

***Understanding Maternal  
Attitudes to Antibiotic Use:  
A Community Based Case Study***

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# *Abstract*

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## **Background**

Antibiotics are vital in treating infections and improving health conditions. However, overuse has led to the rapid development of antimicrobial resistance contributing to about 700,000 deaths globally per year. In United Kingdom primary healthcare settings, antibiotics for young children are prescribed in up to 50% of all consultations, often for viral infections for which antibiotics are ineffective. As mothers are usually the primary carers of their children, their attitudes and expectations to using antibiotics have a profound influence on their behaviour and the decisions they make on behalf of their children. Any reduction in antibiotic consumption in young children will decrease the risk of antibiotic resistance developing; this remains a significant and real threat to healthcare. The aim of this study is to understand maternal attitudes to antibiotic use in children.

## **Method**

A mixed methods case study design was selected consisting of a quantitative and qualitative phase. In phase one, primary care antibiotic prescribing data was collected for children under five years old between July 2016 and July 2017. The results from phase one were used to explore and inform the second, qualitative phase of the study. This phase involved the recruitment of mothers of children under five years old, from local playgroups. Mothers' narratives were gathered from six focus groups of between two and five mothers per group, as well as from 14 one to one interviews undertaken between October 2017 and April 2018.

## **Results**

The key findings of the research suggested mothers trust and rely on antibiotics, which are powerful symbols of safety and recovery from illness. However, maternal decision making regarding antibiotics usage is complex, with many variables including the influence of maternal emotions, previous experience, the relationship with their healthcare professional and ultimately their belief and trust in

antibiotics. Continuity in healthcare services is important to mothers and supports them in managing their children's illness. Austerity measures have resulted in a decrease in health visitor access and has led to mothers seeking alternative services for providing support and advice.

## **Conclusion**

Understanding maternal attitudes to antibiotics for young children is vitally important in reducing inappropriate antibiotic prescription. Antibiotics represent recovery and healing and this trust in antibiotics influences maternal expectations of treatment and interactions with healthcare services. However, to address inappropriate antibiotic prescribing in children, more robust national and local data collection is needed. By understanding the extent of antibiotic prescribing in young children, healthcare professionals will be more able to support mothers in their healthcare decisions.

# Table of Contents

Chapter 1: Introduction .....	13
1.1 Introduction .....	13
1.2 Thesis aim and objectives .....	13
1.2.1 Aim of research .....	13
1.2.2 Objectives of research .....	14
1.3 Background to the research.....	15
1.3.1 Antibiotic use .....	15
1.3.2 Antimicrobial resistance .....	15
1.3.3 Antibiotics prescribing practices and AMR in the UK .....	16
1.4 Primary care antibiotic prescribing practices .....	17
1.5 Antibiotic prescribing in children .....	20
1.6 Structure of thesis.....	23
1.7 Chapter Summary .....	25
Chapter 2: Literature Review .....	26
2.1 Introduction .....	26
2.2 Background and scoping the literature.....	26
2.3 Aim and research questions.....	27
2.4 Methods.....	27
2.4.1 Process .....	27
2.4.2 Research study identification.....	28
2.5 Search methods .....	29
2.5.1 Literature searching .....	29
2.6 Search outcome .....	31
2.6.1 Selection of studies.....	31
2.6.2 Data extraction.....	31
2.6.3 Data quality appraisal including risk of bias.....	33
2.6.4 Data analysis and synthesis.....	34
2.7 Results.....	34
2.7.1 Characteristics of the studies.....	34
2.8 Main Findings .....	35
2.8.1 Importance of relationships with health care providers .....	35
2.8.2 Dealing with conflicting messages .....	39
2.8.3 Rationalising the need for antibiotics .....	40
2.8.4 Parental practices informed by past experience .....	41

2.9 Discussion.....	43
2.10 Review limitations.....	50
2.11 Conclusion.....	50
2.12 Chapter Summary .....	51
Chapter 3: Methodology and Research Design .....	52
3.1 Introduction .....	52
3.2 Theoretical Framework.....	53
3.2.1 Positivism .....	54
3.2.2 Constructivism .....	54
3.2.3 Pragmatism .....	55
3.2.3.1 <i>Rationale for epistemological choice of pragmatism in the study</i> .....	55
3.3 Mixed Methods.....	56
3.3.1 Sequential .....	57
3.3.2 Concurrent .....	57
3.3.3 Transformative.....	58
3.4 Rationale for using mixed methods .....	58
3.5 Case study .....	59
3.6 Rationale for using case study .....	60
3.7 Determining the type of case study.....	61
3.8 Selecting the case.....	62
3.9 Selecting the case boundary .....	63
3.9.1 The research case and rationale for selection .....	64
3.9.1.1 <i>Antibiotic prescribing within the case</i> .....	65
3.9.1.2 <i>Demography of the case</i> .....	65
3.10 Chapter summary.....	66
Chapter 4: Study Methods.....	67
4.1 Introduction .....	67
4.2 Study Methods.....	67
4.3 Phase One- Quantitative- GP antibiotic prescribing practices.....	67
4.3.1 Setting, Access and Recruitment .....	67
4.3.2 Recruitment of GP practices .....	68
4.3.3 Challenges in recruiting.....	69
4.3.4 Data collection .....	70
4.3.4.1 <i>Demographics of general practice</i> .....	70
4.3.5 Challenges in data collection from GP practice .....	70

4.3.6 Challenges in data collection from other sources .....	71
4.3.7 Data analysis .....	72
4.3.7.1 <i>Descriptive statistics</i> .....	72
4.3.7.2 <i>Statistical analysis</i> .....	72
4.4 Phase Two- Qualitative Focus Groups and Interviews.....	74
4.4.1 Setting, Access and Recruitment .....	74
4.4.2 Participant Recruitment.....	74
4.4.3 Challenges in recruiting from play groups .....	75
4.4.4 Sampling Strategy .....	76
4.4.5.1 <i>Focus Groups</i> .....	76
4.4.5.2 <i>In-depth semi structured interviews</i> .....	78
4.4.6 Challenges with data collection .....	79
4.4.7 Data collection .....	79
4.4.8 Data analysis .....	79
4.4.8.1 <i>Demographics of participants</i> .....	79
4.4.9 Thematic analysis.....	81
4.4.9.1 <i>Rationale for thematic analysis</i> .....	81
4.4.9.2 <i>Initial coding</i> .....	82
4.4.9.3 <i>Defining and naming themes</i> .....	84
4.5 Data saturation .....	89
4. 6 Integration and analysis of quantitative and qualitative data sets.....	89
4.7 Data Confidentiality and Anonymity.....	90
4.7.1 Security of data .....	90
4.8 Ethics .....	90
4.8.1 Respect for persons .....	90
4.8.2 Beneficence.....	91
4.8.3 Non maleficence .....	91
4.8.4 Justice.....	91
4.9 Data Limitations and Quality.....	92
4.10 Rigour and Validity of data .....	93
4.10.1 Approaches to rigour .....	93
4.10.2 Credibility.....	94
4.10.3 Triangulation.....	94
4.10.4 Reflexivity.....	95
4.10.5 Subjectivity.....	96

4.10.6 Transferability .....	97
4.11 Chapter summary.....	97
Chapter 5: Antibiotic Prescribing Practices in Primary Care.....	99
5.1 Introduction .....	99
5.2 Data analysis .....	100
5.2.1 Local and national practices.....	100
5.2 Results from GP prescribing data analysis.....	101
5.2.1 Seasonal variation and days of consultations.....	101
5.2.2 Consultations resulting in antibiotic prescriptions by age group .....	104
5.2.3 Common infections receiving antibiotics.....	105
5.2.4 Local prescribing practices.....	107
5.3 Phase One Critical Commentary .....	109
5.4 Chapter summary.....	111
Chapter 6: Factors Influencing Maternal Responses, Experiences and Expectations of Accessing Healthcare Services.....	112
6.1 Introduction .....	112
6.2 Themes from the qualitative data .....	112
6.3. Theme 1: Recognising and responding to illness.....	113
6.3.1 Presentation of illness and initial treatment .....	113
6.3.2 Initial decision making and maternal response .....	116
6.4 Theme 2: Accessing and using information to aid decision making.....	117
6.4.1 Information sources.....	117
6.4.2 Innate versus expert knowledge.....	121
6.5 Theme 3: Maternal expectations and experiences of healthcare services .....	122
6.5.1 Importance of being seen .....	123
6.5.2 Experience and accessibility to healthcare services .....	129
6.5.3 Importance of a relationship between healthcare professionals and mothers .....	135
6.6 Conclusions .....	139
Chapter 7: Symbolism of Antibiotics.....	141
7.1 Introduction .....	141
7.2 Background: symbolism and antibiotics .....	141
7.2.1 What are symbols? .....	141
7.2.2 What is symbolism? .....	142
7.2.3 Antibiotics as symbols.....	142
7.2.4. The power and influence of antibiotics as symbols for mothers.....	143
7.3 Overview of findings .....	143

7.3.1 Antibiotics as a safe and trusted treatment option .....	144
7.3.2 Antibiotics as agents of recovery and healing .....	150
7.4 Chapter Summary .....	159
Chapter 8: Discussion.....	163
8.1 Introduction .....	163
8.1.1 Revisiting the research question and study approach.....	163
8.2 Summary of main findings and original contribution .....	164
8.2.1 Antibiotic prescribing and usage.....	164
8.2.1.1 <i>Review of current practices</i> .....	164
8.2.1.2 <i>Diagnostic uncertainty</i> .....	166
8.2.1.3 <i>'Just in case' or delayed prescriptions</i> .....	167
8.2.2 Antibiotic symbolism and influences on maternal knowledge and decision making .....	169
8.2.2.1 <i>The symbolic power of antibiotics</i> .....	169
8.2.2.2 <i>Influences on maternal knowledge and decision making</i> .....	180
8.2.3 Importance of relationships.....	185
8.3 Limitations.....	193
8.4 Linking with the data: relation to research and literature.....	195
8.5 Chapter Summary .....	197
Chapter 9: Conclusion .....	199
9.1 Introduction .....	199
9.2 Overview of findings .....	199
9.2.1 Unique findings .....	199
9.2.2 Main Findings.....	201
9.3 Original contribution to the literature.....	203
9.4 Contribution to methodology .....	204
9.5 Practice and policy Implications .....	205
9.5.1 Implications of findings for clinical practice .....	205
9.5.2 Implications of findings for policy.....	207
9.6 Implications of findings for future research .....	209
9.7 Personal reflections .....	211
9.8 Thesis Summary .....	213
References .....	215
Appendices.....	255
Appendix 1. Bosley <i>et al.</i> (2017) .....	255
Appendix 2. Characteristics and Key Findings of Literature Review.....	269

Appendix 3. Bosley <i>et al.</i> (2019) .....	272
Appendix 4. Topic Guide .....	276
Appendix 5. GP Invitation to Participate Letter .....	279
Appendix 6. Ethics Approval .....	281
Appendix 7. Invitation to Participate Playgroup Leaders .....	283
Appendix 8. Participant Information Sheet .....	285
Appendix 9. Flyer for Study.....	289
Appendix 10. Participant Mothers’ Demographics.....	290
Appendix 11. Consent Form- Focus Group .....	292
Appendix 12. Consent Form- One to One Interviews .....	294
Appendix 13a. Example of Transcripts -themes, sub themes and codes .....	296
Appendix 13b. Example of Coding Transcript.....	297
Appendix 14. Examples of theme development from the initial coding .....	298
Appendix 15. A Research Protocol: Understanding Maternal Attitudes to Antibiotic Use: A Community Based Case Study .....	301
Appendix 16. Bosley <i>et al.</i> (2021) .....	308
Appendix 17. Bosley <i>et al.</i> (2020) .....	321
Appendix 18. Key Demographic Information Relating to Participant Mothers’ Quotes .....	330
Appendix 19. Publications, Conference Presentations and Travel Scholarship Relating to PhD Research.....	331

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## *Table of Figures*

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Figure 1. PRISMA (2009): Flow diagram outlining the number of articles screened for inclusion in the first and second reviews .....	32
Figure 2. Compiling groups of coded text to develop initial themes.....	83
Figure 3. Sub themes and codes .....	85
Figure 4. Themes and sub themes .....	86
Figure 5. Seasonal variations for GP consultations.....	101
Figure 6. Antibiotic prescription by day of week .....	102
Figure 7. Antibiotic Treatments by Age Group .....	104
Figure 8. Number of consultations resulting in antibiotics prescriptions by age group.....	105
Figure 9. Antibiotics commonly prescribed within the single GP practice .....	108

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## *Table of Tables*

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Table 1. Eligibility criteria for literature review .....	28
Table 2. Number of articles identified in databases in review .....	29
Table 3. Overview of studies.....	33
Table 4. Themes identified from the literature review .....	38
Table 5. Demographic characteristics of participant mothers as reported by mothers .....	80
Table 6. Age of mothers and number of children.....	81
Table 7. Themes, sub-themes and codes.....	87
Table 8. Strategies to determine rigour (Houghton <i>et al.</i> , 2013) .....	93
Table 9. Total number of prescribed antibiotic items per 1000 registered patients (all ages) by quarter for case in England.....	100
Table 10. Chi-square Test Results .....	102
Table 11. Antibiotics issued by day of the week.....	103
Table 12. Number and percentage of children prescribing antibiotics following GP consultations per age group. ....	106
Table 13. Top two reasons children received antibiotics per age group.....	107
Table 14. Most frequently prescribed antibiotics per age group in a single GP practice.....	109

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## *Glossary of Abbreviations*

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Abbreviation	Definition
AMR	Antimicrobial resistance
CSU	Commissioning Support Unit
DDD	Defined daily doses
DNA	Deoxyribonucleic acid
EMIS	Egton Medical Information Systems
ESPAUR	English Surveillance Programme for Antimicrobial Utilisation and Resistance
EU	European union
GP	General Practitioner /practice
HM Government	Her Majesty's Government
IT	Information Technology
NHS	National Health Service
PHE	Public Health England
UK	United Kingdom
WHO	World Health Organisation

# Chapter 1: Introduction

## 1.1 Introduction

This thesis reports on a study exploring maternal attitudes, knowledge, and behaviour regarding the use of antibiotics to treat their children's illness. To undertake this study a two-phase mixed methods case study design was employed. Phase one consisted of collecting and analysing quantitative primary care antibiotic prescribing data for children under five years. Results from the quantitative phase were used to inform the second qualitative phase of the study, which gathered experiences of, and attitudes towards, antibiotic use from mothers of children under five years. The second phase involved focus groups and interviews to explore possible patterns or reasons for antibiotic prescribing practices from phase one.

The introductory chapter begins by presenting the research question, aim and objectives. It will then provide an overview of the research background and present the contextual setting of antibiotic prescribing globally and nationally, including an insight into current antibiotic prescribing practices in young children. The chapter will conclude by outlining the structure, and layout for the remainder of the thesis.

## 1.2 Thesis aim and objectives

### 1.2.1 Aim of research

Despite increased awareness and development of antimicrobial resistance (AMR) globally, there has been little research around the drivers of maternal antibiotic seeking behaviour and how this may influence prescribing practices for young children. Therefore, the study question was:

*“What are the influences on maternal decision making in relation to antibiotic usage for their pre-school children? ”*

To address the research question, the aim of the study was to gain some understanding into drivers and influencing factors which lead to maternal decisions to access primary healthcare services and antibiotic seeking behaviour.

### **1.2.2 Objectives of research**

To achieve the research aim, the following objectives were used:

- To review the literature regarding prescribing practices in pre-school children and what influences mothers’ beliefs for antibiotic use

#### Phase One

- To collect quantitative primary care antibiotic prescribing data for children under five years of age within the case setting and perform descriptive and statistical analysis of the data
- To determine the incidence of antibiotic prescribing in primary care for children under five years of age using quantitative data

#### Phase Two

- To collect qualitative data from focus groups and interviews with mothers of children under five years of age and use thematic analysis to explore findings
- To explore the influence of social factors such as maternal age, family cultures, beliefs, and cultural background, on maternal attitudes towards antibiotic use for children
- To gain insights into maternal understandings of the role of antibiotics in relation to children’s illness in the case study area
- To determine influential sources of healthcare advice valued by mothers

- To integrate and complete comparative and theoretical analysis of the quantitative and qualitative data, including further detailed synthesis.

## **1.3 Background to the research**

### **1.3.1 Antibiotic use**

Antibiotics have been a key component of modern healthcare, since their discovery eighty years ago and have saved countless lives (Laxminarayan *et al.*, 2016; Her Majesty's (HM) Government, 2019a). They are used widely in healthcare to treat complex health conditions and prevent complications of infection, e.g. following organ transplantation, bowel surgery and some cancer treatments (Department of Health, 2013; Department of Health and Social Care 2019a). The success of antibiotics has resulted in a steady increase in usage worldwide, (Van Boeckel *et al.*, 2014), with a global widespread use of antibiotics, not only in healthcare, but also in animal health and food production (O'Neill, 2016). On current antibiotic prescribing practices in health, it has been predicted that there will be a 30% global increase in antibiotic usage by 2030 (Klein *et al.*, 2018).

### **1.3.2 Antimicrobial resistance**

The increase in global large-scale antibiotic use has resulted in the emergence of AMR (Costelloe *et al.*, 2010; O'Neill, 2016; Department of Health and Social Care, 2019a). The development of AMR is unpredictable and occurs when some of the microorganisms, in the body, survive the initial antibiotic exposure. This results in the surviving microorganisms either mutating (changes to organism DNA during replication) or in gene exchanges among the bacteria. This means the next time an antibiotic is used the existing microorganisms may be better able to survive, resulting in the antibiotics being less effective (Department of Health, 2013). Each antibiotic exposure increases the risk of micro-organism resistance developing and as a result, increases the risk of AMR spreading to the wider population (World Health Organisation (WHO), 2018a).

As AMR is developing faster than new antibiotics are being developed, this poses a significant healthcare challenge (O'Neill, 2016). In fact, very few new antibiotics have reached the drug market in the last 30 years, and finding new antibiotics is becoming increasingly difficult and expensive (HM Government, 2019a). This is primarily because of the difficulties in demonstrating efficacy, or due to unacceptable side effects. New antibiotics must also demonstrate they are not inferior to existing drugs before they are granted a licence. Thus, the cost of developing drugs for short term use, which is the role of antibiotics, does not incentivise drug companies to commit their resources for what may be a poor financial return (Sukkar, 2013; Ventola, 2015). This contributes to a decrease in the number of effective and available antibiotics to treat the most common infections, which in turn results in decreased treatment options where antibiotics are vital.

The United Kingdom (UK) prescribes fewer antibiotics compared to other European countries (e.g. Greece, Romania, Spain), in both the animal and human sector (European Centre for Disease Prevention and Control, 2018; HM Government, 2019b). However, the UK National Health Service (NHS) has reported an increase in AMR infections, which resulted in a government review of AMR (O'Neill, 2016). This review estimated that a continued rise in the incidence of AMR will result in a global increase in deaths; from 700,000 deaths every year to 10 million deaths by 2050. This is more people than currently die from cancer (O'Neill, 2016). The review also predicted that the increased global deaths would affect the available workforce and therefore impact global productivity (gross domestic product). As a result, it has been estimated, between now and 2050, the cost of AMR infections to the global economy will be more than \$US100 trillion (O'Neill, 2016).

### **1.3.3 Antibiotics prescribing practices and AMR in the UK**

In the UK, the latest Public Health England (PHE) annual report from the English Surveillance Programme for Antimicrobial Utilisation and Resistance (ESPAUR), identified an overall increase of 32% in antibiotic resistant infections between 2015-2019 (PHE, 2019a). The human impact of AMR is

that without effective antibiotics, even minor surgery and routine operations become high-risk procedures, leading to increased duration of illness and ultimately premature mortality (Department of Health, 2011; HM Government, 2016). As a result, AMR is now considered to be one of the most significant threats to humankind worldwide (HM Government, 2016; WHO, 2018a).

In response to the threat of AMR, the UK government published the Five-Year Antimicrobial Resistance Strategy 2013 to 2018 (Department of Health, 2013). The primary aim of this strategy is to slow down the development of AMR, by using three main activities. These are: to improve the knowledge and understanding of AMR; to conserve and steward the effectiveness of existing treatments; and to stimulate the development of new antibiotics, diagnostics and novel therapies (Department of Health, 2013). These activities have led to a modest 7.3% reduction in the consumption of antibiotics over the last few years (2014-2017) (HM Government, 2019c). To reflect this progress the Five-Year Antimicrobial Resistance Strategy has been updated and a further reduction target of 15% of total antibiotic usage in humans has been set for the next five years (2019-2024), (HM Government, 2019c).

In the UK, 71.4% of antibiotics are prescribed in the primary care setting, mainly by general practitioners (GPs), who are doctors working in community services. Other prescribers of antibiotics include secondary care (13.3% for inpatients, 7.7% outpatients), other community settings (4.1%), and dental practices (3.4%) (PHE, 2019a). Unnecessary antibiotic use in the community, apart from the economic cost, is a major driver for the development of antibiotic resistance (Costelloe *et al.*, 2010; PHE, 2019a). Therefore, as the vast majority of antibiotics are within primary care, this is where the focus of attention needs to be for reducing antibiotic usage and tackling AMR.

#### **1.4 Primary care antibiotic prescribing practices**

In England, there are approximately 307 million primary care consultations conducted annually (NHS Digital, 2018), with the highest consultation rates in children aged from birth to four years of age

(Hobbs *et al.*, 2016). National prescribing data is captured by NHS Digital, the national technology and information partner to the health and care system. To monitor antibiotic usage, national prescribing data is combined to produce estimates of both quarterly and annual levels of antibiotic consumption in England. Antibiotic prescribing rates are categorised as the daily defined doses (DDD) per 1,000 inhabitants per day. The DDD is the internationally recognised and statistical measure of medicine consumption, as defined by the World Health Organisation. It is used to standardise the comparison of medicine usage between different medicines or between different health care environments (WHO, 2018b). A lower DDD value means fewer items of antibiotics are being prescribed (PHE, 2019a).

Between 2015-2019 the NHS has seen an overall decrease of 7.5% in antibiotic use. Specifically, the number of antibiotic items prescribed in primary care has declined by 14.3 % (1.9 to 1.7 items per 1,000 inhabitants per day), with the largest reduction in antibiotic usage in adults (15-64 years), (PHE, 2019a). In 2019, there were typically 8.6 DDDs per item prescribed, per 1,000 inhabitants per day, compared to 8.1 in 2015. This is an increase of 3.0% and suggests, although less antibiotics have been prescribed overall, there has been a 5.3% increase in antibiotic consumption. This could be the consequence of higher antibiotic doses or longer course lengths being prescribed (PHE, 2019a).

Antibiotic prescribing data is collected and monitored via the national general practice profile known as 'Fingertips' (PHE, 2019b -[Public Health Profiles - PHE](#) ). The data provided is intended to raise general awareness of the risk of AMR and to support GPs, Clinical Commissioning Groups (CCGs) and local authorities to ensure that they are providing and commissioning effective and appropriate healthcare services for their local population. This surveillance data can be further broken down as far as individual GP practices, to provide more in-depth local detail. However, whilst 'Fingertips' does provide some information on antibiotic prescribing, the system does not capture data on all antibiotics used. It focuses on collating information on antibiotics, which are associated with a high-risk of developing resistance or contributing to *Clostridium difficile* infections. This is a weakness of the quality and depth of the data currently being collected, as it does not provide an accurate

account of antibiotic usage across the country or the population. Further expansion of the data collection system needs to be implemented, to include all antibiotics prescribed and to capture prescribing activity in children.

To understand the risks of AMR, robust antibiotics prescribing data is vital, as inappropriate antibiotic prescribing has been identified as contributing to rates of AMR increasing in the community (Costelloe *et al.*, 2010). In England, it is estimated at least 20% of all antibiotics prescribed in primary care are inappropriate (PHE, 2018), although antibiotic prescribing does vary considerably across the country. Although the reasons for variations are not fully understood, some possible reasons for overprescribing antibiotics may include poor diagnostics, and a cautionary approach for managing patients with complex co-morbidities (Smieszek, Pouwels and Dolk, 2018). Clinicians may also be influenced by the local population demographics, such as socio-economic status and locality deprivation, patient age, sex, clinical presentation, clinician stress or sympathy for the patient (Hawker, *et al.*, 2014).

AMR may also develop if antibiotic courses are poorly self-administered, for example, by patients not completing the course. In one UK study, it was found that a significant number of patients (25%) did not complete the full antibiotic course and sometimes saved tablets for later self-medication (McNulty *et al.*, 2013). A possible reason for this behaviour may be that patients, with a viral illness, often feel naturally better within a few days, regardless of antibiotic treatment and therefore stop taking the antibiotics. There is also inadequate public knowledge about appropriate antibiotic use (Gaarslev *et al.*, 2016; McCullough *et al.*, 2016; Micallef *et al.* 2016), and recent evidence has suggested there may be still a substantial number (at least 22%) of patients who believe that antibiotics are effective against viruses (PHE, 2020). This may increase antibiotic seeking behaviour from patients, to obtain antibiotics from their GPs (Parliamentary Science and Technology Committee, 2014).

## 1.5 Antibiotic prescribing in children

Accurate primary care antibiotic prescribing data for children is key to reduce the risk of AMR development (Williams *et al.*, 2018). In the UK, the highest antibiotic prescribing rates are in children under five years, which account for almost a third of prescriptions in primary care (PHE, 2019a). Children under one year of age have the highest frequency of being seen by GPs (Hippisley-Cox and Vinogradova, 2009), and about a third of these consultations result in antibiotic prescriptions (Hersh *et al.*, 2011), although in practice this may be higher. For example, in a recent American study, 70% of children aged between birth and two years of age had been prescribed at least one antibiotic, with most children receiving multiple antibiotic courses (Aversa *et al.*, 2021).

One possible reason for high antibiotic usage in young children may be due to them being particularly susceptible to viral infections. Children often present in primary care with symptoms of acute illness, such as coughs, colds, and ear infections, which are likely have a viral aetiology (de Bont *et al.*, 2013; Neill *et al.*, 2015). This may be due to exposure to circulating viruses from other potentially infectious children, via communal childcare settings, such as nurseries or playgroups (Rooshenas *et al.*, 2014). The most common infection antibiotics are prescribed for are respiratory tract (Lous *et al.*, 2019). In one UK study 49% of young children were prescribed antibiotics (Hawker *et al.*, 2014), whereas another study identified 74.4% of children were prescribed antibiotics to treat respiratory infections (Williams *et al.*, 2018).

It is worth noting, whilst a main driver of reducing antibiotic usage relates to decreasing AMR, recent research has also identified that early antibiotic exposure in young children increases the probability of childhood diseases. There is particular concern relating to the affect antibiotics may have on the development of a child's immature gut. A large UK population-based cohort study identified that certain childhood antibiotic exposures were associated with an increased risk of developing inflammatory bowel disease (Kronman *et al.*, 2012). The risks of other long term health conditions have also been identified for children exposed to antibiotics. These include early onset of asthma,

allergic rhinitis, atopic dermatitis, coeliac disease, which will have long term effects on the children and lead to an increased demand for future healthcare services. (Aversa *et al.*, 2021).

There are several factors that may influence the incidence of antibiotic prescribing in children. Parents may consult GPs, because they find it difficult to judge the illness severity and therefore seek medical reassurance (Maguire *et al.*, 2011; Neill *et al.*, 2016; Edwards *et al.*, 2021). In community settings serious illness in children is relatively rare, however, it can be challenging for clinicians to accurately diagnose infections due to lack of access to diagnostic tools i.e. laboratory results (Van den Bruel and Thompson, 2014). This diagnostic and prognostic uncertainty may influence GPs to adopt a cautious approach to managing unwell children, relying on safety netting against potential complications, by using antibiotics (Almond, Mant, and Thompson, 2009; Tonkin-Crine *et al.*, 2017).

GPs may also feel there is parental pressure to prescribe antibiotics (Biezen *et al.*, 2019). Previous studies have examined the attitudes of parents towards antibiotic use in their children (Brookes-Howell *et al.*, 2013; Cabral *et al.*, 2016; Szymczak *et al.*, 2017; Souto-López *et al.*, 2020). Although it is recognised that fathers play an increasingly active role in childcare, the primary care provider in the vast majority of cases is the mother, who often makes the decision to seek medical treatment for their unwell children (Collins *et al.*, 2000). In fact, mothers are hugely influential within the family, and therefore their personal beliefs and attitudes towards health will influence the whole family's healthcare management and behaviour (Erci, Polat and Ozyazicioglu, 2016). Mothers often perceive pressure to adapt to others' expectations of the mothering role. This is predominantly regarding meeting societal and cultural expectations of their mothering, and it may be important for them to be perceived by others as 'good' mothers (Miller, 2005; Davies and Allen, 2007). Therefore, a mother's own identity, health literacy and culture are crucial in the understanding of their attitudes and expectations around antibiotic use for both themselves and their children.

There is also a societal deep-seated faith and belief in antibiotics as 'wonder drugs' (Hansen *et al.*, 2015). This faith in the efficacy of antibiotics, may provide some mothers with comfort and reassurance that antibiotics will 'cure' their children's illness (Yu *et al.*, 2014; Zyoud *et al.*, 2015). Clinicians also report that parents apply pressure for antibiotics mostly on behalf of their children (Stivers, 2002; Al-Ayed, 2019). Findings from some studies have identified there is a widespread parental belief that new antibiotics are frequently being developed ensuring a long term supply of antibiotics to treat infections (Panagakou *et al.*, 2011; Rousoundis *et al.*, 2011; Ecker *et al.*, 2013; Zyoud *et al.*, 2015; El Khoury, Ramia and Salameh, 2017; Wang *et al.*, 2019). This belief may lead to inappropriate antibiotic seeking behaviour and usage.

It should also be recognised that maternal decision making may be influenced by mothers' personal beliefs and knowledge about using antibiotics. Any maternal misconceptions about effective and appropriate use of antibiotics, may lead to increased antibiotic seeking behaviour (Norris *et al.*, 2013). Often the link between antibiotic usage and the emergence of antimicrobial resistant organisms are not generally made by the public (Brookes-Howell *et al.*, 2012a). In fact, most people believe AMR is only a risk if they are hospitalised or taking long term antibiotic therapy (McCullough *et al.*, 2016). However, it should also be acknowledged that some mothers are reluctant to use antibiotics (Norris *et al.*, 2013), and this could lead to delays in seeking medical advice when early antibiotic intervention may be required i.e. to treat sepsis (Cohen *et al.*, 2015).

Several studies have explored the knowledge, attitudes and perceptions of parents (both fathers and mothers), regarding the use of antibiotics for treatment of their children, including the USA (Finklestein *et al.*, 2013), Europe (Panagakou *et al.*, 2011), and the Middle East (Alsuhaibani *et al.*, 2019). These studies cited the importance of the parent/clinician relationship, the influence of the private health care insurance system and the availability of antibiotics to purchase, as factors influencing parental use of antibiotics. The UK has a unique healthcare system, which is free at the point of care (Department of Health and Social Care, 2021). Most antibiotics are only available via a

clinician prescription. However, inappropriate prescribing of antibiotics by clinicians can reinforce the belief to patients that antibiotics ought to be prescribed and are effective in circumstances when they are not (Al-Shawi *et al.*, 2018). It should also be acknowledged that in the UK, there is increasing accessibility to purchase antibiotics via the internet. A UK study (Boyd *et al.*, 2017), explored the accessibility and processes for obtaining antibiotics online. This study found that antibiotics could be bought from online pharmacies, with 80% of pharmacies issuing antibiotics based primarily on patient preferences, including dose and quantity. Further UK research would be beneficial to explore whether mothers would be influenced to buy online antibiotics and what the influences may be.

High antibiotic usage is now contributing to an increase in AMR in children and in some older children, resistance has been seen after only minimal antibiotic exposure (one course) (PHE, 2018). It is also worth noting that antibiotic exposure and resistance in mothers may have an effect on very young children, as the mother's resistant bacteria may be passed onto them (Li *et al.*, 2020), resulting in complications for the child. As a result, children are presenting with more complex and difficult to treat infections. Treatment may require longer antibiotic courses or stronger antibiotics, which may in turn may cause more side effects (PHE, 2018).

## **1.6 Structure of thesis**

To address the research question, the thesis has nine chapters. This chapter has introduced the research study, aim and objectives, background and context to the topic. It has provided an introduction to antibiotic prescribing practices, set within a global and national context, as well as introducing AMR as a significant health threat.

**Chapter 2:** Literature review. This chapter presents what is already known within the existing literature, relating to maternal attitudes, expectations, and experiences towards antibiotic usage.

**Chapter 3:** Methodology and Research Design. The background and rationale for the study are presented in this chapter. It will include overview and rationale for the selected methodology, methods, and research design to address the research question, aim and objectives.

**Chapter 4:** Study Methods. In-depth information on the research methods used in the study is provided. The process of recruitment, sample selection, design, and implementation of a mixed methods approach is described. The methods of data analysis are presented, including ethical considerations and data validity.

**Chapter 5:** Phase One Quantitative Results. This chapter presents data from the first quantitative phase. It includes the analysis of primary care GP antibiotic prescribing data for children under five years of age and provides contextual data regarding antibiotics prescribing within the defined case.

**Chapter 6:** Phase Two Qualitative Findings. This is the main findings chapter from the second qualitative study phase. This data was obtained from maternal narratives, gathered from focus groups and one-to-one interviews. Using thematic analysis (Braun and Clarke, 2006), four themes were identified:

- 1) Recognising and responding to illness
- 2) Accessing and using information to aid decision making
- 3) Impact of culture, time and emotions on maternal decision making
- 4) Maternal expectations and experiences of healthcare services.

**Chapter 7:** Phase Two Qualitative Findings of Antibiotic Symbolism. During analysis of the narratives the concept of antibiotics as symbols was identified and this chapter explores this concept. It presents what symbolism means to mothers and how this may impact and influence their decision making around using antibiotics. The two themes identified were:

- 1) Antibiotics as a safe trusted treatment option

- 2) Antibiotics as agents of recovery and healing.

**Chapter 8:** Discussion. This draws together and presents the overall findings from the data integration from both phases of the study. Key research findings are discussed and linked with the existing literature. These are:

- 1) Antibiotic prescribing and usage
- 2) Antibiotic symbolism
- 3) Influences on maternal knowledge and decision making and importance of relationships.

**Chapter 9:** Conclusion. This summarises the thesis findings and discusses the extent to which the chosen research methodology met the research question, aim and objectives. The unique contribution made to the contemporary literature, and the internal and external factors influencing maternal decision making on using antibiotics for their children are acknowledged. It concludes with recommendations and the implications of the study for clinical practice, policy and future research.

## **1.7 Chapter Summary**

This chapter has introduced and set out the study context. It has outlined the aim and objectives of the thesis, and the importance of the subject for public health. The rationale, motivation, and study background has been presented, with the content of the thesis chapters outlined. Having set the scene, the next chapter will explore and present the findings from a literature review of the existing research into maternal attitudes and expectations, in relation to antibiotic usage for their pre-school children.

# Chapter 2: Literature Review

This chapter is based on a published paper (Appendix 1 -*Bosley, H., Henshall, C., Appleton, J. and Jackson, D. (2018) 'A systematic review to explore influences on parental attitudes towards antibiotic prescribing in children', Journal of Clinical Nursing, 27 (5-6), pp. 892-905.*

## 2.1 Introduction

This chapter will discuss the process and results of a literature review exploring parental attitudes into antibiotic prescribing for their children. The literature review provides a thorough and methodical approach to the collection, appraisal and synthesis of all available research studies relating to a predefined research question (Aveyard, 2018). The process for conducting the literature review will be explained, including identification of key search terms, search criteria, study selection methods, data extraction and data synthesis. The characteristics of the identified studies will be discussed, including the interventions or controls taken to mitigate the risk of bias. The process of critical appraisal will be presented and a discussion of the review findings undertaken. Limitations and strengths of the review will be acknowledged.

## 2.2 Background and scoping the literature

As presented in Chapter 1, overuse of antibiotics and inappropriate prescribing has resulted in rapid development of AMR and is significant global threat to patient safety (O'Neill, 2016). However, there is a paucity in qualitative studies exploring mothers' attitudes, knowledge and practices in using antibiotics for their children. The appropriate use of antibiotics is not generally well understood by mothers and substantial numbers of antibiotics are prescribed for young children, often for viral

infections, for which antibiotics are ineffective (Alkhaldi, Al-Mahmoud, and Kanaan, 2015). Therefore, to explore maternal decision making in this area further, a literature review was undertaken of the existing available research.

## **2.3 Aim and research questions**

The aim of the literature review was to explore any influences on parental attitudes to antibiotic prescribing within the existing literature, to answer the following research questions:

- What factors influence parental attitudes and expectations in relation to antibiotic prescribing for their children?
- To what extent do social factors, such as parental age, socio-economic groups, ethnicity, family cultures, beliefs and cultural background, influence parental attitudes?

## **2.4 Methods**

### **2.4.1 Process**

A literature review was conducted using the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) statement (Moher *et al.*, 2015). The review included all relevant international research studies exploring parental knowledge, attitudes and practices to using antibiotics for their children. The search included studies conducted between the years 2006-2020. Data was also sourced from hand searching. This is a useful method to identify additional sources of data and reports, which although published in journals are not indexed in electronic databases, such as abstracts, letters or reports (Hopewell *et al.*, 2007). The process of the literature review was undertaken using the five steps identified by Khan *et al.*, (2003). Step one involved designing a research question and to do this the Patient, Intervention, Comparison and Outcome (PICO) tool was used (O' Connor *et al.*, 2008). In step two, after application of the inclusion and exclusion criteria (Table 1), a search of the existing available literature was completed.

Table 1. Eligibility criteria for literature review

Inclusion criteria	Exclusion criteria
<ul style="list-style-type: none"> <li>• All global studies published in English</li> <li>• Studies directly exploring the knowledge, beliefs, attitudes and practices of parents towards antibiotic prescribing in children</li> </ul>	<ul style="list-style-type: none"> <li>• All primary research relating to doctors' or GPs' or prescribers' attitudes to antibiotic prescribing</li> <li>• Studies not published in English language</li> <li>• Non-primary research</li> <li>• Publications pre-2006</li> </ul>

Step three involved screening of the identified studies to assess the eligibility of each study for inclusion in the review. The quality of the remaining studies was then assessed using Critical Analysis Skills Programme (CASP) appraisal tools and design-based quality checklists (<https://casp-uk.net/casp-tools-checklists>). The study characteristics were summarised in step four for their quality and the data synthesised. The final step (5) involved interpretation of the overall findings, by analysing and combining the data to provide a complete summary.

#### 2.4.2 Research study identification

The purpose of the literature review was to identify existing research relating to the research questions and any common themes described, which may contribute to mothers' knowledge, attitudes and practices regarding antibiotics. The focus for the review was specifically mothers' expectations and attitudes to using antibiotics for their children, under the age of five years old. This age group was chosen as they are prescribed the highest number of antibiotics when compared to other age groups (de Bont *et al.*, 2013; Williams *et al.*, 2018).

## 2.5 Search methods

### 2.5.1 Literature searching

The PhD commenced in 2016 as a part-time study and first literature review was completed in February 2017. This search was updated in September 2020 (second search), at the beginning of the writing up stage of the PhD. Due to the length of time between the two searches, the aim of the second search was to identify any relevant papers published after the first search had been completed (2016-2020). The review of the publication's findings, from the second search, followed the same process as the first review and the findings from both searches were integrated using the PRISMA process (Figure 1).

A systematic approach to literature searching was undertaken using an electronic database search accessing seven databases, CINAHL (Nursing and Allied Health), MEDLINE, PsycINFO, COCHRANE, British Nursing Index (BNI), EMBASE, PUBMED (Table 2). These were chosen for their relevance to healthcare and scope. An initial search identified only two UK studies.

Table 2. Number of articles identified in databases in review

Database	Number of articles found	
	First search (2006-16)	Second search (2016-20)
CINAHL	77	1
MEDLINE	141	45
PsycINFO	29	0
COCHRANE	12	1
BRITISH NURSING INDEX	35	0
EMBASE	198	26
PUBMED	32	0
<b>Total number of articles</b>	<b>524</b>	<b>73</b>
	<b>597</b>	

The search was therefore broadened to include all international studies. Key words relating to the research questions and involving the identified search terms were: *parent, mother, maternal, beliefs, attitudes, antibiotics, child, primary care, general practice viral illness* were applied. Boolean operators, which are simple words (AND, OR, NOT or AND NOT), were used to combine or exclude keywords in a search, resulting in more focused and productive results. This method ensured any inappropriate and non-relevant research was eliminated from the results. The search terms provided a full and comprehensive search of the literature in relation to mothers' knowledge, attitudes, and practices towards antibiotic prescribing in their children.

The initial review included all relevant published research conducted worldwide between the years 2006-2016 exploring knowledge, attitudes, and practices of parents regarding use of antibiotics in primary care for their children. The first search was limited to the last ten years because of significant changes and increased recognition of the risk of antibiotic overuse in this time. Studies before 2006 may not reflect current practices or knowledge. All publications, including cohort studies, randomised controlled trials (RCTs), observational studies and qualitative studies were eligible. As I only speak English and the cost of a translator was prohibitive, only primary research studies published in English were eligible for inclusion. Grey literature was searched and included, World Health Organisation, Centre for Disease Control, HM Government, Department of Health, Royal Pharmaceutical Society, Royal College of General Practitioners and Public Health England literature. Additional searches were conducted using Google Scholar, which provides access to multiple sources (e.g. articles, books, abstracts), to identify any other relevant or unpublished studies. An additional hand search was conducted of the identified article references to ensure relevant studies were not missed and that the maximum relevant articles were obtained (Aveyard, 2018).

