid process
I00-I99	Diseases of the circulatory system
J00-J99	Diseases of the respiratory system
K00-K95	Diseases of the digestive system
L00-L99	Diseases of the skin and subcutaneous tissue
M00-M99	Diseases of the musculoskeletal system and connective tissue
N00-N99	Diseases of the genitourinary system
P00-P96	Certain conditions originating in the perinatal period
Q00-Q99	Congenital malformations, deformations and chromosomal abnormalities
R00-R99	Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified
S00-T98	Injury, poisoning, and certain other consequences of external causes
Z00-Z99	Factors influencing health status and contact with health services.

Explanatory variables

Migrants themselves are not a homogenous group and any study that generates overall findings risks masking differences within migrant sub-groups. Migrant mothers were sub-categorised by region of birth, according to World Bank Geographic regions and by time since arrival in the UK. The categories for short- and long-term migrants were based on the ONS Migration terms and definitions (Office for National Statistics, 2019b). For this study an additional category of ‘established migrant’ (someone who has lived in the UK for at least five years) was used. This categorisation was derived from the knowledge that permanent residence and British citizenship applications can be completed after a minimum of five years of residence in the UK.

Other covariates of interest included: child's gender, mother's age at recruitment, mother's ethnicity, mother's level, of residential deprivation (IMD quintiles) (Department for Communities and Local Government, 2015), mother's registerable parity, mother's educational level and distance from home to hospital. These variables were considered necessary to adjust for in multivariable models based on evidence from my systematic review and additional scientific literature (Hendry et al., 2005, Bedford et al., 1992, Mallon et al., 1997, McKee et al., 1990). Details of how these variables were categorised are presented in Table 24.

Table 24 (Appendix 5): Variables used in analysis

VARIABLE NAME	Data generation	VARIABLE categories and coding
Child's migrant status	Binary variable mother foreign born yes/no	No=Mother's region of birth is UK/Ireland Yes=Mother's region of birth is not UK/Ireland
Mother's region of birth	Mother's region of birth included 149 unique countries of origin. To analyse these data county of birth was categorised according to World bank regions into the following regions:	UK/ Ireland: which includes mothers born in Northern Ireland, Scotland and Wales Europe/Central Asia: Czech republic, Poland, Slovakia, Germany, Austria, Belgium, Bosnia, Cyprus, Estonia, Finland, France, Gibraltar, Greece, Holland, Italy, Netherlands, Kazakhstan, Kosovo, Latvia, Lithuania, Sweden, Switzerland, Norway, Portugal, Romania, Russia, Serbia, Spain, Turkey, Ukraine, Isle of Man, Channel Islands, Republic of Ireland South Asia: Bangladesh, India, Pakistan, Sri Lanka, Albania, Afghanistan, Maldives Africa: "Africa", Algeria, Angola, Benin, Burundi, Botswana, Cameroon, Congo, Ethiopia, Gambia, Ghana, Guinea, Ivory Coast, Kenya, Liberia, Malawi, Mauritius, Morocco, Nigeria, Rwanda, Senegal, Sierra Leone, South Africa, Somalia, Swaziland, Tunisia, Tanzania, Uganda, Zimbabwe East Asia/Pacific: Australia, China, Hong Kong, Indonesia, Japan, Malaysia, New Zealand, Philippines, Singapore, Thailand, Vietnam, Myanmar Middle East: Qatar, Dubai, Doha, Egypt, Emirates, Iran, Iraq, Israel, Jordan, Kuwait, Libya, Oman, Saudi Arabia, Syria, United Arab Emirates, Abudahbi
Mother's time since arrival in UK. Time since mother's arrival in the UK = age at study recruitment – age mother moved to UK (years)	Mother's time since arrival in the UK categorised into three categories.	Established migrant (living ≥ 5 years in UK) Long term migrant (living in UK $\geq 1 - 5$ years) Short term migrant (<1 year living in UK).
Registerable parity	Previous live birth yes/no	0=No previous live birth 1= At least one previous live birth
Mother educated beyond A level or equivalent	< A level or equivalent A-level equivalent or higher Don't know or foreign unknown	Mother's categorised as having been educated beyond A level were those who achieved an A-level qualification, <i>Higher than A-level or equivalent</i> or <i>Other</i> qualifications which had been categorised by BiB as (<i>City and Guilds, RSA/OCR, BTEC</i>)(West et al., 2014).
Marital and cohabitation status	Married and living with partner Not married, living with partner Not living with partner	Data provided by BiB categorised mother's marital and cohabitation status according to these categories.