## **2.6 Search outcome**

### **2.6.1 Selection of studies**

The first search identified a total of 524 articles and second search 73 articles. The titles and abstracts of all papers were screened for eligibility, inclusion and exclusion criteria applied (Table 1). Grey literature was searched for using the ETHOS database and there were no additional research articles identified. Of the 597 papers identified, ten duplicates were found and removed leaving 587 papers for inclusion. The title and abstracts of the remaining articles were screened resulting in 85 papers undergoing a full text review for relevance to the research questions. A further 47 papers were excluded as they did not focus on parental knowledge and attitudes to antibiotics, which resulted in 38 articles included in the final review (Figure 1).

### **2.6.2 Data extraction**

The selected papers were all read several times to confirm their relevance to the literature search criteria. Key information from each paper was extracted onto a Microsoft Excel<sup>®</sup> 2016 worksheet, which was used to manage the data and identify initial codes and themes. The papers' purposes, designs and methods, samples and settings were recorded, and their main findings were analysed for patterns and commonalities.

### First search (2006-2016)

### Second search (2016-2020)

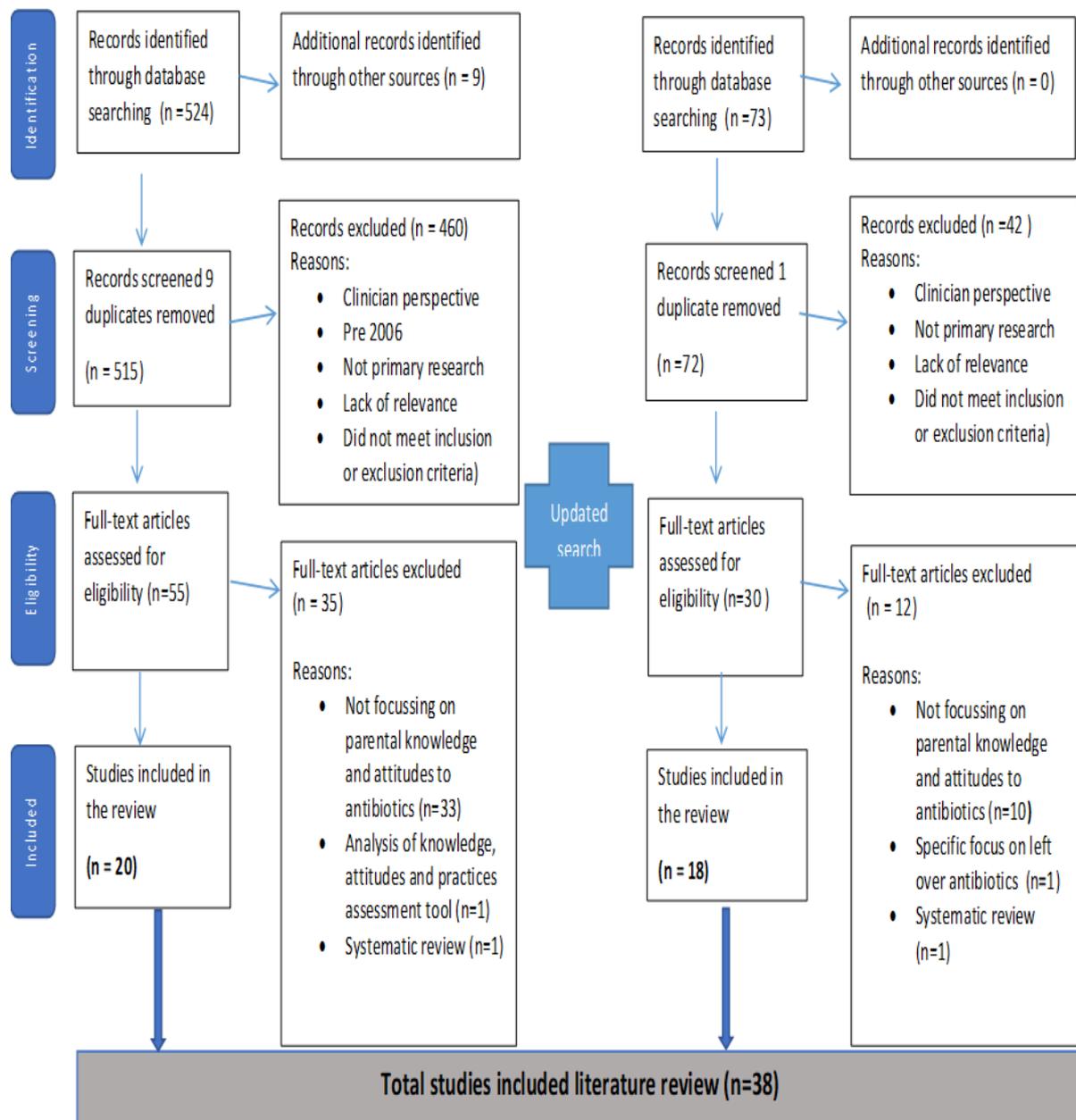


Figure 1. PRISMA (2009): Flow diagram outlining the number of articles screened for inclusion in the first and second reviews

### 2.6.3 Data quality appraisal including risk of bias

The quality of the publications was initially assessed then cross checked by another member of the research supervisory team, who was an experienced researcher (CH), using the Critical Appraisal Skills Programme (CASP) tool. Each paper was appraised on the study design, methods, sample size, setting, key findings and limitations. Using the CASP tools, each study was assessed and rated (good, fair, poor) and scored using Microsoft Excel<sup>®</sup> 2016 software as a framework to collate the information. The greater the number, the lower the risk of bias. A total of 38 studies were reviewed for validity, credibility and relevance to the research questions. Any ethical considerations, the recruitment strategies used, data analysis methods and the studies contribution to current knowledge were also assessed. This information was shared with the research supervisory team to ensure verification and satisfaction with the quality appraisal process.

The predominant methodology (31 studies) was quantitative, using surveys and questionnaires. An overview of the studies can be found in Table 3. There was a risk of recall bias in 38 articles, as they relied on participants recounting previous experiences, which may have been remembered differently over time (Sackett, 1979). Twenty-two studies recruited parents from healthcare settings where parents were waiting to see their clinician regarding the health of their child. This setting could have influenced their perception and the accuracy of answers, as parents are likely to have used antibiotics in the past and been involved in seeking support and advice from a clinician.

Table 3. Overview of studies

Study methods	Types of study
Quantitative	31 surveys
Qualitative	5 using focus groups and interviews
Mixed Methods	2 using surveys, focus groups and interviews

The selected research papers were analysed to determine which factors influenced parental attitudes and decision making, regarding expectations for antibiotic prescribing for their children. The findings were then discussed and shared with the research supervisory team in regular team meetings before the final themes were agreed. This provided the opportunity to address any uncertainties relating to the data extraction process. It was not necessary to contact any authors of included studies during the review for missing information.

#### **2.6.4 Data analysis and synthesis**

Thematic analysis was used to identify words, patterns and themes within and across the data (Ritchie and Lewis, 2003). Using Braun and Clarke's approach to data analysis, themes were identified through a rigorous process of data familiarisation, data coding, theme development and revision (Braun and Clarke, 2013). The whole supervisory team discussed the emerging themes, until a final agreement was reached. Due to the heterogeneity between the studies, meta-analysis of the data was not possible. The studies identified differences, including variation in methodologies, participant numbers, interventions, and different populations.

## **2.7 Results**

### **2.7.1 Characteristics of the studies**

The studies that were included, and met the eligibility criteria, presented an international perspective in terms of the study settings (Table 4). Parents were recruited to studies from various routes. Sixteen studies recruited parents attending a child health clinic or vaccination clinic. Thirteen studies recruited parents, either as part of a general population survey or via schools, six studies recruited when parents attended hospital outpatient departments with their child, three studies recruited via social media/internet.

In 33 of the studies reviewed, at least half the participants were mothers and two studies focused solely on mothers, which collected quantitative data using surveys (Alkhaldi, Al-Mahmoud, and Kanaan, 2015; Lakshmi, Geetha and Vijayasamundeeswari, 2019). One study had more participants who were fathers than mothers (Alili-Idrizi, Dauti, and Malaj 2014). Two studies did not distinguish between mothers or fathers (Salazar, English and Eiland, 2012; Cabral *et al.*, 2016). A detailed summary of the first search findings (n=20 papers) has been published and is included in this thesis (Appendix 1 -Bosley *et al.*, 2017, *A systematic review to explore influences on parental attitudes towards antibiotic prescribing in children*). The papers from the second review (n= 18) have been integrated and combined with the first review and can be found in Appendix 2 (*Summary of study characteristics*).

## **2.8 Main Findings**

As part of the literature review, thematic analysis (based on Braun and Clarke 2006) was used to analyse the data findings and identify common themes.

The themes identified were:

- 1) Quality of relationships with health care providers
- 2) Dealing with conflicting messages
- 3) Rationalising the need for antibiotics
- 4) Parental practices informed by past experience.

A summary of all the studies and which themes they relate to is presented in Table 4 (summarised in the text if more than 10 references).

### **2.8.1 Importance of relationships with health care providers**

Twenty-six of the studies identified the importance of relationship quality between parents and clinicians and this was reflected across the different countries and cultures. These studies found

parents were concerned and anxious for their children's health and wanted to be reassured regarding the decision making and care their clinicians provided (see studies summarised in Table 4). Parents often relied on their clinician for advice and information on their child's treatment options and the importance of communication was identified in 15 studies. This clinician engagement enabled parents to feel supported in their decision making and resulted in feelings of general satisfaction with the amount of information they were given about the need for antibiotics and the risks involved (see studies summarised in Table 4).

Eleven studies identified differences in healthcare systems, which included access to private healthcare providers and securing regular follow-ups with clinicians either by phone or home/office visit. Parents reported more satisfaction when they knew and trusted their clinician and felt the clinician knew their family (see studies summarised in Table 4). This satisfaction was linked to the quality of the relationship between the parent/clinician and was founded on parental trust. Trust was more likely to develop if parents experienced open communication with their clinician, including using a range of communication methods (telephone, email) to obtain easy clinician access. This approach enabled parents to build relationships with their clinician which they found beneficial (Panagakou, *et al.*, 2011; Rousounidis *et al.*, 2011; Al-Dossari, 2013; Brookes-Howell *et al.*, 2013; Chinnasami *et al.*, 2016; Ecker *et al.*, 2013; Finkelstein *et al.*, 2013; Alkhaldi, Al-Mahmoud, and Kanaan, 2015; Vaz *et al.*, 2015; Zyoud *et al.*, 2015). Parents also relied on clinicians as the primary sources of information regarding antibiotics (n=14) (see studies summarised in Table 4).

However, in seven studies, parents did not experience effective communication with their clinicians, as they felt clinicians used complex language, did not explain the terms used and did not spend enough time providing explanations (Wun *et al.*, 2012; Ecker *et al.*, 2013; Agarwal, Yewale and Dharmapalan, 2015; Alkhaldi, Al-Mahmoud, and Kanaan, 2015; Dwibedi *et al.*, 2015; Cabral *et al.*, 2016; Chinnasami *et al.*, 2016). Parents reported lack of time and feelings of the consultation being rushed. Parents felt

this contributed to receiving poor quality information about the rationale for clinical decision making and antibiotic side effects (Wun *et al.*, 2012; Ecker *et al.*, 2013; Alkhaldi, Al-Mahmoud, and Kanaan, 2015). This led to parents not understanding why treatments were being offered or when antibiotics should be used appropriately. Lack of consultation time also contributed to parents feeling the clinician did not know or discuss their children's health with them, leaving parents feeling ill-informed regarding the care of their children (Al Dossari, 2013; Agarwal, Yewale and Dharmapalan, 2015; Alkhaldi, Al-Mahmoud, and Kanaan, 2015). This ultimately led to a lack of trust in the clinician and reduced compliance from parents (Wun *et al.*, 2012; Alkhaldi, Al-Mahmoud, and Kanaan, 2015; Dwibedi *et al.*, 2015). In a qualitative European study using focus groups, parents identified that a lack of information from the clinician was likely to influence parental antibiotic seeking behaviours (Souto-López *et al.*, 2020). The quality of the interaction was also found to be important to parents. For example, in one study, from the United States, parents felt that clinicians were rude to them if they asked questions about their children's illness. This had a negative effect on parental decision making about when to access or seek medical advice (Dwibedi *et al.*, 2015). This may also prevent parents from interacting with healthcare professionals in a timely manner, which could result in deterioration or complications of their child's illness.

Table 4. Themes identified from the literature review

Studies	Country of study	Importance of relationships with health care providers	Dealing with conflicting messages	Rationalising the need for antibiotics	Mothering practices informed by past experience
Agarwal, Yewale and Dharmapalan, (2015)	India		√		√
Al-Ayed, (2019)	Saudi Arabia		√	√	√
Al-Dossari, (2013)	Saudi Arabia		√	√	√
Alili-Idrizi, Dauti, and Malaj, (2014)	Macedonia	√	√	√	√
Alkhalidi, Al-Mahmoud, and Kanaan, (2015)	Jordan	√	√	√	√
Alrafiaah <i>et al.</i> , (2017)	Saudi Arabia	√	√	√	√
Al-Saleh, Abu Hammour, and Abu Hammour W., (2019)	Dubai		√		√
Al-Shawi <i>et al.</i> , (2018)	Saudi Arabia	√	√	√	√
Alsuhaibani <i>et al.</i> , (2019)	Saudi Arabia	√	√	√	√
Bert <i>et al.</i> , (2016)	Italy		√		√
Brookes-Howell <i>et al.</i> , (2013)	UK	√	√	√	√
Cabral <i>et al.</i> , (2016)	UK	√	√	√	
Chan and Tang, (2006)	Malaysia	√	√	√	√
Chinnasami <i>et al.</i> , (2016)	India	√	√	√	√
Coxeter, Mar and Hoffmann, (2017)	Australia	√	√	√	√
Dwibedi <i>et al.</i> , (2015)	USA	√	√	√	√
Ecker <i>et al.</i> , (2013)	Peru	√	√	√	√
El Khoury, Ramia and Salameh, (2017)	Lebanon		√	√	√
Farha <i>et al.</i> , (2016)	Jordan	√	√	√	√
Finkelstein <i>et al.</i> , (2013)	USA	√	√	√	√
Hammour, Al-Saleh and Abu Hammour, (2019)	Lebanon	√	√	√	√
Mallah <i>et al.</i> , (2020)	Lebanon	√	√	√	√
Panagakou <i>et al.</i> , (2011)	Greece	√	√	√	√
Paredes <i>et al.</i> , (2019)	Peru		√	√	√
Rousounides <i>et al.</i> , (2011)	Cyprus	√	√	√	√
Salazar, English and Eiland, (2012)	US	√	√	√	√
Saleh Faidah <i>et al.</i> , (2019)	Saudi Arabia	√	√	√	√
Salonga M.C., (2009)	Philippines		√	√	√
Shah and Rahim, (2017)	Malaysia	√	√	√	√
Souto-López <i>et al.</i> , (2020)	Spain	√	√	√	√
Szymczak <i>et al.</i> , (2017)	USA	√	√	√	√
Teck <i>et al.</i> , (2016)	Malaysia	√	√	√	
Vaz <i>et al.</i> , (2015)	USA	√	√	√	
Wang <i>et al.</i> , (2019)	China	√	√	√	√
Wun <i>et al.</i> , (2012)	China		√	√	
Yu <i>et al.</i> , (2014)	China		√	√	√
Zyoud <i>et al.</i> , (2015)	Palestine		√	√	√

### **2.8.2 Dealing with conflicting messages**

A dominant theme, identified in all the studies, was the variation in parental knowledge, attitudes and practices on antibiotic use and misuse in children. In 27 studies, level of education was cited as significant to parents' knowledge (see studies summarised in Table 4). The literature review included countries from across the globe, which reflected different levels of education and knowledge especially between parents from developed countries versus less developed countries.

Eighteen studies identified the belief that symptoms caused by viral illnesses required antibiotic treatment (see studies summarised in Table 4). These studies were conducted in Western and less developed countries, so whilst the level of parental education may influence this belief, it does not account for this belief in Western countries, where parents were generally more informed about antibiotics. It is possible lack of knowledge could also be a reflection of inadequate public health messages and campaigns. In eight studies parents understood that viral illnesses were self-limiting and therefore did not require treatment (Panagakou *et al.*, 2011; Al-Dossari, 2013; Ecker *et al.*, 2013; Alkhaldi, Al-Mahmoud, and Kanaan, 2015; Zyoud *et al.*, 2015; Farha *et al.*, 2016; Al-Shawi *et al.*, 2018; Alsuhaibani *et al.*, 2019). However, despite this knowledge, parents were still likely to use antibiotics if they were provided, which may relate to the belief that if antibiotics are prescribed, they are needed and should be given. This is an understandable response, which may reflect parental trust in the clinical judgement of health professionals, and fear for their child's welfare (Alsuhaibani *et al.*, 2019). Fourteen studies identified other sources of information accessed by parents including pharmacies, newspapers, media, internet, family and friends (see studies summarised in Table 4). In over half of the studies (n=24) parents reported being aware of AMR; however, this did not seem to particularly influence their approach to using antibiotics (see studies summarised in Table 4). A common theme in nearly half of the studies (n=18), was that many parents were not aware or concerned about possible antibiotic side effects (see studies summarised in Table 4). Antibiotics were perceived as necessary for

recovery and therefore the risks of AMR were outweighed against the risk of illness complications and delayed recovery.

In almost half of the studies (n=18), antibiotics were commonly seen by parents as being effective treatments for managing upper respiratory tract infection (URTI) symptoms, which are usually caused by viruses. Antibiotics were believed to shorten the duration of illnesses and this was important in relieving parental anxiety (see studies summarised in Table 4). As URTI's are common infections in children, it was possible parents had experience of being previously prescribed antibiotics to treat respiratory infections for their children. This may have endorsed their belief in antibiotic efficacy relating to URTIs.

### **2.8.3 Rationalising the need for antibiotics**

Nearly three quarters of the studies (n=22) identified discrepancies between the perceptions of parents and clinicians regarding their expectations of receiving / prescribing antibiotics (see studies summarised in Table 4). In one study, 28% of parents reported they directly requested antibiotics from their clinician. This was in contrast to 60% of clinicians who reported feeling directly pressurised by parents to prescribe antibiotics, which they expected to receive even when not clinically indicated (Rousounidis *et al.*, 2011). The familiarity and relationship with the clinician may have influenced mothers to ask for and receive antibiotics (Hammour, Al-Saleh and Abu Hammour, 2019; Mallah *et al.*, 2020; Souto-López *et al.*, 2020).

Ten studies found parent's attitudes and beliefs were influenced by anxiety and concern for their child's welfare (Brookes-Howell *et al.*, 2013; Ecker *et al.*, 2013; Finkelstein *et al.*, 2013; Alkhaldi, Al-Mahmoud, and Kanaan, 2015; Dwibedi *et al.*, 2015; Cabral *et al.*, 2016; Szymczak *et al.*, 2017; Al-Ayed, 2019; Saleh Faidah *et al.*, 2019; Souto-López *et al.*, 2020). This concern resulted in seeking clinician advice. However, if the advice resulted in antibiotic prescribing, the perception of the seriousness of

the child's illness and antibiotic need was reinforced (Rousoundis *et al.*, 2011; Alili-Idrizi, Dauti, and Malaj, 2014; Al-Shawi *et al.*, 2018). Three other studies identified that if a child had received antibiotics in the past for a similar illness, parents expected an antibiotic prescription would be provided again. When parents did receive antibiotics, this reinforced belief in their decision making (Ecker *et al.*, 2013; Cabral *et al.*, 2016; Al-Shawi *et al.*, 2018).

Ten studies identified that parents believed antibiotics could treat all manner of infections, considered as 'wonder' drugs and were in limitless supply as new antibiotics were always being developed (Chan and Tang, 2006; Panagakou *et al.*, 2011; Rousoundis *et al.*, 2011; Ecker *et al.*, 2013; Yu *et al.*, 2014; Zyoud *et al.*, 2015; El Khoury, Ramia and Salameh, 2017; Hammour, Al-Saleh and Abu Hammour, 2019); Saleh Faidah *et al.*, 2019; Wang *et al.*, 2019). The cultural background of parents, which is influenced by ideas, customs, and social behaviours, was identified as influencing antibiotic usage (Chan and Tang, 2006; Salonga, 2009; Panagakou *et al.*, 2011; Salazar, English and Eiland, 2012; Alkhaldi, Al-Mahmoud, and Kanaan, 2015). These findings were found in five studies from China, Philippines, Greece, United States and Jordan.

Four studies (Middle East and China) cited the rationalising of antibiotic usage to prevent child illness (Al-Dossari, 2013; Yu *et al.*, 2014; Alkhaldi, Al-Mahmoud, and Kanaan, 2015; Wang *et al.*, 2019). In one study, nearly half of parents believed antibiotics could protect children from common colds and therefore they were more likely to give antibiotics prophylactically (Yu *et al.*, 2014). Only two studies identified parents recognised antibiotics should be kept for more serious illnesses (Chan and Tang, 2006; Cabral *et al.*, 2016).

#### **2.8.4 Parental practices informed by past experience**

Over half the studies (n=23) explored antibiotic prescribing in relation to upper respiratory tract infections (see studies summarised in Table 4). Parents were found to base their practices on what

had worked previously when their child had presented with similar symptoms. Thirteen studies identified the importance parents placed on relieving symptoms of pain and discomfort for their child and nearly half of parents expected and received antibiotics for ear pain, fever and sore throats (see studies summarised in Table 4).

The purchase of over-the-counter antibiotics was identified in over half the studies (n=22) as being common practice by parents (see studies summarised in Table 4). Four studies identified that this practice was primarily associated with the easy accessibility and availability of antibiotics without the need for a clinician prescription (Al-Dossari, 2013; Ecker *et al.*, 2013; Yu *et al.*, 2014; Farha *et al.*, 2016). One study identified that parents felt purchasing over the counter antibiotics reduced their anxiety and was more convenient for them, primarily because time was not spent visiting clinicians for an initial review (Al-Dossari, 2013). In some countries antibiotics are also relatively inexpensive to purchase compared to paying to see a clinician and this may influence some parents to pursue purchasing over-the-counter antibiotics (Mallah *et al.*, 2020).

Fourteen studies found parents used leftover antibiotics to treat their children (see studies summarised in Table 4). None were UK studies, and this may reflect the different healthcare systems which are commonly accessed via direct patient payments. In over a quarter of the studies parents did not finish the antibiotic course for their children (Chan and Tang, 2006; Al-Dossari, 2013; Ecker *et al.*, 2013; Yu *et al.*, 2014; Alkhaldi, Al-Mahmoud, and Kanaan, 2015; Bert *et al.*, 2016; Chinnasami *et al.*, 2016; El Khoury, Ramia and Salameh, 2017; Al-Ayed, 2019; Wang *et al.*, 2019). This was largely due to an improvement in the child's symptoms (Chan and Tang, 2006; Yu *et al.*, 2014; Bert *et al.*, 2016; El Khoury, Ramia and Salameh, 2017; Wang *et al.*, 2019; Mallah *et al.*, 2020; Souto-López *et al.*, 2020), although three studies cited antibiotic cost as a reason (Salazar, English and Eiland, 2012; Finkelstein *et al.*, 2013; Alkhaldi, Al-Mahmoud, and Kanaan, 2015). Most of the studies identified antibiotic prescriptions as the primary treatment for managing illness. However, three studies cited parents

would use home remedies to initially treat common viral symptoms of pyrexia, pain, and coughs (Brookes-Howell *et al.*, 2013; Finkelstein *et al.*, 2013; Coxeter, Mar and Hoffmann, 2017).

## 2.9 Discussion

The review findings identified some common themes, which influenced parental expectations regarding antibiotic prescribing. A major influence was the anxiety and concern experienced by parents about their children's health and the relationship with their clinician. Parents generally trusted their clinician to care for their children, which included a thorough physical assessment and appropriate treatment. This resulted in them seeking reassurance, including a medical review. The concern for their children meant that parents often consulted clinicians promptly within the first two days of illness (Panagakou *et al.*, 2011; Alsuhaibani *et al.*, 2019; Saleh Faidah *et al.*, 2019). The purpose of the consultation was to gain medical care, review and reassurance, validate decision making and to be seen as a good parent (Panagakou *et al.*, 2011; Ecker *et al.*, 2013; Szymczak *et al.*, 2017; Souto-López *et al.*, 2020). This behaviour seemed to be primarily due to anxiety and concern rather than any public health messages regarding when to visit the clinician. In two studies, parents preferred to see a clinician, rather than purchasing antibiotics which were readily available in those settings (Ecker *et al.*, 2013; Souto-López *et al.*, 2020). However, antibiotics were often considered to be the correct treatment. This could be due to the perception antibiotics can treat any illness (Chan and Tang, 2006; Panagakou *et al.*, 2011; Rousoundis *et al.*, 2011; Ecker *et al.*, 2013; Yu *et al.*, 2014; Zyoud *et al.*, 2015; El Khoury, Ramia and Salameh, 2017; Hammour, Al-Saleh and Abu Hammour, 2019; Saleh Faidah *et al.*, 2019; Wang *et al.*, 2019).

The link between education and knowledge was another clear finding in the review. Parents in low to middle income countries demonstrated significantly lower levels of knowledge about the appropriate use of antibiotics in comparison (Yu *et al.*, 2014) to those in Western countries (Cabral *et al.*, 2016). The literature review suggested parents with basic educational attainment levels were not as well-

informed about the appropriate uses and risks associated with antibiotics as parents with higher educational attainment levels. This was reflected in a study into the knowledge, attitudes, and practices of parents in rural China on the use of antibiotics in children (Yu *et al.*, 2014). In this study parents in rural areas were much less knowledgeable about antibiotics than parents living in towns or urban areas. This may reflect that only 5% of parents in rural areas had experienced education at college level or above, compared to 39% of parents in urban areas. This difference in education may influence parents' exposure and familiarity with regards to accessing internet resources and other sources of information. Salonga (2009) also identified the difference between lower education levels and increased misconceptions about antibiotic usage. However, this study identified antibiotic self-prescribing was more common in parents with higher levels of educational attainment. There is no clear indication for this, although it is possible parents with high education levels may perceive themselves to be well informed and therefore more confident about making decisions about what is appropriate antibiotic usage.

The literature review identified there was a large variation in the nature and quality of information and communication from clinicians, experienced by parents. Clinicians were the main source of information for parents regarding antibiotic usage (see studies summarised in Table 4) and most parents wanted to be informed about appropriate prescribing, risks, side effects and implications for use (Coxeter, Mar and Hoffmann, 2017; Szymczak *et al.*, 2017; Souto-López *et al.*, 2020). However, the literature identified that parents reported clinicians used complex words and jargonistic language, which meant they did not understand the information provided. They also felt clinicians did not spend enough time explaining the treatment decision making (Agarwal, Yewale and Dharmapalan, 2015). This meant that parents felt their clinician did not know their children and this resulted in a lack of trust and poor level of knowledge regarding antibiotic usage. A poor relationship may influence parents not to seek medical interventions, but instead to source alternatives such as self-prescribing antibiotics. Whilst presenting a challenge to a busy healthcare service, clinicians should prioritise

sufficient appointment time for clinical reviews. This investment in time may result in parents feeling adequately reassured and informed when to access services, potentially influencing any future healthcare seeking behaviours.

The literature identified another important factor on antibiotic usage was the age of the parents, with younger parents having less knowledge (Vaz *et al.*, 2015; Al-Saleh *et al.*, 2019). This may be because younger parents have not had as much exposure to managing illness. However, new mothers in general, regardless of age, have less parenting practice and therefore caring for an ill child is a new experience. To support parents, readily accessible information and knowledge needs to be provided by healthcare professionals. The information needs to be simple and easy to understand, regarding the management of common childhood illnesses and when to use antibiotics and could be made available as leaflets and posters.

The influence of anxiety for the child on parents' attitudes and beliefs was another identified theme (Brookes-Howell *et al.*, 2013; Ecker *et al.*, 2013; Finkelstein *et al.*, 2013; Alkhaldi, Al-Mahmoud, and Kanaan, 2015; Dwibedi *et al.*, 2015; Cabral *et al.*, 2016; Szymczak *et al.*, 2017; Al-Ayed, 2019; Saleh Faidah *et al.*, 2019; Souto-López *et al.*, 2020). Parents were concerned they would misinterpret and not recognise the symptoms of serious illnesses, which could potentially lead to a dangerous deterioration in their children's condition. Parents were also concerned that if antibiotics were not prescribed, their children could deteriorate and they may not want to take this risk (Brookes-Howell *et al.*, 2013; Souto-López *et al.*, 2020). The need for parental reassurance resulted in their seeking a clinician's advice (see studies summarised in Table 4) and if the consultation outcome was a prescription of antibiotics, this reinforced the perceived need for antibiotics in the future (Rousoundis *et al.*, 2011; Ecker *et al.*, 2013; Alili-Idrizi, Dauti, and Malaj, 2014; Cabral *et al.*, 2016; Al-Shawi *et al.*, 2018).

Parental anxiety was linked to a strong protective instinct towards their child's health, and it was repeatedly expressed that if they believed their child needed something, they would do whatever was necessary to obtain it (Finkelstein *et al.*, 2013; Souto-López *et al.*, 2020). Parents' attitudes to management of childhood infection, use of antibiotics and awareness of antibiotic resistance were influenced by the concept of a safety net. This was expressed as clinicians being fallible and parents needed to remain vigilant and proactive in getting the treatment that they believed their children needed. Parents were also concerned about the seriousness of possible illness and there was a belief that antibiotics reduced complications (see studies summarised in Table 4).

There was also a reluctance to delay seeking clinician advice when children were symptomatic with a cold or sore throat. Parents did not like to see their children unwell or in pain and felt antibiotics could shorten symptoms and provide relief. In some studies parents would access antibiotics via pharmacies or purchase them online to avoid a return to the clinician. This action was taken in the belief antibiotics would speed up recovery, especially if parents were concerned there was no perceived improvement in their children's health (Al-Dossari, 2013, Souto-López *et al.*, 2020, Wang *et al.*, 2019). A return to normal family life and routine was sought by parents and particularly important if there were issues with childcare provision (Dwibedi *et al.*, 2015). Some parents felt taking time off work to care for an ill child would result in loss of earnings, and therefore sought means to accelerate recovery (Salazar, English and Eiland, 2012; Ecker *et al.*, 2013).

The review identified parents need more support and reassurance when managing their child's illness to help them make informed decisions. Conversely, two studies found that some parents believed antibiotics were withheld by clinicians due to resource rationing and level of cost (Finkelstein *et al.*, 2013; Cabral *et al.*, 2016). These studies were conducted in America and UK respectively, which have well-established healthcare systems and the reason is unclear. Further exploration of this concept

would be useful. It has not been replicated in any other studies which included countries with less developed health systems.

The literature identified parents' own confidence and experience of caring for and managing ill health can have a direct influence on their ability to care for their children's health. Generally, older mothers were less likely to seek antibiotics for their children, although in one Peruvian study, grandmothers were found to use antibiotics recommended by pharmacists twice as often as mothers (Ecker *et al.*, 2013). It is not clear why this was the case unless they were influenced from past experiences, when perhaps health care access was not so readily available. However, reasons for parental anxiety were also found to be influenced by the mothers' age. Younger mothers were worried predominantly about symptoms of fever, whilst older mothers were concerned about any altered behaviour in their child (Rousoundis *et al.*, 2011). Parents with only one child may have less experience and confidence in managing childhood illness (Rousoundis *et al.*, 2011). It is likely mothers with more than one child relied on their previous parental experience to inform their decision making, and the number of children in the family influences this (Al-Saleh, Abu Hammour, and Abu Hammour, 2019). Certainly, parents who had previously used antibiotics, were more aware about the appropriate usage of antibiotics, perhaps due to advice from a clinician, or through learned experience (Agarwal, Yewale and Dharmapalan, 2015; Souto-López *et al.*, 2020). It was likely that when parents had received antibiotics in the past for similar illness symptoms, they used that experience to inform their current antibiotic decision making. Parents wanted to see their children recover quickly and, in some cases, if significant signs of improvement were shown, parents discontinued antibiotics, considering them unnecessary (Chan and Tang, 2006; Al-Dossari, 2013; Ecker *et al.*, 2013; Yu *et al.*, 2014; Alkhalidi, Al-Mahmoud, and Kanaan, 2015; Bert *et al.*, 2016; Chinnasami *et al.*, 2016; El Khoury, Ramia and Salameh, 2017; Al-Ayed, 2019; Wang *et al.*, 2019).

Some parents tried to manage their child's illness at home, using alternative treatments and home remedies. This may be based on previous experiences of successful use, and cultural beliefs (Panagakou *et al.*, 2011; Brookes-Howell *et al.*, 2013; Ecker *et al.*, 2013; Finkelstein *et al.*, 2013; Agarwal, Yewale and Dharmapalan, 2015; Dwibedi *et al.*, 2015; Cabral *et al.*, 2016; Chinnasami *et al.*, 2016; Coxeter, Mar and Hoffmann, 2017). However, this was only for perceived mild and non-serious illnesses.

The literature review has identified how in some countries antibiotics can be easily accessed and purchased, resulting in poor compliance with appropriate antibiotic use. Parents may base antibiotic purchase decisions on convenience, pharmacy advice, self-experience, previous experience of managing their child's illness and may increase or decrease the dose depending on their personal judgement (Al-Dossari, 2013; Yu *et al.*, 2014; Dwibedi *et al.*, 2015; Al-Ayed, 2019; Al-Saleh, Abu Hammour, and Abu Hammour, 2019; Alsuhaibani *et al.*, 2019; Hammour, Al-Saleh and Abu Hammour, 2019; Lakshmi, Geetha and Vijayasamundeeswari 2019; Wang *et al.*, 2019; Souto-López *et al.*, 2020). Furthermore, if the child is perceived as not being very unwell, it is possible antibiotics were viewed as a cost-effective way to care for children, without paying for clinician time or buying expensive alternative medications (Alkhadi *et al.*, 2015; Al-Shawi *et al.*, 2018; Al-Saleh, Abu Hammour, and Abu Hammour, 2019; Saleh Faidah *et al.*, 2019; Wang *et al.*, 2019; Mallah *et al.*, 2020). Sometimes parents preferred to seek advice from pharmacists whether to commence antibiotics for their children. This was primarily driven to avoid taking time off work to visit the clinician and consultation costs (Al-Dossari, 2013; Yu *et al.*, 2014; Dwibedi *et al.*, 2015; Al-Ayed, 2019; Alsuhaibani *et al.*, 2019; Hammour, Al-Saleh and Abu Hammour, 2019; Lakshmi, Geetha and Vijayasamundeeswari, 2019; Wang *et al.*, 2019; Souto-López *et al.*, 2020). This degree of self-management was dependent on parental personal attitudes and health beliefs. However, in several studies, parents were found to behave differently towards their child's illness than their own and be more cautious regarding antibiotic use for their children (Wun *et al.*, 2012; Szymczak *et al.*, 2017; Souto-López *et al.*, 2020). In the study by Wun *et al.*,

(2012), most parents avoided antibiotics for their child, due to concerns about side effects, and their increased vulnerability. This was due to the perception children have an immature weaker immune system, which is less able to meet and counteract the effects of any medication, therefore increasing the likelihood of experience unpleasant side effects. However, if the illness was perceived as being serious, antibiotics were sought as they were considered effective and fast acting (Rousounidis *et al.*, 2011; Alkhaldi, Al-Mahmoud, and Kanaan, 2015; Chinnasami *et al.*, 2016; Al-Shawi *et al.*, 2018).

This review included studies from a range of countries and differing attitudes, where antibiotic prescribing may be influenced by the cultural, social, and healthcare norms of these different countries. Only one study, in Greece, included the attitudes and practices of immigrant parents. This study identified that this client group would be dissatisfied if they did not receive antibiotics, would consider changing their clinician and would be more likely to buy over the counter antibiotics (Rousounidis *et al.*, 2011). The study does not identify which countries the immigrants were from to identify any cultural influences on their behaviour. However, other studies cited parents would consider changing their clinician if they did not receive antibiotics (Panagakou *et al.*, 2011; Rousounidis *et al.*, 2011; Al-Dossari, 2013; Zyoud *et al.*, 2015; Farha *et al.*, 2016; El Khoury, Ramia and Salameh, 2017; Hammour, Al-Saleh and Abu Hammour, 2019). Four studies identified parents followed clinician advice in terms of completing antibiotic courses (Chan and Tang, 2006; Brookes-Howell *et al.*, 2013; Agarwal, Yewale and Dharmapalan, 2015; Al-Ayed, 2019). Brookes-Howell *et al.* (2013) found parents were motivated to adhere to and be compliant with medical advice. This was primarily due to the fulfilment of their parental roles and responsibilities to care for their child's recovery. This supported further studies, which found many parents deferred and complied with physician prescribing and actively sought this reassurance rather than self-prescribing (Ecker *et al.*, 2013; Szymczak *et al.*, 2017; Souto-López *et al.*, 2020).

## **2.10 Review limitations**

The review was limited to articles published in English which met the search eligibility criteria. This may have meant some research was not reviewed, although only one article was identified that was not published in English. The included articles originated from a range of countries and differences in the provision and arrangements of health care systems between countries may have influenced the study findings. However, the publications reviewed identify common themes in a variety of healthcare settings which attests to the global nature of the issue.

## **2.11 Conclusion**

The review identified the main themes that impact on and influence parental expectations to receive antibiotics for their children. One main influence was the concern and the perceived seriousness of their children's illness. Parents relied on the clinician to provide reassurance, advice and information regarding the care of their children; however, lack of consultation time and use of complex language impacted on the quality of parents and clinicians' relationships. As a result, parents were not reassured and often relied on previous experiences and outcomes to influence their expectations. The second literature review identified 18 more studies for inclusion which were largely from the Middle East. This perhaps reflects the interest and concern due to increasing incidence of in AMR cases in this region. The literature identified most research into parents' knowledge attitudes and practices was via quantitative studies using surveys.

In summary, there is a gap in the literature of qualitative studies which explore parental beliefs, knowledge, attitudes and practices of antibiotic use in their children. The review identified only two qualitative studies, both from the UK, relating to antibiotic use and parental attitudes (Brookes-Howell *et al.*, 2013; Cabral *et al.*, 2016). Further high-quality qualitative research should be undertaken to explore the underlying issues experienced by parents, including the influence of socio-economic

factors and culture in countries with different healthcare systems. This would assist in understanding drivers associated with antibiotic seeking behaviour globally, which may impact the development of suitable strategies and interventions to address these influencing factors. This could include ensuring accessible information is provided to parents, so they can make informed decisions regarding their children's health.

## **2.12 Chapter Summary**

This chapter has presented the findings from a systematic literature review exploring influences on parental attitudes towards antibiotic prescribing in children. An overview of the literature review rationale, the methods taken to appraise the quality of the included papers and the findings have been presented. This has included individual study characteristics, their risk of bias and a description of the studies. Four main themes were identified from the literature: the quality of relationships with health care providers; dealing with conflicting messages; rationalising antibiotic use and parental practices informed by past experience. These findings have been discussed, limitations acknowledged and recommendations made.

The literature review has identified a paucity (n=2) of qualitative studies exploring parental attitudes to using antibiotics for their children in the UK and no studies have specifically addressed maternal attitudes. The findings from this thesis will contribute to addressing these gaps in the existing literature. The following chapter will address the methodology and rationale of the study design chosen to explore this topic further.

# Chapter 3: Methodology and Research Design

This chapter contains work from a published paper (Appendix 3- Bosley, H., Appleton, J., Henshall, C., and Jackson, D. (2019) 'Using local communities to establish geographical boundaries for case studies', *Nurse Researcher*. doi: 10.7748/nr. 2019.e1623).

## 3.1 Introduction

This chapter will discuss the methodology of the study. A mixed methods case study research design was chosen, with pragmatism underpinning the philosophical concept. The methodology selected was deemed the most appropriate for addressing the research question:

*“What are the influences on maternal decision making in relation to antibiotic usage for their pre-school children? ”*

The specific aim of the study was to gain some understanding into the drivers and influencing factors which lead to maternal decisions to access primary healthcare services and antibiotic seeking behaviour. To achieve the aim of the research study objectives were employed (see Chapter 1).

These were:

Phase One

- To collect quantitative primary care antibiotic prescribing data for children under five years of age within the case setting and perform descriptive and statistical analysis of the data
- To determine the incidence of antibiotic prescribing in primary care for children under five years of age using descriptive quantitative data.

## Phase Two

- To collect qualitative data from focus groups and interviews with mothers of children under five and use thematic analysis to explore findings
- To integrate and complete comparative and theoretical analysis of the quantitative and qualitative data, including further detailed synthesis
- To explore the influence of social factors such as maternal age, family cultures, beliefs, and cultural background, on maternal attitudes towards antibiotic use for children
- To gain insights into maternal understandings of the role of antibiotics in relation to children's illness in the case study area
- To determine influential sources of healthcare advice valued by mothers.

Qualitative data was gathered from focus groups and one to one interviews with participant mothers. This chapter will begin by presenting the choice of pragmatism, mixed methods and case study as the methodological design for this study.

### **3.2 Theoretical Framework**

The way knowledge is understood is influenced by one's philosophical position and research is then conducted based on that belief (Crotty, 1998). Hence, to explore the research question adequately, it is important to understand the philosophical concepts underpinning the different approaches to social science research (Ritchie *et al.*, 2013). When selecting an appropriate research question and method, researchers are likely to be influenced by the beliefs of different research paradigms (Morgan, 2007). A paradigm reflects how the world is viewed by the researcher based on their common beliefs (Guba, 1990), and their ontological and epistemological views. Ontology relates to what is the nature of knowledge and reality and epistemology is how knowledge is known based on personal experience and insight (Cohen, Manion and Morrison, 2017). Therefore, to adopt the most suitable philosophical position/perspective to explore the phenomenon, an understanding of different epistemological (how

we know what we know; Crotty, 1998) perspectives is required. Three major epistemological views are positivism, constructivism, and pragmatism (Morgan, 2007).

### **3.2.1 Positivism**

Positivists believe that there is a single reality and numeric measurable data is required for the data to be trustworthy (Philips and Burbules, 2000). Positivism follows the view that for data to be trustworthy, only factual knowledge gained through observation, including numeric measurement can be used (Philips and Burbules, 2000). This is traditionally connected to quantitative research (Burke Johnson, Onwuegbuzie and Turner, 2007). Crotty (1998) believes positivism enables unequivocal and precise knowledge of the world, identifying existing meaning, which differ from individual beliefs, feelings, and assumptions. In recent years, there has been a move to accept that scientific and common-sense reasoning are similar and basically the same process and this has led to the idea of post-positivism, where there is no preference to subjectivity or objectivity (Guba, 1990). The post-positivist method relies on emphasising individuality, experience and knowledge as relational and not bounded by reason (Henriques *et al.*, 1998).

### **3.2.2 Constructivism**

Constructivists believe reality needs to be constructed or interpreted. As there is no single reality, it is built on the experiences of the individual and each person is unique. This approach lends itself to qualitative methods (Lincoln and Guba, 2018). Reality is socially created between and by the individuals who experience it (Gergen, 1999). However, an individual's reality will be unique to that person, reliant on individual experiences, informed by cultural, historical, political, and social norms (Berger and Luckman, 1991). There may be multiple interpretations of an experience or phenomenon, which results in no single defined reality but multiple variations depending on the individual. This means reality is constructed based on experience and all interpretations are uniquely valuable (Crotty, 1998). The constructivist approach relies on the participants' views of the phenomenon being studied

being built and generated into a theory or pattern rather than beginning with a theory (Creswell, 2003). Therefore, this approach usually aligns with qualitative data collection methods and analysis or a combination of both qualitative and quantitative methods (mixed methods). Quantitative data can be used to support or add to the qualitative data. This results in a deepening of the analysis.

### **3.2.3 Pragmatism**

The third approach is pragmatism, which takes account of the aim and context of the study (Ritchie, Lewis and Elam, 2003) and does not conform to any one philosophy or reality. With a pragmatic approach, the research question is central and data collection and analysis methods are selected based on which are most likely to address the research question (Creswell, 2003). Pragmatism is simply defined as “what works” and pragmatists use the most appropriate approach to answer a particular research question or issue, regardless of the philosophical or methodological view (Robson and McCartan, 2016). Pragmatism in mixed methods research allows multiple methods, viewpoints, and assumptions as well as different data collection and analysis techniques to be used (Murphy, 1990). Although pragmatists acknowledge there is a single ‘real’ world, there is recognition that individuals have their own personal view of the world (Morgan, 2007). A pragmatic approach enables mixed method research to comfortably incorporate the philosophies of both quantitative and qualitative research (Burke Johnson, Onwuegbuzie and Turner, 2007). By acknowledging both quantitative and qualitative research methods, it allows both approaches to be a properly integrated methodology for the social sciences (Morgan, 2007).

#### ***3.2.3.1 Rationale for epistemological choice of pragmatism in the study***

Both quantitative and qualitative approaches are viewed as compatible from a pragmatic standpoint (Tashakkori and Teddlie, 1998; Burke Johnson, Onwuegbuzie and Turner, 2007). By acknowledging both quantitative and qualitative research methods, a pragmatic approach allows both sets of data to be integrated and supports a mixed methods approach (Florczak, 2014). Pragmatism offers

researchers the opportunity to search for useful points of connection between these two types of data. This was the basis for being chosen as the most suitable approach to use in this study. When selecting a philosophical approach, positivism was primarily focused on quantitative data. The primary research question related to maternal experiences, attitudes, and feelings, which constitutes a qualitative approach aligning with a constructivist approach. Constructivism maintains understanding and perception of reality is acquired via constructed knowledge obtained by interaction with the world (Crotty, 1998). Whilst constructivism does recognise and align with maternal experiences, pragmatism allowed the combination of both quantitative and qualitative approaches to enrich and contextualise the data.

The research aim and study objectives (section 3.1) related to exploring the attitudes of mothers towards antibiotic prescribing for their children. The quantitative general practice data was used to inform and determine the incidence of antibiotic prescribing in children under five and contextualise current antibiotic prescribing practice. These findings were then further explored in the qualitative phase. Focus groups and one to one interviews were used to explore the subjective experiences of mothers, as they provided multiple views and opinions based on individual experiences and cultures. The qualitative data was analysed to gain insights into maternal understandings of the role of antibiotics in relation to children's illness. Therefore, in this study, a pragmatic approach was used, where the understanding of personal and shared experiences was explored from different perspectives to gain insight and meaning from the different data sources.

### **3.3 Mixed Methods**

Creswell and Plano Clark (2018), define mixed methods as a method of collecting, analysing, and mixing both quantitative and qualitative data in a single study or series of studies. Its core principle is, when used together in combination, quantitative and qualitative approaches provide a better understanding of research problems than either approach alone (Glogowska, 2011; Zhang and

Creswell, 2013). Mixed methods can be applied in several ways and integration of data can occur at any time to meet study needs (Glogowska, 2011). One method may assist in the development of another method (Greene, Caracelli and Graham, 1989), or be embedded within a different method to provide insights on different levels of the phenomena (Tashakkori and Teddlie, 1998). There are three particular strategies and variations to mixed methods approaches defined as sequential, concurrent and transformative (Creswell, 2003), which will now be discussed.

### **3.3.1 Sequential**

Sequential strategies are used when the researcher seeks to use the findings from one method to inform another method and will depend on the research question (Mason, 2006). An example could be using quantitative data to test a theory or hypothesis and following up with qualitative methods to explore in depth with individuals. However, another approach could be to complete the qualitative phase first and use those findings to explore or inform the quantitative data. This approach may be appropriate when designing a survey or questionnaire where the qualitative findings may inform the survey questions (Creswell and Plano Clark, 2018).

### **3.3.2 Concurrent**

The researcher uses both quantitative and qualitative data, in parallel, to provide a comprehensive analysis and exploration of the research question. The data is collected at the same time during the study and data is integrated to obtain overall results (Halcomb, 2018). Priority is given to the larger dominant data collection method, which guides the research question, whilst another data set is embedded. This allows the analysis of different questions and levels of enquiry.

### **3.3.3 Transformative**

Transformative approaches can occur sequentially or concurrently, incorporating both quantitative and qualitative data within each other (Halcomb, 2018). For example, multiple sources of data, such as descriptive statistics, or participant observations and narratives can be used to answer research questions (Halcomb and Hickman, 2015). These strategies all have benefits and drawbacks. Following assessment of the three approaches, this study determined that a sequential explanatory mixed methods approach was the most practical approach, to elicit the richest data (Creswell, 2003; Creswell and Plano Clark, 2018). The collection of quantitative data and analysis of the results provided a general picture of the research question, namely the antibiotic prescribing practices for children under five years. It was important to contextualise prescribing practices and complete the quantitative phase of the study first so that these results were then explored in more detail within the main qualitative phase of the study.

### **3.4 Rationale for using mixed methods**

By using a mixed method approach, a breadth of meaning and knowledge can be derived by combining the data sets and incorporating the reliability of quantitative data and the validity of qualitative experiences, views and perceptions (Burke Johnson, Onwuegbuzie and Turner, 2007). Mixed methods recognise and value both quantitative and qualitative approaches and what they can contribute to addressing the research questions under investigation (Creswell and Plano Clark, 2018). This approach also provides more detailed findings than can be obtained from a single source, as it can include analysis of data from several perspectives (Andrew and Halcomb, 2012).

This study used an explanatory sequential mixed methods approach. The combined quantitative and qualitative data provided a wider, more in-depth, and richer understanding of the study research question, aim and objectives. This approach involved collecting and analysing the phase one quantitative GP antibiotic prescribing data, followed by the larger qualitative data collected in phase

two of the study. The quantitative data, from the general practices, provided an insight into prescribing practice, age of children seen, and the common illnesses treated with antibiotics. Descriptive GP data included the number and age of children receiving antibiotics, and the reasons for the consultations. This type of data is measurable via statistical programmes (Burns and Grove, 2005) and provided a view of antibiotic prescribing practices. Collecting and analysing the GP data first, provided a contextual and general introduction to the research objectives, which was further explored in more depth during the qualitative phase (Tashakkori and Teddlie, 1998; Creswell, 2003; Halcomb and Hickman, 2015). Key findings from the quantitative data were then later used to build upon and inform qualitative data collection and shape follow up qualitative questions for the study topic guide.

The second, qualitative phase of the study was designed to explore and further explain results from the first quantitative phase. By using this approach, direct comparison between the two data sets was possible (Creswell, 2003). The qualitative stage explored mothers' experiences of receiving antibiotics for their children and accessing healthcare services. This phase involved exploring mothers' interpretations of knowledge and their understanding of reality, which were influenced by personal experiences and memories. A topic guide was used to provide some structure in the qualitative phase (Appendix 4 - *Interview Topic Guide*). Topic guides are useful for the researcher, as they enable the participant's responses to be expressed in their own way (Kvale and Brinkmann, 2009) and steer discussion towards areas of study interest, for example attitudes and knowledge of antibiotics. This approach recognises knowledge to be constructed from multiple interpretations of experience (Burke Johnson, Onwuegbuzie and Turner, 2007) whilst allowing research to be undertaken in a pragmatic way.

### **3.5 Case study**

Case study research is well established within social sciences as an appropriate method for in-depth research investigation (Feagin, Orum and Sjoberg, 1991), and is used to obtain and explore in-depth

understanding of complex problems in a real-life natural setting. Case study has been defined by an interest in an individual case, rather than the methods of inquiry used (Stake, 1994), although some researchers have emphasised it is more the method and the techniques that constitute a case study (Yin, 2014). The flexibility of case study means that, the ontological, epistemological, and methodological positions may be more easily integrated (Jones and Lyons, 2004; Marshall and Rossman, 2016). Case study is designed to use multiple sources of data to explore a topic, and research questions can evolve as new data emerges (Stake, 1995). This provides flexibility for the selected method and the data collection procedure, enabling the researcher to investigate the research topic and address the study questions (Luck, Jackson and Usher, 2006). Case studies can also be simple or complex, single or multiple (Robson and McCartan, 2016) and use both quantitative and qualitative methods of data collection (Gerring, 2006; Yin, 2014). Case studies are empirical enquiries used to investigate in depth an event, activity, or process in a natural setting (Yin, 2014). They are particularly useful when little is known about the issue being explored (Appleton, 2002) and can use multiple sources of data to investigate the phenomenon. This may enable new research questions to evolve as new data emerges (Stake, 1995) and provides flexibility for the chosen method and the procedures selected to collect the data (Luck, Jackson and Usher, 2006).

### **3.6 Rationale for using case study**

Case studies can be used to describe, explain or explore everyday phenomena in their natural settings (Yin, 2014). To address the research question, aim and objectives, a case study approach was selected, as it provided a defined population and access to multiple sources of information, which were used to inform the research. This approach enabled mixed methods to be used (Yin, 2014), to explore a contemporary topic (maternal attitudes to antibiotic prescribing), in a real situation (local diverse population). The research question involved an in-depth exploration, of a contemporary issue, within a real-life setting using more than one method to elicit deep and rich data of the phenomenon under study. Both Yin (2011) and Stake (1995) provide exploratory

qualitative approaches with an emphasis on the natural setting. However, Stake advocates a more qualitative approach, with an emphasis on naturalistic and real-life settings, and stresses the importance of the context description (Zucker, 2009). This approach involves understanding individual perspectives and shared social experiences in a defined community. For this study, Stake's (2000) approach was used as the study concerns understanding mothers' attitudes towards antibiotics. These attitudes will be defined and constructed by multiple factors, including experiences and cultural influences.

### **3.7 Determining the type of case study**

Classification or determining the case informs the study design and research aim (Hyett, Kenny and Dickson-Swift, 2014). The case is selected not because it is representative of other cases, but because of its uniqueness, which is of genuine interest to the researcher. Stake (1995) defined case studies as being either intrinsic, instrumental, or collective. Intrinsic case study is used to explore the details of a single unique case, rather than what it represents and where there is limited transferability. The uniqueness of the phenomenon and the how it is distinguished from everything else needs to be clearly identified. In instrumental case studies, the issues remain dominant and the case provides insight into a defined event or phenomenon or refines a theory (Stake, 1995). The case is selected to advance understanding of the issue of interest and is not the main research focus, rather it allows investigation of the phenomenon. This approach uses particular cases to gain a broader appreciation of an issue or phenomenon (Stake, 1995). Collective cases use an instrumental case study approach, which enables multiple cases to be sequentially or simultaneously studied as a means of broadening exploration of a specific issue or phenomenon (Appleton, 2002). They are studied holistically and remain a single entity (Stake, 1995, 1998), however in collective case studies they need be carefully chosen. This is to ensure comparison, testing of theories or replication of findings can be made across the multiple case studies (Stake, 1998). For this study an instrumental case study approach was

selected as the most appropriate type of case study as it enabled exploration of the phenomenon, namely maternal experiences to using antibiotics.

### **3.8 Selecting the case**

A case is a specific, complex, recognisable, and integrated system that is the object of the study, not the process (Stake, 1995). It needs to be easily identifiable (Dempsey and Dempsey, 2000). It has been suggested what the case is or is not, does not diminish the importance of understanding the case or the ability of the case to discover relevant knowledge about the research subject (Stake, 2000). When deciding and defining what a case is, researchers need to consider carefully theoretical issues, existing literature and the setting (Stake, 1995; George and Bennett, 2005). The selected case needs to be accessible to the researcher, with access to appropriate participants who can address the research, namely mothers of children under five years. It also needs to be able to provide support for the research to take place (Stake, 1995). The nature of the research and the burden and risks to the potential participants must be addressed, including ethical considerations, confidentiality, and anonymity. The study needs to ensure the participants in the case are provided with the right support and information to make informed choices and consent. This is important to ensure the demands of the study of the case can be met by potential participant organisations and individual participants. If the disruption, time and resources and the emotional burden is deemed too high it may discourage participation (Crowe *et al.*, 2011). The research question required investigation into what mother's beliefs were, and their thoughts and experiences about antibiotic provision for their children. This was an explorative question and therefore it was important to identify a study population that could provide rich and broad information. Lincoln and Guba (1985) identify several advantages to studying a case in its context. These include the belief that by studying a phenomenon in context, fuller data is obtained. This data can provide a more detailed insight of the phenomena, and therefore enhance the potential relevance of the study results (Lincoln and Guba, 1985).

### 3.9 Selecting the case boundary

It was important to focus and understand what the case is and is not, as without maintaining a focus, it is possible to lose sight of the research question (Stake, 1995). A case may be purposefully selected by virtue of being information-rich, critical, revelatory, unique, or extreme as opposed to cases selected within a representational sample strategy used in correlational research (Stake, 1995; Patton, 2015). If a case is purposefully selected, then there is an interest in generalising the findings. To select an appropriate case for study there must be a clear boundary, which defines the nature and scope of the case (Stake, 2000). However, it may not be easy to differentiate the case from the context, and it is important to ensure boundaries of the case are readily distinguishable from events, behaviour or actions that are outside the boundaries of the case (Stake, 2000). To address this, both Yin (2014) and Stake (1995) suggest using boundaries to contain the case and ensure the study's scope remains reasonable. Ragin and Becker (1992) suggest a case may be either empirical or theoretical and is specific to time and space. It is possible the nature and focus of the case may change over time as the study progresses, however, specific time boundaries are required to identify the beginning and end of a case (Yin, 2014).

Case boundaries need to be clearly defined and unambiguous. If they are, then it will be easier to relate them to the research question and identify the data collection methods required (Holloway and Wheeler, 2002). A case can be bounded by different factors, including time, geography, place, and events (Ragin and Becker, 1992). Time boundaries identify a case's beginning and end (Yin, 2014). Researchers specify boundaries to help define the case, (Stake, 1995), for example, a local annual event such as a festival or summer school. A boundary may be implicit, such as a hospital ward or unit, which could be bounded by location or time depending on the research question (Dempsey and Dempsey, 2000). An example of a hospital unit bounded by time would be an outpatient department which has defined operational times. Set case boundaries also enable a comparison of findings with similar studies (Yin, 2011).

In this study, postcodes were used to define the case. Many countries throughout the world use postal codes to identify geographical areas. These were introduced to assist postal delivery but have been extended in some countries to collect a range of administrative, health and statistical information and services. National governments collect demographic data about the population living in each postal code, such as statistics about the economy, society and population including socio-economic status, types of housing, household characteristics, health inequality, child health, health conditions, mortality, employment rate, cultural identity and education. It is possible to compare and review this data, as they are usually accessible and available through established public health and national statistics databases. By using established communities, useful demographic and contextual data is often obtained by national governments, which can be used to contextualise the population and explain the nature of the case (Jackson *et al.*, 2017a, 2017b; Bosley *et al.*, 2019).

### **3.9.1 The research case and rationale for selection**

To address the research question, the case needs to provide accessible and appropriate participants (Stake, 2000). The postcode 'bounded' case in this study offered the most diverse population available in the locality, which provided flexibility, holistic, meaningful, contextual understanding, and knowledge about real life events (Yin, 2014). In this study, the research question related to understanding the influences on maternal decision making regarding use of antibiotics for their young children, using a mixed methods approach. This meant the case needed to provide local access to mothers of young children and GP practices, which would be able to provide antibiotic prescribing data for children under five. The case was therefore mothers of children under five years of age and the eight GP practices located within the postcode area.

### **3.9.1.1 Antibiotic prescribing within the case**

As discussed, (section 3.9), using postcodes to set case boundaries is an effective means of identifying an appropriate population to address the research aim and achieve the objectives. Public information available from the Office of National Statistics was used to identify the case characteristics. The case contained eight GP practices from which antibiotic prescribing data for children under five years was requested. GP practices in the case prescribed fewer antibiotics (average 119.8 per 1000 registered patients) than other GP practices in England (average 138.6 per 1000 registered patients, PHE, 2019b). This was across all age groups. England does have regional variation for antibiotic prescribing and higher prescribing is often linked to socio-economically deprived populations (Thomson *et al.*, 2020), which may be considered as more at risk from complications by the GP (Kumar, Little and Britten, 2003). However, generally the reasons for the variation are not clear and would benefit from further study. The results from the phase one analysis of the quantitative GP prescribing data are discussed further in section 5.2. of this thesis.

### **3.9.1.2 Demography of the case**

Although the study setting for the case itself was not as ethnically or economically diverse as other locations in the country, the case location offered the most diverse population available in the geographical area. The population of the case was approximately 61,972 (Office of National Statistics, 2019), which included families with young children. Most residents were aged between 16-49 years with about 8% aged between birth and 16 years old. There was a slightly higher unemployment rate of 6.1% within the case, compared to the national average of 4.9%, with a mixture of professional and non-professional people. Housing was a mix of private and rental properties with 13.2% of properties provided by the local authority, which was again higher than the overall average in England (7.5%). The case also offered a range of ethnic diversity, with approximately 11.7 % of inhabitants recorded as Muslim, compared to 6.8% in the rest of the city. According to PHE public health profiles, children

aged less than five years old accounted for 5.8% of the local study population, in comparison to 6.1 % nationally (Office of National Statistics, 2019).

When conducting research, it is also important to establish contact with local communities. By understanding local communities, case study researchers can identify appropriate populations to study and access contextual data from a multitude of sources, thereby informing the case. However, if the researcher has little or no in-depth knowledge of a community, it may be difficult to conduct research in that community. It is therefore important for researchers to create appropriate connections with local government bodies to identify local community leaders, who can facilitate and introduce the researcher to the local communities. To address this, local playgroup leaders, council led children's service playgroup leaders and local voluntary playgroups were contacted. This contact provided an understanding of the types of playgroups i.e. baby, frequencies (number per week) and mothers (young, non-British), how to access local preschool playgroups, as well as providing an insight into the diversity of the local communities. This will be discussed in detail in Chapter 4.

### **3.10 Chapter summary**

This chapter has discussed pragmatism as the philosophical underpinning of the study, the rationale for using a mixed methods and case study design, as a means of capturing broad, rich knowledge to address the research question. The case has been defined as mothers of children under five years and the eight GP practices, bounded geographically by a single postcode location, which provided access to appropriate participants to address the research question. Having outlined the philosophical approach, and methodology of the study, Chapter 4 will now discuss in more detail the study methods including recruitment, data collection and analysis.

# Chapter 4: Study Methods

## 4.1 Introduction

As discussed in the preceding chapter, a sequential mixed methods case study approach using a combination of both quantitative and qualitative data, was chosen to explore maternal attitudes to using antibiotics. The case chosen was a defined population, geographically bounded, which provided the setting for both phases of the study. This chapter will present the quantitative (one) and qualitative (two) phases of the study. It will include the setting, access and recruitment process for each phase; the sampling strategy of participants; the challenges in obtaining the data and steps taken to maximise access to the data; a description of the process of data collection; data analysis, saturation and data integration; ethical considerations and study rigour.

## 4.2 Study Methods

The first phase of the study consisted of quantitative data collection and analysis of primary care prescribing practices in children under five years of age, in the case. This was provided by the GP practices. The second phase involved thematic analysis of qualitative data, gathered from focus groups and semi-structured one to one interviews from mothers living within the identified case with children under five years of age. Each phase will be described in more detail in this chapter.

## 4.3 Phase One- Quantitative- GP antibiotic prescribing practices

### 4.3.1 Setting, Access and Recruitment

Phase one of the study collected quantitative primary care antibiotic prescribing data for children under five years of age within the case setting. This was to gain an insight into the antibiotic prescribing

practices in children under the age of five, in the eight GP practices, within the case boundary. Basic demographic data was requested from GP practices regarding the age of the children, reasons for consultations, and what antibiotics were prescribed. The time period of a full year was requested to ensure a complete picture and to gain some insight into any seasonal variation (July 2016- 2017). The purpose of the data sought was to contextualise practices within the identified case population and provide information on the frequency and type of antibiotics prescribed, as well as any conditions commonly prescribed for (i.e. chest or ear infections). Initially, three GP practices were randomly selected as pilots and contacted. The purpose of this first contact was to gauge whether there would be practical support for the study and whether the antibiotic prescribing data for children under five years, within the selected time frame, could be obtained. Initial discussions with these three GP practices were positive and confirmation was given from the practice managers that this data could be provided from the practice patient databases. The three pilot practices were visited to discuss this further and offer practical support (i.e. aiding in downloading the data), however unfortunately none of the initial pilot practices subsequently provided any information, although it is not clear why.

#### **4.3.2 Recruitment of GP practices**

Following ethical approval, all eight GP practice managers, within the case, were contacted by both telephone and email. An invitation to participate letter (*Appendix 5 - GP invitation to participate letter*) and confirmation of ethics approval were provided (*Appendix 6 - Ethics approval*). Of the eight GP practices, one declined to take part due to the perceived work involved. From the responses obtained, this seemed to be the main reason why practices did not want to participate in the study. The remaining seven GP practice managers were contacted on separate occasions, via telephone and email, over a six-month period. The study information was also addressed to the senior GP partners and hand delivered to the practices. However, despite the initial positive response, practices were difficult to engage and did not generally return phone calls or emails.

At this point in the study, there was a concern that there would be no or insufficient data provided from the practices regarding antibiotic prescribing, and a number of options for progressing the project were considered (e.g. a survey). However, fortunately data was submitted from one large GP practice, which provided an insight into antibiotic prescribing within the case. The decision to retain the descriptive statistics of antibiotic prescribing practices from the GP practice was made. This was because the quantitative data was intended to contextualise the qualitative data captured by the interviews and focus groups with mothers.

### **4.3.3 Challenges in recruiting**

When contacting the GP practices, I presented myself as both a PhD researcher, but also as a healthcare professional colleague and experienced clinician, specialising in infection prevention and control. However, often the initial point of contact was the practice manager, who acted as a gatekeeper to accessing clinical colleagues. One GP practice did respond after three contacts and a GP, who was also the practice manager, invited me to attend a staff meeting to discuss the study. This did take place, and although there was general interest in the study, the practice staff did not offer to supply any data. The feedback from this practice meeting cited it was too time consuming and labour intensive to provide specific prescribing data. They reported that record keeping systems were complex to navigate and there were too many variations in coding of information to run reports. One practice responded on the last contact and suggested a web-based search could be developed to gather the information via an information technology (IT) data system. This would enable the information to be more readily and quickly obtained. Following this suggestion, contact was made with the local Commissioning Support Unit (CSU). This unit is part of NHS England and supports commissioners of health services to focus clinical expertise and leadership in securing the best outcomes for patients and improving the quality of NHS patient services. An aspect of this role is IT and the CSU provide a range of GP IT and technology support services. However, when this was explored further with the CSU, it was clear a specific search could not be easily developed and would

be very expensive to do. Also, there was no guarantee that, if a search tool was designed and provided, the practices would submit the data. Therefore, this option was not possible for a PhD student. This left one practice, which agreed to be visited to discuss the data requirements in detail and subsequently provided prescribing data. Four GP practices did not respond at all.

#### **4.3.4 Data collection**

##### ***4.3.4.1 Demographics of general practice***

A single GP practice provided information. However, it was one of the largest GP practices in the case, with over 13,000 registered patients and equating to 21% of the total case population. The number of registered patients for this practice was larger than the average for other GP practices in the CCG (11,565) and England (9,004) (Office for National Statistics, 2021). Of the patients registered in this practice, 5.6% were aged between birth to four years (PHE, 2019a). This was slightly higher than the average percentage of children under four registered with GP practices within the case, which was 5.3%. The ethnicity estimates for the practice submitting data was 3.9% mixed, 13.6% Asian, 5.7% Black, 1.1% other non-White ethnic groups (PHE, 2018).

The data was charted using a Microsoft Excel® 2016 worksheet. There were 687 consultations for children under five years old between July 2016-17, with comparable numbers of male and female children: 342 males and 345 females respectively. A similar number of children were seen in each age range. The age groups were collated into year groups: birth-one year, one-two years, two-three years, three-four years and four-five years old. Each age group data was analysed separately and included, if provided, the reason for the antibiotic usage and the consultation.

#### **4.3.5 Challenges in data collection from GP practice**

In primary care services, an IT system known as EMIS (Egton Medical Information Systems) is used, which enables the recording of patient consultations, outcomes and management. This system does

not record ethnicity, or socio-economic background. Consultations can be coded by the clinician to include why the patient presented, any action taken, and any medication prescribed, but this requires manual input. Only a few codes were recorded and included: name of antibiotic, symptom/diagnosis, date of prescription, age range of the children. It was not possible to run comprehensive searches as data can be missing, or inaccurately entered, therefore affecting the accuracy of results. This was also secondary data. Secondary data is simply analysis of data collected by someone else (Boslaugh, 2007), which in this case was the GP practice. The advantage of using secondary data was the easy accessibility to the information, with a predetermined sample size. However, as seen in this study, there were also some disadvantages to using secondary data sources. Firstly, the data obtained may not address the research questions, or be recorded in sufficient detail or accuracy for the research study (Doolan and Froelicher, 2009). This was the case in this study as the secondary data lacked any information relating to factors which may have influenced the prescribing decisions i.e. medical history of child, any previous antibiotic use, assessment of illness severity, physical presentation and specific clinical features, ethnicity, and socio-economic background were not recorded. Therefore, on data analysis this information was missing and no further extrapolations or insights could be obtained into possible prescribing influences (Doolan and Froelicher, 2009). Data collection was entirely dependent on being collated by the GP surgeries and could not be sourced using other means, such as CCG, PHE or NHS England. However, this may change in the future, as there is a national move towards adopting more integrated healthcare systems, which will allow healthcare professionals to record, share and use information to improve patient care (NHS Long Term Plan, 2019).

#### **4.3.6 Challenges in data collection from other sources**

To improve and maximise the quality of the data available, alternative means of obtaining this data were explored. This involved contacting the local CCG, who commission and monitor the performance of local health services. Although some antibiotic prescribing information is collected by the CCG, it is limited and only relates to usage of high-risk antibiotics. PHE collect data on prescribing, but this is not

detailed and provides only a general overview. The NHS Business Services Authority was also contacted under a freedom of information request; however, this data was not available as generally prescribing practices via age and in children are not collected at this time in the NHS (section 1.3).

#### **4.3.7 Data analysis**

##### ***4.3.7.1 Descriptive statistics***

Descriptive statistics use data to describe a population or event and provide simple summaries about the sample and the measures (Fox and Bayat, 2007). Descriptive statistics attempt to describe the association between variables in a sample or population (Satake, 2015), with a variable being a characteristic like age or sex that is different between individuals (Kaur, Stoltzfus and Yellapu, 2018). A summary of the data can be described in the form of mean, median and mode. In its essence, descriptive studies are used to describe various aspects of the phenomenon. Analysis of descriptive data regarding the local prescribing practices in children under five years old was used to provide a background context of antibiotic prescribing prevalence within the defined case study. The data provided summary information to describe characteristics and/or behaviour of the sample population (Stake, 2005) including the age range of children receiving antibiotics, how many consultations resulted in antibiotic prescriptions, conditions prescribed for, the antibiotics used and their appropriateness for the diagnosis. The data provided was limited (section 4.3.5), although it did allow analysis of seasonal variations and days of the week consultations.

##### ***4.3.7.2 Statistical analysis***

The first stage of the analysis involved checking and cleansing the data, which was reviewed for any double entries and incorrectly entered or missing data (Polit and Beck, 2008). The analysis explored whether there was a relationship between the days of the week and the treatment given. Each age group was analysed separately and comparisons drawn between them.

The age group and day of week are categorical variables and have discrete values (Monday – Friday and age group in years 0-1, 1-2, 2-3,3-4 and 4-5). A contingency table was used showing the frequencies of treatment per day of the week, for each age group (Table 11, page 103). This data is presented and discussed in Chapter 5.

To look at the relationship between two categorical variables, a Chi-squared test can be used, which compares the observed and expected frequency per combination of categorical variables (Field, 2018). It tests whether the frequency distribution of certain events observed in a sample is consistent with a particular theoretical distribution. In this case, was there a relationship between the day of the week and the number of treatments?

The hypotheses that were tested in each age group were:

$H_0$ : there is no relationship between days of the week and whether treatment was given

$H_1$ : there is a relationship between days of the week and whether treatment was given

The Chi-square test is a non-parametric statistic which requires that the following assumptions are met:

1. Each entry is independent
2. The value of each cell in the contingency table should be 5 or more in at least 80% of the cells, and no cell should have an expected of less than one

These were both met in this study.

The Chi-square statistic for each age group was calculated using the R statistical environment (Kabacoff, 2015) and compared against a value of 9.49 (4 degrees of freedom (df) and  $p= 0.05$ ). Df was calculated as the number of values that are free to vary, namely days of the week. If the test statistic is greater than this value, then there is a significant relationship between the two

categorical variables, at that level of probability (Field, 2018). The results of the quantitative data analysis will be presented in more detail in Chapter 5.

## **4.4 Phase Two- Qualitative Focus Groups and Interviews**

### **4.4.1 Setting, Access and Recruitment**

For the qualitative phase of the study focus groups and one to one in-depth interviews were used. Prior to commencing the study, I attended several university run training sessions on different qualitative data methods and collection. The training included topic guide development and how to prepare and conduct focus groups and interviews. I observed a focus group, conducted by a fellow PhD student, who then observed the first focus group I held and provided feedback. This process enabled me to obtain practical experience of conducting qualitative research, whilst receiving support from a colleague. I also had discussions with and support from the supervisory team on how to conduct focus groups and interviews.

### **4.4.2 Participant Recruitment**

The purpose of the study was to explore mothers' attitudes and experiences of using antibiotics for their children and therefore participants were recruited from local play groups within the identified case. Fourteen playgroups were found using local county council websites, internet searching for local mothers' networks, social media pages, local community centres websites and word of mouth. All play leaders or contacts were initially contacted via email or telephone (depending on contact details supplied). Study information was sent via email, with a request to attend the play group sessions to explain the purpose of the study to the mothers and to invite them to participate (Appendix 7- *Invitation to participate playgroup leaders*). Six playgroup leaders confirmed their support, via email, and these sessions were attended and printed participant information sheets (Appendix 8- *Participant information sheet*) were provided for the mothers. The mothers were invited to participate, either via

a focus group or one to one interview, but not both. This was to make sure participants were not fatigued by the study, but also to ensure as broad a range as possible of individual views were captured. An open offer of either focus group or one to one interview gave the mothers autonomy to select their preference. It is possible a study in a different area of the UK, would identify mothers with different experiences and views.

Consenting mothers provided their contact details (email, phone or text depending on their communication preference) and during this initial contact, a date was arranged to return to the playgroup to conduct the focus group. Some mothers were recruited for focus group participation on the day, after reading the participation information and providing written consent. This was to maximise participation as unfortunately some mothers, who had previously agreed to take part, did not attend the playgroup on the day the focus group was arranged. Where contact details had been provided mothers were contacted and offered a one-to-one interview. A few mothers preferred an interview. Interviews were arranged by contacting the mothers directly by email or text (depending on their preference) to arrange a suitable date and time. This contact was usually within the following week, with a text asking them to confirm their participation. Mothers generally preferred to be contacted by text rather than phone. If mothers were still willing to participate, a date and time was then arranged for the interview. Several mothers, who had initially consented then did not make further contact with me or respond to email or text. A maximum of three attempts were made to contact the mothers, before accepting that the participant did not wish to take part. Mothers were given the choice to withdraw at any point of the process and this was respected.

#### **4.4.3 Challenges in recruiting from play groups**

There were 14 play groups within the case, identified via internet searches (see 4.4.2). Of these 14, two playgroups did not give me permission to attend the playgroup session in person to talk to mothers but did allow posters and flyers inviting mothers to contact me and participate in the study

to be displayed at their venue (Appendix 9- *Study Flyer*). No mothers contacted me in response to the flyers. There were a further two playgroups identified on the internet, which did not have the correct contact information or had closed permanently and therefore could not be accessed. There were three playgroups who did not respond to emails or voice mail messages and were contacted on four separate occasions. One playgroup was very small with only three attendees, one of which was a grandmother and one a childminder; neither were eligible to participate. The remaining mother did not wish to participate. Therefore of the original 14 playgroups, only six took part.

#### **4.4.4 Sampling Strategy**

For this study, it was necessary to use convenience sampling. This is a type of non-probability sampling that relies on data collection from participants who are conveniently available to take part in study (Saunders, Lewis and Thornhill, 2018). This was because playgroups operate as drop-in sessions, and therefore not all mothers attended every week, so attendance was unpredictable. This made it difficult to purposively recruit mothers with specific demographic characteristics, although efforts were made to recruit mothers from as broad a range of age, ethnicity and socio-economic backgrounds as possible. Convenience sampling fits with a pragmatic approach, by recruiting easily accessible participants from the target community, who meet the criteria of the study (Dörnyei, 2007). This was namely mothers of young children, living in the designated case area, who were willing to participate in the study. This sampling strategy is practical and efficient (Tashakkori and Teddlie, 2010). However, there are disadvantages to convenience sampling. These include a lack of representation of the chosen population which makes findings more difficult to generalise across the whole population (Jager, Putnick and Bornstein, 2017).

##### **4.4.5.1 Focus Groups**

By using focus groups, the study was able to capture a lot of broad information regarding mothers' attitudes to using antibiotics for their children. This approach to data collection enabled direct

targeting of the research topic and allowed the knowledge, attitudes and practices of mothers towards antibiotic use to be explored, identifying influences which may affect opinions, beliefs and motivation of participants (Krueger and Casey, 2014). The first focus group was conducted during the existing timetabled playgroup session after the session had finished. This was because the room was quite small and the noise level was deemed prohibitive to recording a focus group, while the session was in progress. However, as most subsequent venues were large halls, focus groups were held during the playgroup sessions as this ensured participation. Also, mothers were more willing to participate during the playgroup session as they were often unable to stay after the session had finished. It was also more difficult to find a suitable location to hold the focus group.

Using an existing location/play session was an advantage as the mothers were all familiar with the set up and environment. Familiar surroundings provided a relaxed and open environment, which supports more insightful and detailed discussion and therefore rich data collection (Dundon and Ryan 2010). It was important to create an open, relaxed and friendly rapport with participants, ensuring it was clear there were no right, or wrong answers, no judgment in any responses or beliefs expressed and that the mothers were considered to be the experts in their children's care.

It was ensured at the start of the focus group, there was adequate time for introductions to all the participants and further study information was made available. The study was explained again, and opportunities provided for the participants to ask questions. Prior to starting the focus group, a consent form was signed and a self-reported demographic screening questionnaire completed (Appendix 10- *Mother's demographics*). All participants were reminded they could withdraw anytime without explanation, participation was voluntary and completely confidential. A disadvantage of focus groups can sometimes be that participants may feel uncomfortable in discussing sensitive topics publicly. This can in turn influence the output data (Krueger and Casey, 2014). However, in this study, mothers knew each other and therefore it was possible they felt able to speak freely in the group.

Participants were encouraged to engage in an open free flowing discussion. Safeguards to address any concerns or safeguarding issues, which might have been identified during the dialogue, were identified i.e. county council safeguarding teams and GPs. The topic guide was only used when the dialogue drifted away from the focus of the study and the intervention was kept to a minimum. Quiet or less engaged participants were encouraged with direct questions to ensure all narratives were captured. Although, it is helpful to have a second researcher available to take notes i.e. which participants said what and when, or any non- verbal behaviour (Barbour, 2013), this was not possible in this study. This was primarily due to availability of colleagues and time limitations. To ensure a robust data collection process, focus groups were digitally audio recorded, once written consent was obtained. All participants were thanked at the end of the focus group and the playgroup session was attended until the end in case there were any additional study questions.

#### ***4.4.5.2 In-depth semi structured interviews***

Participants were able to select the location of the interview. Although alternative venues were offered, such as cafes, church halls, all participant mothers chose to be interviewed in their own home, which provided a familiar and comfortable environment. This was also more convenient for the mothers as their children could play during the interview. This supported a relaxed approach and may have increased the openness of the dialogue, therefore enhancing the quality and richness of the data. It was felt mothers were open whilst being interviewed and there was a good rapport. Four mothers did not have their child present during the interview, as their child was either with grandparents or at the nursery. I had met the mothers during a visit to the playgroup session, therefore the initial rapport had already been established and study information provided. The one-to-one interviews followed a similar process to the focus groups (section 4.4.5.1). An advantage of one-to-one interviews was the researcher had direct control over the flow of the data collection process. This meant any specific or interesting points were explored during the interview in much more detail than was possible in a focus

group. However, the process of interviews does require more time to gather the data in comparison to other data collection methods (Boyce and Neale, 2006).

#### **4.4.6 Challenges with data collection**

Obtaining data from mothers with young children presented challenges. Due to the inclusion criteria the participants were carers of young children. This meant there were unpredictable noise levels and interruptions. Due to holding focus groups during playgroup sessions, there were varying levels of background noise which made it challenging at times to hear the mothers' conversations. Efforts were taken to minimise noise disruptions, by conducting the focus groups in corners of the rooms, away from the main activities and if comments were difficult to hear, I asked the participants to repeat their comments for clarity.

#### **4.4.7 Data collection**

The focus groups and semi structured interviews were guided by the topic guide (section 3.4 and Appendix 4 - *Interview Topic Guide*), which was developed from the literature review findings and to address the research question. The participants were included in the study if they had children under the age of five years (high recipients of antibiotics), could speak, read and understand English and could provide informed consent. Prior to any data collection, the format of the focus group or one to one interview was discussed and a signed written consent form obtained from all participants (Appendix 11 - *Consent form focus groups* and Appendix 12 - *Consent form interviews*).

#### **4.4.8 Data analysis**

##### **4.4.8.1 Demographics of participants**

In total there were 33 participants, 19 from across the six focus groups with a median 3.5 (range 2 to 5) participants per group, and 14 from interviews. Although the case study area consisted of the most

socio-economic and ethnically diverse population in the area, most participants were White (88%), British (64%), educated to degree level (76%) and aged between 26 and 40 years of age (87%) (Table 5). This meant it was not possible to generalise the data, as the findings reflected a small subset of the population, and this was a limitation of the study.