Residential deprivation IMD quintile	1 (most deprived) 2 3 4 5 (least deprived)	Data provided by BiB categorised mother's residential deprivation according to IMD quintiles (Department for Communities and Local Government, 2015).
Distance from home to hospital	Km	Details of how a child's distance from home to hospital was calculated are provided below.

Distance from home to hospital

Any data that could identify children in the BiB cohort via location are treated as sensitive data by BiB. Lower Super Output Area (LSOA), which is considered less sensitive, was provided and this was used to determine the distance from home to hospital for each child. Output areas (OAs) are areas created from adjacent postcodes and are the lowest level at which census geographical data are provided (Office for National Statistics, 2011). LSOAs are small areas with a mean population of about 1,500 each. These areas have a minimum population size in order to maintain confidentiality and protect the identity of individuals living within this area (Office for National Statistics, 2011). By using the LSOA data and the location of Bradford Royal Infirmary (BRI) (where the ED is situated) I was able to determine the distance travelled by the patient to hospital.

Data received from BiB contained the population weighted centroids for the LSOA in which the child's mother lived at the time of birth. This centroid represents the centre of LSOA and is used as a reference point for that particular LSOA. To determine distance from a patient's home to hospital, the population weighted centroid was used as an approximation of the patient's home location rather than using a patient's address, which would risk disclosure of patient identity. Although the LSOA does not represent the exact location of a child's home, it is unlikely that using this centroid as an approximation will add significant bias to the study results, given the relatively small size of each of these LSOAs.

All ED attendances in this data set were for BRI and thus the distance to the ED could be measured using the grid reference for this hospital site. Using the postcode for BRI, the grid reference point, including Eastings and Northings data, was obtained.

To calculate the distance from home to the ED, I used the same methodology as that used by Robert's et al., 2014, in which the authors examined the distances people travel from home to receive emergency care (Roberts et al., 2014). Using the Easting and Northings data for each LSOA centroid, and Eastings and Northings data for the position of the hospital ED, a straight-line distance between the population centroid and hospital was calculated using Pythagoras' theorem. Eastings and Northings data are perpendicular to each other, so using Pythagoras's theorem, that states that in a right angled triangle the square of the hypotenuse is equal to the sum of the squares on the other two sides the distance between the two points can be calculated.

Calculation: $\sqrt{((N1-N2)^2+(E1-E2)^2)}$

1. Six digit Eastings and Northings give result in meters.
2. Calculate difference in Northings and Eastings data
3. Square the two results and add together
4. The distance from the hospital, the length of the hypotenuse, is the square root of the number arrived at in 3 above.

These calculations were done in Microsoft excel for all LSOAs in Bradford. To check the accuracy of these calculations I used the UK Grid Reference finder online to identify the location of the LSOA centroid (<https://gridreferencefinder.com/>). This program provides a postcode for the

nearest address in the LSOA. Using the postcode given, I used a further website to measure the straight-line distance between this postcode and the postcode of the hospital (<https://www.freemaptools.com/distance-between-uk-postcodes.htm>). This was done for a random selection of postcodes and for each the estimate was judged to be accurate.

During the analysis I became aware that some children within this cohort might live in closer proximity to another ED and that by including these children in the study that this might bias the study result. To assess this, I identified the other EDs within the Bradford region. These included: Leeds General Infirmary, Calderdale hospital and Pinderfields Hospital. Using the method described above, I calculated the distance from each child's LSOA to each of these hospital sites to establish the closest ED. The results of this analysis showed that for 98% of children in the Cohort, BRI was the closest ED. For 0.18% of the children Leeds Royal infirmary was the closest ED to home; for 0.83% of the sample Calderdale hospital was closest; and for 0.36% of the cohort Dewsbury hospital was the closest to home. A decision then needed to be taken as to whether these children should also be excluded from the analysis. It was decided to keep these children in the population because in each of these other groups at least one visit was made to Bradford ED by children who lived closer to another hospital.