Table 5. Demographic characteristics of participant mothers as reported by mothers

Demographic characteristics	Category and number % (n=33)	
Education level	Degree – 25 (76%) College – 2 (6%) Doctorate – 1 (3%)	Diploma – 3 (9%) Secondary School – 2 (6%)
Ethnicity	White – 29 (88%) Asian – 1 (3%)	Black – 2 (6%) Mixed race – 1 (3%)
Nationality	British – 21 (64%) Asian – 1 (3%) Oceania -1 (3%)	European – 9 (27%) African – 1 (3%)
Age of mother	26-30 – 7 (21%) 31-35 – 10 (30%) 36-40 – 12 (36%)	41-45 – 3 (9%) 46-50 – 1 (3%)

There were no mothers under the age of 25 years in the study, as this age group did not attend the playgroups I was able to access. There were only two Black mothers, one Asian mother and one mother who described herself as mixed race recruited into the study. There were several mothers from different countries, which reflected the culturally diverse characteristics of the case setting. The majority of mothers were married (91%) and had one child (51%), with 39% having a child under two years of age. The age of participants and the number of children they had can be found in Table 6.

Table 6. Age of mothers and number of children

Age range of mothers	No. of children each participant has								Total no. participants
	1 child		2 children		3 children		4 children		
	FG	I	FG	I	FG	I	FG	I	
26-30 years	3	1	3	0	0	0	0	0	7
31-35 years	4	2	1	1	1	0	0	1	10
36-40 years	1	4	2	3	2	0	0	0	12
41-45 years	0	1	1	0	0	1	0	0	3
46-50 years	1	0	0	0	0	0	0	0	1
<b>Total</b>	9	8	7	4	3	1	0	0	33

\* FG- focus group I- interview

#### 4.4.9 Thematic analysis

##### 4.4.9.1 Rationale for thematic analysis

Thematic analysis is used to explore qualitative findings, as it enables recognition of patterns or themes within and across qualitative data (Ritchie and Lewis, 2003). It is a method and therefore does not follow any particular philosophical perspective but provides flexibility to develop the research design (Braun and Clarke, 2006, 2013). Within thematic analysis codes are used to identify words and chunks of narratives, which can develop into themes (Ritchie *et al.*, 2013). There are six distinct phases of thematic analysis, as described by Braun and Clarke (2006): data familiarisation; generating initial codes; searching for themes; reviewing themes; defining and naming themes; and producing the report. For this study, thematic analysis was considered to be the most appropriate analysis method, to explore the experiences, views and perceptions of the participant mothers. This included capturing their views, experiences, beliefs, and providing contextual perspective questions, which may have provided insights into the influences of societal expectations and structure towards the issue (Braun and Clarke, 2013), namely antibiotic usage.

#### **4.4.9.2 Initial coding**

The transcripts from both the focus groups and one-to-one interviews were transcribed by myself as the researcher and all identifying details were removed to protect confidentiality and anonymity of the participants. It took a substantial amount of time to transcribe verbatim all 20 transcripts (about 80 hours). However, by personally transcribing the narratives it was possible to immerse myself within the data, which provided early identification of any similarities or early commonalities. Transcribing the narratives personally, also enabled the participant stories to be clearly heard, and assisted in the identification of the initial themes and commonalities, whilst being carried on throughout the analysis. All twenty transcripts (six focus groups and 14 interviews) were coded by hand, line-by-line. There are computer software programmes available to manage qualitative data, which can make the data analysis quicker and easier to manage (Elliot, 2018). However, coding by hand was chosen, to enable immersion and connection with the data (Basit, 2003). The allocation of codes to data also enables similarities and differences in the data to be mapped, providing an overview of how the data contributes to the research study (Elliot, 2018). Codes were assigned to identify similar and common points within the narratives and generated to describe or highlight information that may be important or relevant to the research study (Gale *et al.*, 2013). Both focus groups and one to one interview data were analysed together. Initial codes were identified and discussed with the supervisory team to increase rigour in the analysis of the data (Bryman, 2012). The supervisory team met regularly and discussed the findings to ensure the themes accurately reflected the narratives. This involved double coding several transcripts, by two of the supervisory team, who were both experienced qualitative researchers (JA, CH), after which the codes and themes were further discussed and compared. This was an important and beneficial process which was done to enhance rigour in the data analysis. The process of double coding and cross checking the assignment and development of codes contributed to the rigour of the study, by providing and assurance that themes were being collated and identified appropriately. The whole process provided transparency for the research study, and oversight of the

findings, analysis and conclusions. These generated codes were then initially written onto post-it notes and grouped into similar themes via colour coding (Figure 2).



Figure 2. Compiling groups of coded text to develop initial themes

Codes were continuously reviewed and refined by moving back and forth across the transcripts before being finally collated into early sub themes and themes. These were discussed within the supervisory team before final agreement of the main themes was reached.

This in-depth line by line data analysis enabled an inductive emergence of themes (see Appendix 13a and 13b -*Examples of transcripts*- themes, sub themes and codes), rather than trying to fit any preconceived ideas into a pre-existing framework, which may have been influenced by personal beliefs or preconceptions.

#### **4.4.9.3 Defining and naming themes**

The data was charted using a Microsoft Excel® 2016 spreadsheet to capture the content of each transcript. Using this approach also allowed the large data set to be more easily managed, whilst being analysed, increasing the credibility and rigour of the findings (Ritchie and Lewis, 2003). The spreadsheet was used to provide a framework to order and manage the data and consisted of columns (participants) and rows (codes). This process enabled the researcher to manage the data so it could be analysed by codes (Ritchie and Lewis, 2003). Each cell summarised the data and recorded participant quotes from the transcripts to illustrate the codes. To further manage the data and once the codes identified were felt to be correct, codes were grouped together into possible sub themes to allow constant comparison across the data (Cohen *et al.*, 2000). The final framework was then used to index and order data from the interviews and focus groups. This involved labelling all data according to the sub themes and adjusting the framework for any incidences of data which provided new concepts. The codes were lastly organised into the emergent themes. A theme “captures something important about the data in relation to the research question and represents some level of patterned response or meaning within the data set” (Braun and Clarke, 2006, p. 82). The resultant themes offered visual presentations of the data, showing how the codes were finally clustered together and were positioned within sub themes (Figure 3) and finally themes (Figure 4). Further examples of the *progression from the raw study data to the development of themes are provided in Appendix 14- Examples of theme and sub theme development from the initial coding.*

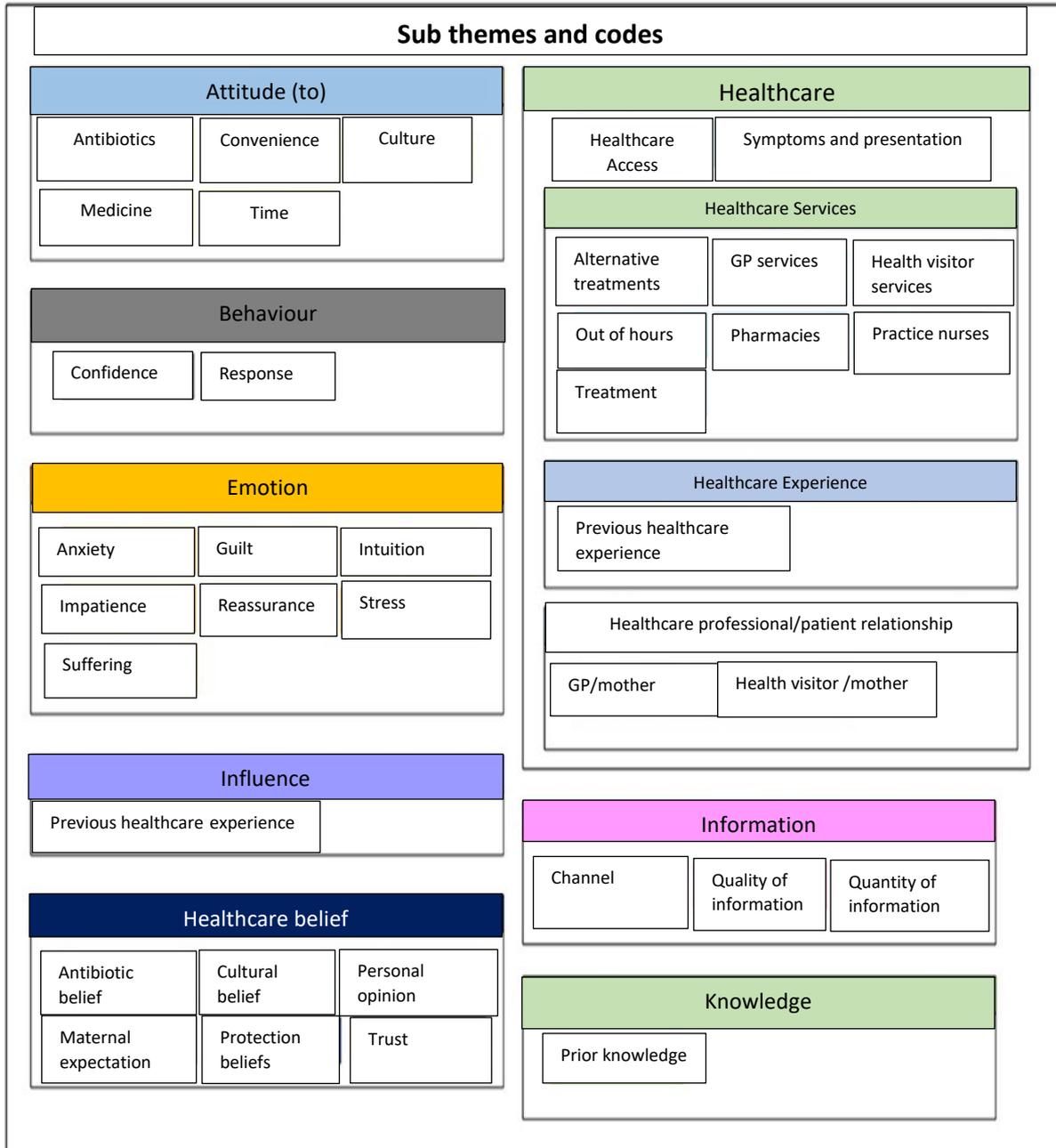


Figure 3. Sub themes and codes

This whole analysis process was very organic and codes did move across themes, until a final consensus was reached. An example of such a code was maternal anxiety, which was ultimately assigned to the sub theme of emotion (Figure 4), however anxiety could be related to three of the identified themes, which will be presented in Chapter 6. This charting of the data allowed easy

comparisons across the focus groups and interviews (Gale *et al.*, 2013). Interpretation and mapping the data involved assessing the similarities across the data sets and any connections.

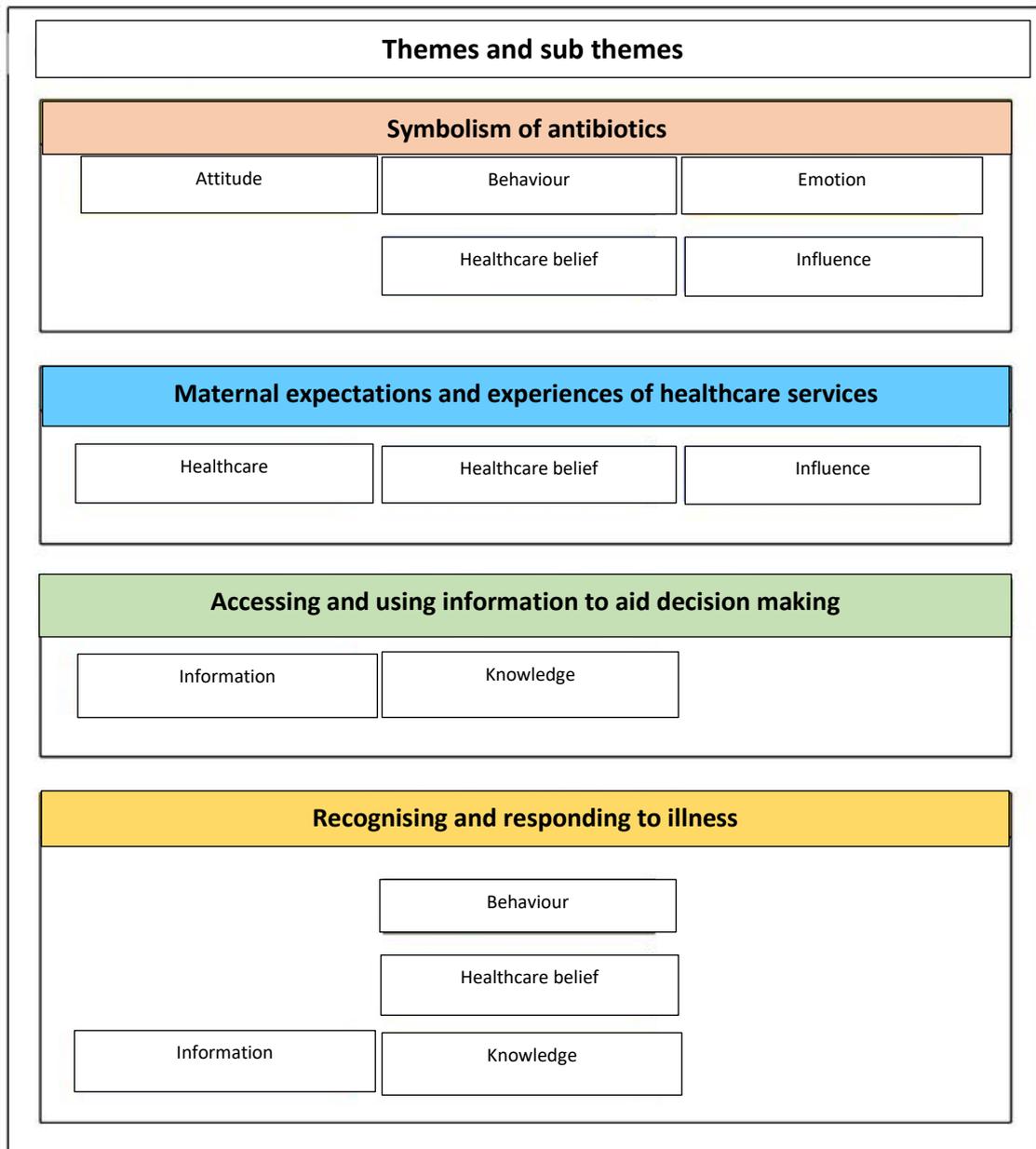


Figure 4. Themes and sub themes

Throughout the data analysis process, the study findings were shared and discussed with the supervisory team. Each of the codes were illustrated with analytic summaries which provided clear examples of how the themes were identified and the analysis process. This 'thick description'

enhanced the transferability of the study findings (see section 4.10.1). Following lengthy discussion, the final themes were reviewed and agreed by the supervisory team.

Data analysis took place over several months and was iterative by moving back and forth across the different data sets, between collection and analysis, and using the findings to build on and shape the findings. Findings indicated that the quality of relationships with health care professionals was very important to mothers, as was any previous experience of managing illness. These were similar findings from the literature review. However, this study has also identified new insights and concepts which may also influence parental behaviour and antibiotic seeking behaviour, including antibiotic symbolism and the impact of austerity on maternal decision making.

For example, the literature review identified the importance of past experience and maternal beliefs on decision making but did not recognise or explore in-depth possible underlying reasons such as the symbolic power of antibiotics. Further detailed modelling was completed before the final themes were identified (Table 7).

Across the data set, the symbolic power of antibiotics was identified as a theoretical concept underpinning the mothers' narratives. Antibiotic symbolism offered a link between the identified themes as to what influenced maternal decision making. Mothers trust in the efficacy of antibiotics to effectively treat and protect their children and this influenced their response to managing their children's illness. For example in theme 1- recognising and responding to illness, mothers assessment of illness and severity informed their response, and they believed some symptoms require antibiotics for recovery. This belief in requiring antibiotics may be enforced by seeking and obtaining further information (theme 2- accessing and using information to aid decision making) for example treatment of ear infections, which in some cases do require antibiotics treatment. Once the decision to access healthcare services had been taken by the mothers (theme 3- maternal expectations and experiences

of healthcare services, mothers were often prescribed antibiotics which reinforced their trust and belief in antibiotic efficacy.

Table 7. Themes, sub-themes and codes

Themes	Sub-themes	Codes
Recognising and responding to illness	Presentation of illness and initial treatment	Symptoms and presentations Alternative treatments Changes in children's behaviour
	Initial decision making and maternal response	Confidence Response Influence of self and others
Accessing and using information to aid decision making	Information sources	Mode of delivery Trustworthiness of information
	Innate versus expert knowledge	Prior Knowledge Knowing their child/ Intuition
Maternal expectations and experiences of healthcare services	Importance of being seen	Expected outcome from visit and access/diagnosis Organisation trust Assessment of severity
	Experience and accessibility to healthcare services	GP /Out of hours Services Health Visitor Services Role of practice nurses Pharmacy Services Impatience /Convenience/ Time Delayed prescriptions
	Importance of relationship between healthcare professionals and mothers	GP and mother relationship Health Visitor and mother relationship
Symbolism of antibiotics	Antibiotics as a safe and trusted treatment option	Trust in antibiotics/medicine Past experience Maternal beliefs Necessary treatment
	Antibiotics as agents of recovery and healing	Cultural beliefs Emotional response - Anxiety /Stress/ Suffering/ Guilt Active response Expectations of others Being a good mother / seek reassurance

It should be acknowledged symbolism was one of a number of different theoretical models which could have been used to view the emergent findings. For example one model was health belief. This model posits that people will take action to prevent illness if there is perceived susceptibility; perceived severity; perceived benefits to taking a particular course of action or there are few

perceived barriers related to the health action (Glanz and Bishop, 2012). However, symbolism was chosen for its pre-dominance within the findings from the data.

#### **4.5 Data saturation**

The validity and quality of qualitative research is bound by attaining data saturation (Kerr, Nixon and Wild, 2010). This is usually achieved when there is no new information identified (Morse, 1995; Sandelowski, 1995), or it is not viable to continue coding (Guest, Bunce and Johnson, 2006). Data saturation has also been defined as when sufficient information has been collected to allow study replication (Walker, 2012; O'Reilly and Parker, 2013). It was estimated a sample size of about thirty participants would be required, based on the aim of the study and others similar qualitative studies (Cabral *et al.*, 2014a; de Bont *et al.*, 2015). It was also based on established theory (Malterud, Siersma and Guassora, 2016), pragmatic reasons (number of playgroups who consented to participate), and to address the research question (Mason, 2010). The data was iteratively analysed following each focus group and interview and data saturation was considered to have been reached when no new themes emerged (Given, 2016).

#### **4. 6 Integration and analysis of quantitative and qualitative data sets**

As presented in Chapter 3, mixed methods integrate and analyse both quantitative and qualitative data (Creswell and Plano Clark, 2018). The integration of different data sets enables a more in-depth appreciation of the research study and should take place prior to any final data conclusions (Bazeley, 2020). As this was a sequential mixed methods case study, phase one involved the collection and analysis of data regarding GP antibiotic prescribing practices, prior to the qualitative phase. The results from phase one influenced some of the questions for phase two, for example, maternal attitudes to accessing out of hours primary care services. The process of integrating both data sets provided clearer, more in-depth and richer findings (Teddlie & Tashakkori 2010).

## **4.7 Data Confidentiality and Anonymity**

### **4.7.1 Security of data**

Personal participant information was confidentially collected and managed in accordance with General Data Protection Regulation (GDPR) and adhered to the Data Protection Act (1998). All data (digital recordings and transcriptions) was securely stored on an encrypted memory stick. Following collection, they were transferred to a password protected computer. During analysis paper transcripts were locked in a secure cabinet, in swipe-access protected and locked offices in the university. Confidentiality of data was maintained by ensuring all data used was de-identified so no one person could be identified. Data will be securely stored, as per university regulations, for 10 years.

## **4.8 Ethics**

Ethics approval was obtained from the Oxford Brookes University Faculty Research Ethics Committee (February 2017) and from the National Research Ethics Service (NRES) following presentation of the study at the regional ethics review meeting (May 2017- application 217969). The four basic principles of ethical research; respect for persons, beneficence, non-maleficence and justice were followed throughout the study (Belmont and Childress, 2001).

### **4.8.1 Respect for persons**

Respect for persons recognises people to be autonomous, that they should be respected, and have control throughout the research process (Belmont, 1979; Beauchamp and Childress, 2013). To achieve this, participants must be able to give informed consent and have a clear understanding of the research process, their rights and how their anonymity and confidentiality will be protected (Wiles *et al.*, 2005). In this study participation was entirely voluntary, with no coercion or unfavourable effects

and participants were free to withdraw at any time with no adverse consequences (Orb, Eisenhauer and Wynaden, 2001). Written and verbal consent was obtained prior to any participation in this study.

#### **4.8.2 Beneficence**

Beneficence relates to treating people respectfully and acting in a manner to protect their wellbeing. In research, it is the responsibility of the researcher to ensure that the participant receives no harm from participation and the risk and any benefits are balanced. Participants are treated in an ethical manner, not only by respecting their decisions and protecting them from harm, but also by making efforts to secure their wellbeing (Belmont, 1979; Beauchamp and Childress, 2013). In this study, written and verbal information was provided for the participants, prior to data collection, including an opportunity to ask any questions.

#### **4.8.3 Non maleficence**

This relates to the principle that harm should not come to individuals because of their participation in a research project (Belmont and Childress, 2001). It was acknowledged that the research questions might elicit some emotional responses from the participant mothers, who might recall an upsetting or distressing experience relating to their child's illness and their decision making. It was made clear to the mothers that participation was voluntary, and they were free to withdraw at any time. I ensured participants were treated respectfully, fairly and provided with clear information regarding the aim of the study. The study information was provided in advance of the data collection to ensure participants had time to read and ask questions, before informed consent was obtained.

#### **4.8.4 Justice**

Justice ensures everyone has a fair opportunity to participate in the study and no-one is excluded. Participants should not be disadvantaged or exploited in any way, due to taking part in the research,

and there should be equality in any risks and benefits involved (Belmont, 1979; Beauchamp and Childress, 2013). A potential risk associated with participation in this study includes the recall of a stressful or negative experience and the associated unpleasant feelings. Benefits from participation may include feeling more confident and informed regarding their decision making regarding antibiotics usage for their children. To achieve this, I ensured the participants knew they could withdraw at any time, without providing an explanation, from the study.

#### **4.9 Data Limitations and Quality**

Firstly, although a large GP practice provided antibiotic prescribing data, this was the only one out of eight GP practices within the case. Additional data from across the case would have provided more information to analyse, including more detail on child demographics or characteristics. It was not clear if the different GP practices recorded the same information. However, of the data provided, there was no detail on whether the consultations were for the same child and the data did not always provide the rationale for the antibiotic prescribing. Also, it was possible a child could re-present to the GP for further consultation, which may then result in antibiotics, when the first consultation perhaps did not. Unfortunately, this information was not captured in the data and therefore cannot be determined. The data system also relies on manual data entry, which increases the risk of inaccurate or incompleteness in data collection. For example, in this study, 13% of consultations were not coded. This meant information was missing on the diagnosis and rationale for the antibiotic prescription. Missing data also included information on the actual dose prescribed for the child, as the records only documented the antibiotic quantity dispensed. Therefore, it was not possible to know if the dose and duration of the prescription was appropriate for the condition being treated. The prescribers may also be different and therefore personal clinician preferences may have influenced prescribing practices.

## 4.10 Rigour and Validity of data

### 4.10.1 Approaches to rigour

It is important to ensure the rigour and validity of data. To achieve transparency of the methods and subsequently assessment of the data quality, full details must be provided of the study design, sampling strategy, data collection and analysis methods (Bryman, 2012). Qualitative research can be criticized as being biased, small scale, anecdotal, and/or lacking rigour (Anderson, 2010). However, qualitative research seeks to explore understanding, beliefs and feelings which cannot be measured and therefore addressed using quantitative methods (Maxwell, 2013). Universal agreement seems to have been reached however, that quality concepts developed for quantitative research such as generalisability, validity, reliability and replicability cannot, nor ought to be applied to qualitative research (Spencer *et al.*, 2003, Polit and Beck, 2010). In this study the qualitative component was the dominant data and therefore it was appropriate to apply the criteria for judging qualitative data. To determine the rigour in qualitative research, strategies to address the research's credibility, dependability, confirmability, and transferability have been proposed (Lincoln and Guba, 1985). Other strategies to promote and ensure rigour are identified by Houghton *et al.* (2013) (Table 8).

Table 8. Strategies to determine rigour (Houghton *et al.*, 2013)

Approaches to rigour	Strategies
<b>Credibility</b>	<ul style="list-style-type: none"><li>• Prolonged engagement and persistent observation</li></ul>
<b>Triangulation</b>	<ul style="list-style-type: none"><li>• Peer debriefing</li><li>• Member checking</li><li>• Dependability Audit trail</li></ul>
<b>Reflexivity</b>	<ul style="list-style-type: none"><li>• Confirmability Audit trail</li><li>• Reflexivity</li></ul>
<b>Transferability</b>	<ul style="list-style-type: none"><li>• Thick descriptions</li></ul>

#### **4.10.2 Credibility**

Credibility refers to the plausibility and importance of the findings (Noble and Smith 2015; Lincoln and Guba, 2018). It is deemed that prolonged interaction with the research, increases its credibility (Lincoln and Guba, 2018). Researchers need to invest adequate time in the research environment to gain enough information about the issue being investigated (Patton, 2015). In this research study, data was derived from focus groups held over six months across the case study locality. Participants from all areas of the case were sought to provide a broad and varied insight into their experiences. Demographic details were obtained from the participants and general themes explored.

#### **4.10.3 Triangulation**

Triangulation provides an important way of ensuring the validity of research and refers to using multiple methods or data sources to investigate and develop a detailed insight into a phenomenon (Burns and Grove, 2005; Heale and Forbes, 2013; Noble and Heale, 2019). Triangulation is important as it verifies or confirms the research data, as well as ensuring its completeness (Casey and Murphy, 2009). The use of multiple sources of data enhances credibility of the research and by collating, exploring and incorporating information from multiple sources, research findings are deemed more valid (Noble and Heale, 2019). This is because when consistent findings and results are identified across the data set, increased confidence occurs and enhances study credibility (Knafl and Breitmayer, 1991; Flick 2018). For this research study, multiple sources of data were used (section 3.4). To further strengthen the process of data interpretation, the supervisory team also reviewed and discussed the quantitative data. This was important to confirm and agree the interpretation of the quantitative data analysis, as these results were explored further in the main qualitative phase of the study. The transcripts from the qualitative data were also reviewed by members of the supervisory team, and regular discussions held, to debate the emerging themes and findings.

#### **4.10.4 Reflexivity**

Within qualitative research there is also risk of researcher subjectivity. Personal interpretations of research results may be influenced intentionally or unintentionally by pre-existing experiences, views or attitudes, therefore reducing bias is important to ensure rigour is applied to research findings (Noble and Smith, 2015). To minimise researcher bias, a reflexive approach to the research process is now widely accepted as essential within qualitative research (Mortari, 2015). The purpose of using reflexivity is to ensure the research is clear and transparent to the reader, regarding the thought processes and decision making of the researcher during the research process (Barrett, Kajamaa, and Johnston, 2020). It is important to acknowledge the values, culture, professional background and individuality of the researcher, rather than focusing on controlling them. Patton (2015) advocates that using a reflective approach when conducting interviews establishes rigour to the study, and provides an audit trail, which in turn contributes to the credibility of the study's final conclusions (Lincoln and Guba, 1985).

Reflexivity in the current study was maintained by capturing personal thoughts and ideas by using a reflective diary. A reflective diary can be used by the researcher to explore and appraise one's own personal views, beliefs and assumptions (Russell and Kelly, 2002). This was a helpful approach as throughout the study I was acutely aware that my own personal experiences as a mother and a healthcare professional may influence the research process (Bernard, 2012) and I endeavoured to maintain impartiality at all times. I felt the participants were able to identify with me, as a mother and this encouraged open and relaxed interaction between myself and the mothers, which strengthened the data provided. However, I was also mindful my personal views did not influence any interpretation of the data and to minimise any personal bias there was extensive discussion with the supervision team at all stages of the study. By adopting a reflexive approach when conducting research and discussing the findings with the supervisory team, I sought to address and minimise any existing bias, thereby strengthening the credibility of the research.

## **4.10.5 Subjectivity**

### **4.10.5.1 Participant subjectivity**

Participant subjectivity may also influence who chooses to take part in the study. For example, if a mother was interested in primary care services and health, they may be more likely to participate in related research studies (responder bias). There is also a chance the participant may respond to research questions, based on what they perceive are the expected answers, rather than what they think or feel (Smith and Noble 2014). However, it was felt this did not seem to occur. As the recruitment strategy for the study was via playgroups, there was also the potential for economic bias, as some mothers may need to work and therefore are unable to attend playgroups.

### **4.10.5.2 Recall bias**

Qualitative data relies on how events and experiences are remembered and described by the research participants (Palacios, Benissa and Hodge, 2015). There are several factors which may affect the accuracy of how the event or experience is remembered. For example, events which have occurred after a prolonged period of time may affect the accuracy of the recalled memory (King and Horrocks, 2010). Personal memories can also be influenced by the emotional state of the person at the time of the event and the time of recollection (Bietti, Stone, and Hirst, 2014). Therefore, as the mothers were recalling a stressful incident (managing their unwell children), this may have affected their perspective of the event, rather than the actual event itself (Halls *et al.*, 2017).

### **4.10.5.3 Procedural subjectivity**

A study protocol was also developed and used to minimise procedural subjectivity (Appendix 15- *A Research Protocol*). The protocol was used to ensure the research design was clear and transparent, including the process for data collection (Bryman, 2012). The topic guide ensured there were no

leading or closed questions in the interviews and focus groups, allowing free flowing and honest responses.

#### **4.10.6 Transferability**

Transferability refers to the extent that the research findings can be applicable to another setting, situation or group (Graneheim and Lundman, 2004). For an individual to make a judgement on how the research has been conducted and how transferable the findings are, the study must be adequately described (Koch, 2006). The responsibility of the researcher lies in providing detailed descriptions for the reader to make informed decisions about the transferability of the findings to their specific contexts (Stake, 2000; Bogdan and Biklen, 2003; McKee, 2004; Lincoln and Guba, 2018). The emphasis should be on creating ‘thick’ descriptions, including accounts of the context, the research methods and examples of raw data, so that readers can consider their interpretations (Stake, 2005; Dawson, 2019). Ultimately, the reader can decide whether the findings are transferable to another context (Graneheim and Lundman, 2004). A rich and rigorous presentation of the findings, with appropriate quotations, also enhances transferability (Graneheim and Lundman, 2004).

#### **4.11 Chapter summary**

This chapter presented the methods used in this case study. The setting, access and recruitment of participants within the case, including criteria for inclusion and challenges in recruitment were discussed. The process for both the quantitative (phase one) and qualitative (phase two) phases were presented, with detailed description of the case setting, recruitment, data collection, and management of data confidentiality. Data analysis of each phase including how the results for phase one and the findings from phase two, were integrated according to the mixed methods approach. The chapter has concluded with consideration of the importance of ethical issues and data quality. The next three chapters will present the results and findings in detail from both study phases, with Chapter

6 and 7 specifically addressing phase two and the qualitative findings. However, the next chapter will present the findings from phase one of the study relating to the quantitative GP prescribing data.

# Chapter 5: Antibiotic Prescribing Practices in Primary Care

This chapter contains work from a published paper (Appendix 16- *Bosley, H., Henshall, C., Appleton, J.V., Jackson, D. (2021) 'Mixed methods case study exploring primary care antibiotic prescribing practices and maternal expectations of using antibiotics in children', Contemporary Nurse,* <https://doi.org/10.1080/10376178.2021.1994865>).

## 5.1 Introduction

In this chapter, the phase one quantitative results from the research study are presented and analysed. This was the first stage of the mixed methods approach as discussed in Chapter 4 (section 4.3). This chapter addresses the research objectives:

- To collect quantitative primary care antibiotic prescribing data for children under five years of age within the case setting and perform descriptive and statistical analysis of the data
- To determine the incidence of antibiotic prescribing in primary care for children under five years of age using quantitative data

This quantitative data was obtained from a single GP practice within the case (section 4.3.4). Data provided detailed the incidence of antibiotic prescribing for children under five years of age, over the period of one year. The results of the phase one data analysis have been presented in the context of national prescribing practices and the implications on local and national practice.

## 5.2 Data analysis

### 5.2.1 Local and national practices

As previously identified in the thesis introduction (section 1.3), the results identified that children under five years were often prescribed antibiotics following a GP consultation. To set the context of the phase one results, the local and national prescribing data are presented together. The local and national prescribing data is secondary data submitted by practices via a national reporting system (section 1.4).

Data collection was from July 2016-July 2017 (a full year) and presented as quarterly (3 months blocks): Quarter 2 July-September 2016, Quarter 3 October- December 2016, Quarter 4 January-March 2016 and Quarter 1 April- June 2017. The phase one results will present the local antibiotic prescribing within the case and national prescribing data will provide a contextual picture of antibiotic prescribing practices in England, the local CCG and the case (Table 9).

Table 9. Total number of prescribed antibiotic items per 1000 registered patients (all ages) by quarter for case in England

Period	Case rates	NHS local CCG rates	England rates
<b>July-September 2016 – Q2</b>	127.0	111.7	132.8
<b>October-December 2016- Q3</b>	107.7	107.5	125.5
<b>January-March 2016- Q4</b>	116.7	126.7	150.0
<b>April-June 2017- Q1</b>	126.5	120.9	146.2

Source: PHE Fingertips, accessed :31/07/19

Following analysis of the GP data from the case, it was identified that the total number of antibiotics, prescribed as items per 1000 registered patients, were lower than the antibiotic prescribing rate for the rest of England. However, within the local CCG (countywide) the case prescribing was comparable, to other GP practices in the county. Nonetheless as only one GP practice submitted

antibiotic prescribing data from the case, any interpretations within a wider context are unknown.

## 5.2 Results from GP prescribing data analysis

A total of 687 children were seen within the GP practice, over a full year. This equated to 342 males, and 345 females. The GP data was summarised and as discussed in Chapter 4 (section 4.3.7), due to the lack of details provided, descriptive statistical analysis was undertaken. For categorical variables, chi-square tests were used to identify if there were any significant relationships between them (e.g. age group, day of week, treatment).

### 5.2.1 Seasonal variation and days of consultations

Data was captured over a year (July 2016 - July 2017) to capture any seasonal variations in antibiotic prescribing practices. The data included the number of GP consultations in children under five, within the case (Figure 5). Most prescriptions were issued in the colder winter months between November and January.

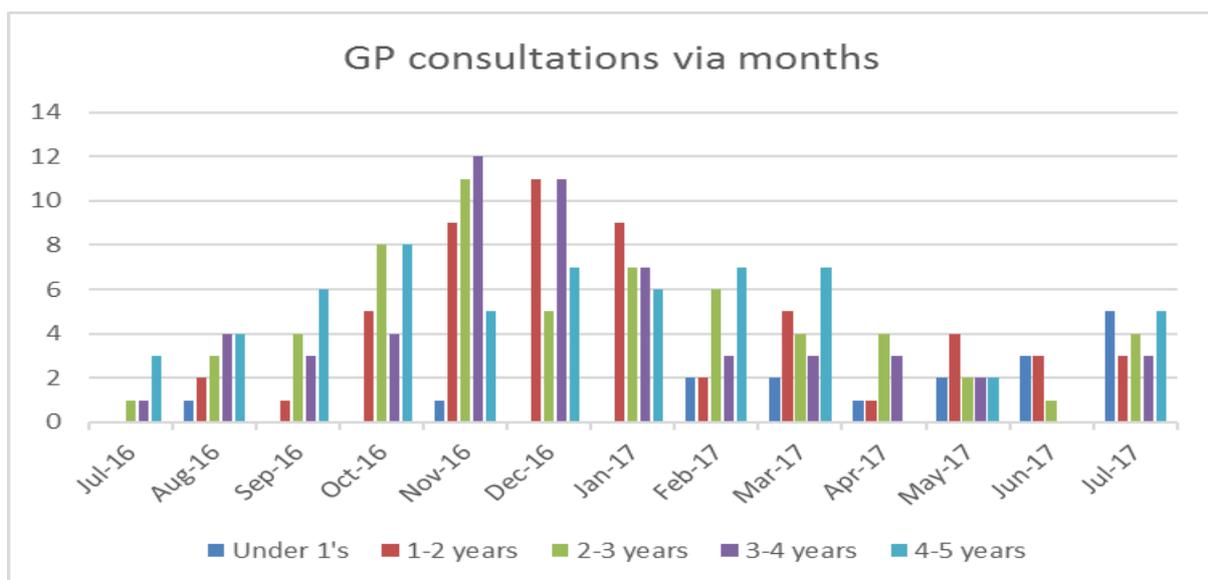


Figure 5. Seasonal variations for GP consultations

As discussed in Chapter 4, the relationship between the days of the week the antibiotics were

prescribed, and the age of the child was analysed. Children were prescribed antibiotics on the same day of the consultation. Overall, across the age groups, slightly more children were seen on a Thursday and Friday (Figure 6).

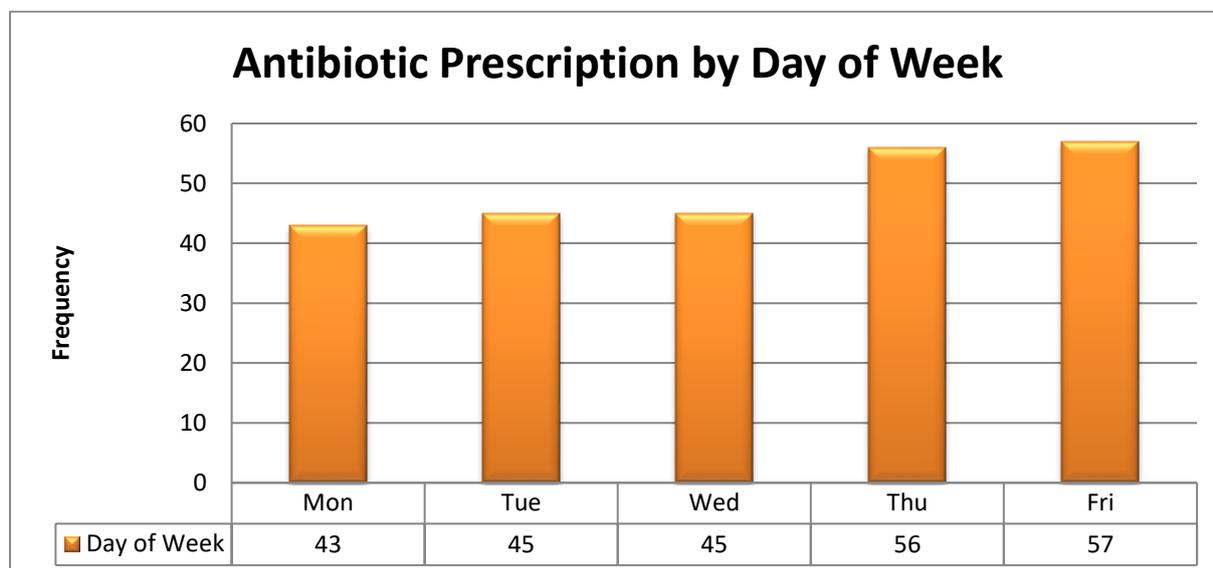


Figure 6. Antibiotic prescription by day of week

To explore further, statistical (chi-square) tests were made to explore whether the days of the week were significant for each child age group (section 4.3.7.2). However, analysis identified there was no statistically significant day of the week for consultations in any of the age groups. In each age group, the test statistic was not more than the critical value of 9.49 ( $p=0.05$ ), so the null hypothesis (presented in section 4.3.7.2), that there was no relationship, was accepted in all cases. Table 10 below provides a summary of the following results.

Table 10. Chi-square Test Results

Age Group (years)	Test statistic	p-value
<b>Under 1 year</b>	5.888889	0.207601205
<b>1-2 years</b>	6.528302	0.163015848
<b>2-3 years</b>	4.474576	0.34557273
<b>3-4 years</b>	1.678571	0.794606372
<b>4-5 years</b>	3.333333	0.503668274

Although children under one year of age were more likely to be prescribed antibiotics on a Friday and were prescribed the least amount of antibiotics, this was not found to be statistically significant. Table 11 provides a breakdown of the days of the week antibiotics were prescribed for each age group.

Table 11. Antibiotics issued by day of the week

Antibiotics issued by day of the week										
Age of child	Monday		Tuesday		Wednesday		Thursday		Friday	
(years)	%	No.	%	No.	%	No.	%	No.	%	No.
<b>Under 1 year</b>	22%	4	22%	4	11%	2	6%	1	39%	7
<b>1-2 years</b>	23%	12	11%	6	17%	9	32%	17	17%	9
<b>2-3 years</b>	12%	7	15%	9	25%	15	22%	13	25%	15
<b>3-4 years</b>	18%	10	16%	9	18%	10	25%	14	23%	13
<b>4-5 years</b>	17%	10	28%	17	15%	9	18%	11	22%	13
<b>Totals</b>		<b>43</b>		<b>45</b>		<b>45</b>		<b>56</b>		<b>57</b>

The day of the week antibiotics were prescribed were not statistically significant for any age group. The second lowest prescribing rate was in children aged 1-2 years of age (36.5%). They were more commonly prescribed antibiotics on a Thursday (32%). Children aged 2-3 years old were most frequently prescribed antibiotics Wednesday and Friday. GP consultations in 3-4 years old were more frequent towards the end of the week, Thursday (25%), followed by Friday (23%). For children aged 4-5 years, Monday was the most frequent day to be issued antibiotics (28%). Figure 7 summarises the days of the week antibiotics were prescribed per age group.