There are imitations to using the LSOA data. Firstly, the LSOA data was generated from information provided by mothers at the time of study recruitment, and it is acknowledged that a child might have moved during the first five years of life. A further limitation is that it is assumed that the place of incident is the child's home, whereas in fact, the place of incident may be different to place of residence. However, it is assumed that any biases created in the data would be similar for children of migrant and those of non-migrant parents.

Appendix 6: Additional detail to support qualitative methods. Study 2 (Chapter 7)

This appendix provides additional detail on some aspects of the qualitative methods used in study 2 (Chapter 7) “Migrant use of paediatric emergency departments in an English region. A qualitative study of healthcare providers’ perceptions”.

Developing the topic guide

The interview guide (Appendix 7) was developed to explore providers’ perceptions of migrants’ use of the ED. The main topics covered in this guide included: experiences of managing children of migrant parents in the ED; perceived differences in the use of the ED between migrant families and non-migrant families; any challenges faced in delivering healthcare to children of migrant parents; and ways to improve service provision for children of migrant parents. Using the structure for an in-depth interview proposed by Hennink et al., 2011, the interview guide included an introduction, opening questions, key questions, and closing questions (Hennink et al., 2011b). The interview guide and the associated prompts developed as the project progressed. The guide initially developed from the systematic review findings, and was shaped by themes from the limited published qualitative research in this topic area. As the interviews progressed, amendments were made to this guide to allow for further exploration of particular themes that were emerging.

Pilot interviews

After gaining ethical approval, research governance approval and research access to the hospital facilities, two pilot interviews were undertaken with an ED doctor and an ED receptionist (site 1). The pilot interviews were undertaken to test the interview guide and allow me to gain familiarity with this guide, as well as providing an opportunity for me to reflect critically on my interviewing style. Piloting the topic guide is an important step in the research process to ensure that the guide used in interviews generates the scope and depth of data that is required, and if not, for revisions to be made (Arthur et al., 2014).

The pilot interviews were invaluable in identifying where changes were needed in the topic guide, as well as being important in allowing me to reflect on my interviewing techniques as a new qualitative researcher. The transcripts of these pilot interviews were shared with my supervisor (ES) and the comments provided by her enabled me to identify how directive my questioning was, whether I was asking leading questions, and where I could improve my interviewing technique. Following the pilot interviews, I made minor revisions to the topic guide, particularly the ordering of questions and the use of prompts.

Data collection

All, but one, of the interviews were conducted face-to-face at each of the respective hospital sites. One participant requested a telephone interview as the interview was scheduled for the participant’s day off. While telephone interviews may be seen to be inferior to face-to-face interviews, due to the loss of contextual and non-verbal data, there is evidence that telephone interviews may allow participants to feel more relaxed during the interview and this may lead to richer, more sensitive information than that gathered through a face-to-face interview (Novick, 2008). The telephone interview that took place was longer than the other interviews and the data

provided great insight and rich descriptions, suggesting that this participant may have felt less constrained by time and more comfortable about speaking openly.

The face-to-face interviews took place within office spaces or unoccupied rooms at the hospital facilities. Two of the interviews, conducted in rooms near the ED, were subject to short interruptions, during which I paused the recordings and the interview. All interviews were tape-recorded with the participant's consent, using an encrypted recording device. Each interview was transcribed verbatim by me, and each transcript was checked against the original recording for accuracy. During transcription, all identifiable participant information was removed to maintain anonymity.

Analysis

A process of sequential analysis was undertaken. Data were transcribed and analysed during the data collection phase to enable the collected data to shape ongoing data collection (Pope et al., 2000a).

Thematic analysis, which involves identifying, interpreting and reporting repeated themes that appear within the data (Spencer et al., 2014), was used in this qualitative study. Thematic analysis, considered to be the 'foundational method' of qualitative analysis, was chosen due to its flexibility in that it is not tied to a particular theoretical or epistemological position, and is flexible with regard to the data collection methods used and the way meanings are generated from the data (Clarke and Braun, 2017). Thematic analysis is useful in identifying participants' perspectives and understanding what they think and feel (Clarke and Braun, 2017). A further reason for the use of this analytical technique is that it is seen to be the first analytical method a qualitative researcher should learn, as the skills learnt in undertaking this analysis can be transferred to other forms of qualitative analysis (Braun and Clarke, 2006).

The process of undertaking thematic analysis in this study was guided by the six phases of thematic analysis presented by Braun and Clarke, 2006. These six phases consist of: familiarization with the data; generating initial codes; searching for themes; reviewing themes; defining and naming themes; and producing the report (Braun and Clarke, 2006).

Familiarization with the data

Having conducted all the interviews myself, I was familiar with the data and had some prior analytical thoughts and ideas before I began the data analysis. To immerse myself further in the data, I listened to each of the recordings, transcribed each interview, and subsequently checked each transcript against the recording for accuracy. Following transcription, each transcript was transferred to NVivo 11 (QSR International Pty Ltd, 2015), and read, and reread, prior to data coding.

Generating initial codes

Initial coding of the transcripts was undertaken using NVIVO 10. The entire data set was coded using a line-by-line approach, coding for all potential themes that emerged. Codes included both deductive codes, derived from existing literature, and inductive codes that developed from the interview data (Hennink et al., 2011a). Initial 'codes' were developed from groups of ideas and opinions that I thought were relevant to the research objectives.

To strengthen the trustworthiness and credibility of this qualitative research a number of checks were implemented during data analysis. The first check involved independent coding from a

second researcher (ES) early on in the data analysis process. A sample of the transcripts was read and coded separately by this supervisor to ensure that the themes and categories generated were not simply developed from the subjective judgements of a single researcher (Pope et al., 2000b). The categories identified by the two researchers were compared and a robust set of categories was developed through discussion (Thomas, 2006). Subsequent coding was based on these agreed categories, allowing additional categories to be added as they emerged.

Searching for themes, reviewing themes and naming themes

Following coding of the dataset, these codes were sorted and grouped into themes. Themes, as stated by Braun and Clarke, 2006, capture important concepts or topics in the data as it relates to the research question. In deciding on themes, I used my judgement to decide what constituted a theme, or sub-theme. These themes were generated via the repetition of the same topic, or perceptions, by different participants across the range of interviews. At this stage of analysis a second consistency check was undertaken to check for clarity of the derived themes/categories (Thomas, 2006). This involved providing a second researcher (ES) with a sample of text from the transcripts and the derived categories. The second researcher was tasked with independently assigning the coded text to the given categories.

The fourth phase of analysis involved reviewing the themes to ensure that the coded data formed a coherent pattern and that the coded extracts fitted within the themes (Braun and Clarke, 2006). In reviewing the themes, it was also important to check that they worked across the entire data set. Phase five involved defining the themes and identifying the essence of each theme, particularly what is interesting about each theme (Braun and Clarke, 2006).

Appendix 7: Supporting documents for study 2 (Chapter 7)

Recruitment email to ED staff for qualitative interviews

Study title: Healthcare providers' perceptions of migrants' use of paediatric emergency departments in Yorkshire and Humber: a qualitative study

Sent to staff via NHS Service address/or via email.

Dear [name of individual],

This email is being sent on behalf of Sarah Crede, a PhD student at the University of Sheffield. I am writing to ask if you would kindly consider taking part in an interview for Sarah's research project.

Title of Project: Healthcare providers' perceptions of migrants' use of paediatric emergency departments (ED) in Yorkshire and Humber – a qualitative study.

Sarah's PhD aims to generate a better understanding of how migrant parents use paediatric ED services for their children in Yorkshire, particularly whether there are differences in use between migrant and non-migrant parents. One aspect of Sarah's PhD involves interviewing ED staff to understand their perceptions and experiences of migrants' use of paediatric ED services.

Ten ED staff have been purposively identified at [hospital name] as individuals who would offer interesting insights into this research topic. These interviews will be conducted with a range of clinical and non-clinical ED staff with different job roles and grades to ensure the views of a diverse range of staff, with different experiences are included in this study. Additional interviews will also be taking place at [hospital name]. As research lead I have agreed for these interviews to take place as has the ED manager [named manager].