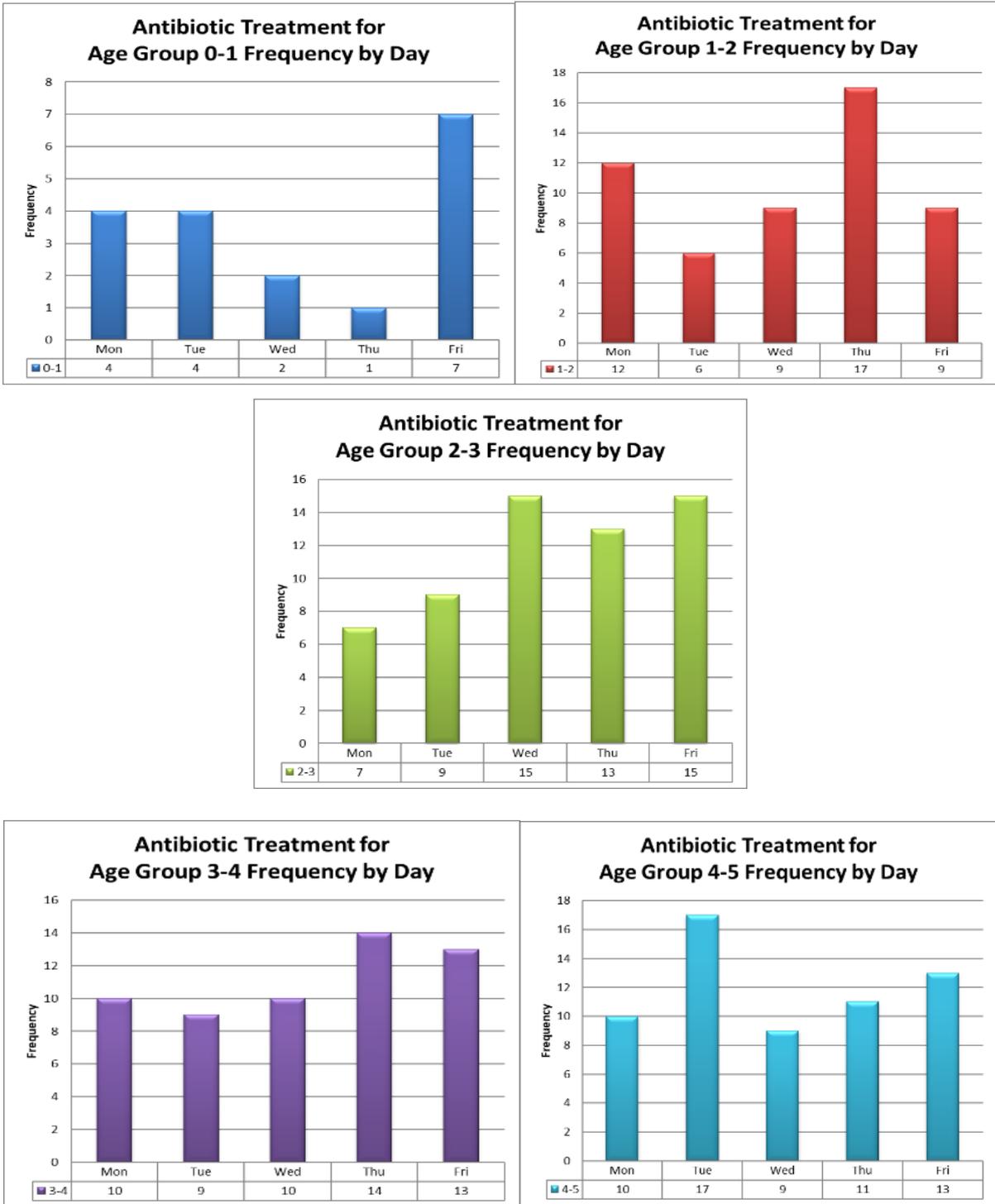


Figure 7. Antibiotic Treatments by Age Group

**5.2.2 Consultations resulting in antibiotic prescriptions by age group**

Although the overall data summarised the sex of the children seen, this was not recorded for each individual consultation. Therefore, it was not possible to identify if more male children or female

children were prescribed antibiotics. The data recorded that similar numbers of children, per age group, were seen by the GP. However, there were differences in the overall number of antibiotics prescribed for the different age groups. Children under one year of age did not receive as many antibiotic prescriptions as the older age groups (Figure 8).

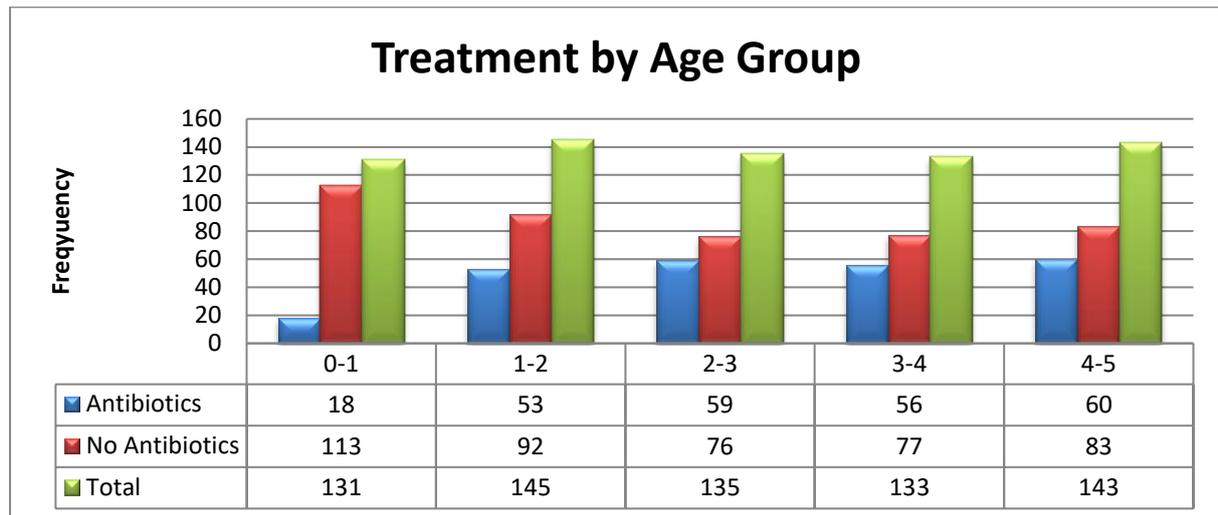


Figure 8. Number of consultations resulting in antibiotics prescriptions by age group

Only 13.7% (n= 18) of consultations in the birth to 1-year age group resulted in an antibiotic prescription, compared to 36.5% (n= 53) of children aged between 1-2 years of age. The number of children receiving antibiotics following a consultation across the 2-3 years, 3-4 years and 4-5 years age groups were similar. Children aged between 2-3 years of age received the highest number of antibiotics (45%, n=59), compared to 42% of children aged between 3-5 years (Table 12).

### 5.2.3 Common infections receiving antibiotics

Only basic information including the age of child, consultation date, type of antibiotic prescribed, and condition was recorded within the primary care dataset. However, the data did generally record the common infections seen by the GPs which resulted in an antibiotic prescription. The top two infections were chest followed by ear infections. Other infections treated with antibiotics, but in smaller numbers, included soft tissue, rashes, sore throat and impetigo.

Table 12. Number and percentage of children prescribing antibiotics following GP consultations per age group.

Age range of child (years)	Number of antibiotics prescribed following GP consultation	Percentage of children prescribed antibiotics following GP consultation
<b>Under 1 year</b>	18/131	13.7%
<b>1-2 years</b>	53/145	36.5%
<b>2-3 years</b>	59/135	45%
<b>3-4 years</b>	56/133	42%
<b>4-5 years</b>	60/143	42%

The most common infections treated with antibiotics in children under one year of age were jointly ear and chest infections (22.2%). Children aged between 1-2 years old were most frequently prescribed antibiotics for chest infections or coughs (37.7%), followed by ear infections (20.7%). Respiratory infections such as coughs or chest infections were the most common infections treated with antibiotics in 2-3 years old children (35.5%), followed by ear infections (11.8%). In children aged 3-4 years, 26.8% of antibiotic prescriptions were for chest infections or chesty coughs, followed by 23.2% of antibiotic prescriptions for ear infections. A diagnosis of a chesty cough (26.6%) or chest infection (10%) collectively resulted in 36.6% of antibiotic prescriptions in children aged 4-5 years old. The second most common infection treated with antibiotics in this age group (16.6%) was ear infections (Table 13).

Table 13. Top two reasons children received antibiotics per age group

Age range of child (years)	Total number of children receiving antibiotics	Top two infections treated with antibiotics	Children treated with antibiotics for infection	
			Number	%
Under 1 year	18	Chest infection /cough	4	22.2%
		Ear infections	4	22.2 %
1-2 years	53	Chest infection/cough	20	37.7 %
		Ear infections	11	20.7 %
2-3 years	59	Chest infection/cough	21	35.5 %
		Ear infections	7	11.8 %
3-4 years	56	Chest infection/cough	15	26.8%
		Ear infection	13	23.2%
4-5 years	60	Chest infection/cough	22	36.6%
		Ear infections	10	16.6%

#### 5.2.4 Local prescribing practices

The overall GP antibiotic prescribing practices in the case were reviewed and compared against the primary care prescribing guidelines. In the GP practice data provided, if the diagnosis was recorded alongside the antibiotic prescribed, this enabled a comparison of antibiotic appropriateness against the infection to be made against the local CCG prescribing guidelines. It was therefore possible to gain an insight into the most used antibiotics in young children and their appropriateness. The different antibiotics prescribed within the one GP practice are presented in Figure 9. However, due to only one GP practice providing the prescribing data it is not possible to extrapolate these results to the whole case and further data and research is needed.

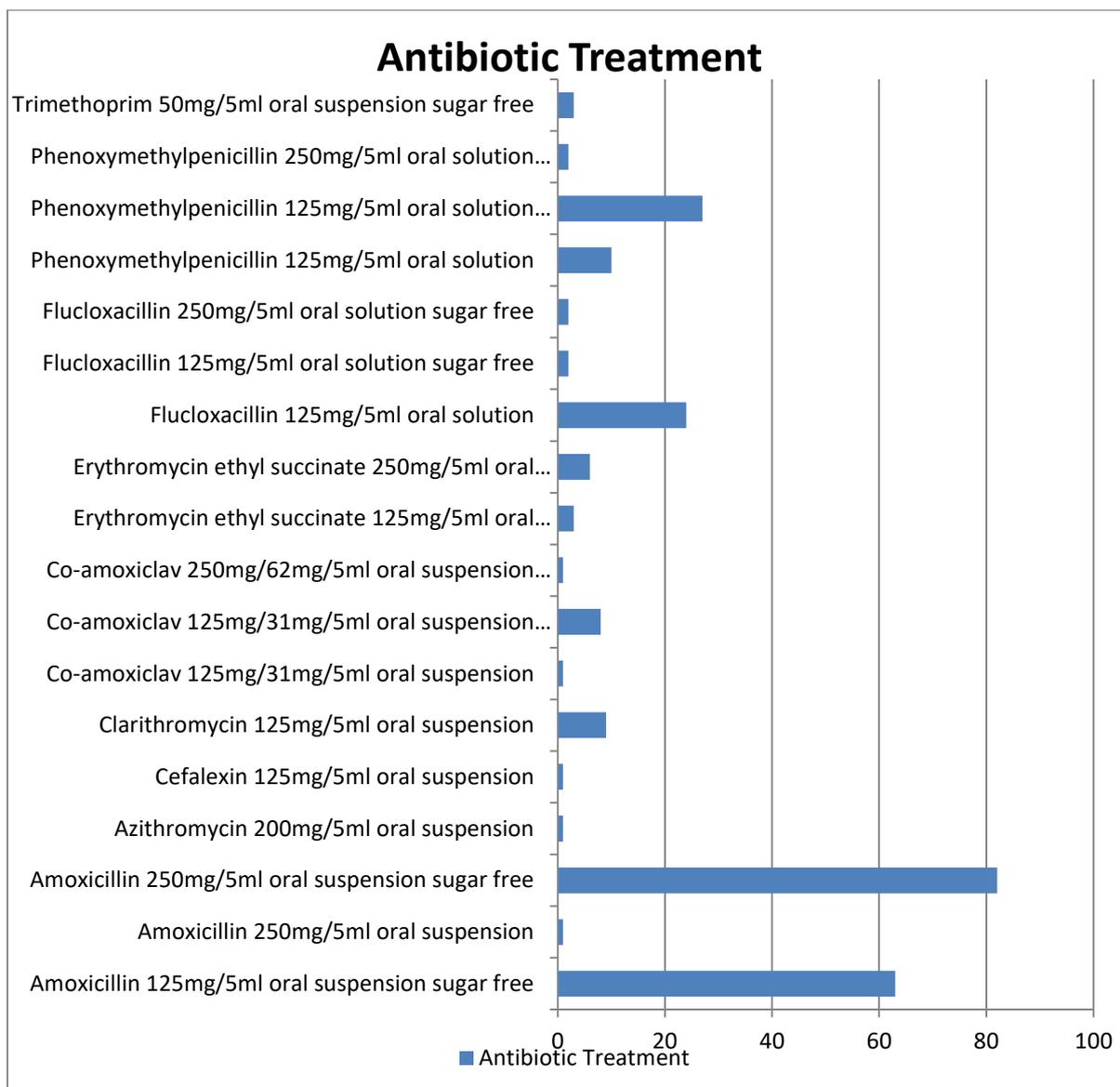


Figure 9. Antibiotics commonly prescribed within the single GP practice

The CCG primary care antibiotic prescribing guidelines identify and recommend first and second line antibiotic treatment based on the diagnosis and age group. Data analysis from the single GP practice identified the highest antibiotic prescribing compliance was in children aged between one and two years old (84.9%) followed by children under one year of age (83.3%). This means most children were prescribed antibiotics in accordance with their age group and local guidelines. However, in the other age groups there was more variation in antibiotics compliance with the prescribing guidelines. In children aged 2-3 years old, 77.9% were prescribed antibiotics in line with guidelines. This dropped to 76.7% in children aged 3-4 years old and to 71.6% in children aged 4-5 years old (Table 14).

Table 14. Most frequently prescribed antibiotics per age group in a single GP practice

Age range of child (years)	Top two antibiotics prescribed in age group	Number of prescriptions	% of prescriptions	% prescriptions within guidance
Under 1's	Amoxicillin	10 /18	55.55%	83.3%
	Flucloxacillin	5/18	27.77%	
1-2 years	Amoxicillin	39/53	73.58%	84.9%
	Flucloxacillin	6/53	11.32%	
2-3 years	Amoxicillin	34/59	57.62%	77.9%
	Phenoxymethylpenicillin	12/59	20.33%	
3-4 years	Amoxicillin	32/56	57.14%	76.7%
	Phenoxymethylpenicillin	11/56	19.646%	
4-5 years	Amoxicillin	33/60	55%	71.6%
	Phenoxymethylpenicillin	10/60	16.6%	
Total number of prescriptions, % and in guidance		192/ 246	78.8%	78%

The main antibiotic prescribed in all age groups was commonly amoxicillin, which is the first line recommended antibiotic to treat chest infections (PHE, 2021). Overall prescribing compliance was 78% across the age groups, however this data may not reflect the rationale for prescribing decisions (e.g. allergies) and therefore while of interest, requires further investigation before reaching any conclusions about the standard of compliance with guidelines.

### 5.3 Phase One Critical Commentary

As discussed in Chapter 4 (section 4.3.3), this was a relatively small sample, however, the data did represent 21% of the case study population. The case was as broad as possible within the confines of the geographical location and incorporated affluent as well as more socio-economic deprived areas within the postcode case boundary. It also contained different ethnic groups, with Asian being the largest (13.6%). However, this level of information was not recorded by the GP data capture system.

This meant it was not possible to identify any variations in antibiotic prescribing between the different demographic groups (socio-economic and ethnicity).

In the single general practice, a total of 4.8% (n=32/687) of the consultations recorded did not document a rationale for the antibiotic treatment, therefore the GP decision making resulting in the antibiotic prescription cannot be identified. Also, the data did not capture other information which may influence GP antibiotic prescribing decisions including: the presenting symptoms used to inform the diagnosis (accuracy), existing health conditions, past medical history (i.e. previous hospital admissions), and whether the same child was seen on more than one occasion. For example, a child may present on more than one occasion to the GP before receiving antibiotics and these repeat visits may influence the GP's decision to prescribe. The prescribers may also be different and therefore personal preferences may have influenced prescribing practices. Details relating to the prescribers was not captured as this was not the focus of this study. Further research into how GPs access and use CCG and national prescribing guidelines for antibiotic prescribing decisions would be useful.

The results from this study identified that 78% of antibiotics prescribed were in accordance with the local CCG prescribing guidelines. Adherence to prescribing guidelines should be 100%, so this study identified room for improvement. However, it is difficult to ascertain from the data whether all prescriptions were appropriate as the rationale for antibiotic treatment and diagnosis was not documented for all consultations. For example, the data does not capture whether the child has a penicillin allergy which would affect prescribing choice. The lack of detail recorded on the GP database systems means it is not possible to make any clear interpretation of the quantitative results and any possible reasons for the variations in antibiotic prescribing within the different demographic groups.

Although these are all study limitations, the data obtained did offer some insight into general antibiotic prescribing practices in children under five years of age within an English primary healthcare

service. This included possible reasons why mothers might visit their GPs (e.g. chest infections) and the ages of the children who are most likely to receive antibiotics following a consultation. Further study would be beneficial, using a larger data set and more detailed information regarding the variation in population demographics, before any inferences can be made.

## **5.4 Chapter summary**

This chapter has provided results in relation to the primary care prescribing practices within a single general practice within the case. Descriptive statistics were used to support the investigation of the research question and were used to explore the incidence of antibiotic prescribing in primary care for children under five years of age. An overview of the most common infections treated, and the antibiotics used, were presented. Due to the participation of only one GP practice in the case, the phase one quantitative results have only provided a limited overview of antibiotic prescribing practices. Analysis of the quantitative data, using descriptive and chi-square tests, have shown there is no statistical significance between the incidence of antibiotic prescribing across the different age groups of children under five years. As the research study was a mixed methods design, results from the quantitative phase were used to inform the second qualitative phase of the study. For example, what were the symptoms children were likely to present with at a GP appointment were explored using focus groups and interviews with mothers. The findings from phase two will be presented in the next chapter and will explore some of the complex drivers behind maternal influences to using antibiotics.

# Chapter 6: Factors Influencing Maternal Responses, Experiences and Expectations of Accessing Healthcare Services

This chapter contains work from a published paper (Appendix 17- Bosley, H., Appleton, J.V., Henshall, C., Jackson, D. (2020) 'The influence of perceived accessibility and expertise of healthcare professionals, and service austerity, on mothers' decision making', *Health Social Care in the Community*, 00:1–9. <https://doi.org/10.1111/hsc.13115>).

## 6.1 Introduction

This chapter presents an overview of the main findings from the thematic analysis of the qualitative data, from the focus groups and interviews with mothers of children under five years of age living within the case. Although maternal responses and experiences will be unique to each individual, to guide the reader, the key elements of the findings will be presented from the perspective of a sequential journey. The first theme relates to mothers recognising and responding to their children's illness and moves through to the subsequent process mothers employ to access information to aid their decision making and mothers' experiences of accessing healthcare services. This chapter addresses the research question:

*“What are the influences on maternal decision making in relation to antibiotic usage for their pre-school children?”*

## 6.2 Themes from the qualitative data

This chapter will present the following themes (section 4.4.9.3):

- 1) Recognising and responding to illness

2) Accessing and using information to aid decision making

3) Maternal expectations and experiences of healthcare service.

Verbatim participant quotes from the transcripts have been included to support the analysis and interpretation of the data. The demographic characteristics of each of the participant mothers are summarised in Appendix 18 - *Key demographic information relating to participant mothers' quotes*.

### **6.3. Theme 1: Recognising and responding to illness**

The recognition of their children being unwell was usually the first stage of the mothers' response to their children's illness. This included an initial individual maternal assessment of illness signs and symptoms from which mothers made informal judgements about the severity of the illness. This theme included two sub themes:

- Presentation of illness and initial treatment
- Initial decision making and maternal response.

#### **6.3.1 Presentation of illness and initial treatment**

Mothers responded in a variety of ways to managing their children's illness and this response was related to their perception of illness severity. The initial steps taken by the mothers usually involved providing some symptom relief for their children using medication. For example, paracetamol was commonly used to manage and reduce high temperatures. However, several mothers also initially considered alternative first line treatment options, such as natural remedies or other non-medical options to help relieve symptoms. This extended to trying their mothers' home remedies/advice, although this was dependent on whether they felt it was safe to do so and if they considered it may be beneficial for their child. Most mothers considered natural remedies to be harmless and several spoke about using additional vitamins to boost the immune system (prevention of illness). Although

one mother believed there was an over reliance on medicines, most mothers preferred the medical route if they were concerned about their children's health.

*"I use certain herbal things, like the snuffle oil or whatever, when they have colds or things like that, but I'd always go down the medical route." (ID: MI 11)*

Mothers were also concerned regarding the nature and presentation of their children's illness and this often related to whether the illness was following the expected pathway i.e. the duration of symptoms. Any deviations or variations in how the illness progressed, based on their expectations, influenced anxiety and concern. A lack of or insufficient response to alternative treatments increased maternal anxiety, which could lead to mothers' seeking a medical consultation.

*"More than 3 days of high temperature or if the Calpol /ibuprofen weren't touching it, then it would be... I'm coming up to the doctor... I would really like to have my son seen today." (ID: MI 9)*

Another key indicator of illness for mothers related to any changes in their children's behaviour, which included a lack of appetite, decreased energy levels, crying or distress or visual and audible symptoms. This was particularly important for assessing illness severity in very young children, who had not yet developed language. Mothers usually associated visual symptoms, like rashes, with severe illness (e.g. meningitis). The first line of treatment for serious and life-threatening infections is early antibiotic treatment, which is vital in protecting life and minimising complications (i.e. meningitis is often associated with severe symptoms including death and limb loss). This anxiety was reflected in the following narrative, where the mother described feeling scared resulting in repeated visits to the hospital.

*“We’ve been to A&E a few times and the reasons for that is typically a rash and a high temperature so the scary stuff, so that’s why we were there.” (ID: MI 14)*

Audible symptoms, such as coughs or wheezes, were also found to increase maternal anxiety and could trigger them to seek a medical review. Particular triggers included coughing (rasping, dry) or changes in breathing patterns (frequency, stridor). Maternal concern was exacerbated in cases where the symptoms were new to them and were not something they had heard of before.

*“ He was coughing so bad; it was difficult to take the air so that scared me, so then I called the GP.” (ID: MI 7)*

Most mothers assessed the severity of the illness with the duration of the symptoms, and this influenced their decision making. As these assessments were based on individual opinions, there was variation between mothers regarding the length of time they would wait from the initial onset of symptoms to seeking medical advice. This ranged from two or three days to a couple of weeks. In one example, a mother felt two weeks was too long for her child to be unwell and actively sought a medical review.

*“I think when we first went, she had been ill for about two weeks and I felt it had just been going on too long time.” (ID: MI 3)*

However, all mothers reported they would contact the GP if they felt their children were not improving and this was a common response. There was a shared approach to initially try to manage symptoms at home, wherever possible, however, in situations where mothers perceived their children were really unwell (fever, rashes, cough, changes in breathing), or had more than one symptom, they would

unsurprisingly, seek reassurance from medical professionals. This response was uniform across all the mothers, regardless of maternal age, experience or cultural background.

### **6.3.2 Initial decision making and maternal response**

This sub theme relates to how mothers used their initial assessment of the illness severity to inform their subsequent decision making. Factors influencing these decisions also included the individual mother's confidence in managing the illness and whether they had previous or similar experiences they could refer to. This confidence often resulted in mothers not seeking a GP appointment, as they were able to draw upon their previous knowledge and experience to assess any likely causes of the illness. They felt more confident in their ability to manage their children's illness and about what to expect including symptoms, severity and recovery time.

*"I've seen the signs when they've been getting ill, so it's never been an emergency situation." (ID: MI 11)*

*"I guess with your first child it's the first time you experience and not sure what's going on, but with the second child you are a bit more confident." (ID: MI 1)*

Mothers were keen the GP did not view them as overanxious, overreacting or 'wanting something' when seeking an appointment. They were worried the GP would not take their concerns seriously that something was wrong with their child and this contributed to feelings of self-doubt. Consequently, some mothers felt more reluctant to seek GP appointment than others.

*"I sometimes feel like I'm wasting their time, they're really busy, I'm oh my God what will they think? It's not serious enough to go." (ID: FG 6; P1)*

Often mothers spoke about how their children's symptoms could change quickly over time, which resulted in alternating between appearing unwell i.e. lethargic, with a temperature, to behaving more normally.

*"How can he believe me when I say he had 40 degrees' temperature when he is all over the place, with energy running around. Nobody believes me!" (ID: FG2; P3)*

On occasion, several mothers felt that the time it took to secure a GP appointment may have meant the child was asymptomatic by the time of the GP appointment, and this meant the GPs did not always perceive the child was or had been unwell.

## **6.4 Theme 2: Accessing and using information to aid decision making**

This theme relates to the mothers' responses following identification of their children's illness and concerned the different information sources mothers accessed. Two sub themes were identified:

- 1) Information sources.
- 2) Innate versus expert knowledge.

### **6.4.1 Information sources**

Accessing information was central to decision making. All mothers invariably wanted information relating to illness symptoms and treatment, which often included antibiotics. Information sources which were commonly accessed included social media, the internet, friends, family, books and healthcare professionals. However, for all mothers, the main information source was social media, even though most participants felt social media was not a reliable source. This perception of unreliability was due to the information available being based on personal views rather than evidential facts. Mothers wanted helpful and trustworthy medical information to aid their decision making and therefore treated social media with caution.

*“You do read things don’t you or read things that other people have put up, but I wouldn’t trust it. ” (ID: MI 4)*

However, although most mothers did not rely on social media as a reliable source of medical information, they did use social media for peer support, and this was consistent across all the maternal ages, cultures and groups in the case. Generally, mothers found it useful to hear different perspectives, experiences and views from other mothers on how to manage perceived non-medical or minor illnesses.

*“Yeah, social groups are really important; if like someone had been through the situation and like when hand foot and mouth was doing the rounds, that would be quite good.” (ID: FG 1, P1)*

An advantage of the internet was convenience, as mothers spoke about how easy it was to access information at any time. This allowed them to research, in real time, symptoms or signs of illness and therefore the potential expected treatments and outcomes. In some cases, mothers spoke of how the internet information had provided sufficient reassurance to avoid them seeking a GP appointment.

*“I think cos sometimes symptoms occur in the night and you want to just type in what the symptoms are, and all the illnesses might come and ping at you so yeah there might be a sentence to say this cream may help and then you can go out and just get the cream without even having to go to the doctors.” (ID: FG 6; P2)*

It was a common practice for mothers to undertake internet searches, following up the first few sites that were identified. Although mothers actively sought out the NHS website, they would also look at

other sites containing visual information such as photographs of rashes. Mothers actively sought and used additional information to support their ability to make a judgment of the possible illness cause and its severity.

*“I had already read up to see how long it should last cos it seemed to be lingering.”*

*(ID: MI 4)*

All mothers reported using the NHS website (<https://www.nhs.uk>), which they found very useful and this was the preferred source for information. The NHS was described as a trusted and reliable source of information, as it provided clear advice and importantly, quick answers. Fundamentally, most mothers spoke about having a strong trust and belief in the NHS and this was a direct and distinct influence on their decision making.

*“I try to put my question into the NHS website, because that is what I trust.” (ID: MI 3)*

However, similarly to social media, some mothers felt the internet should be treated overall with caution due to a concern about the reliability of the information sources. A few mothers expressed concern there was a possibility unreliable information could be followed, which may be harmful.

*“The internet is dangerous you can read so many things and then make the wrong decision, because people just write whatever.” (ID: MI 5)*

Less common sources of information for mothers included media campaigns and public health messages. Although some mothers had an awareness of the appropriate use of antibiotics, which had been promoted through a national media campaign, they did not really know where the information

came from. In some cases, a few mothers actively searched for information, reading magazines, books or listening to radio programmes, although this was not common.

*"I've seen something lately, but I can't remember if it was in the surgery ...I think...it is...I seen some campaign lately ...I can't remember if it was on the TV or the radio." (ID: MI 10)*

All mothers felt the information available in GP practices relating specifically to using antibiotics was inadequate. This related mostly to information leaflets and posters on antibiotic usage on display in the GP practices. Any posters that were displayed were not really noticed or read as mothers felt they did not seem to provide detailed information.

*"I think I saw about one poster that said make sure you complete the course, but not a lot of information." (ID: MI 9)*

Several mothers spoke about accessing information and advice from their family, particularly their own mothers. This was primarily due to their relationship with their own mothers, who were seen as being more experienced parents.

*"I would give my Mum's ideas a go and a lot of the time they are good." (ID: MI 3)*

Another source of information was anyone with medical expertise or knowledge, which included family, friends and colleagues, as mothers trusted them to have useful knowledge and insight into illnesses.

#### 6.4.2 Innate versus expert knowledge

This sub theme related to mothers' existing knowledge about antibiotic use versus their innate sense of when there was something wrong with their children. There was a general awareness regarding the appropriate use of antibiotics amongst the majority of the mothers and most knew antibiotics did not effectively treat viral infections. However, mothers often referred to their innate knowledge of their child and how this informed their healthcare decisions. Innate knowledge can be defined as the ability to understand something instinctively, without the need for conscious reasoning (Binder, Hirokawa and Windhorst, 2009). Mothers described themselves as the experts on their children and wanted to use their in-depth knowledge, in conjunction with GP medical assessments. They also believed the GP consultation was a conversation and expected to be included in any medical decision making, addressing their concerns and the process to manage their children's illness.

*"I don't really buy into this medical model where healthcare is one way - it's a conversation isn't it? I mean someone is an expert and you aren't but it's still a conversation." (ID: MI 14)*

The concept of knowing their child and innate maternal intuition was strongly reflected in the narratives and this was expressed as knowing something was not right. Although mothers felt it was often hard to articulate these feelings and why they were concerned, they all believed they knew when their children were unwell and this prompted them to promptly seek a GP appointment. They also trusted their own instincts.

*"I knew something was wrong, seriously wrong. I think that is intuition cos the doctor wouldn't have known this baby is worse than a normal grouchy baby, but I did, cos you know the baby." (ID: FG 3; P1)*

This innate concern would result in some mothers returning to the GP multiple times, until they felt reassured or obtained their expected outcome (i.e. antibiotics). This included one mother, who rang the GP practice every morning for an emergency appointment and was seen on four consecutive days, until she was ultimately prescribed antibiotic treatment.

*“Yes, I rang up eight in the morning, every morning, and then got seen, by the same doctor, four days in a row and it did turn out she had a chest infection in the end. I was right to keep taking her.” (ID: FG 3; P1)*

*“I felt relieved ‘cos you do kind of feel like you’re going mad, when you say there’s something not quite right.” (ID: MI 12)*

When mothers received antibiotics from the GP, they spoke about feeling justified and validated for their actions. This finding linked with how important it was to the mothers to be listened to and to be taken seriously by the GP (6.3.2).

### **6.5 Theme 3: Maternal expectations and experiences of healthcare services**

This theme explored maternal expectations and experiences of accessing and using healthcare services and was a consistent theme throughout the participants’ narratives. Findings from this study have also identified new knowledge relating to the impact of austerity on health visiting services and this are included in this chapter (Appendix 17- *Bosley et al., 2020*). Within this theme three further sub themes were identified.

These were:

- 1) Importance of being seen.
- 2) Experience and accessibility to healthcare services.
- 3) Importance of relationship between healthcare professionals and mothers.

### 6.5.1 Importance of being seen

In cases where the mothers perceived their children as being very unwell, they actively sought an appointment with a GP. Often acute illnesses require emergency GP appointments and these are accessed via a duty doctor system. This means mothers may not see their own GP unless they are the duty doctor on call. A strong recurring thread in the narratives was the expectation to get a same day appointment to see a GP. Although most mothers would prefer to see their own GP, it was more important to have their children medically reviewed and therefore they would see any available GP in the practice. All mothers insisted on an appointment and expected to be seen the same day, especially if they were anxious, worried or the children had prolonged symptoms. Not only did all case mothers expect to be seen by the GP, but they also wanted a thorough and comprehensive examination of their children, so any symptoms e.g. chest crackles, could be identified.

*“If something is not quite right then I go to the doctors and if they say they don’t have an appointment until tomorrow or the next day, I say I can’t wait. I get it dealt with straightaway.” (ID: FG 5; P2)*

As presented in the preceding sub theme (6.5.3), there was a low tolerance of any rashes and mothers expected to be seen by the GP for assessment, diagnosis and reassurance. Some mothers discussed the practice of sending a photograph to their GP of a rash, as a method of remote consultation. Whilst a few mothers liked the idea of using this approach, as it removed the need to make an appointment and a physical visit, others preferred to be seen face to face/in person seen by the GP. In the following narrative, the mother expressed concerns that photographs were not always accurate and therefore should not be relied upon as a means of diagnosis.

*“I think that there are several different things that can present themselves as one thing, when they’re not so I’d rather the doctor actually saw my child, rather than judge something by a photo where...sometimes you’re looking at something, and you take a photo of it and the colour comes up all different and you’re like that’s not what I’m looking at.” (ID: MI 12)*

Several mothers spoke about feeling reassured, following the GP consultation, about their management of their children’s illness i.e. talking to GP, return visits, or being prescribed antibiotics. In the following narrative, one mother recounted how she felt justified in taking her child to the GP, as it was only after an examination, it was identified that the child required treatment.

*“The GP clearly said, he’s fine, but I’ll check him over. So, he (GP) checked him over and he was like, I (GP) was going to say there’s nothing wrong, but actually I can hear a crackle there, so he needs antibiotics, cos there’s some sort of infection there.” (ID: MI 12)*

Understandably, GPs were seen as medically trained professionals and experts and participant mothers trusted their decision making. They were expected to possess appropriate knowledge, experience, competence and expertise in treating their children.

*“But of course, you wouldn’t question anything like that you just always think GPs and doctors they know everything. I trust my doctor’s opinion, so if the doctor says they are not needed, I’m fully accepting of that, and I’m happy to go back in a couple of days if things have worsened, or the situation has changed.” (ID: MI 12)*

The quality of the GP consultation was also extremely important to mothers. Mothers assessed the quality of the consultation by the time spent examining their children and providing rationale and clear explanations for any decision making.

*“There is one GP that I like. She took time to explain and made everything clear. I understood what was happening.” (ID: FG2; P3)*

In cases where the GP provided a rationale for treatment based on diagnostic information, mothers felt they were more likely to accept a GP decision or advice, as they could follow and understand the explanation or rationale, behind any decision making.

*“I felt like even when he’s said no, he justified his reasons and just didn’t say no.”  
(ID: FG 1; P2)*

The expectation that GPs were the providers of this medical knowledge meant some mothers continued to ask questions until they were satisfied with the explanation and they would not be deterred from doing this.

*“I’ve always asked lots of questions. I’m not worried about taking up time and asking questions and that, so I think if it hasn’t been explained, I’ll ask until I’m happy with the answer. I will always ask and always have to fully understand before I come away.”  
(ID: MI 6)*

Mothers also valued the amount of time they had to discuss their concerns with the GP, and the findings showed a variation in mothers’ experiences relating to this. It was important for mothers not to feel the appointment was rushed and they expected the GP to spend time answering their questions, explaining the symptoms of their child’s illness and providing reassurance to them.

*“I have been in other surgeries in the past, where you do feel like it’s a conveyer belt and a bit rushed and they want you in and out.” (ID: MI 4)*

There were some mothers, who did not feel that the GP listened or respected their concerns. This resulted in them feeling their opinions, experience and knowledge were not respected, and they felt dismissed by their GPs.

*“The doctor didn’t listen to me. He listened to me the second time, but the first time he didn’t. If I said, he had a temperature and didn’t sleep well last night would you believe me? No, you don’t.” (ID: FG 2; P3)*

This led to a few mothers experiencing feelings of frustration and mistrust in the GP. They wanted their opinions to be valued and viewed as credible, when considering any course of treatment. Positive experiences of this interaction between mothers and GPs, resulted in an increased maternal confidence in their own assessments and judgements in managing and recognising their children’s illness.

Several mothers described how important it was that the GP was able to interact and communicate with their children, and mothers expressed an expectation that GPs take time to talk to their children and gain their co-operation (for examination). In one case, a mother recounted how she felt the GP was unrealistic in their expectation of her child’s behaviour and expected too much from the parent.

*“She (child) was very little and so moves and the doctor told us we needed to hold her very strong, and was a bit upset that the child did not allow her to do her job. But I think working with children, you need to know tricks or how to know how to do it yourself, rather than ask the parents to hold them so hard.” (ID: MI 1)*

All mothers expected their GP's to be confident in providing a diagnosis and decision making during the consultation. If the GP had a calm and relaxed demeanour, mothers felt more reassured and were less likely to make return appointments.

*“He wasn't too concerned. Now if I had detected concern or panic or something like that, then I wouldn't have waited (to give antibiotic prescription). But because he was quite relaxed about it himself, that affected me and what I should do.” (ID: FG 4; P2)*

Part of the reassurance mothers sought related to not knowing what was wrong with their children. In this respect they found it helpful to have a diagnosis for the illness, to ensure their children got the right treatment, had a quick recovery and experienced no lasting effects. Mothers wanted to know what to expect from the illness and the possible normal timelines for the illness duration, so they could track the progression of the illness.

*“I was still concerned it was there and hadn't gone (cough), she (GP) said the thing is with a cough, it will peak before it gets better, so it was normal, so, you know.” (ID: MI 3)*

Several mothers spoke about adopting a considered approach to using antibiotics, which included understanding when to start antibiotics, as there was some recognition illnesses may resolve spontaneously with time.

*“We can either give it (antibiotic) a go straight away or we can try hold off and the (GP) explain their reasons why, and then each parent can decide if they can hold off or not. Obviously, we have to weigh up the pros and cons because we don't want antibiotics to stop being efficient, that's why I don't always go straight for them and if can hold off I do.” (ID: MI 6)*

Although some mothers were comfortable on deciding when to start any antibiotic treatment, participants of one focus group felt they did not want the responsibility. All participants in this group were aged 26-30 years old and had only one child, and these findings may reflect a lack of confidence and experience of looking after unwell children and parenting. This was expressed by one mother in the following narrative.

*“I don’t like the thought of the doctor saying you’ve got to use your judgment - I don’t like that, it’s kind of puts the pressure on you, when you don’t really know what you are talking about and what you are supposed to be looking for.... No, I don’t like the responsibility – I like to be told you can or can’t take it.” (ID: FG 6; P3)*

Prevention of illness was also important and most mothers wanted to gain some understanding of the reasons and causes of the illness, in case it was possible to prevent recurrence in the future. In this respect, mothers valued a diagnosis, although it was recognised a diagnosis may be difficult. This was because a diagnosis provided the mothers with something tangible, they could understand and provided reassurance that the correct and appropriate treatment was being given.

*“I have to know why he had it (seizure) so I can prevent it to happen again, and, in the end, they didn’t know, so a diagnosis would be really important, but I know it’s difficult, but I would certainly consult a medical professional before I would get confident, he is fine.”*  
*(ID: MI 2)*

In a few cases where there was a lack of trust felt by mothers towards the GP, they actively changed GP practices. Some mothers also sought advice from other GPs within the same practice if they felt

unhappy with their primary GP's decision or if they believed their own GP was perhaps less experienced in treating children. It was considered reassuring if the second GP gave the same advice.

*"GP's have different experience. I know they are meant to be general all-round knowledge but I'm sure some must have perhaps different slight expertise in different areas I guess or different interests in different areas. I don't see why you can't ask for another opinion from another and if the other doctor says the same thing, it's a bit more reassuring to make you think' maybe I shouldn't be so worried."* (ID: MI 10)

The importance of being seen was common for all mothers irrespective of age, cultural background or others socio-economic factors. The maternal perception of the illness severity did influence some mothers to actively seek a medical appointment and they were willing to pursue whatever course of action they felt was required for their children. However, some mothers valued other healthcare professional's advice and this will be discussed in the next section.

### **6.5.2 Experience and accessibility to healthcare services**

This sub theme related to mothers' experiences of accessing healthcare services and includes GP and practice nurse appointments, pharmacy advice and health visiting services. As previously reported, when accessing same day emergency appointments for their children, mothers were not able to choose which GP they saw (6.6.1); they would see whichever clinician was available rather than waiting for their usual GP.

*"They'll see me that day so it's whoever is there, and I don't really care who it is as long as it's a doctor."* (ID: FG 5; P1)

*"I would never wait with him, if he is ill, I would just really ask the receptionist to schedule that day in the morning or afternoon.... I'm an overprotective person and I'm always like that. I'm always like oh...my little baby.... he is my highest priority." (ID: MI 2)*

It was also reported, due to the nature of requiring an emergency appointment, most mothers found it relatively easy to get an appointment with the GP. Mothers felt this was due to it being an emergency appointment for a child and therefore prioritised by the practice.

*"I never struggle if I need an appointment. For a child, I have never not had a same day appointment, at least over the phone. They are brilliant. I can't grumble." (ID: FG 3; P2)*

Several mothers reported they generally felt the GP was happy to see their child and it was not difficult to get an appointment or go back to see them. In some cases, mothers spoke about the GP making time to see them, especially in children with existing or previous health illnesses.