I am attaching some further information about the research and what agreeing to take part in the interviews may involve for you. I would be grateful if you could read this carefully. I hope this is clear but if you have any further questions please contact, myself or Sarah Crede, on 0114 222 6390 or s.h.crede@sheffield.ac.uk

If after reading the information leaflet you feel happy to participate then please email Sarah to arrange a convenient time for the interview. If you would rather not take part I would be grateful if you could email me to let me know this and I will not contact you again.

Yours sincerely

Signed

Participant Information Sheet

Study title: Healthcare providers' perceptions of migrants' use of paediatric emergency departments in Yorkshire and Humber – a qualitative study

We would like to invite you to take part in a research study that is being undertaken to develop a better understanding of migrants' use of paediatric emergency department (ED) services. Specifically, this research seeks to understand service providers' perceptions of any differences in ED utilization between migrants and non-migrants. Before you make any decision regarding participation you need to understand why the research is being done and what it would involve for you. Please take time to read the following information carefully. And discuss it with others if you wish. If you have any further questions, please contact Sarah Crede (contact details provided at the end of this leaflet).

What is the purpose of the study?

This research seeks to understand service providers' perceptions of migrants' use of paediatric EDs. In England there has been no research into the experiences of ED staff in providing care to the children of migrant parents. Developing an in-depth understanding of providers' perceptions and experiences in managing migrant families should assist an appreciation of whether, and why, migrants are perceived to use ED services differently to non-migrants. Furthermore, these findings will help to identify where support is needed for providers so as to facilitate the provision of care to migrant patients.

Who is conducting the study?

This work is being undertaken as part of a PhD in Health Services Research at the University of Sheffield. The student (Sarah Crede) is supervised by Prof Suzanne Mason, a Professor of Emergency Medicine at the University.

Why have I been chosen?

You have been selected because you are involved in the delivery of ED services (either clinical or administrative) and will have contact with migrant and non-migrant patients in your role at the ED. 7-10 interviews will be conducted with a broad range of staff from different positions within the ED who undertake a variety of different roles, including both clinical and administrative as well as staff from different job roles and grades.

Do I have to take part?

A decision to take part in this study is entirely voluntary. Any decision regarding participation will be confidential between you and the research team. You are also free to withdraw from the study at any time while fieldwork is being undertaken.

What does agreeing to take part involve?

If you agree to take part in this study you will participate in one interview with the lead researcher. Prior to taking part in the interview you will be required to sign a consent form (an example of this consent form has been sent to you). In the interview the main discussion will be

around your perceptions of migrants' use of the emergency department and how utilization may differ between migrant as compared to non-migrant families.

The interview will take place at a convenient time for you, at your place of work. The discussion will last for around an hour. These interviews will be audio recorded and then transcribed. The information collected from the interview will be analysed independently by the research team. The interviews will be conducted over a 6 month period.

What about confidentiality and data protection?

All information collected during this research will be kept strictly confidential. The interviewer will take notes on the discussion but any information you give during the interview will be fully anonymised and combined with the views and experiences of other participants who agree to take part. Personal details will remain confidential; any data used will be anonymised. Data collected will be stored securely in a manner consistent with the data protection act.

What are the potential disadvantages and risks of participating?

As this is an interview the risks to you are minimal. We understand that there are many demands on your time and there is some inconvenience in taking part in the interview. You are free at any stage to withdraw from the interview or take time out if you wish.

What are the possible benefits of taking part?

Whilst there is no immediate benefit for those people participating in the study, it is hoped that this work will create a better understanding of migrants' use of EDs. We hope you will find the experience of taking part in the interviews interesting and useful. You will have the opportunity to receive feedback from the study team in a short report of the overall interview findings if you wish to.

What will happen as a result of the study?

The data collected from you will be aggregated with the data from other participants in the interviews and this will be analysed and submitted as part of a PhD in health services research. The findings will also be submitted to a peer reviewed journal. A short report of the findings will be made available for study participants.

Who has ethically reviewed the project?

This project has been ethically approved via the School of Health and Related Research's Ethics Review committee.

What should I do now?

You should take enough time as you feel you need to consider whether to take part. If you do wish to take part, there is a contact email/number of the researcher to reply to below. Sarah Crede will then contact you to arrange a time for the interview. If you do not wish to take part then you are not required to do anything. You may wish to let **[named ED consultant]** know that you do not wish to take part in the study to ensure that she does not contact you again.

What will happen if I don't want to carry on with the study?

If after consenting to take part in the interview, you subsequently change your mind about participating, you can withdraw from the study while fieldwork is being undertaken. Any data collected from you would not be included in the study.

Further contact

If you have any further questions then please feel free to contact Sarah Crede, PhD Student (s.h.crede@sheffield.ac.uk or telephone 0114 222 6390). If you have any concerns about the conduct of this study please contact the student's supervisor Prof Suzanne Mason (s.mason@sheffield.ac.uk).

If you feel that you have concerns about this study that cannot be addressed by Sarah Crede or Prof Suzanne Mason please contact Prof John Brazier, Dean of the School of Health and Related Research, University of Sheffield. (j.e.brazier@sheffield.ac.uk or telephone 0114 222 0726).

Thank you for your time

Participant consent form

Title of Research Project: Healthcare providers' perceptions of migrants' use of paediatric emergency departments in Yorkshire and Humber – a qualitative study

Name of Researcher: Sarah Crede

Participant Identification Number for this project:

Please initial box

1. I confirm that I have read and understand the information sheet dated (30/06/2017 version 2) explaining the above research project and I have had the opportunity to ask questions about the project.
2. I understand that my participation is voluntary and that I am free to withdraw from the study while fieldwork is in process without giving any reason and without there being any negative consequences. In addition, should I not wish to answer any particular question or questions, I am free to decline. The following contact details for the lead researcher have been provided for me to use if at any stage I wish to withdraw from the study: Sarah Crede (s.h.crede@sheffield.ac.uk or 0114 222 6390).
3. I understand that the interview will be audio-recorded and that my personal details will be kept strictly confidential. I understand that my name will not be linked with the research materials, and that any data used in the report or reports that result from the research will be anonymised.
4. I agree to take part in the above research project.

Name of Participant

Date

Signature

Lead Researcher

Date

Signature

To be signed and dated in presence of the participant

Copies:

Once this has been signed by all parties the participant should receive a copy of the signed and dated participant consent form, the letter/pre-written script/information sheet and any other written information provided to the participants. A copy of the signed and dated consent form should be placed in the project's main record (e.g. a site file), which must be kept in a secure location.

Qualitative interview guide

Semi-structured interview guide: migrants' use of emergency services: provider's views

This interview is being conducted for my PhD which aims to look at international migrants' use of paediatric emergency departments. By migrants I mean people who are born outside of the UK so this can include people from Europe or further afield as well as people who may have arrived in difficult circumstances such as asylum seekers and refugees. Also, it's worth saying that non-UK born patients may have also lived here for a long time so I realise this is not a straightforward study. For the purposes of this work, I'm mostly interested in your experiences with parents and families who are relatively new to the UK.

I'm particularly interested in how healthcare providers perceive the health related needs of migrant patients presenting to the ED as well as the experiences of providers in treating migrant children and dealing with their parents or caregivers in the ED. For this work I'm interested in children born to migrant parents.

All information that you provide in this interview will be confidential and all data will be anonymised. Your name will not be used although your grade and place of work will be noted. Following transcription of this interview the recording will be deleted. Is it okay to record?