*"I've always explained that, in the twins' case when they've had bronchiolitis, it usually has been an emergency and couldn't wait a week and a half to get an appointment if you know what I mean, and they've been really understanding generally, when you do that."*

*(ID: MI 1)*

Telephone triage is a system by which designated medical advisors review caller information to make assessments regarding the severity and urgency of the query and take appropriate action. The usual 'gatekeepers' to the allocation of appointments were reported to be the practice receptionists, who were the first point of contact at the practice. Some mothers found it was often difficult to get through on the phone to the practice (queuing system before phones are answered) and sometimes the

receptionists were perceived to be rude and unfriendly by the mothers, which did put them off contacting the GP practice.

*“I find the receptionists at my doctors quite rude. So, I don’t particularly feel confident talking to them, and don’t particularly like them.” (ID: FG 3; P1)*

However, one mother did describe how speaking to the receptionists was reassuring, especially when she was given an appointment. She felt this reinforced her decision to see a GP.

*“I’m really fine about talking it through with someone else, cos when you put the symptoms down in your head, you’re like am I over thinking it, but when you say to someone else what they are, it’s like she definitely needs to go.” (ID: FG 3; P3)*

For same day appointments, it was usual for most GP practices to provide a telephone call back by the duty GP for that day. This review call enabled the GP to prioritise the allocation of appointments depending on identified medical need. Mothers felt the call back system was convenient, time saving and offered reassurance to mothers as they could talk to a GP.

*“I ring up as we can do telephone appointments so that really helps, so on the day you can get advice on whether to come in or not and if there are spare or reserved appointments to come in if they think that you should which really helps.” (ID: MI 4)*

However, choice of GP was not possible when accessing emergency appointments, as these services operate at weekends and outside normal weekday working hours. Although mothers preferred continuity with their GP, this system often meant mothers did not know the clinician and vice versa. In some cases, mothers considered the GP not knowing the child was an advantage, as they felt the

consultation was often more thorough. As the GP was unfamiliar with the child, mothers felt they allowed more time to assess the illness, conducting physical examinations and tests, which mothers found reassuring.

*“I contacted 111 and from there they sent me to out of hours and to be honest the medical check they did on him, it was an Indian lady and she asked permission if she could check it. That was nice to be asked. She checked his output of urine, if he’s alright what his generally like.... everything.” (ID: FG 2; P3)*

Another service accessed by mothers was the National 111 service, which is a telephone triage system. This involved the mothers answering pre-set medical health questions, following which advice was given or action taken. This system for obtaining medical advice produced mixed feelings in the mothers. Several mothers preferred to access the telephone advice via 111 as they found this more convenient than going to the GP surgery, however, there were also a few mothers who found the set questions asked unhelpful and this deterred them from contacting this service.

*“It’s not always the way I go about it but say I’m considering or thinking about making that call, do I really want to spend time being asked if they are unconscious.”*  
*(ID: FG 1; P3)*

General practice nurses work in GP surgeries as part of the primary healthcare team where they plan, provide care, treatment and health education to patients of all ages. Although the roles of practice nurses do vary depending on the GP practice, they are registered nurses with community nursing experience (NHS England, 2017). As practice nurses are based within a GP practice, appointments with them rather than a GP were considered an option by several mothers. This was primarily due to practice nurse appointments being more readily obtainable, more convenient (less waiting) and a

good alternative to seeing a GP. It was generally felt as the practice nurse had direct access to a GP, by working in the same practice, they would ask the GP if they were unsure or needed any advice.

*“They might not make you wait and also if they’re not sure they always pop around for the doctor and I think that’s good cos they know where they can go.” (ID: MI 13)*

One mother had a very positive experience of seeing a practice nurse and thought it was a very convenient service. Generally, practice nurses were reported to provide a telephone call back, offered an appointment to see them and spent time listening to mothers.

*“Actually, it’s a good system. When you go into their office and they listen to you and they check the file (notes).” (ID: MI 13)*

The majority of mothers expressed that they were happy to see a practice nurse rather than a GP, following good prior experience and just wanted a healthcare professional (a trained experienced professional) to see their children for reassurance.

*“A nurse is fine. It just matters that someone who knows about the illnesses sees her... There are really good nurses here and I’ve had really good experience so far.” (ID: MI 8)*

Mothers trusted the nurse’s advice as nurses having healthcare knowledge and some mothers felt the nurses may know more about children than the GP. One mother was very enthusiastic regarding the concept of a nurse led clinic at the GP practice. In this case, it was viewed as a viable and convenient alternative to seeking a GP appointment, whilst securing ‘back door’ access to a GP.

*“A nurse led clinic that you could access at the doctors .... would be awesome, cos sometimes you just need reassurance.” (ID: MI 9)*

Local pharmacies were also accessed by some mothers for advice on treating minor illnesses and conditions. Most mothers described pharmacists as being very helpful as they provided time to listen to the mothers’ concerns and the description of their child’s symptoms. The localities of the pharmacies were also described as being more convenient for mothers to travel to.

*“I’m lucky to live near the pharmacy. For mild things, I go to them first, because they give you time. ” (ID: MI 14)*

However, the perception of illness severity was again a key factor influencing maternal decision making. Whilst some mothers recognised pharmacists as knowledgeable sources for advice and information, this was invariably in the context of minor illness. In the following narrative, one mother did not consider pharmacists to have adequate expertise or be as medically knowledgeable as GP’s, and therefore preferred the trained doctor to see her child.

*“The pharmacist is not qualified like a doctor and does not understand anatomy and physiology and everything.” (ID: FG 2; P5)*

Another healthcare service mothers accessed was health visitors. Most mothers valued their health visitor and the importance of this relationship will be explored later in the next sub theme (6.5.3). However, several mothers did describe how they felt a decrease in health visitor services across the NHS had affected their experiences of access to these healthcare services.

*“I’m not sure where you can see your health visitor now as they don’t seem to advertise clinics very openly, whereas I think when the children’s centres were open, cos obviously the children’s centres would have a weekly timetable, it was really easy to find out where there was a health visitor. But now I just have no idea.” (ID: MI 10)*

Overall, mothers noted that changes in health visiting services had directly affected their access to these previously used clinics, which they had regularly used to access general information, get reassurance and engage with health visitors.

### **6.5.3 Importance of a relationship between healthcare professionals and mothers**

When accessing primary care services, mothers predominantly interacted with GPs and health visitors. This sub theme will explore the value mothers placed on these relationships and how it influenced their responses. A key component to developing a positive relationship between mothers and healthcare professionals was continuity of care. Mothers valued continuity in seeing the same GP and felt it enabled the GP to get to know the family. This included any past medical history of the family.

*“I do like finding a doctor I like who I trust and having them and sticking with them. I prefer that than rotating through lots of different people. ” (ID: MI 6)*

*“I tend to ask for the same one if I can get her but most of the time... she’s (GP) great. I’ve got quite a nice relationship with her with my medical history so she knows who I am.”  
(ID: FG 6; P3)*

Mothers relied on their GP to provide advice, treatment and reassurance in caring for their unwell children and therefore it was important to them, they were able to access GP services when they felt they needed to. A positive relationship between the mother and GP also contributed to maternal

decisions to access appointments. Mothers reported they were more likely to visit their GP if they personally liked them, as well as feeling GPs sometimes encouraged them to make return visits if they were concerned about their children's progress and recovery.

*"They were quite happy for me to come in if I was worried and said to come back if it carried on or anything else occurred. You never feel like you are wasting their time, which is nice."*

*(ID: MI 4)*

Mothers spoke about making return GP visits to obtain validation and confirmation that their children were recovering as expected. Several mothers relayed feeling reassured by a positive GP response and spoke about feeling pleased they were not seen as timewasting, which was a finding from an earlier theme (6.3.2).

The other key relationship for mothers was the health visitor, who plays a significant role in supporting parents of young children (IHV, 2019). Mothers primarily viewed the role of the health visitor as providing advice on feeding, behaviour and child development and therefore mothers tended to use the health visiting services more when their children were babies.

*"I would feel confident going to them, if I had any concerns re their development, maybe rather than going to the doctor." (ID: MI 11)*

The findings identified the relationships between mothers and health visitors varied among all case participants. Some mothers felt they had a very positive relationship with their health visitors, knew who they were, how to contact them and valued their advice:

*"The health visitor was really helpful. I found they were a little bit more sympathetic; I think they really care." (ID: MI 4)*

They described valuing the expertise and knowledge of the health visitor as professional experts in young children. Access to this expertise provided mothers with confidence in their own abilities to manage the illness as well as providing reassurance in recovery.

*"Sometimes just the reassurance of health visitors who are working with small people, somehow make you feel more confident, when they turn around and say, 'it's just a cold but if the symptoms get worse...'" (ID: MI 9)*

The relationships between mothers and health visitors were based on trust and respect and some mothers felt their health visitor was approachable, knowledgeable and were able to give good and reliable advice about general health matters. This mother's narrative described the importance of continuity of care in forming a trusting relationship with the health visitor.

*"I always call my health visitor, if I've got a question, especially with my youngest one, I always find my health visitor is really good about saying right 'you don't need to go to the doctor 'try this, or no you need to go to the doctor and get the prescription, cos my youngest has reflux at the moment, so you need to get the prescription for Baby Gaviscon and get it sorted. I find I can always go to my health visitor. I got the same one for all three of my kids, but I guess it's the continuity cos she knows my three, I feel I can trust and ask do you think I should go or what do you reckon.'" (ID: FG 3; P1)*

However, this was not the experience of all the mothers. Some described how a lack of continuity in services had resulted in them losing contact with individual health visitors. This meant mothers often

saw different health visitors that they did not know, which led to them being given mixed messages. This contributed to disengagement with the healthcare services and meant mothers did not access or use health visiting services for any advice.

*“I was going here to the health centre to the clinic and every time it was a different person so.....I knew at the end if there was 1 or 2, I was not asking them anymore, I don't know, I didn't, they were saying different things.” (ID: MI 7)*

Several mothers would ask their health visitor for guidance regarding minor illnesses, although a few mothers described the health visitor as reluctant to offer any information or advice. In this scenario, mothers felt health visitors would often refer them directly to a GP, even for minor illnesses e.g. cold.

*“If she had a cold or something, I wouldn't think to call the health visitor I would always think to call the GP. I think they would probably end up referring to the GP anyway.” (ID: MI 3)*

*“I found them not very helpful. I did speak to them about his rash, but they were like we don't know.” (ID: FG 1; P2)*

A few narratives discussed how a reluctance to provide advice could be reassuring. This was because the health visitors were viewed to be practicing within their professional knowledge or competency, and this was considered to be safe practice.

*“I think they always knew when it was above their expertise and would say when not sure and see the GP. I found them very sympathetic and helpful, but if he was ill, I wouldn't just go to the health visitor.” (ID: MI 2)*

This sub theme reflects the value that mothers attach to the relationship with their healthcare professional, and how this may influence any decision making about who to contact and which service to access when seeking advice for their unwell children.

## **6.6 Conclusions**

This chapter has presented some of the key themes from the qualitative phase of the study which also provides an overall view of the sequential steps often taken by mothers in managing their children's illnesses and the influences affecting their decision making. There were numerous factors which affected mothers' responses to managing their children's illnesses from the first recognition to the subsequent action taken. All mothers were concerned about a wide variety of illness symptoms, ranging from changes in behaviour to audible symptoms. These concerns were influenced by their own personal confidence in managing the illness, which included any previous individual experiences of illness.

Following recognition of their children's symptoms, mothers sought further information from a range of sources, including the internet, family, friends, books, and general media. This was to inform their decision making about what could be wrong and decide on appropriate actions. The internet was particularly favoured due to the easy availability (day or night) and the extensive information available. Having gathered enough information, mothers applied their existing knowledge to the illness, especially if they had seen the symptoms before.

Another finding explored mothers' experiences and expectations of healthcare services. These included the importance of being seen by a clinician, having a thorough examination of their child, having a diagnosis, being listened to and being given options for treatment. The preferred access was via their own familiar GP, but mothers would access out of hours services if seeking medical

reassurance. However, if the illness was not seen as too serious by the mothers, practice nurses were considered a convenient and easily accessible option to seeing a GP. This was due to their co-location and easy access to a GP, to whom they were able to escalate concerns in a timely manner.

A key element of the findings related to the importance mothers placed on having a good relationship with their healthcare professional. Mothers relied on these relationships to provide support and advice in managing their children's health. However, this study also identified new and original findings relating to the impact of austerity on health visiting services and the impact this has had on maternal decision making and management of their children's illnesses. Reduced investment in local health visitor services has resulted in a decreased availability and access for mothers (Peckover and Appleton, 2019). This has resulted in a loss of contact and fewer relationships between mothers and health visitors, which in some cases has meant mothers directly accessing GPs for minor illness advice and management e.g. rashes. This impacts GP workloads and capacity.

During the analysis of the qualitative data, the narratives identified the underlying concept of antibiotics as powerful symbols for treatment and recovery. There is a lack of extant literature in relation to antibiotic symbolism and this is an original finding from the study. To explore this further, the following chapter will focus on antibiotic symbolism as a new concept in healthcare. It will demonstrate the links between the themes in this chapter and go on to introduce how antibiotic symbolism influences mothers' understandings and attitudes towards using antibiotics for their children.

# Chapter 7: Symbolism of Antibiotics

## 7.1 Introduction

This chapter will address the research aim, which was to gain some understanding into the drivers and influencing factors which lead to maternal decisions to access primary healthcare services and antibiotic seeking behaviour. A recurring theme identified in the maternal narratives was the symbolic power of antibiotics and how this symbolism influences decision making and antibiotic seeking behaviour. This chapter will introduce antibiotic symbolism as a concept with references to existing literature. The concept of symbolism in healthcare, antibiotics as symbols and the power of symbols will be explored. This chapter will argue that antibiotics are associated with providing effective, safe treatment and represent recovery and healing from infections. Examples to support the findings will be provided from the narratives.

## 7.2 Background: symbolism and antibiotics

### 7.2.1 What are symbols?

Symbols are used to convey ideas and concepts, places, objects and activities, which represent shared meanings (Barrett and Parker, 2006). It has been argued that symbols enable society and individuals to gain a better understanding of the world, which in turn influences decision making and behaviour. Therefore, if symbols are used to inform our understanding of the world, they may also represent a collective identity which we can recognise (Palczewski, Ice and Fritch, 2012). For example, the symbol of a red cross is globally recognised as representing healthcare. The red cross symbol was originally used to identify and protect medical vehicles and buildings from any military attack but was later adopted to the International Committee of the Red Cross and is used worldwide. Symbols may carry much deeper, latent meanings behind their patent ones and can be

used to convey strong and emotive messages, having the potential to be very influential and powerful (Itao, 2010). For example, the swastika is a Hindu symbol of luck and prosperity, however following its adoption by the Nazis in the Second World War, it came to represent hatred and fascism. Thus, symbols often have numerous layers of meaning (Womack, 2005) and their meanings can change as the culture or the individual evolves (Tillich, 1957).

### **7.2.2 What is symbolism?**

Symbolism is the use of symbols to represent ideas and concepts by giving them symbolic meanings that are different from their literal sense (Womack, 2005). It has been argued that man is a "symbolic animal" because, whereas animals perceive their world by instincts and direct sensory perception, humans create a universe of symbolic meanings and use concepts to structure their impressions of the natural world (Cassirer and Mannheim, 1955). An action, person, place, word, or object can all have a symbolic meaning that is different from their literal sense and can convey an entirely different and more significant concept. For example, snakes have represented medicine and healing for centuries in Egyptian and Greek cultures: however, within Christianity the snake is often symbolic of evil and sin (Antoniou *et al.*, 2011).

### **7.2.3 Antibiotics as symbols**

If symbols are used to convey ideas and shared meaning, then antibiotics are strongly associated with recovery and saving lives from infection. As presented in Chapter 1 (section 1.3), antibiotics have been widely used since the 1940's and have become a core, staple and trusted component of global healthcare treatment. They have an impressive track record for being an effective treatment option, have saved countless lives, are perceived as a 'magic cure', and in some cases are the only treatment option (Aminov, 2010; Hansen *et al.*, 2015). Few people today remember life without them, including

clinicians, who trust and rely on antibiotics to treat their patients (Kumar, Little and Britten, 2003; Teixeira Rodrigues *et al.*, 2013).

#### **7.2.4. The power and influence of antibiotics as symbols for mothers**

To address attitudes and beliefs regarding the use of antibiotics and their symbolic nature, this chapter will present findings from the mothers' narratives. These relate to how antibiotics represent safety, protection, recovery, and healing. Throughout the narratives and across the case participants, antibiotics symbolised a safe and effective resolution to illness and can be linked to maternal experiences of healthcare (section 6.5). To explore the meanings attached to antibiotics for mothers and what they represent, it is necessary to gain an insight into the factors influencing and driving maternal attitudes towards antibiotic usage. A mother's own identity, health literacy and culture can be crucial in shaping her attitudes and expectations around antibiotic use for herself and her children. Thus, Chapter 7 will explore and draw out from the study findings, what antibiotics mean, symbolise and represent to mothers. The implications for these findings will be discussed further in the discussion chapter of the thesis (Chapter 8).

### **7.3 Overview of findings**

The concept of antibiotic symbolism is a new contribution to existing knowledge and the findings explored how it may influence maternal antibiotic seeking behaviour and decision making. Within the main theme of antibiotic symbolism, two sub themes were identified:

- 1) Antibiotics as a safe and trusted treatment option
- 2) Antibiotics as agents of recovery and healing.

These will now be presented.

### 7.3.1 Antibiotics as a safe and trusted treatment option

Mothers, regardless of culture background, age and education status, spoke about antibiotics in a positive light. There was a belief antibiotics prevented complications developing and aided in a faster recovery time. Mothers also sought antibiotics in the absence of a diagnosis, and for non-specific infections. Although, most mothers would not routinely ask for antibiotics, there were some situations when they did.

*“I would push for it if he had a really bad cough instead of waiting it out or just having some pain killers. He had quite a severe illness.....which was I mean it’s still undiagnosed and we took some antibiotics at that time, cos he had a really high temperature.”*

*(ID: MI 2)*

Another component of the symbolic meaning associated with antibiotics related to the belief antibiotics speed up illness recovery and reduce the duration of symptoms. It was important to mothers to actively resolve and seek effective treatments. Within this context, antibiotics were perceived as providing protection against the development of possible complications. This resulted in some mothers expressing feelings of anxiety if antibiotics were not readily available to them and worry that, by not giving antibiotics, serious complications could develop. Several mothers were therefore keen that their children were given the maximum dose of antibiotics to aid a quicker recovery.

*“I’ve always asked for the max dose when they do decide to prescribe antibiotics. We have a situation with a chest infection, and they said only give him five days. So, we did that and wasn’t better. We went the following week and saw a different doctor who said they shouldn’t have only given you five days.” (ID: FG 1; P2)*

*“Sometimes I feel no I need this tackled now, because he’s had this a couple of times and we’ve waited a couple of times, and it didn’t work, so in that situation no I want them straight away.” (ID: MI 6)*

Mothers also perceived antibiotics were symbolic of providing protection for children, who were perceived as being more vulnerable to infections and therefore should be managed differently than adults. Mothers spoke about how they felt they visited the GP more with their children than for themselves.

*“With kiddies as you go for them (GP) more than you do for us (mothers), as you let things linger and are too busy.” (ID: MI 4)*

Time and convenience were raised as influencing factors by several mothers on their management decisions. Time primarily related to the use of delayed antibiotic prescriptions (section 7.2.3). This was a popular approach for all mothers. They felt it was a convenient approach to starting treatment and avoided unnecessary return to the GP, especially over weekends and out of hours.

*“It is reassuring that I have a piece of slip and if I feel it’s worse, I just go to the pharmacy. I think in a way it is convenient .... I can just cash it (prescription) whenever I need it and don’t have to waste time.” (ID: MI 2)*

In several narratives’ mothers reported they had not needed to start antibiotic treatment, due to their children recovering. However, mothers welcomed the practice of being given a ‘just in case’ or a delayed prescription for antibiotics from the GP. This was perceived as providing a safety net from potential complications of the illness.

*“It was a Friday, so he gave me a prescription in case it didn’t get better over the weekend.*

*I think it was especially reassuring because it was the weekend.” (ID: MI 3)*

There were differing views as to whether antibiotics were more readily accessible now than in the past. Several mothers referred to their own childhood experiences and spoke about how as children, they felt antibiotics had been widely available and used. They felt GPs were more reluctant to prescribe now.

*“I think attitudes in that sense have changed. It’s harder now. I’m almost 40 now so 30-35 years ago it was standard that you would go in and come out with a bottle of antibiotics, regardless of... You know, even before you’d been actually checked sometimes. ” (ID: MI 9)*

In contrast, a few mothers believed some GPs did still overprescribe antibiotics and this affected how they accessed services. All mothers spoke about not wanting to give antibiotics unnecessarily, and in one case, the mother actively sought an appointment with an alternative GP, if she perceived they were less likely to prescribe antibiotics.

*“My GP is very antibiotic driven.... yeah so, I’d rather see someone else.” (ID: FG3; P4)*

There was also a concern for children who have a pre-existing health condition e.g. asthma or small/low birth weight babies, as these children had often had previous and ongoing interaction and contact with healthcare services, which drove maternal expectation, action and anxiety. Mothers perceived their children as being more vulnerable and susceptible to deterioration in the existing condition, and usually based this view on previous experience.

*“In the twins’ case they were born 33 weeks and, when they were really little, they’ve had bronchiolitis. If they are working hard at their breathing, I would just take them in straight away to the doctors.” (ID: MI 11)*

Most mothers expressed they were generally reluctant and lacked confidence to give antibiotics without further medical advice. In several cases, mothers did not want to make any decisions regarding when to start antibiotics and preferred clear and direct instructions from their GP, without having to make another appointment with them.

*“I had been given the prescription if she needed it. I don’t think I’d need her to be seen again. I think I would rather just be told, give it to her or not.” (ID: MI 3)*

All mothers believed antibiotics provided a safe and effective treatment option and although there was growing understanding regarding appropriate antibiotic use, all the mothers expressed the view antibiotics were generally accessible and it was the ‘norm’ to receive them. Maternal past experiences of using antibiotics were found to be another influencing factor on their attitudes. This was illustrated in one mother’s narrative when she spoke about treating recurring infections, which had required antibiotics treatment for recovery.

*“My son is prone to tonsillitis and my doctor generally likes to give him antibiotics for it, cos he’s got enlarged tonsils anyway and he’s really prone to it. So, when I call up, they say ok we’ll send over a prescription for some antibiotics, and we don’t even generally go in anymore.” (ID: FG 3; P1)*

In one example, a mother spoke about how she had been brought up in Africa, where antibiotics were readily given, and associated with life and death. Therefore, she associated the ultimate power of

antibiotics as symbols of life saving treatment and found it difficult to change her personal expectations to receiving antibiotics.

*“Everything is antibiotics and I used to know that if you don’t get it, you might die...the doctors will give them to you easily. So, when you know the doctor didn’t give you, you start panicking you might die.” (ID: MI 13)*

The findings identified mothers had some awareness relating to the risks associated with overusing antibiotics and how this was linked with the development of AMR; however, it was not well understood (similar to findings from the literature review section 2.8.2). Primarily mothers associated AMR as a wider public health issue and did not connect how an individual’s antibiotic usage contributed to the overall incidence of AMR rates. For example, one mother expressed she was not concerned about using antibiotics as she felt they had not been taken enough by their family to cause the development of antibiotic resistance.

*“I don’t take (antibiotics) and as a family we don’t take antibiotics so often so I don’t think we will get that (resistance). I don’t remember the last time I get antibiotics.” (ID: MI 7)*

Although they were aware of the importance of finishing the antibiotic course, mothers were not generally concerned about the risks of AMR. It may be more difficult for mothers to relate the risks of AMR, which has a less tangible impact versus the physical impact of antibiotics’ side effects. However, the real time effects of antibiotics on the body were of particular concern to several mothers, who were anxious possible side effects may be inadvertently harming the body’s natural immune response.

*“They can be harming your body rather than letting your body fight against it and your body recover itself.” (ID: MI 13)*

Mothers overwhelmingly reported they would not hesitate to give antibiotics if advised to by a healthcare clinician or they felt their children needed antibiotics to recover. Their anxiety for their children's recovery overrode any caution about possible inappropriate antibiotics usage or risk of AMR.

*"I'm not concerned about giving them.... I will give them if they will make my baby better."*

*(ID: MI 6)*

*"I know that it's not good for them to have antibiotics, just willy nilly, cos they lose their effect or whatever, and I wouldn't ever want to risk anything in case they needed them, and it wasn't going to work. But I wouldn't have had any qualms starting the antibiotics if I felt I needed them." (ID: MI 11)*

All mothers felt strongly that any unused antibiotics should not be given, although a few mothers felt given the option, they would keep any unused antibiotics. This behaviour was not specific in any particular groups of mothers and did not seem to be influenced by age or culture.

*"I tend to keep them in the fridge until they are out of their date, which isn't very long actually, once they have been made up. I sort of keep them in case, like in a weeks' time might need them." (ID: FG 3, P4)*

Although this was not common, a few mothers (n=5) expressed feeling tempted to keep antibiotics. This behaviour seemed to be associated with convenience, by avoiding a repeat visit to the GP. This was primarily so antibiotics were readily available to treat any recurring symptoms. This is despite all mothers acknowledging the importance of taking the prescribed antibiotics correctly and showing an

awareness of the importance of finishing the course. It was also generally recognised that it was difficult to keep antibiotics once dispensed as the liquid form could only be kept for a short period (10 days) and this prevented mothers from reusing them.

### **7.3.2 Antibiotics as agents of recovery and healing**

The sub theme explores how the symbolic power of antibiotics may shape maternal beliefs towards antibiotic use, including cultural beliefs, and the impact of emotions and feelings on maternal behaviour and decision making. The current study findings identified the possible influence of culture on maternal decision making and attitudes to antibiotics.

Overall antibiotics were universally considered to be important agents for recovery and treatment, however, several of the participant mothers were from countries other than the UK, where English was not their first language (section 4.4.8.1). This meant mothers may have had difficulty finding the appropriate translated words to convey the severity of symptoms, when relating the illness to the healthcare professional. Although this was not reported widely to be an issue with mothers, whose first language was not English, one European mother did express concern regarding her ability to describe the symptoms accurately enough to the GP. She spoke about feeling her English was less clear when stressed and was worried this may lead to an inaccurate diagnosis being made by the GP, resulting in less effective therapeutic treatment.

*“Sometimes when you are a bit worried and stressed, as I’m not from the UK, the language is a problem. Normally you don’t have a problem, but at that time, you know, your mind cannot think so well...Getting more nervous and have the feeling you gave the wrong answer, because you are not describing it well.” (ID: MI 7)*

The narratives also identified mothers from countries other than the UK had a different experience to using healthcare services and antibiotics. This was particularly evident for mothers from countries where antibiotics were readily available and widely used (e.g. Romania). In these examples, several mothers were influenced by their own personal experience of using antibiotics, as well as feeling there was an expectation to use antibiotics, by their families.

*“While my mother, doesn’t have much education and she is a factory worker and all that and if she wasn’t prescribed medication, she would think that the doctor is incompetent or there was something wrong with the doctor.” (ID: FG 4; P2)*

A few mothers expressed a mistrust in the UK general healthcare system, which resulted in bypassing primary care services and directly accessing Accident and Emergency departments or seeking information and advice from a doctor from their home country for advice and treatment.

*“If he was properly ill, I would go to the hospital, I don’t know if I would go via the GP, cos I just don’t think they are trained enough.” (ID: MI 2)*

Other countries have healthcare systems where services are purchased, which enables mothers to have access to appointments with doctors when they want. Mothers found this access reassuring and would use even when their children were not particularly unwell. Ready access to healthcare professionals was valued by mothers, who were willing to pay for services if it meant being seen by a doctor. This private healthcare system supported mothers to develop an ongoing relationship with a doctor thereby building on trust and familiarity.

*“I have a private doctor in x (EU country). You choose the doctor when you are pregnant, so you actually have time to speak to them, they know you as it’s the same doctor you have*

*seen from birth. I decided to go and pay to check if everything is alright with her (child)."*

*(ID: FG 2; P2)*

There were some differences expressed by the mothers regarding the choice of medical services used. A small number of mothers (n=5) described feeling too worried and nervous to wait and see a GP, especially over weekends and out of hours. This was not specific to any particular group of case mothers (age, number of children). Most mothers requested a GP appointment with their own GP practice, before the start of the weekend, as they felt it was more convenient and reassuring to be seen by their own doctor.

*"I did think...Can't somebody see her now, cos they were saying bring her on Monday, and there was a whole weekend. Temperature was high so what if...I was a bit nervous in that case." (ID: MI 1)*

However, several mothers also accessed out of hours or acute hospital services, if they felt they needed to and were anxious. One mother did express concern about any lasting damage from infection, if not treated immediately and did not want to wait to visit the GP.

*"I'd be at the hospital waiting for someone to check my kid. There is no way I would, if I was worried, I'd keep being told to stay at home, stay at home. No chance would I do that."*

*(ID: MI 14)*

Another factor contributing to the symbolism of antibiotics as agents of recovery and healing is the impact of maternal emotions and feelings on decision making. These included maternal anxiety, guilt, impact of intuition, stress, impatience, reassurance, and perception of children suffering. The biggest

emotional driver on maternal decision making was anxiety and this emotion influenced whether mothers actively asked for antibiotic prescriptions for their children.

*“We (mothers) are always scared of everything, and we go to them (GP’s) because we’re scared, and we don’t know. So, we need to go and ask.” (ID: FG 2; P2)*

The anxiety of being a first-time mother and lack of childcare experience were also contributing factors to maternal anxiety levels. This resulted in first time mothers being more likely to visit the GP to seek reassurance and was not specific to any specific maternal age group or demographic.

*“I just needed some reassurance as she was so young, I think, and I was so new.” (ID: MI 3)*

Overall, mothers expressed feeling more anxious if their children were preverbal, (usually under two years of age). They related this concern to their children’s inability to express their feelings or symptoms. All mothers spoke about worrying more when the child was a baby and very young. This included the perception babies were more vulnerable and therefore at increased risk of serious illness. Mothers did not want to take risks with the children’s health, which resulted in healthcare seeking behaviour.

*“She still couldn’t say what was wrong and even, I was holding her the whole night, she kept crying and crying and then in the morning I called for help and they gave us an appointment that day. They (GP) checked her out, she was alright.” (ID: MI 8)*

The findings also found some mothers described themselves as feeling emotional or hormonal, which they felt made them more tearful and anxious. They related these emotions to changes in their hormone levels (post- partum and up to first year of their child’s life).

*“I think cos x(child) was so sick when he was so little, and I was so full of hormones, and it was really hard for me, I think I had a month crying just wanting him to feel better.”*

*(ID: MI 5)*

An emotional response was also considered to be exacerbated by lack of sleep, which mothers believed influenced their responses to managing the illness. This finding was first introduced under initial treatment (6.3.1). The effects of nocturnal anxiety were expressed by the following two mothers.

*“I just wanted to make sure she was checked out in case we had the same problem in the middle of the night again. It was really bad to hear her cry.” (ID: MI 8)*

*“I have been known to be sat in my kid’s rooms, cuddling them, whilst googling their symptoms. Thinking oh my god what am I doing, cos I’m sleep deprived. I think mummy brain sleep deprivation does influence what I’m googling at 3 o’clock in the morning, especially if he has been screaming for the last 2 hours.” (ID: FG 3; P2)*

These emotions could influence mothers’ feelings, causing them to feel desperation and adding to their anxiety if they were unable to get a GP appointment for their child. One mother described begging a GP to prescribe antibiotics for her child when she felt antibiotics were required. This anxiety was linked to her trust and belief in antibiotic efficacy.

*“They didn’t prescribe me (antibiotics) when I wanted to, the more I will panic and think she might be coughing and sick and I really begged them when my daughter was young (to give antibiotics).” (ID: MI 13)*

Several mothers spoke about feeling guilty for not seeking medical treatment promptly following onset of symptoms. These feelings were exacerbated in cases where their children were ultimately prescribed antibiotics and originated in concern that their children were suffering from the prolonged symptoms.

*“I did feel a bit guilty in the end as she did actually need (antibiotics), because then we did go back a week later, she still has a high temperature and a cough and did actually need antibiotics, so I wondered what it...whether I had you know made it worse because I chose not to take antibiotics.” (ID: FG 1; P2)*

One mother spoke about feeling guilty regarding lack of time to spend with her unwell child, due to having other children to care for. This meant she relied on medical interventions, much sooner, rather than other practical alternatives e.g. eye drops for conjunctivitis versus conventional eye cleaning.

*“I mean maybe there are others out there that have more time that they can dedicate. I might not be able to clean his eye as regularly like every half an hour, with the saline and that and maybe other parents do, its.... If you have just got one child..... I could have got rid of it if I had ignored all the other kids.” (ID: MI 6)*

A couple of mothers expressed, how they felt the weight of responsibility in caring for their children, especially if they were a single parent. As the sole decision maker for her children, this single mother spoke about feeling the burden of responsibility and how difficult she found the balance between working and childcare.

*“I was nearly going to resign from my job cos I was stressed (lack of sleep) and I’m a single parent and hate to do all that [taking to the doctors, deciding on management] by myself.”*

(ID: MI 13)

However, the nature of the illness did affect all mothers' behaviours and responses, especially if they felt the children were unwell as they were unwilling to wait to be seen by a GP. This response was based on mothers' perception of the severity and seriousness of the illness and their perceived ability to manage symptoms effectively. This often resulted in maternal antibiotic seeking behaviour.

*"I really felt strongly that she needed them (antibiotics)... I think I would stress that."*

(ID: MI 4)

It is also possible some mothers sought primary preventative interventions, such as reassurance and support rather than a passive, wait and see approach, based on personal experience and anxiety. This may have been particularly the case for less experienced first-time mothers, who may have felt worried due to their lack of experience managing illness and thus sought out expert medical reassurance. This finding links to a result from the quantitative data, which although not statistically significant, suggested children aged under one year of age received fewer antibiotics than children in other age groups. This may reflect the maternal need for reassurance rather than the children being clinically unwell enough to require antibiotics or treatment.

*"New mums... we are always scared of everything, and we go to them (GPs) because we're scared, and we don't know. So, we need to go and ask." (ID: FG 2; P2)*

Individual thinking and beliefs meant some mothers actively sought reassurance via repeat visits to their GP. These mothers thought repeated visits to the GP, may lead to antibiotics being prescribed, which in turn would protect and treat possible infections.

*“I think they just thought she’s a mother and she just wants to do something, because when he was little, I took him to the doctor every week, because you are so worried, and you would just do anything .... I was worried he had an infection...And in the end we got them.”*

*(ID: MI 2)*

Another consideration is the idea mothers may feel they ‘should’ be giving/seeking antibiotics for their child, in a bid to get their child well. This relates to the idea of being a ‘good mother’.

*“I want for him to be better, yeah cos he was miserable. I don’t want him to be ill longer than he needs to be.” (ID: FG 3; P2)*

*“The cough wasn’t very nice cos she was making herself sick almost from it ... she was really distressed; she wasn’t very happy, so we went to the GP.” (ID: MI 3)*

Most mothers described feeling external pressures to manage their child’s illness, and they wanted to do the right thing for their children. In some cases, a few mothers felt there was a societal and peer expectation to give or obtain antibiotics, in order to help their child, recover quickly and avoid complications.

*“I always feel that maybe I should go to the doctor cos what if it turns out to be something worse and maybe I’ll get judged if I don’t take her to the doctor, by other women I know. ”*

*(ID: MI 10)*

All mothers expressed seeking a timely and effective resolution to their children’s illness, and a return to normality. However, mother’s decision making was influenced by their social interaction and the expectations of others, such as their family. It is possible, some mothers, especially new or less

experienced ones, relied on family support and advice. This sometimes led to mothers seeking a GP appointment, to meet the expectation and pressure from their family.

*“He [child] had one night when his temperature went up to 39 degrees and he had a cough. My mum [grandmother] started [telling mother] take him down to the doctor, so fine we’ll take him to the doctor, so she’ll stop saying that. If my mum wasn’t here, we wouldn’t take him to the doctor. It was just for her to stop.” (ID: MI 5)*

Mothers also spoke about meeting the expectations of others as a driving influence on their response and assessed the severity of their children’s illness against other people’s opinions and experiences. This included friends’ experiences of severe illness, concerns over septicaemia and meningitis and any symptoms deemed out of the ordinary. Some mothers spoke about how they found it helpful to share experiences with friends or family as this helped them gauge what to expect from the GP and what they should do.

*“My two best friends are mums, both each have two children. One of them is the doctor and I definitely trust them. They are definitely my ‘go to’ people if I need something.” (ID: MI 5)*

Several working mothers felt they were viewed differently by society to non-working mothers, as they were less committed to the mothering role than stay at home mothers. They felt that they were expected to seek antibiotic treatment by others and therefore obtain a quick recovery for their child. A few mothers felt guilty for working and the challenges this presented, which was primarily due to trying to manage their work/life balance.

*“She was 11 months, and I was working full time. That would stop me sometimes going to work, with the nights awake and everything. It was going on and I asked the doctor ... whether I could get any antibiotics.” (ID: MI 13)*

Some mothers described experiencing feelings of being judged by peers, family and others (nursery) to behave in the manner expected of them. This was especially the case when accessing childcare, where several mothers felt childcare providers i.e. nurseries, exerted pressure on them to respond in a certain way when managing their child’s illness. This included taking the child to see a GP and seeking treatment.

*“I was told he can’t come back to nursery until he had the all clear from the doctor, so I then made an appointment with the doctor.” (ID: MI 12)*

## **7.4 Chapter Summary**

In this chapter the symbolism of antibiotics has been introduced as an original finding. Antibiotic symbolism as a concept has significant implications in how public perceptions and attitudes to antibiotic usage can be addressed and managed. First and foremost, we are social beings and are very much influenced by the world and environment we live in. Although this study related to maternal attitudes to antibiotic usage for their young children, the concept of antibiotics as symbols for recovery, protection, and safety can be related to the wider global population. Indeed, antibiotic symbolism, as a concept, may have international implications and relevance in terms of understanding consumer attitudes towards using antibiotics, which are still considered widely in global society as the ‘go to’ treatment for infections.

This chapter introduced the idea that antibiotics hold different meanings to different people, and examples from the mother’s narratives have been used to describe how mothers associated

antibiotics with safety, protection, recovery and healing. For mothers, who are often the custodian of their family's health (Erci, Polat and Ozyazicioglu, 2016), the findings of the study identified that antibiotics symbolised the hope of a cure for the illness and a means to return to normality. This belief informed their initial decision making. The idea of returning to normality was particularly important for participant mothers, who had busy lives, perhaps more than one child, possibly working and managing a household.

The findings from this current study offer real insight into the symbolic power of antibiotics. Maternal trust and belief in antibiotics were often rooted in the successful outcomes of past experiences. Mothers also associated antibiotics with contributing to the successful treatment of certain infections i.e. ear infections. For example, the current study identified the first step to recognising and responding to illness (section 6.3) was heavily influenced by the provisional diagnosis and assessment by the mother, and how they thought they should respond. Mothers perceived antibiotics as providing safe and effective treatment (regardless of the aetiology), and this influenced their antibiotic seeking behaviour. The maternal decision to seek antibiotics was associated with the perceived severity of the illness and risk of not using antibiotics. The study identified antibiotics were often linked to maternal fear of deterioration in the health of their child and all mothers regularly accessed the internet for information on illnesses and treatment options (section 6.4). In some cases, antibiotics are entirely appropriate to treat serious infections and this message was clearly reinforced by the information available. For example, some public health media campaigns have featured the severe and devastating outcome of meningitis for a child, including the loss of limbs (Meningitis Now, 2020), which presents a very emotive image. Not surprisingly, for parents seeing these images, the importance of giving antibiotics early, to prevent mortality, morbidity and complications is paramount. Therefore, in this context, antibiotics represent a lifesaving treatment and where mothers perceived the illness to be serious, they expected to be prescribed antibiotics. However, some internet sources may provide inaccurate information, which could lead to mixed messages relating to appropriate antibiotics usage.

An example of this is the recommendation of antibiotics to treat ear infections, even though the root cause is often viral in nature and antibiotics ineffective. Although there is more public awareness regarding increased AMR and the importance of using antibiotics sparingly, these often compete against strong media messages which symbolise antibiotics as vital in treating serious illness and ensuring recovery.

In order to develop effective health interventions, medical and non-medical prescribers need to appreciate how influential symbols can be in maternal and societal antibiotic seeking behaviour. National public health campaigns, such as 'keep antibiotics working', (PHE, 2014) have introduced target interventions, including educational materials to influence public behaviours and beliefs. These include specific information for the general public and the practice of visual displays of the messages in GP practices. However, these campaign materials need to be made more effective to engage people and ensure the messages are being heard. The findings from the study identified mothers were generally not aware or accessing antibiotics information from posters or public health campaigns. Therefore, more effective strategies to communicate appropriate antibiotics use is needed. By understanding and gaining insights into the importance of antibiotics as symbols of recovery, healing and protectors of health, clinicians may be more able to recognise and appreciate the origins of maternal anxiety, and antibiotic seeking behavior.