<u>Place:</u> <u>Interviewer:</u>	<u>Date:</u>	<u>Duration:</u> <u>Respondent ID:</u>
Opening questions:		
1.	Firstly, could you tell me about your role in the ED <i>Probe: level of training, how long been working in the ED?</i>	
2.	Can you tell me about your patient population? Who do you treat/ see in a normal week? <i>FOLLOW ON: Do you think this reflects the population of [city name]? OR How diverse is your local patient population? Are there a range of nationalities and backgrounds?</i> <i>DISCOVER Which 'groups' the respondent refers to – USE that language.</i>	
3.	Who do you see as the heaviest users of children's ED services? In what way are they heavy users?	
Key questions:		
4.	Obviously, people new to England have a lot to learn about the healthcare system, how do you think this affects the way they use healthcare generally? ... And the ED in particular?	
5.	Do you think there may be any specific problems faced by immigrant parents in seeking healthcare, which British parents may not face, that result in children being brought to your ED? What are the issues and challenges parents new to the UK might face ...	
6.	Do you think migrant parents or caregivers may be using the emergency department for their children in different ways as compared to UK born parents or caregivers? <i>Probe: Types of presentations? Time of presentations?</i>	
7.	Why do you think migrant parents may use the services <i>more/ less/ differently</i> to UK born parents?	
8.	Do you think that there are any differences in service use between different migrant populations? Are there some new arrivals who are more vulnerable than others? Who? How is this addressed in care?	
9.	Are there any factors that you think make service use different between different migrant groups or even between different migrant parents? <i>e.g. education/ professional background of parent; age of child; country of origin; legal status</i>	

10.	What is your experience of treating/ managing children brought to the ED by migrant parents or caregivers? <i>Probe: any experiences that stand out in your mind</i>
11.	Do you have any sense of whether these are migrants that have settled in [<i>city name</i>] or are they visitors?
Questions 7-9 may be answered by questions above..skip if necessary	
12.	It's known that within paediatric services more parents, generally, use the ED for conditions that could be managed within primary care. Do you think that migrant parents are using the ED for conditions which could be better managed in primary care? <i>Probe: do you think children of migrant parents present to the ED when they don't need to more than British children?</i> Are migrant parents using primary care differently (more/ less/ similarly) to British-born parents before seeking care at the ED? Why do you think this may be?
13.	Are there any differences between UK and non-UK migrant parents or caregivers in how they use ambulance services? <i>Probe: If yes, how are they using these services differently?</i>
14.	As a healthcare provider do you think there are any differences in the way that migrant children and their families are treated or managed in the ED as compared to non-migrant children and their families? <i>Probe: time, resources used, culture, discharge destination?</i>
15.	From your perspective, what are the specific challenges or barriers for you in the care of children with parents/ caregivers new to the UK that you would not have in the care of a patient with a similar condition from a British background? <i>Probes: cultural challenges? (gender roles, health behaviour, health knowledge, culture, expectations)</i> <i>Types of presentations? Time taken to treat patients?</i> <i>Difficulties relating to contact with relatives?</i>
16.	How do you think your colleagues perceive patients from an overseas background?
17.	How confident do you feel working with people with diverse backgrounds?
18.	One common challenge in providing care to patients from overseas is language differences. What translation services are available in the ED for you to use? (<i>phone, direct, nothing</i>) <i>Probe reception staff: are these services only available for the medical staff or can you use them in reception?</i>
19.	What are your experiences of using these translation services? <i>Probe: Do you find using translation services easy or difficult?</i> <i>Are there important factors that you need to consider when using an interpreter? (privacy, planning, professional knowledge of interpreter, trust in translation ability?)</i> <i>Do you use the translation services or do you sometimes try and 'get by' using family members or other means?</i>
Closing questions:	
20.	In your experience, what are the strengths of your service in the care of children with migrant parents?

21.	<p>Within your emergency department have any changes been made to meet the needs of migrant families attending the ED for their children?</p> <p><i>Probe: e.g. Translation services, translated documents, support workers?</i></p>
22.	<p>What changes, if any, are needed in your department to respond to the needs of migrant parents or carers to improve the care provided to their children?</p>
23.	<p>Following on from that...</p> <p>What changes, if any, are needed in the emergency care systems as a whole to respond to the needs of migrant children?</p>
24.	<p>What can be done outside of the ED to assist migrant parents with their use of healthcare services?</p>
25.	<p>Do you have any further comments?</p>

Finish by recapping the confidentiality and the use of the interview material.

Appendix 8 Ethical approval study 2 (Chapter 7)

SCHARR Research Ethics Committee Approval



Downloaded: 17/07/2017
Approved: 12/07/2017

Sarah Crede
Registration number: 150246347
School of Health and Related Research
Programme: Doctor of Philosophy

Dear Sarah

PROJECT TITLE: Healthcare providers perceptions of migrants use of paediatric emergency departments in Yorkshire and Humber a qualitative study.
APPLICATION: Reference Number 013510

On behalf of the University ethics reviewers who reviewed your project, I am pleased to inform you that on 12/07/2017 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 013510 (dated 30/06/2017).
- Participant information sheet 1030707 version 2 (30/06/2017).
- Participant consent form 1033411 version 1 (30/06/2017).
- Participant consent form 1030708 version 1 (12/05/2017).

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.

Yours sincerely

Jennifer Burr
Ethics Administrator
School of Health and Related Research



Health Research Authority

Mrs Sarah Crede
Research fellow in Health Services Research
University of Sheffield
Regent Court
30 Regent Street
Sheffield
S1 4DA

Email: hra.approval@nhs.net

01 August 2017

Dear Mrs Crede

Letter of HRA Approval

Study title: Healthcare providers perceptions of migrants' use of paediatric emergency departments in Yorkshire and Humber: a qualitative study
IRAS project ID: 231220
Sponsor School of Health and Related Research, University of Sheffield

I am pleased to confirm that **HRA Approval** has been given for the above referenced study, on the basis described in the application form, protocol, supporting documentation and any clarifications noted in this letter.

Participation of NHS Organisations in England

The sponsor should now provide a copy of this letter to all participating NHS organisations in England.

Appendix B provides important information for sponsors and participating NHS organisations in England for arranging and confirming capacity and capability. **Please read Appendix B carefully**, in particular the following sections:

- *Participating NHS organisations in England* – this clarifies the types of participating organisations in the study and whether or not all organisations will be undertaking the same activities
- *Confirmation of capacity and capability* - this confirms whether or not each type of participating NHS organisation in England is expected to give formal confirmation of capacity and capability. Where formal confirmation is not expected, the section also provides details on the time limit given to participating organisations to opt out of the study, or request additional time, before their participation is assumed.
- *Allocation of responsibilities and rights are agreed and documented (4.1 of HRA assessment criteria)* - this provides detail on the form of agreement to be used in the study to confirm capacity and capability, where applicable.

Further information on funding, HR processes, and compliance with HRA criteria and standards is also provided.

It is critical that you involve both the research management function (e.g. R&D office) supporting each organisation and the local research team (where there is one) in setting up your study. Contact details and further information about working with the research management function for each organisation can be accessed from www.hra.nhs.uk/hra-approval.

Appendices

The HRA Approval letter contains the following appendices:

- A – List of documents reviewed during HRA assessment
- B – Summary of HRA assessment

After HRA Approval

The attached document *“After HRA Approval – guidance for sponsors and investigators”* gives detailed guidance on reporting expectations for studies with HRA Approval, including:

- Working with organisations hosting the research
- Registration of Research
- Notifying amendments
- Notifying the end of the study

The HRA website also provides guidance on these topics and is updated in the light of changes in reporting expectations or procedures.

Scope

HRA Approval provides an approval for research involving patients or staff in NHS organisations in England.

If your study involves NHS organisations in other countries in the UK, please contact the relevant national coordinating functions for support and advice. Further information can be found at <http://www.hra.nhs.uk/resources/applying-for-reviews/nhs-hsc-rd-review/>.

If there are participating non-NHS organisations, local agreement should be obtained in accordance with the procedures of the local participating non-NHS organisation.

User Feedback

The Health Research Authority is continually striving to provide a high quality service to all applicants and sponsors. You are invited to give your view of the service you have received and the application procedure. If you wish to make your views known please use the feedback form available on the HRA website: <http://www.hra.nhs.uk/about-the-hra/governance/quality-assurance/>.

HRA Training

We are pleased to welcome researchers and research management staff at our training days – see details at <http://www.hra.nhs.uk/hra-training/>

Your IRAS project ID is **231220**. Please quote this on all correspondence.

IRAS project ID	231220
-----------------	--------

Yours sincerely

Juliana Araujo

Assessor

Email: hra.approval@nhs.net

*Copy to: Sponsor Representative: Dr Jennifer Burr, University of Sheffield
Lead NHS R&D Office Representative: Mrs Wendy Swann, Sheffield Children's
NHS Foundation Trust*