As discussed in this chapter, mothers were driven by their trust in antibiotic efficacy. Antibiotics were associated with safe and effective treatments, which were reinforced by maternal experiences, the views of others (friends, family, clinicians) and public health campaigns (Meningitis Now, 2020). By understanding the potential underlying drivers to antibiotic seeking behaviour, clinicians may be able to engage and consider different approaches to consultations and a potential driver to antibiotic seeking behaviour. For example, by recognising anxiety as an influencing factor on mothers seeking antibiotics, clinicians could allocate additional time for appointments for children. This would allow

time for explanation of the clinical decision making rationale and provide reassurance that the mother was involved and listened to as part of the consultation. This may support and enable mothers to be more accepting of potentially alternative treatments to manage the child's illness, which does not involve antibiotics e.g. use of medication, such as paracetamol, to manage and reduce raised temperatures. This could result in reduced expectations for receiving antibiotic prescriptions from mothers, leading to less antibiotic usage and consequently a reduction in the risk of AMR development.

In the next chapter the findings from the two phases of the study will be integrated and drawn together. The analysis of the data will be discussed, including how the mixed methods study design allowed data from each phase to inform one another. This approach enabled some of the questions from the quantitative phase to be explored in more depth in the qualitative phase, resulting in a more in-depth understanding of maternal ideas, beliefs, attitudes and behaviour to using antibiotics for their children. The implications and recommendations from the study findings and how this contributes to understanding antibiotic use will be presented in the concluding chapter of the thesis.

# Chapter 8: Discussion

## 8.1 Introduction

This chapter begins with revisiting the original research aim and objectives of the study (section 1.2). The key findings from both the quantitative and qualitative phases will then be discussed, synthesised, and linked to existing literature. Limitations of the study will be highlighted and implications of the findings made. The chapter will conclude with discussion regarding possible future research recommendations in relation to the existing literature.

### 8.1.1 Revisiting the research question and study approach

The aim of this study was to gain some understanding into the drivers and influencing factors which lead to maternal decisions to access primary healthcare services and antibiotic seeking behaviour.

To address this aim, the following steps were taken:

- Collection of quantitative primary care antibiotic prescribing data for children under five years of age within the case setting.
- Descriptive and statistical analysis of the quantitative prescribing data.
- Collection of qualitative data from focus groups and interviews with mothers of children under five.
- Thematic analysis of qualitative data to explore findings.
- Integration and completion of comparative and theoretical analysis of the quantitative and qualitative data, including further detailed synthesis.

## **8.2 Summary of main findings and original contribution**

The literature review identified only two UK studies exploring maternal attitudes to primary care antibiotic prescribing (section 2.11). This chapter will argue that the integrated findings from the current study provide a unique contribution to the existing literature. Specifically, this was an original, UK conducted, mixed methods case study exploring antibiotic prescribing practices and mothers' experiences of using antibiotics for their young children. New and original findings were identified from this study. These were the impact of austerity on service provision and how this affects maternal decision making and the symbolic power of antibiotics. The chapter will now present a summary overview of the study findings which were: antibiotic prescribing and usage; antibiotic symbolism and influences on maternal knowledge and decision making and the importance of relationships.

### **8.2.1 Antibiotic prescribing and usage**

#### **8.2.1.1 Review of current practices**

The aim of the first phase of the study was to explore antibiotic prescribing data for children under five years of age, using descriptive and statistical analysis. The findings confirmed most children were seen in the winter months and that respiratory tract infections (coughs and colds) were the most common reason for antibiotic prescribing. This was due to the fact that viruses are more prevalent in colder weather (Sundell *et al.*, 2016), and respiratory tract infections are often viral in aetiology as identified in findings from other studies (McNulty *et al.*, 2013; Shah and Rahim, 2017; Dekker *et al.*, 2018; Mallah *et al.*, 2020).

The current research study captured and reported the day of the week antibiotics were prescribed, which has not been previously reported in existing literature. The study sample size was relatively small and there were no statistically significant differences between the days of the week that children were seen and their age. However, descriptive statistics did identify that children under one year of

age were most often seen on a Friday, and further research would be beneficial to explore these findings in more detail. These results may suggest the day of the week could influence maternal decision making and possible reasons why a particular day of the week may be significant were explored further in the qualitative phase of the study. The findings suggested as Friday directly precedes the weekend, anxious or less experienced mothers may be keen for their very young children (under one year) to be seen by their own GP, rather than using unfamiliar GPs working in out of hours services. The study identified that mothers reported that they often accessed healthcare services for reassurance, when they were worried about their children's wellbeing and health. Therefore, it is possible mothers, with very young children, may have a lower threshold for managing their children's illness and are therefore more likely to visit their GP seeking medical reassurance. These findings are consistent with other studies (Brookes-Howell *et al.*, 2013; Maguire *et al.*, 2018).

Another important finding from this study was children under one year of age were prescribed fewer antibiotics (13.7%) than the other age groups (average 41%). These results may suggest children under one are presenting with probable viral infections, (e.g. bronchiolitis), which are more common in younger children and do not require antibiotic treatment (Maguire *et al.*, 2018). Although, as previously acknowledged, a limitation of these results is the small sample size and that this finding was not statistically significant. This study also found antibiotic prescribing compliance, with CCG guidelines, was highest in children under one year (83.3%), compared to an average of 75% compliance across the other age groups, as described in Chapter 5. Children under one may be perceived as more vulnerable to illness due to their age and an immature immune system.

It is important to acknowledge the study findings were not statistically significant and therefore it could be argued this finding may correspond with the wider existing literature. For example, in one large primary care antibiotic prescribing study, the incidence of antibiotic prescribing was comparable in children under five years, across all age groups (Williams *et al.*, 2018). However, no explanation was

offered for possible reasons by Williams *et al.*, (2018), and additional research would be useful to explore this further using a larger data set.

### **8.2.1.2 Diagnostic uncertainty**

This current study found antibiotic prescribing was highest in children aged three-five years, although again not statistically significant. Diagnosis in young children can be particularly challenging, especially in a community setting, where there are fewer reliable diagnostic and point of care testing tools, which would aid diagnosis (Lucas *et al.*, 2015; Thornton *et al.*, 2015). The signs, symptoms and clinical presentation can also be similar for viral and bacterial infections, and it can therefore be difficult to reliably diagnose whether antibiotic treatment is required (Brooke-Howell *et al.*, 2014; Horwood *et al.*, 2016; Williams *et al.*, 2018). It is therefore possible, in the presence of any uncertainty and an unwell child, GPs may default to taking a cautious approach as well as meeting any parental expectation to prescribe antibiotics (Biezen *et al.*, 2019). This was identified in a previous study by Currie *et al.*, (2014), who found three quarters of parents expected to receive antibiotics to treat a self-limiting viral chest infection.

It is possible that clinicians feel that not prescribing antibiotics is a greater risk to health, due to the potential of possible patient harm and potential litigation, such as in the case of sepsis (Boiko *et al.*, 2020). There is also heightened awareness of the dangers of sepsis in children, following some high-profile cases (Parliamentary and Health Service Ombudsman, 2014). This is in conjunction with an increase in the number of children admitted to hospital over the last 10 years, with the highest number of admissions seen in the under one age group, up by 46.8% between 1997-2006 (Saxena *et al.*, 2009; Neill *et al.*, 2018). This may suggest that the age of the child influences prescribing decisions.

### **8.2.1.3 'Just in case' or delayed prescriptions**

To manage diagnostic uncertainty, antibiotics may be prescribed 'just in case' or as delayed prescriptions by clinicians, which are only to be used when there is no clinical improvement in the patient's illness. The rationale for this potential delay in starting treatment is based on the premise that the origin of the illness is viral and therefore, by waiting a few days, symptoms may improve on their own, thus avoiding unnecessary antibiotic use. Delayed prescribing has been found to be effective in reducing antibiotic prescribing (Andrews *et al.*, 2012; Little *et al.*, 2014), and has been incorporated within the national AMR strategy, as a standard practice to reduce antibiotic prescribing (Department of Health, 2013; National Institute for Clinical Excellence (NICE), 2017).

The current study findings identified, that in practice, most mothers reported they had been recipients of delayed antibiotic prescriptions. In the advent of an undiagnosed illness, the mothers felt reassured by this antibiotic prescribing approach, as it provided ready access to perceived effective and timely antibiotic treatment. Although the case offered some diversity (section 4.4.8.1), there were shared priorities and commonalities between the mothers regardless of their background or age. Findings from the focus groups and interviews identified that mothers often felt reassured when provided with a delayed antibiotic prescription, especially prior to a weekend. This was to avoid the need to access alternative, and perhaps unfamiliar services. Clinicians may also use delayed prescribing as a means of meeting patient expectations. Patients often feel more satisfied with the healthcare experience, if they receive an action following their visit, and this may influence GP prescribing (Lucas *et al.*, 2015). The use of 'just in case' antibiotics may help maintain the patient/clinician relationship, manage uncertainty by providing reassurance and provide a safety net against possible deterioration and complications (Ryves *et al.*, 2016). In practice, delayed prescribing may offer clinicians a solution to immediate prescribing, when the necessity of the antibiotic is in doubt (Spurling *et al.*, 2017). However, this approach also allows GPs to prescribe more freely and could increase overall antibiotic prescribing (Tonkin-Crine and Knox, 2015). In turn, the provision of antibiotic prescriptions may lead

to an increased risk of antibiotics being hoarded and saved at home for later use (Thompson *et al.* 2009), although this did not seem to be the case in this study. It is also possible that the use of a delayed prescription contributes to the idea that ultimately antibiotics are required to treat an infection (Stuart *et al.*, 2021). This may influence the symbolic power of antibiotics as agents of recovery and healing.

The current study findings revealed mothers were reluctant to self-prescribe antibiotics for their children and generally felt very cautious about using antibiotics without their GP's advice. This was different to some findings from the literature review, which found that in countries where antibiotics were more easily available i.e. could be purchased without a prescription, mothers were more likely to self-prescribe antibiotics. This was based on their own judgement rather than medical advice and contributed to inappropriate antibiotic usage (Souto-López *et al.*, 2020). There is also a risk when using the delayed prescription approach, that the burden of decision making, when to start or not start antibiotics, is placed on the mother. This could be difficult for some mothers, who may not feel confident to make the decision when to start treatment and therefore may give the antibiotics to be 'on the safe side'. This was reflected in the current study findings, as was the importance of spending time to discuss rationale and decision making choices by the clinician. It should also be noted, variation in GP prescribing practices has been shown to be unconnected to patient age, gender, clinical presentation (Butler *et al.*, 2009) and GP empathy (Hawker *et al.*, 2014); this would benefit from further evaluation in future studies.

As introduced in Chapter 1, the UK government's AMR five-year strategy (Department of Health, 2013) was developed in response to increasing AMR infections, although it was updated in 2019 (Department of Health and Social Care, 2019a). National reporting systems are used to collate and monitor antibiotics prescribing practices (Department of Health and Social Care, 2019a). This data is used to inform both national and local prescribing guidelines, which are made available to prescribers,

to support antibiotic prescribing decisions (see 1.3). Robust antibiotic stewardship programmes have also been introduced, to encourage clinicians to only prescribe antibiotics when there is a good chance of patient benefit. However, data collection is not comprehensive and focuses on monitoring the use of antibiotics associated with higher risk of AMR development and other associated infections e.g. *Clostridium difficile*. This research study has found antibiotic prescribing data in children requires improvement; additionally antibiotic prescribing data collection should be expanded to include all age ranges of children. This level of detail and information is needed to obtain a more comprehensive understanding of antibiotic use in relation to AMR development, across all sectors of healthcare. This information could be used to identify and monitor antibiotic use in potentially more susceptible populations i.e. children.

## **8.2.2 Antibiotic symbolism and influences on maternal knowledge and decision making**

### ***8.2.2.1 The symbolic power of antibiotics***

Another objective of this study was to use thematic analysis of the qualitative focus group and interview data from mothers of children under five to explore mothers' experiences and attitudes to using antibiotics for their children. Integration of results and findings from both phases of the study identified the concept of antibiotics as holding symbolic meaning and is an original finding (section 7.1). This study was conducted in the UK, where Western medicine, in developed countries like the UK and USA, is firmly grounded in a scientific evidence base. Practices and treatments are based on tried and tested research and are generally focused on 'fixing' illness to improve health. This ranges from complex treatment for cancer, or organ transplantation to simple surgical procedures or medication to manage illness symptoms. As a result, Western medicine which is based on authoritative knowledge, offers the majority of treatment options in society. Authoritative knowledge is constructed from expert knowledge derived from dependable sources (Watson- Miller, 2005), and in a healthcare context, this knowledge shapes clinical decision making and the interactions between healthcare professionals and patients (Ivry, 2010). These findings suggest antibiotics symbolise and

reflect individual and societal trust in Western medical treatments and clinician expertise, and this symbolism is integrated into mother's personal beliefs. The Western medical model is widely accepted as the societal norm and focuses primarily on the eradication of illness through diagnosis and effective treatment. It could be argued that the UK NHS symbolises safe effective and reliable care, and therefore antibiotics, by association, convey the same subliminal message of trust.

The study findings found most mothers were willing to use antibiotics for conditions likely to have a viral origin, such as influenza, sore throat, cough, earache and they were influenced by a general, yet false belief that antibiotics are effective against viruses, and therefore safe to use. The willingness to use antibiotics was driven by their perception of the illness severity. For example, the current study findings revealed that most mothers perceived respiratory tract infections as potentially severe and therefore antibiotics were the appropriate and effective treatment, even if the cause was viral. The belief that antibiotics can be used for viral infections has been found in previous studies, which have identified there is general lack of public understanding about correct antibiotic usage i.e. virus versus bacteria (Pechère, 2001; André *et al.*, 2010; PHE, 2015; McNulty *et al.*, 2019). Although mothers are aware of public health media campaigns, regarding inappropriate use of antibiotics in treating self-limiting and viral infections (PHE, 2019c), the study found they often sought antibiotics as a first line treatment. This relates to the core beliefs, that antibiotics can be used to treat all illnesses and a lack of understanding about correct usage i.e. virus versus bacteria (André *et al.*, 2010; PHE, 2015).

Challenges in reducing patients' expectations to receive antibiotics have also been well documented (Gaarslev *et al.*, 2016; WHO, 2018; Boiko, Gulliford and Burgess, 2020). However, public health campaigns have not seen sustained changes in public perceptions regarding antibiotic use. These campaigns have predominantly focussed on the message that antibiotics are ineffective against viral infections and often rely on the display of patient informational material in waiting rooms or pharmacies (Huttner *et al.*, 2010). Johnstone (2016) argues public awareness of AMR and the risks

associated with it will increase this public fear. This may impact on how health care professionals manage their patients collectively and individually depending on their perceived needs, and clinicians may become morally conflicted over balancing the patient's general wellbeing and welfare interests with justifying what is seen as the 'right' and 'wrong' decision making. Therefore, personal experience and confidence in diagnosis are key influencing factors for clinical decision making, and clinicians need to be reflective and self-aware of any possible effects of this. The complete trust in the efficacy of antibiotics expressed by mothers was also influenced by social interaction with others, namely clinicians. Brookes-Howell *et al.*, (2014) argue clinicians convey their trust in antibiotics by prescribing them, which has a follow up effect on how patients perceive antibiotic use. Therefore, it is also important to recognise the confidence clinicians may place in the efficacy of antibiotics to treat infections. The findings from this study are consistent with previous studies, which found that in the presence of diagnostic uncertainty, over 70% of children were prescribed antibiotics (O'Brien *et al.*, 2015). Therefore, it could be argued antibiotics may symbolise a safety net for clinicians, by offering security from professional vulnerability and self-protection in case of patient deterioration (Mclsaac and Butler, 2000; Edelstein *et al.*, 2016).

The phase two qualitative data analysis from the current study, identified the novel concept of antibiotics as a safe and trusted treatment option (section 7.3.2). All mothers viewed antibiotics as often being necessary to treat infections, prevent deterioration in illness and prevent prolonged suffering of the child, and these findings correspond with findings from other studies (Rousounidis *et al.*, 2011; Cabral *et al.*, 2015; Bagnulo *et al.*, 2019). Although, there is a growing awareness regarding appropriate antibiotic use, several mothers in the study still believed antibiotics could 'cure' everything. This belief and trust in antibiotics appeared to arise from individual mother's own thinking, experience and the influence of their social interactions with others.

The study narratives also identified how audible symptoms increased maternal anxiety and if a child was coughing, mothers were more likely to seek antibiotics and a medical review. Factors increasing maternal anxiety included young children, who had not yet developed use of language or communicated their feelings, and concern that their children were in pain. As found in previous studies, when children are ill, mothers sought to protect their children and were concerned that they may fail to recognise serious illnesses and take appropriate action (Kai, 1996; Ingram *et al.*, 2013). Mothers reported the perceived threat posed by the illness influenced their response and decision making and these findings correspond with a study by Cabral *et al.*, (2015), which found parents rely on antibiotics to provide effective and efficient treatment for children.

Following on from this concept of antibiotics being needed to treat infections, is the maternal belief that clinicians would not prescribe antibiotics unless absolutely necessary. This was particularly linked to the maternal perception of illness acuity. However, the seriousness and severity of the illness was subjective and interpreted differently by all mothers, who may be influenced by the impact on their children's life i.e. sleep disruption or missing school, supported by findings from Cabral *et al.*, (2016). As found in other studies (Brookes-Howell *et al.*, 2014; Al-Ayed, 2019), several mothers expressed anxiety, that if antibiotics were not prescribed, their children's health would deteriorate. They would not want to take this risk and could feel a loss of control of their children's care, thereby increasing their anxiety.

It is worth acknowledging that GPs may misinterpret parental concern or information-seeking as pressure for an antibiotic prescription (Cabral *et al.*, 2014b; Lucas *et al.*, 2015). One Australian study found GPs and parents often have dissonant views regarding use of antibiotics. The study showed GPs misinterpreted parents seeking reassurance and a diagnosis, as a pressure to prescribe, whilst parents' satisfaction with GPs was not dependent on receiving antibiotics (Biezan *et al.*, 2019). Reliable and consistent messaging about the appropriate usage of antibiotics is also vital in addressing patient

expectations. The findings from this study identified mothers expected to be prescribed antibiotics again, if previously treatment had been successful and effective. For example, mothers wanted to be prescribed antibiotics to treat chest or ear infections, if they have been prescribed them in the past. This has been found in other studies and may be because antibiotics are perceived as a reaffirmation of an earlier experience and associated with recovery from unpleasant symptoms (McNulty *et al.*, 2013; Cabral *et al.*, 2016).

This current study also found all mothers invariably wanted healthcare information and therefore sought this from a variety of resources, including social media, internet, friends, family, books, and healthcare professionals. The most common sources of information, which all mothers had access to, were the internet and social media. It provided mothers with immediate access to multiple data sources, and provided tailored information (Moon *et al.*, 2019). The internet provided easily accessible information and is often the first source mothers access and is consistent with findings from other studies (Malone, While and Roberts, 2013; Sundstrom, 2016). It is often used to find information in a crisis, such as illness symptoms (Spence *et al.*, 2006; Moon *et al.*, 2019), and was used in this study by mothers, to assess and judge the cause and severity of the symptoms, without seeing a GP. Similarly, mothers used the internet to research the illness and prepare for the GP appointment. This is supported by findings from a study by Malone *et al.*, (2005), which found that mothers use the internet to improve their knowledge so they can make a good impression on the GP. The importance for mothers to be taken seriously and listened to by the clinicians was echoed in this study.

Whilst every participant mother perceived the NHS website as reliable and trustworthy, social media offers an easily accessible and powerful platform for people to access information (Westerman, Spence and Van Der Heide, 2013). However, nearly all mothers participating in this study felt it should be treated with caution, as it offered personal views rather than clear medical information and was therefore less trustworthy. Mothers valued evidence-based information and although mothers

accessed the internet for information, they also relied on healthcare professionals to provide information (Letley and Yarwood, 2018), and therefore the relationship between parents and clinician was highly influential in parental decision making.

This current study identified that most mothers were well educated (63% had a degree) and were generally aware of the appropriate use of antibiotics, although there were variations in knowledge between the different maternal age groups. Age has been previously shown to be an influencing factor on knowledge as found in a study by Shallcross *et al.*, (2015), who identified that about of third of mothers under 25 years believed antibiotics were effective for treating viral infections. There were only three mothers in the study, aged 26–30-years-old, who participated in a focus group, who did not seem to know antibiotics were ineffective treatment for viral infections. These mothers also had the lowest level of education (secondary school), compared to the other mothers in the case. This finding was consistent with previous studies relating to the influence of education on parents' knowledge (Agarwal, Yewale and Dharmapalan, 2015; Dwibedi *et al.*, 2015; Vaz *et al.*, 2015; Chinnasami *et al.*, 2016). The findings from the current study also showed that although most mothers were aware antibiotics were not effective against viral infections, this did not affect their approach to seeking antibiotics or using them. Possible explanations for these findings may be that maternal anxiety for their children's recovery is more powerful than any concern mothers may have regarding inappropriate antibiotic use and the risk of AMR developing. Some mothers also felt that some infections could not resolve without using antibiotics i.e. ear infection, which is in line with previous studies (de Bont *et al.*, 2013). However, as previously stated, it can be difficult to differentiate whether infections are viral or bacterial in origin (Williams *et al.*, 2018).

Another possible explanation from the study findings of mothers' attitudes towards using antibiotics was the perceived risk of using antibiotics and subsequently developing AMR as being low. This was a shared belief across all the mothers in the case, irrespective of cultural background or maternal age,

and was primarily due to the perception that as individuals and families, they were low users of antibiotics. This meant mothers did not relate their antibiotic use and behaviour to contributing to the risk of AMR developing in the wider community, which is consistent with previous research (Brookes-Howell *et al.* 2012a; McCullough *et al.* 2016; Szymczak *et al.*, 2017; Van Hecke *et al.*, 2019). In this case study, all mothers were unconcerned regarding using antibiotics, if they believed they were needed to treat infection. A few expressed they may be concerned about AMR if they used antibiotics often, for example to treat a recurring illness (e.g. tonsillitis), but this would not deter them from using antibiotics if they felt they were needed. Mothers were generally not overly concerned about side effects from using antibiotics. However, interestingly this was not the finding from a study by Szymczak *et al.*, (2017), which identified parents were generally reluctant to use antibiotics due to concerns about side effects i.e. diarrhoea or allergic reaction, rather than concern about antibiotic resistance, although no reasons for this finding were offered.

Another key influence on maternal behaviour is the concept of being a 'good' mother; a mother devoted to her child who puts her child's needs first (Raddon, 2002; Johnston and Swanson, 2006). This concept of motherhood is central to the symbolism of antibiotics. For mothers, who are generally the custodian for a family's health (Erci, Polat and Ozyazicioglu, 2016), antibiotics may symbolise the hope of a cure for the illness and a means to a return to normality. The study findings identified that all mothers wanted to care for their child and relieve any perceived suffering, and antibiotics are often perceived as effective in relieving symptoms and significantly shortening the illness duration. These results are consistent with findings from other studies (Alili-Idrizi, Dauti, and Malaj, 2014; Cabral *et al.*, 2016; Chinnasami *et al.*, 2016; Hammour, Al-Saleh and Abu Hammour, 2019; Souto-López *et al.*, 2020).

As perhaps expected, given the strength of maternal feelings, this study also found mothers were strongly influenced by their emotions when decision making. These included feelings of guilt and anxiety, which were influenced by the perception of the illness threat, suffering of the child, and

personal experiences of dealing with illness. Time and convenience were also key factors. There was a general acknowledgement that mothers may feel guilty regarding their decision making and response to managing their child's illness. This was expressed as a scenario when children who did not initially receive antibiotics, had ultimately been prescribed them. Mothers felt guilty when they had not received antibiotics earlier in the illness to prevent the perceived suffering of their children. They wanted to relieve symptoms of pain and discomfort and believed antibiotics could provide this. These findings are consistent with findings from other studies, where nearly half of mothers expected and received antibiotics for fever and sore throats (Bert *et al.*, 2016; Teck *et al.* 2016; Al-Shawi *et al.*, 2018; Alsuhaibani *et al.*, 2019; Saleh Faidah *et al.*, 2019; Wang *et al.*, 2019; Mallah *et al.*, 2020).

In the current study, mothers often expected to receive antibiotics for ear infections, as the symptoms were seen as painful, and the infection would not be able to resolve without antibiotic treatment. This finding was consistent with a study by Van Hecke *et al.* (2019), which identified mothers would seek antibiotics to help resolve any symptoms of illness and speed recovery. This was despite the fact antibiotics have been shown to have little therapeutic value in treating children with symptoms of ear infections aged two years old and above (Venekamp *et al.*, 2015). This Cochrane review of existing evidence demonstrated antibiotics did not significantly reduce the ear pain children experienced and most children (60%) improved without antibiotics after 24 hours (Venekamp *et al.*, 2015).

The concept that children were different to adults and more vulnerable to infection, was widely held by all mothers, who believed children should be managed more proactively than adults. All mothers in this study worried more when the child was a baby and very young. Children may be perceived as a naturally vulnerable population, arising from an immature immune system (Cabral *et al.*, 2015; World Health Organisation, 2016) and the domain of managing illness and advising healthcare lies traditionally with medically trained professionals (Knaak, 2010). This perception of vulnerability increased if the child had a pre-existing health condition i.e. asthma or small/low weight. These

conditions contributed to the perception of vulnerability and antibiotics could be seen as symbolic of protection from serious infections. This finding from the current study was supported by a study, conducted in France, which used surveys to explore the motives behind patient compliance with taking or refusing antibiotics (as adults). Although the French study was only conducted in the community, in a single city and relied on self-reporting for results, it did identify that patients with poor health, who have perhaps experienced unsuccessful treatment, may view antibiotics as a means of protection to keep themselves well and prevent further illness (Bagnulo *et al.*, 2019).

The idea of children as being vulnerable to illness is linked to the concept of protection and was expressed by many of the mothers in the study. Results from the current study identified children under one were prescribed fewer antibiotics than other age groups. Although the children under one were prescribed fewer antibiotics, the number of GP consultations for children in each age group was similar. These findings may reflect that mothers of very young children perceive them as being more vulnerable due to their age, and therefore are more likely to seek early medical review and interventions than mothers with more parenting experience.

In another study, nearly half of parents believed antibiotics could protect children from common colds, and therefore they were more likely to give antibiotics prophylactically (Yu *et al.*, 2014), although, this study was in China where antibiotics can be purchased over the counter. Maternal anxiety was linked to a strong protective instinct towards their children's health and mothers repeatedly expressed in the narratives, they would do whatever they could for their children. This finding was consistent with to a study by Finkelstein *et al.* (2013), who identified that although parents were reluctant to use antibiotics, they were also willing to do whatever was necessary to obtain antibiotics if they thought they were required. Therefore, in this context, antibiotics represent and symbolise a lifesaving treatment, which mothers want to access. This shared view by the wider society, including mothers, enables antibiotics to be seen as symbolic for resolving infection and as vital in securing a recovery

from illness. Of course, the perception of illness severity will vary for each mother, but as reflected in the findings, mothers did not want to take any chances with their children's health and in some cases, their concern resulted in antibiotic seeking behaviour. This supports the concept of antibiotics as valuable and reliable treatment options and symbolic of providing safe therapy.

Generally, the study found most mothers did not feel confident to give their children antibiotics, without further direction from the GP, or unless they knew the cause (previous experience). This was in contrast to other countries, where the parental prescribing and administration of antibiotics is more common (Panagakou *et al.*, 2011; Al-Shawi *et al.*, 2018; Wang *et al.*, 2019). Several mothers, from the UK and other countries, believed that if antibiotics were not prescribed, their children would deteriorate, therefore, antibiotics were felt to be required to prevent deterioration of illness; this is consistent with a previous study (Brookes-Howell *et al.*, 2014). This finding was evident in recurring conditions, such as chest infections, which may require management by repeat courses of antibiotic treatment. These constructs may be applied to the societal association and representation of antibiotics as symbols of safe, effective treatments. This was especially the case if mothers were worried about serious illnesses, as they believed antibiotics were effective in reducing complications, as supported by findings from other studies (Rousounidis *et al.*, 2011; Coxeter, Mar and Hoffmann, 2017; Alsuhaibani *et al.*, 2019).

Previous and personal experience was found to be influential on maternal decision making. This ranged from recognising symptoms, their experience of managing illness, their own upbringings, and self-confidence. In this study, mothers expected to receive antibiotics when they had previously been prescribed them, which may make it more difficult for clinicians not to prescribe them in the future. This was not a new finding and has been previously identified in studies (Panagakou *et al.*, 2011; Saleh Faidah *et al.*, 2019). However, it is worth acknowledging that the majority of the existing literature, as identified in the review, (section 2.4) was conducted via surveys in countries where healthcare services

are purchased. This may mean that the clinician could feel increased pressure to prescribe antibiotics to meet parental expectations, as this is a directly paid for service. The consequence for not doing so, may result in loss of potential business and therefore earnings if parents choose to visit alternative clinicians.

Antibiotics were found to be deeply linked to mothers' past experiences (reflecting the symbolism of antibiotics), including childhood and their own maternal modelling. These experiences were very emotive and therefore in cases where there had been stressful episodes or incidents of illness, mothers felt very emotional and attached to wanting to use antibiotics. By giving antibiotics, mothers could be active in resolving their child's symptoms or suffering. This action may feel positive and provide some sense of control, which can be reassuring. The findings identified that antibiotics were symbolic of recovery and emotional reassurance, and some mothers sought active interventions, rather than passive, wait and see approaches. This may be particularly the case for less experienced, young, or first-time mothers, who may feel anxious and therefore less willing to wait before seeking antibiotics. Similar studies have suggested this may be due to having decreased knowledge about antibiotic usage (Vaz *et al.*, 2015; Al-Saleh *et al.*, 2019). The impact of past experiences of using antibiotics on an individual and possible societal thinking and beliefs, is very influential on subsequent human behaviour. Societal perceptions of antibiotics are that they provide a safe treatment and have few serious side effects (McNulty *et al.*, 2007). However, encouragingly, with increasing societal awareness around AMR, there is a gradual move towards the public health message that antibiotics are not always appropriate or the right course of action (Ancilotti *et al.*, 2018). Conversely, it is possible that the idea of giving antibiotics representing being a good mother, will change to not giving antibiotics as the preferred response. A shift in societal views towards the norm being not to give antibiotics, would be extremely helpful in reducing inappropriate antibiotic use. However, at present society does not seem to be ready to move away from their perceived dependency on antibiotics (Ancilotti *et al.* 2018).

### **8.2.2.2 Influences on maternal knowledge and decision making**

An objective of the study was to explore the influence of social factors such as maternal age, family cultures, beliefs and cultural background, on maternal attitudes towards antibiotic use for children. Universally antibiotics have a positive public image (Pechère, 2001) as effective agents to treat infections. A study by Pechère (2001) used surveys, in nine countries, to evaluate patient attitudes towards antibiotics use. The study found variation in attitudes, with British participants demonstrating high self-reported compliance, administration at correct intervals, and high respect for the physicians, which was also shared in Belgium and France. However, compliance did vary across the countries and possibly reflected the differences in access to medical care facilities, health insurance systems, education, and cultural background. Although the original study by Pechère (2001) was conducted 20 years ago, the findings are not dissimilar to more recent studies (Souto-López *et al.*, 2020; Al-Ayed, 2019).

The case reflected a fairly diverse population within the locality, as previously discussed (section 4.4.8.1), and there were participant mothers from other countries, mainly European, living in the case location. The findings suggested all mothers, regardless of cultural background, shared similar attitudes and experiences of using antibiotics, although attitudes to accessing antibiotics were influenced by the mothers' past experiences of different healthcare systems. The UK has a diverse and multi-cultural population and healthcare professionals do need to recognise how cultural experience and expectations may influence possible antibiotic seeking behaviours. For example, there may be cultural differences about how patients interact and respond to authority i.e. role of the clinician, which may address cross-national differences in antibiotic use (Deschepper *et al.*, 2008). Mothers from countries where the practice of purchasing antibiotics is common and the fear of infection is high, may struggle to accept clinicians' decisions to not prescribe antibiotics. This was found in this

current study in one African mother who was used to being able to purchase antibiotics in her home country. She reported feeling extremely anxious and concerned when she felt her child needed antibiotics but was unable to secure them from her GP. This anxiety may lead to antibiotic seeking behaviours and ultimately may influence the clinician to prescribe (Rousounidis *et al.*, 2011). Another point to consider is that most mothers generally adapt to meet the cultural expectations of their role and therefore the idea of being a 'good parent' may influence the decision whether or not to take their child to see a GP or to seek antibiotics (Casiday, 2007; Davies and Allen, 2007). Although this current study identified the importance of cultural influences, further research would be beneficial into how cultural influences affect health seeking behaviours in culturally difference countries i.e. the Middle East and within the context of the UK.

In this study about a quarter of the mothers were White European (27%), and although generally cautious about using antibiotics, they were more used to using and buying them than British mothers. The practice of keeping and using left over antibiotics has also been identified, as being more acceptable to mothers from countries where it is easy to purchase antibiotics (Al-Dossari, 2013). The only way to obtain antibiotics in the UK is via a clinician prescription, however, several mothers in the study stated they would consider keeping antibiotics if they could. This was for convenience to avoid a return GP visit and for reassurance. However, in young children the antibiotics prescribed are often provided as a liquid, so it is not possible, once reconstituted, to keep them. Whether mothers would view antibiotics prescribed in capsule form differently, which can be kept longer, for use in older children, would be an interesting area for future research. Cultural differences should be recognised when devising any public health messages, and by clinicians.

The findings from the current study recognised that mothers were influenced by a broad range of external influences on their decision making. Some mothers found it helpful to share experiences with friends or family, as this helped them gauge what to expect from the GP which has also been reported

in other studies (Ingram *et al.*, 2013). However, several mothers were also influenced by friends' experiences of severe illness, concerns over septicaemia and meningitis and any symptoms deemed out of the ordinary. The expectations of family, friends, and public health messages had a direct influence on how mothers responded to the management of their child's illness and influenced how mothers assessed the severity of their children's illness. This included asking for antibiotics and return GP visits, if they felt they were needed. An unwell child presents a very emotive image. For parents seeing these images, the message may convey the importance of giving antibiotics early, to prevent mortality, morbidity and complications.

Another influence for mothers was feeling judged by others to behave in an expected way and several mothers spoke about this. The finding of feeling judged was also identified in a large UK national survey (Best Beginnings, 2020), which found 70% of parents felt judged by others with regards to their actions, with nearly half of them reporting these feelings had a negative impact on their mental health. Although the 'Best Beginnings' survey had a broad remit relating to maternal mental health, it did offer insight into how feeling guilty impacts mental health and wellbeing. Several mothers also identified feelings of guilt due to going out to work rather than staying at home. It is certainly more common for mothers to return to work, in either full time or part-time capacity, following the birth of a child in the UK. However, as identified in the findings, some of the mothers did feel they were societally judged for going to work and felt guilty for doing so. Other studies have previously identified and suggested that society may view working mothers as being less committed to the mothering role or bad parents (Morgenroth and Heilman, 2017; Meeussen and Van Laar, 2018).

When a child is unwell there is a disruption to normal family activity. There may be many aspects to this disruption, but these may include disturbed sleep, parental anxiety and stress of dealing with an ill child, parental distress at perceived suffering of the child, and worry of potential spread of infection to other family members. An ill child may also result in maternal inconvenience (taking time off work

or nursery/school). The results in the phase one quantitative GP data identified antibiotic prescribing was higher in children aged three- five years of age. This may be due to these age groups mixing more frequently via playgroups and childcare day-care services. This is supported by other studies, which identified GP antibiotic prescribing increased in children attending day care settings, where viral infections could be common (Schneider-Lindner *et al.* 2011; Rooshenas *et al.*, 2014). Antibiotic prescribing decisions could be influenced by day care child provider policies regarding children attending their services if unwell. This was borne out in a study by Rooshenas *et al.* (2014) into the influence of children's day care on maternal antibiotic seeking behaviour. They found parents were encouraged to seek medical appointments and secure antibiotics, although policies were not evidence based and had no justification. As a result, parents felt obliged to consult and seek antibiotics to meet the expectations of the childcare provider, rather than their own personal beliefs. The impact of this type of policy may influence how quickly mothers may seek healthcare interventions and demonstrate antibiotic seeking behaviours, as some mothers may feel getting early treatment is important in managing childcare provision (Dwibedi *et al.*, 2015). This may affect mothers, who do not receive benefits or payments for not working, as an inability to work if they are caring for their children will cause a loss of earnings. A loss of earnings can put further pressure and anxiety onto parents to seek early medical treatment. This has been reported particularly as an issue in countries where there is no provision of sick/carers leave. In this scenario, mothers may seek means, by using antibiotics, to accelerate their children's recovery and therefore reduce the impact of caring responsibilities on their employment (Salazar, English and Eiland, 2012; Ecker *et al.*, 2013). However, although the challenges that mothers experience with loss of earnings has been widely reported in countries where there is financial support for not working due to childcare responsibilities, it should be acknowledged that some jobs within the UK, often low paid sessional or part-time work do not provide sick, or carer's pay. This may therefore impact mother's decision making. Although the case provided the most diverse population available, reflecting slightly higher unemployment and use of local authority

housing than the national average, none of the mothers reported this as a factor for seeking antibiotics, and further research to explore this would be of benefit.

The importance that mothers placed on feeling listened to by healthcare professionals and not being timewasters, was identified in this study, and has been found in another study (Tallon, Kendall and Snider, 2015). Mothers did not want to be seen as overanxious and wanted to be taken seriously by healthcare professionals (Cabral *et al.* 2015). Feelings of self-doubt were common, especially if mothers felt the child was behaving normally once they had arrived for the GP appointment. They were concerned the GP would perceive the child as not being particularly unwell and that this may subsequently affect how the GP interacted with them in the future i.e. whether they were listened or whether they were seen as overreacting. It was also the case, where mothers had received antibiotics from the GP, that they felt their actions in seeking an appointment and antibiotic prescription had been justified. This resulted in increased confidence in their own assessments and judgements in managing and recognising their children's illness, but also an increased likelihood to seek antibiotics again.

The concept of maternal intuition was strongly reflected in the narratives. Mothers described knowing something was not right and this was expressed as innate insight. The majority of mothers drew on their innate knowledge of their child, to inform their healthcare management decisions. All mothers instinctively knew when their child was not well and sought GP appointments promptly. They felt they were the experts for their child and expected to be able to use their knowledge in conjunction with GP medical assessments. The findings of the current study also identified that it was important for mothers to feel involved in any decision making for their children. Several mothers described the GP consultation as 'a conversation' and the importance of maternal inclusion in any decision making for their children has been previously acknowledged in the existing literature (Coxeter *et al.*, 2015; Brookes-Howell *et al.*, 2014). This issue was explored further by Coxeter, Mar and Hoffmann, (2017),

who found that only 44% of parents had had some discussion with a clinician about the rationale for antibiotic use and that 93% wanted to be involved in future decision making regarding the use of antibiotics. However, despite this being known, it is interesting that the current study has identified a lack of involvement in any decision making with the GP is still a real issue for mothers. Any service development initiatives need to ensure that strategies are focused on improving these important relationships between healthcare professionals and mothers.

### **8.2.3 Importance of relationships**

One of the study's objectives was to determine the influential sources of healthcare advice valued by mothers. Chapter 6 presented the phase two qualitative findings which identified how valued and important healthcare professional/mother relationships, and continuity in care were to mothers. Early engagement and interaction between mothers and healthcare professionals, is instrumental in developing accessible resources, networks, and supportive relationships, which mothers rely on whilst learning their new role and gaining mothering experience (Jack, DiCenso and Lohfeld, 2005; Department of Health, 2009). This has been recognised in national initiatives and strategies to improve children's health and wellbeing such as the Healthy Child Programme (Department of Health, 2009). A key aspect of the Healthy Child Programme is keeping children healthy and safe and the prevention of some serious and communicable diseases.

A new and unexpected finding from this study was the impact of austerity measures on health visiting services, which are often key services accessed by mothers (Whittaker *et al.*, 2021). This has occurred as a direct consequence of reduced UK primary care funding. Austerity measures have resulted in a 22% reduction in health visitor training places in 2017 (Royal College of Nursing, 2017), which has contributed to an overall 3.6% reduction, between December 2019-December 2020, in whole time equivalent health visitors working in the community (NHS Digital, 2020). Although a decrease in training places has contributed to the reduction in practicing health visitors, since 2015, there has

been a steady increase (24%) in the number qualified nurses retiring and moving to other roles (Local Government Association, 2019; BMA, 2019). With fewer nurses specialising in health visiting, this has led to an inevitable reduction in the service.

The current study found the relationship with health visitors was variable and differed between participant mothers. All participants had had experiences of interacting with health visitors following the birth of their child, but changes in ongoing services have reduced the contact time between mothers and health visitors (Bryar *et al.*, 2017). The current global pandemic is an example of the negative impact of a reduced health visiting service, which has seen reduced contact time between mothers and health visitors (Conti and Dow, 2020). Decreased and loss of contact time have affected the opportunity for mothers and health visitors to form effective trusting relationships, based on familiarity and continuity of care (Bryar *et al.*, 2017; Cowley and Bidmead, 2020). Mothers in the study, sought and valued continuity, which they relied on to build relationships and rapport with health visitors. The issue and importance of a good relationship was a recurring finding in this study and has been previously identified in existing literature (Donetto *et al.* 2013; Cowley *et al.*, 2015). In a study by Donetto *et al.* (2013) semi structured interviews were used to explore mothers' views and experiences of health visiting. The majority of participants reported positive experiences with the health visiting services, which resulted in feeling of being listened or being 'known' by the health visitor and this was appreciated by the mothers (Donetto *et al.*, 2013). Equally health visitors often use these relationships to address the needs of the mothers/families under their care (Cowley *et al.*, 2015).

The findings from this research study did show that there were some mothers who did not have any continuity or a relationship with their health visitor. This had resulted in mothers often seeing different health visitors, which had led to mothers being given mixed messages. This made those mothers feel anxious and confused and resulted in a lack of trust in the health visitor advice. Consequently, some

mothers sought a GP appointment, which may not have otherwise been needed. The lack in personalised care affected mothers' experiences of using health visiting services. These findings from this study have been identified and reflected in other literature (Cowley *et al.*, 2013; Donetto *et al.* 2013; Brook and Salmon, 2017; RCN, 2017). Not only has the importance of continuity of services been acknowledged as a key component of effective health visiting practice, being highly valued by parents, service continuity is strongly associated with improved health outcomes (Cowley *et al.*, 2015; Institute of Health Visiting (IHV), 2020a). However, there is clearly also a practical challenge for health visitors to meet parents' needs within the constraints of the current healthcare system (IHV, 2016; BMA, 2019).

The accessibility and location of services, as these findings have shown, also greatly influenced mothers' decision making around accessing health care services. This was supported by the results of a recent survey of 1000 mothers of children aged birth-23 months, which showed issues of accessibility, continuity and health visitor responsiveness were identified as key issues for mothers (IHV, 2020b). One location for health visitor services was the GP practice, however, services have generally been relocated, which has contributed to a loss of visibility, profile and integrated working relationships (Peckover and Appleton, 2019). Another easily accessible location for mothers to access health visiting services were children's centres. Many health visitors were based in these centres, which were developed as a central location, where early interventions and support for young families could be readily accessed (Barnardos, 2014; Department of Education, 2015). However, in response to the current austerity measures, children's centres in England have seen their budgets halved from £1.2 billion to £0.6 billion in the last nine years, which has resulted in the closure of 508 centres nationally (Gayle, 2018). Several mothers expressed their disappointment at the loss of the children's centres, as they found them a supportive resource and this has been reflected in other research findings and surveys (Department of Education, 2014; Institute of Fiscal Studies, 2019; Mason *et al.*, 2021). The findings from this study have identified the health visitor's role and ability to support and

promote the prevention of illness and promotion of health may have been weakened at a time when prevention could help decrease service demands (Bryar *et al.*, 2017).

Other important healthcare professionals were GPs and most mothers felt it was important to know their GP and for them to know their children and family. Mothers liked continuity in seeing the same GP, as they felt this allowed the GP to get to know their children and what was normal for them, including any past medical history. Mothers also felt reassured the GP could easily identify if the children were unwell and therefore identify what was causing the illness. It was also important for recurring health problems to be seen by the same GP, to allow monitoring and assess any progress or medical changes. However, in the findings, most mothers felt it was important to be seen by a healthcare professional, who could be a GP, practice nurse or health visitor, depending on the perceived severity of the illness. With a decrease in practicing GPs, there has been a modest increase in practice nurse services within primary care of 1.8% in 2019 (NHS Digital, 2019). This was reflected in the findings, with some mothers seeking appointments with practice nurses rather than GPs, as it was felt to be generally easier get an appointment with a practice nurse, especially in an emergency.

The issue of trusted relationships was a recurring thread within the narratives (section 6.5.3). Mothers rely on societal trust, which relates to a collective institution i.e. NHS healthcare and is shaped by current events and media, to inform their actions (Mechanic, 1996; King's Fund, 2017a). Fundamentally, mothers have a strong trust and belief in the NHS healthcare systems (Department of Health and Social Care, 2021) and individual healthcare professionals, and they relied on this interpersonal trust to inform their actions. Interpersonal trust develops over repeated interactions and is dependent on how competent and caring the healthcare professional was perceived to be by the patient (Mechanic and Meyer, 2000).

Continuity in service provision and the provision of integrated care is vital in healthcare and is recognised in several UK national healthcare strategies and initiatives to improve health outcomes in children (NHS England, 2019). The NHS Long Term Plan (NHS England, 2019) has been developed to include a specific focus on young children, as set out in 'The Best Start for Life A Vision for the 1,001 Critical Days' (HM Government, 2021). Although a lack of healthcare professional relationships meant that, at times, mothers found it harder to trust and have confidence in the healthcare professionals to manage their child effectively. Several mothers did express some mistrust in the healthcare system, especially when accessing services where they did not know the healthcare professionals. This included the out of hours services, which usually meant contact with unfamiliar GPs, and in some cases, this resulted in maternal antibiotic seeking behaviour or seeking other healthcare services (i.e. acute hospital services).

Generally, mothers viewed GPs as experts and expected them to provide professional examination, diagnosis and treatment options to aid a smooth recovery; this is consistent with previous research findings (Cabral *et al.*, 2014b). All mothers expected their GPs to be confident in providing a diagnosis and decision making during the consultation. They also reported that they valued a positive relationship with their GP and mothers generally felt GPs were happy to see their children if they were anxious or worried. Continuity of care, accessing medical experts, receiving reassurance, and forming a trusting relationship with healthcare professionals was also valued by mothers. Where established GP services provided consistency and stability, it is possible for trusting relationships to develop, especially when doctors meet the expectations of mothers following the consultation, and more than two-thirds of mothers reported they trusted the doctor's decision whether to prescribe or to withhold an antibiotic (Ridd *et al.*, 2009). In the current study most mothers felt that as long as a clear rationale for the GP's decision making was provided, they would be satisfied with not being prescribed antibiotics. This links to the concept that doctors are seen as powerful holders of knowledge and treatment and that patients are dependent on them to access this (Aarhun and Akerjordet, 2014). A

study by Cabral *et al.*, (2019) found parents did not generally expect to be prescribed antibiotics, and in the case of a probable viral illness, clinicians usually recommended non-antibiotic treatment strategies. However, when clinician's expressed concern relating to specific symptoms or illness presentation i.e. discoloured phlegm, prolonged fever or pink /bulging ear drums, antibiotics were prescribed.

Conversely, inconsistent prescribing practices provide a barrier to patient/clinician trust, as patients will expect antibiotics based on a previous experience (Williams *et al.*, 2018). Similarly, previous studies identified that mothers wanted to receive medical reassurance about their children's health and get appropriate treatment as soon as possible, thereby seeking a timely resolution to their children's illness (Chinnasami *et al.*, 2016; Maguire *et al.*, 2018). This is especially the case for first time, inexperienced mothers who want reassurance from a doctor (Rousoundis *et al.*, 2011). This study found mothers perceived GPs as providing an expert 'one stop shop', including examination, diagnosis and treatment and therefore were convenient.

It should be acknowledged that clinician decision making regarding antibiotic prescribing is complex and multi factorial (Kianmehr *et al.*, 2019). The issue of lack of time for consultations has been acknowledged in out of hours services to influence the levels of antibiotics prescribing. However, this is also true of general practice (Biezen *et al.*, 2019), with higher antibiotic prescribing rates associated with slightly shortened consultation times (Linder *et al.*, 2003). It is possible that patients may also feel more satisfied with the healthcare interaction if they are prescribed an antibiotic and clinicians may therefore feel influenced to prescribe antibiotics to meet the patient's expectations (Stearns *et al.*, 2009; Dempsey *et al.*, 2014). However, with more general public awareness regarding the appropriate use of antibiotics, the extent to which patients expect antibiotics may be changing. In one study, two-thirds of the patients accepted the prescribing decision of the clinician, regardless of whether an antibiotic was prescribed. Patients who were prescribed antibiotics were satisfied that

they were necessary for recovery, whilst most patients who were not prescribed antibiotics understood that they were not necessary (Tonkin-Crine *et al.*, 2014). However, Tonkin-Crine *et al.*'s study was conducted in out of hours services and utilised point of care testing to support decision making, so this may have had some influence on patients' views.

The accessibility to primary healthcare services was also a key factor in mothers' decision making. There has been a widespread reduction in healthcare service expenditure in recent years, which has led to a reduction in some primary healthcare services (British Medical Association (BMA), 2016; King's Fund, 2018). This has resulted in an estimated funding deficit of about £5.8 billion by 2019-20 for local authorities providing healthcare services (Local Government Association, 2017; King's Fund, 2017b). Financial uncertainty and a lack of funding has led to fewer doctors entering general practice, and more leaving the profession or retiring (Roland and Everington, 2016). Fewer GPs has led to increased workloads and additional demands on services (Baird *et al.*, 2016), resulting in difficulty in obtaining appointments for patients (King's Fund, 2017c). For example, in 2012, 19.2% of patients reported difficulty getting through to their GP on the phone, however this increased to 31.7% in 2019 (Ipsos MORI, 2019). To address these shortfalls many GP practices are joining together and forming 'federations', to share resources and centralise services. There is a risk that large GP federations may further decrease localised services, thereby affecting familiarity, continuity and trust between service users and professionals.

Apart from the convenience of a practice nurse appointment, the findings identified that mothers trusted and valued the input of practice nurses, who are typically based in established, accessible GP practices. Practice nurses were viewed as credible, approachable and able to provide continuity of care. It was felt that this continuity of professional services enabled mothers to develop relationships with practice nurses and form a supportive rapport, in much the same way as the formation of a relationship with the GP. Mothers were reassured by a thorough examination and review by a healthcare professional and felt the practice nurse would ask the GP, if unsure or if they needed any

advice. Mothers appreciated and valued the time practice nurses spent with them, which they felt was often longer than doctors. The findings of the current study are supported by a Cochrane review into nurses as substitutes for doctors in primary care (Laurant *et al.*, 2018). This review identified the length of time spent with the clinician is important to patients, with a longer consultation leading to greater healthcare experience satisfaction. This may in turn influence which healthcare professional appointment is sought by patients, thereby driving demand for particular services.

The findings also identified that mothers would sometimes be seen by practice nurses, who were perceived as accessible and convenient. They provided 'back door' access to a GP, as mothers felt that practice nurses would escalate any concerns they had directly to the GP, forgoing the need to try to secure a GP appointment. Although practice nurses were not seen as a substitute for a GP, if the mothers perceived the illness as serious. This suggests mothers have a different perception of the expertise and role of GPs and nurses, which may reflect the concept of professional hierarchy, where the doctor leads (Charles-Jones, Latimer and May, 2003). Other influencing factors for mothers deciding which service to access include their individual experience of health care services, and their perception of healthcare professionals' roles and expertise (Mechanic and Meyer, 2000), especially if they have previously had a positive healthcare experience. This was evident in the findings, as mothers reported they would seek healthcare professionals, with whom they had had a previously positive and satisfactory experience.

The findings from this study have identified the potential key role nurses can play to support antibiotic prescribing and AMR. Nurses and other health professionals offer additional resources and services to support antibiotic stewardship and for managing maternal experiences and expectations of using antibiotics (Johnstone, 2016). However as previous studies have identified, any service development needs to include frontline nurses to shape and contribute their local insights and expertise (Haycock-Stuart and Kean, 2012).

### 8.3 Limitations

There were several limitations of the study, which have been highlighted throughout the thesis. These have been summarised and are presented here. Firstly, this was a small, mixed methods case study. Data was collected from a single case site and therefore the maternal experiences and attitudes towards using antibiotics may differ in other parts of England (or UK). The case was selected as the most diverse population available within a large university city. However, despite this, analysis of the participants identified most mothers were well educated, middle class and aged in their mid- thirties. There was a lack of young mothers and mothers belonging to Black and Ethnic minority (BAME) groups. This may be due to the potential participants belonging to these hard-to-reach groups (Jones and Newburn, 2001). Although the case demographics recorded a 13.6% Asian population, there was only one Asian mother captured in the study (focus group). Possible reasons for low attendance of Asian mothers at local playgroups were unclear and further research into how to effectively engage with BAME mothers would be beneficial.

However, the case participants did generally reflect the national data relating to the age of mothers. Most case mothers were aged 30 years and over (n =22, 66%), which is slightly higher than the national data of 54% (Office National Statistics, 2016). It was difficult to recruit young mothers and mothers from deprived backgrounds as these mothers did not seem to attend the playgroups I was able to access (section 4.4.2). This has been identified in previous studies and remains a challenge in conducting research especially in this age group (Daniels *et al.*, 2012). Further research exploring antibiotic knowledge and influences on maternal decision making in young mothers and mothers from BAME backgrounds would be of interest. The socio-economic status of the mothers was not specifically explored in the study and is another limitation.

The study also used convenience sampling for recruitment. It is possible mothers who were interested in research or antibiotics use chose to participate and this may have influenced how mothers responded in the narratives. For example, mothers who had a strong view, opinion or experience of using antibiotics may be more likely to participate in research studies, whereas mothers without experience or exposure to using antibiotics may have excluded themselves. Convenience sampling also relied on which mothers were available and present during the playgroup sessions and this may have excluded some mothers i.e working mothers. Efforts to include all mothers in the study were made with the provision of contact details and study flyers, which were distributed to all playgroups in the case. However, there were no participants recruited via flyers.

Another possible limitation of the study was qualitative software was not used for analysis. Computer software can make the data analysis quicker and easier to manage (section 4.4.9.2) and contribute to improved validity and auditability of qualitative research (St. John and Johnson, 2000). However, I would argue that hand coding of the data was a strength as it enabled immersion in the data, which contributed to the depth and richness of the findings from the narrative analysis.

Finally, as discussed in Chapter 4 (section 4.3.5), the phase one quantitative GP data was limited due to the difficulty in recruiting participant GP practices and the quality of the data collected. Although the cases contained eight GP practices, despite several contacts, only one practice provided data on antibiotic prescribing. This meant the data was limited to only one practice and therefore the findings could not be extrapolated or generalised to the wider population. The data submitted by the practice was also secondary data and relied upon manual data recording, which increased the risk of inaccuracy. Data was also limited and did not capture information which may have influenced antibiotic prescribing decisions, e.g. underlying medical conditions.

## 8.4 Linking with the data: relation to research and literature

The first step to addressing the research aim and objectives regarding maternal attitudes to using antibiotics for their children was to complete a literature review. This was presented in Chapter 2 and identified a significant increase in global research studies, regarding parental knowledge, attitudes, and practices into antibiotic prescribing (Coxeter, Mar and Hoffmann, 2017; Al-Ayed, 2019). However, most studies were conducted in Middle Eastern countries, rather than in the UK. This is important, as access to antibiotics in other countries is less restricted and therefore the incidence of antibiotics misuse is more common (Al-Saleh, Abu Hammour, K., and Abu Hammour, W. 2019; Mallah *et al.*, 2020). This is raising real concern regarding an increase in AMR in those populations (Alsuhaibani *et al.*, 2019; Saleh Faidah *et al.*, 2019).

The search of the existing literature has identified similarities and differences in maternal attitudes and practices. As stated, although the majority of research has been conducted outside the UK, common themes, including the influence of maternal knowledge on using and seeking antibiotics for their children have been seen. A fundamental influence on maternal behaviour is feelings of anxiety, which may drive antibiotic seeking behaviour (Souto-López *et al.*, 2020). Most mothers are aware of AMR, but not enough to override their feelings towards using antibiotics (Brookes-Howell *et al.*, 2013; Alili-Idrizi, Dauti, and Malaj, 2014; Coxeter, Mar and Hoffmann, 2017; Al-Ayed, 2019), and this was reflected in the study findings. The literature review found that all mothers, from all educational backgrounds, countries, and social-economic groups would seek antibiotics if they felt they were needed (Finklestein *et al.*, 2013). This was also reflected in the findings, which had the most diverse case population available within the study setting and included mothers with different ages and education levels. In the UK, antibiotic prescriptions for children and GP appointments are free (Department of Health and Social Care, 2021) and it would be interesting to consider whether paying for these services would influence maternal antibiotic seeking behaviour. In studies in other countries,

cost has been shown to be influential (Al-Ayed, 2019; Al-Saleh, Abu Hammour, and Abu Hammour, 2019).

AMR was still viewed overwhelmingly as something that does not affect low users of antibiotics (Brookes-Howell *et al.*, 2012b), and the findings identified mothers perceived the risk for AMR development was low. The importance of relationships was also key to mothers. In cases where mothers do not have a good relationship with a clinician, they are more likely to either purchase antibiotics, if they can, or seek for them to be prescribed (Souto-López *et al.*, 2020). In a global context, the purchasing of antibiotics and the ready accessibility of antibiotics is universally acknowledged, as having a direct impact on antibiotic use (Adhikari *et al.* 2021). In the wider global context, when considering strategies to address access and the inappropriate use of antibiotics, it should be recognised in countries where the cost of seeing a doctor is much more than buying antibiotics that this may affect parental practices (Brookes-Howell *et al.*, 2013; Alkhadi *et al.*, 2015; Saleh Faidah *et al.*, 2019; Wang *et al.*, 2019).

The importance of supporting parents to provide the best health outcomes for their children was identified in the findings and captured in the narratives relating to access and continuity of care. The external pressures on parents and the importance of a supportive parent/healthcare professional relationship have been recognised in the NHS Long Term Plan (NHS England, 2019). This plan seeks to support and develop the relationships between patients and healthcare professionals by service integration, thereby improving continuity, the quality of care delivered and ultimately healthcare outcomes for children. Other national initiatives include the State of Child Health (2020), which recommends further investment and expansion of community-based services, including health visiting to support immunisation and educate and inform mothers about general health and illness management including AMR. Training and educational resources (PHE, 2019d) have been developed for healthcare professionals to promote health and wellbeing and prevent illness. These have

specifically included information on the benefits of preventing AMR. However, the impact of these resources is unclear. Detail on how a reduction in antibiotic use may be achieved is lacking and further clarity on possible workstreams to support reduced antibiotic usage in children would be beneficial.

Finally, the symbolism of antibiotics as trustworthy and effective agents is global and unquestioned, and antibiotics are established agents for treating infections. Mothers rely on antibiotics to manage illness and are unlikely to change this view, without further public health initiatives, educational resources and changes being implemented to monitor antibiotics access. However, to support and improve appropriate antibiotic prescribing practices, it is important clinicians and policy makers understand the drivers behind antibiotic seeking behaviours. This understanding can be used to inform and further policy development, target public health messaging and reconfiguring of primary care services to ensure there is appropriate access and support for mother's decision making. Although this work has started (Department of Health, 2019b), further focused workstreams need to be developed with clear objectives to address how antibiotic usage in young children can be optimised.

## **8.5 Chapter Summary**

This chapter has integrated the findings from both the quantitative and qualitative phases of this case study to situate the findings with what is already known and to describe areas of new knowledge derived from the study. The antibiotic prescribing practices and the factors which may influence maternal antibiotic prescribing behaviour have been presented. This includes the introduction of antibiotics as symbols, as an original finding. Analysis of the findings identified patterns between GP prescribing practices and maternal attitudes to using antibiotics for their children. The findings suggest the importance of continuity of care and developing a relationship with their GP and healthcare professional, directly impacts any antibiotic seeking behaviour. Ultimately all mother's behaviours were underpinned by their perception of illness severity in their child, which linked to their anxiety

levels. They actively sought reassurance and timely access to healthcare professionals, especially for their young children, who were seen as vulnerable. The findings were linked and contextualised within national child health initiatives and strategies. The concluding chapter of the thesis will draw together the research implications of this study for clinical practice and policy. It will also present the unique contributions to existing knowledge and make recommendations for further research.

# Chapter 9: Conclusion

## 9.1 Introduction

The final chapter of this thesis presents a summary of the key findings from the research study. It begins by revisiting the original research question: *‘What are the influences on maternal decision making in relation to antibiotic usage for their pre-school children?’* and the aim and objectives employed to address this question (section 1.2). The chapter will then outline the original contribution of the study to the existing literature, before summarising the main findings of the study. It will then discuss the study’s contribution to methodology, before discussing the implications of the findings for clinical practice and policy. Recommendations for future research are made and the chapter will conclude with a personal reflection and a final conclusion for the thesis.

## 9.2 Overview of findings

### 9.2.1 Unique findings

This study identified original and unique contributions to existing knowledge. These were: the influence of perceived accessibility and expertise of healthcare professionals, and service austerity, on mothers' decision making (presented in Chapter 6 - 6.5.3); and the power of antibiotics as symbols of safety, recovery and healing (presented in Chapter 7).

Firstly, during analysis of the narratives, mothers expressed how changes in services had impacted their healthcare decision making. This was particularly evident with respect to health visiting services, where reduced investment, in recent years, had resulted in decreased numbers of practising health visitors. Mothers felt this affected their access to health visitor expertise, which resulted in a loss of contact and fewer relationships between mothers and health visitors. Continuity and

interpersonal/professional relationships were highly valued by mothers, who felt these contacts were important in forming trusting therapeutic relationships. The findings also noted that where the relationship was absent, this resulted in some mothers accessing GP services for reassurance, for example, for management of minor illnesses such as rashes, rather than needing more urgent medical treatment. This may have a significant impact on precious GP resources, workload and capacity.

The second unique finding from the study related to the novel concept of antibiotic symbolism. An objective of the study was to gain an insight into how mothers perceived the use of antibiotics to manage and treat their children's illnesses, and during the phase two qualitative data analysis, the symbolic power of antibiotics emerged. The symbolism of antibiotics was a new concept and an original finding from the study (Chapter 7) and has not been previously identified in the literature. Mothers recognised antibiotics as integral components of healthcare, which are used extensively to protect, prevent, and cure infections. Antibiotics were regarded as 'life savers' and necessary agents by the mothers as they were associated with, and symbolic of, recovery, safety and as a means of returning to normality. However, despite most mothers acknowledging the ineffectiveness of antibiotics in treating viral infections, they still actively sought to obtain them, even for treating coughs, colds and sore throats. This belief was generally held by all the mothers regardless of their cultural background or age and the case findings shared common themes identified in the literature review (Chapter 2). This suggested that the case provided a good representation of antibiotic usage in mothers of young children, within a wider context. Mothers were generally aware of the increase and risks of AMR development and some expressed concern about using antibiotics, but this caution was overridden by anxiety to make their children better. This finding contributes to existing knowledge and understanding of antibiotic usage and introduces the opportunity for further research into this antibiotic symbolism as a concept.

### 9.2.2 Main Findings

The first objectives of the study data were to collect quantitative primary care antibiotic prescribing data for children under five years of age within the case setting. Descriptive and statistical analysis of the data was performed to determine the incidence of antibiotic prescribing in primary care for children under five years of age in the case. Although the quantitative data was limited in this case study (Chapter 4, 5), it was used to determine the incidence of primary care consultations of pre-school children presenting with a possible viral infection. This data also provided an insight into the incidence of when antibiotics were and were not prescribed within the case. Analysis of the quantitative prescribing data did not identify any statistically significant differences between the day of the week children were seen by clinicians and whether they were prescribed antibiotics. However, interestingly the phase one quantitative data did identify children under one year of age were more likely to be seen on a Friday and be prescribed less antibiotics than other age groups. Although it should be acknowledged that neither of these results were statistically significant, and further research into age group prescribing, with large data sets are recommended.

Using the chosen mixed methods approach, possible reasons for these findings from the quantitative data were then explored within the qualitative phase of the study. Therefore, a study objective was to collect qualitative data from focus groups and interviews with mothers of children under five and use thematic analysis to explore the findings. The data from both study phases were integrated and comparative and theoretical analysis of the quantitative and qualitative data, including further detailed synthesis, was completed.

The findings suggested very young children under one year were perceived as being more vulnerable by mothers, who may seek a GP appointment based more on a need for reassurance, rather than the actual illness of their children (section 8.2.1.1). First time and less experienced mothers did not always have the confidence or experience to know what may be wrong and how to manage it. They were

concerned and worried about symptoms, especially visual (rash) and audible (coughing) and sought prompt medical treatment.

Another objective of the study was to explore the influence of social factors such as maternal age, family cultures, beliefs, and cultural background, on maternal attitudes towards antibiotic use for children. Using the case study approach enabled a defined community population to be accessed for the study (Chapter 4). Although the case was the most diverse available within the location (section 3.9.1), it did have limitations and did not include many young mothers or Black and Ethnic minority groups. The findings identified that mothers articulated feelings of wanting to protect their children, and guilt if they perceived their children were suffering. They wanted to do everything they could to resolve any illness symptoms, decrease the duration of symptoms, and return to normality. This was expressed as meeting their own, family, and societal expectations of being a 'good' mother. A significant driver to seeking antibiotics was the perceived seriousness of their children's illness and mothers actively sought reassurance and timely access to healthcare professionals, especially for very young children. In most cases, mothers did not want antibiotics, once they have been reassured by a clinician, and they were generally cautious about antibiotic use. However, this caution was generally based on possible unpleasant side effects rather than concerns regarding the development of AMR.

The final study objective was to explore and determine influential sources of healthcare advice valued by mothers, who often make key decisions regarding their children's health. Mothers hold core beliefs and attitudes towards healthcare providers, relying on healthcare services to provide support, advice, and reassurance. The study found that GPs were considered the preferred option when seeking timely healthcare advice and information, due to their medical training and expertise. Mothers expected GPs to be knowledgeable, and their previous experience with the GP influenced how mothers viewed subsequent interactions and what services they accessed. This was especially true if the mothers felt the interaction had resulted in a perceived positive outcome. Mothers actively sought appointments with their GP, if they felt they had a good, trusting relationship with them.

However, the study also found mothers were open to accessing professional advice concerning their children's health, from a range of health professionals. In particular, several mothers considered seeing a practice nurse as a convenient, easily accessible alternative to a GP appointment. All mothers trusted and valued the nurses' advice for managing common illnesses and considered them as a suitable alternative to seeing a GP if the illness was considered mild. They also felt practice nurses would escalate concerns in a timely manner to a GP, if they considered it necessary. Practice nurses were also felt to provide more time, than a GP, to listen to the mother's concerns and provide supportive follow up calls. This approach was viewed as reassuring, and mothers felt it contributed to building trust and a positive relationship with the nurse.

### **9.3 Original contribution to the literature**

Firstly, this study identified another original finding relating to the impact of austerity on mother's decision making (Chapter 6). As discussed, a reduction in funding has led to a decrease in health visiting services and has resulted in mothers seeking advice and reassurance elsewhere, namely through GPs. This has an impact on already stretched primary care resources. Mothers really valued continuity of care and forming a relationship with their healthcare professional (Ridd *et al.*, 2009; King's Fund, 2010) was found to decrease anxiety and support maternal decision making. Further investment in alternative primary care services may support mothers to manage illnesses at home, rather than seeking medical interventions.

As stated, this study has also identified antibiotic symbolism (Chapter 7) as a novel and original contribution to existing literature. The impact and influence of antibiotics as symbols of recovery and safety have not been previously described or acknowledged and has significant implications towards understanding public antibiotic seeking behaviour, both in the UK and across the world. With the increase in AMR, especially in low- and middle-income countries, further actions to reduce antibiotic

usage are urgently needed. By recognising antibiotics as symbols and how this can influence practice, appropriate and targeted healthcare messaging and interventions may be developed. To develop effective health interventions healthcare prescribers, need to appreciate how influential symbols can be in societal decision making. Interventions, which target behaviours and beliefs, including specific education and information materials, public health campaigns and messages in GP practices, need to be made more effective to engage people (Huttner *et al.*, 2010; Formoso *et al.*, 2013). By understanding and gaining an insight into the importance of antibiotics as symbols of protectors of health, clinicians may be more able to recognise and appreciate the origins of maternal anxiety and antibiotic seeking behaviours. This may lead to the development by clinicians of different approaches to consultations, where an alternative treatment is provided and accepted by the mother, which is not an antibiotic (i.e. use of paracetamol). This could result in reduced expectations for receiving antibiotic prescriptions from mothers, leading to less antibiotic usage and consequently a reduction in the risk of AMR development.

#### **9.4 Contribution to methodology**

A mixed methods explanatory sequential case study approach was used in this study (Chapter 3). Mixed methods enabled both quantitative data from GP antibiotic prescribing practices and qualitative data from interviews and focus groups with mothers to be synthesised and provided a better understanding of the research question than either research approach alone. Completing the quantitative data analysis first provided a contextual background of local prescribing practices, which informed the qualitative phase of the research and enriched the data. The qualitative data provided more insight into the attitudes and experiences of mothers, using antibiotics for their young children. Maternal demographic data was also obtained during the qualitative phase, which enabled some insights into the possible influences on decision making such as maternal age and level of education.

This research also used a case study approach. Applying boundaries is vital to ensure cases are easily identifiable and similar enough to be treated as instances of the same phenomenon. In this study post codes were used to define the geographical boundaries of the case. This allowed a broad range of statistical data to be collected, including demographic information, which assisted in identifying appropriate communities that have certain issues or characteristics, to address the research question (Bosley *et al.*, 2019). Using local communities to identify case constraints may be beneficial for researchers, as a means of immersing themselves in the local community and ensuring engagement with the population in any research projects.

## **9.5 Practice and policy Implications**

### **9.5.1 Implications of findings for clinical practice**

The findings suggested mothers in this study trusted and relied on antibiotics to resolve their children's illness. However, maternal decision making regarding antibiotics usage was complex, with many variables including the influence of maternal emotions, previous experience, the relationship with their healthcare professional and ultimately their belief and trust in antibiotics. In this study continuity of care was identified as important in enabling the development of positive relationships between healthcare professionals and mothers, as has been acknowledged and incorporated with national strategies and policies to improve healthcare outcomes for young children (RCPC, 2020; HM Government, 2021). The findings also demonstrated the influence of emotions on maternal antibiotic seeking behaviour, which overruled any concerns the mother may have had regarding antibiotic overuse and risk of AMR. A key to addressing maternal emotions was the quality of the consultation between mothers and healthcare professionals. A means of improving this interaction is by ensuring adequate and uninterrupted time to discuss maternal concerns. This could be achieved by ensuring appointment times for children are slightly extended and longer than general appointments. This would allow more time during the consultation to engage with parents, explain the rationale for

decision making and provide clear information regarding correct use of antibiotics i.e. ineffective for viruses. This increase in the initial consultation time may result in an overall decrease in subsequent consultation time with each mother, as she will be better informed about managing her child's/children's illness.

Another advantage to expanding and investing services would be to increase maternal access to other healthcare professionals, including practice nurses and health visitors via appropriate triage and screening. This study found mothers expressed a willingness to access alternative professionals for support and advice, which they valued. A way to increase access would be to relocate health visitors' services within GP practices as they previously were and return to child health clinics being held in GP practices. Practice nurses' roles could be further developed and broadened to include appointments for minor illness, which would release GP appointment times, thereby increasing appointment time and capacity for other patients. The benefits of improving utilisation of primary care services will result in longer term cost savings by improving health and wellbeing (NHS England, 2016). Within the context of the study, less antibiotics may be prescribed if mothers are adequately reassured, thereby reducing the risk of inappropriate antibiotics prescribing and the development of AMR.

Findings from this study have demonstrated in the current healthcare climate that mothers wanted to see GPs if they considered their children's illness as being serious. However, they were willing to consider seeing other healthcare professionals as an alternative option, especially if professionals were co-located within the GP practice and could therefore provide access to GPs directly if needed. This study has also identified that a national strategy is required to engage with mothers and raise the profile of available nurse led services as a credible alternative to seeing a GP. This has implications for future health care service design and investment and further work is required to focus on how healthcare services can be developed to support parents in managing their children's illnesses.

To develop the different health care models available, more research would be beneficial into how healthcare professionals can engage with and be accessed by mothers, to provide support, advice and reassurance. It is crucial that health providers form authentic relationships with families with young children to effectively provide healthcare, support and information as needed (HM Government, 2021). This study has identified the vital role of health visitors, who are well placed to provide support, advice and information around managing children's illnesses (Department of Health, 2009; RCPCH, 2020).

Lastly, mothers generally wanted to be involved in decision making for their children. They felt it was important for them to be listened to, respected by the clinician and wanted to understand the rationale for any treatment decisions. Increases in feelings of maternal satisfaction with this engagement may lead to less antibiotic seeking behaviours. By understanding the influences and motivators for mothers accessing and seeking GP services, measures can be developed to provide more support to mothers in their decision making, with the aim of reducing appointments and antibiotic prescribing, as well as the otherwise inevitable development of AMR.

### **9.5.2 Implications of findings for policy**

As identified, some of the actions needed to be taken to strengthen and improve primary healthcare services for children are being taken (RCPCH, 2020; HM Government, 2021). The Best Start for Life (HM Government, 2021) review has set out recommendations to create and expand additional support for families to improve healthcare outcomes for children. Part of this strategy includes improving access to information via digital and internet-based services, but also building on the expertise of the existing workforce. This study identified that mothers were receptive to accessing alternative healthcare workers when seeking advice and reassurance. Further training of healthcare professionals regarding appropriate antibiotic usage and the risks of AMR would be beneficial. It would support and strengthen their ability to provide clear messaging for parents, informing decision making

and their ability to recognise and manage children's illnesses. One approach to increasing healthcare professionals' knowledge of antibiotic usage and risks of AMR would be to incorporate specific education in their continuous professional development (CPD) programmes. This additional training could be incorporated into the development of GPs, health visitors and practices nurses to ensure they are able to deliver and provide support to parents.

One approach to optimising these healthcare interventions could be via immunisation clinics. The importance of improving immunisation rates has also been acknowledged in these documents and the importance of additional funding via the State of Child Health programme (RCPCH, 2020) has been identified. Therefore, an expansion of immunisation clinics could have a twofold effect. Firstly, by increasing immunisation rates but also the opportunities health visitors would have to see mothers. This increased contact with mothers may allow health visitors additional time to provide advice on managing minor illnesses as well as information relating to appropriate antibiotic use. This healthcare contact and input would support the development of the mother/health visitor relationship and would contribute to supporting mothers in their subsequent decision making. This may reduce 'just in case' antibiotic prescribing and therefore contribute to reduced antibiotic prescribing overall. But current resources are finite and capacity to take on additional activities may be challenging (IHV, 2020a).

Health policy needs to expand its surveillance within community prescribing. This should include recording of the rationale for the antibiotics, conditions being treated and any diagnostic indicators. More robust surveillance programmes are required to capture antibiotic prescribing for children within primary care settings. GP and patient records should provide detailed information regarding the illness presentation, comprehensive patient' history, rationale for prescribing choices and a robust reporting and monitoring system. At present, community antibiotic prescribing data in children is poorly recorded and a clear picture of actual prescribing practices is hard to obtain (Chapter 4). This means targeted approaches to address any inappropriate prescribing are not in place and the true nature and prevalence of AMR in children is not known. The national surveillance programme for

antimicrobial resistance infections also needs to be expanded in the community setting, so that accurate and robust data is obtained. More comprehensive and accurate surveillance data will provide a clearer picture of the likelihood of the current prevalence of AMR in children, which will inform any future initiatives to address AMR strategies.

Public health campaign messages regarding the risks of AMR development and the effectiveness of antibiotics for viral illnesses need to be made clearer. All mothers in the study used social media and the internet to obtain information. Potential future campaigns could link social media to key public health messages, to assist in reinforcing positive information messages and provide clear signposting to reliable sources of information. More frequent exposure and the reinforcement of messages could improve maternal knowledge and influence their response to their children's illness. Another option could be the development of both digital /internet-based community support groups for mothers to access information around general child health, supported by a healthcare professional.

## **9.6 Implications of findings for future research**

The findings from the study provide an original and important contribution to the existing knowledge relating to the use of antibiotics in young children. Several important findings have been identified and would benefit from further research as discussed above. Firstly, the concept of antibiotics as powerful symbols in healthcare decision making and antibiotic seeking behaviour should be acknowledged. This study identified the symbolic meaning of antibiotics and how this underpinned maternal, and to some extent, possibly clinicians' decision making regarding use of antibiotics. The implications of antibiotic symbolism would benefit from further research to better understand antibiotic seeking behaviour and has implications within the wider global population. It would be useful for further studies, exploring the views of clinicians, general population, patients with complex health conditions, and vulnerable patients (i.e. immunocompromised) to be conducted in high, middle- and low-income countries, where attitudes and access to antibiotics vary. Further qualitative

studies, across different cultures, countries, socio- economic and diverse populations would enable further insights into antibiotic seeking behaviour and drivers to usage. This is particularly important for countries where self-prescribing and the purchase of antibiotics are common. This increased awareness will enable future local and national strategies to be developed to reduce antibiotic prescribing and the development of AMR.

Secondly, the literature identified a general gap in qualitative studies, exploring knowledge, attitudes, and practices of parents. Further qualitative research, to further explore antibiotic seeking behaviour and influencing factors would also be beneficial. The findings also identified the issue of purchasing antibiotics online. This is very little existing UK literature on this and further research would be beneficial to explore whether mothers would be influenced to buy online antibiotics and what the influences may be. Also, more UK studies would be useful, with specific research into minority ethnic communities and how cultural beliefs affect maternal practices. Suitable strategies and interventions could then be developed to address these influences and provide accessible information to parents, so they can make informed decisions regarding their children's health. However, there is also a significant gap in the literature exploring fathers' beliefs and attitudes towards using antibiotics and their concerns and thoughts regarding the risks of AMR. Therefore, the knowledge, attitudes and practices of fathers would be valuable in recognising any differences between mothers and fathers. This knowledge would potentially enable future public health campaigns about AMR to be more effective in communicating its message.

The importance of accessing accurate information was another finding, as well as the value mothers place on continuity of care. Research exploring the views of practice nurses, health visitors and GPs regarding their role in providing support, health and antibiotic advice would help in defining possible new interventions. This could include the development of designated care pathways for children in

primary care and specific education and training relating to antibiotics for GPs, nurses and health visitors.

Finally, the quality of the quantitative antibiotic prescribing data collected by GP and national IT systems is primarily reliant on manual data entry and subject to human error. This can lead to omissions in information, including recording of diagnosis, underlying medical conditions, whether the child has allergies, whether the child has presented to the GP on several occasions. These are all influencing factors which are not captured; therefore, it is harder to understand and provide an informed view on inappropriate antibiotic prescribing decisions. More detailed and comprehensive information would provide a clearer perspective on overall prescribing practices and this data should be collected nationally. It would also be interesting to explore in more detail, the influence of personal experiences and AMR knowledge on GP's prescribing behaviours.

## **9.7 Personal reflections**

The motivation behind this research originated from my experience as an infection prevention and control specialist nurse in managing patients with AMR, my interest as a paediatric trained nurse in the health of children, and my personal experiences of being a mother. In my role as a Nurse Consultant in infection prevention and control, I provide advice on management of patients with antibiotic resistant infections almost daily. Management often relies on patient isolation, and treatment involves the administration of stronger antibiotics (more effects on the whole-body system i.e. kidney toxicity). Within the community, very little is known about the prevalence of AMR in children, either by within healthcare professionals or mothers. This felt like a significant gap in existing knowledge, which this PhD has started to address. As a mother, I know antibiotics are often prescribed for young children and I have reflected on possible reasons for maternal antibiotic seeking behaviour. The mother's narratives resonated with me and I was able to identify with their reported feelings of anxiety and feelings of protection. All mothers in the study seemed to share uniform goals, values and

priorities for safeguarding their children's health, which was recognisable across the different nationalities and BAME groups. Understanding the impact of emotional drivers on maternal behaviour is key in supporting their healthcare decision making.

This study has identified the importance of reducing antibiotic usage in safeguarding the efficacy of antibiotics in the future and avoiding further increases in resistant organisms, which will have an impact on the entire human population. The study has raised questions regarding what we understand about the effective use of antibiotics and how do we employ a national response to reduce inappropriate use. The journey to meeting some of these challenges has started, however much more effective and targeted strategies need to be developed for these to be effective. The PhD has been a life changing experience, particularly the data collection process. It was a privilege to hear those mothers' stories and experiences. Mothers wanted to engage with the research, share their experiences, and ask questions and I was privileged to be hear their stories.

Throughout the research process, opportunities to present and disseminate findings were taken (*Appendix 19- Publications, conference presentations and travel scholarship relating to PhD research*). This has included three publications, several oral and poster presentations, with two more papers on the findings of the study in progress. I have also shared my findings from the quantitative GP prescribing phase of the study, with the participating GP practice. I was also fortunate to be awarded a travel scholarship from the Florence Nightingale Foundation, which was an amazing experience and has widened my perspective of antibiotic prescribing practices in different healthcare systems. It also highlighted that AMR is a shared issue and the importance of a collective approach, working together with colleagues globally, to reduce unnecessary antibiotic prescribing.

## 9.8 Thesis Summary

This thesis has provided a deeper insight into maternal attitudes to using antibiotics, in children under five years old. The contribution to the existing knowledge and methodology has been presented and several recommendations and implications for practice, policy and future research have been identified. The importance of continuity of care, healthcare professional relationships, accessibility to services and the trust and belief in antibiotics has been discussed. This research has contributed new findings to the existing knowledge and consequently new areas for further research. Specifically, novel knowledge has been identified regarding the impact of austerity on maternal access to healthcare services and subsequent decision making, and antibiotics as powerful symbols.

The first finding related to how a reduction in the availability of health visiting services, due to austerity measures, influenced mothers' decision making. Reduced investment in local health visitor services has resulted in a decrease in contact time and continuity in care between health visitors and mothers. Consequently, the opportunity for a relationship to develop between health visitors and mothers has been affected. This influenced mothers to seek advice and reassurance from other healthcare professionals (GPs), which may result in an increase in the GP workload.

The second finding has identified the importance and trust antibiotics represent as effective treatment agents. Although mothers demonstrated a general awareness that the misuse of antibiotics contributed to the development of antibiotic resistance, their anxiety for their children's recovery outweighed any concern of misuse. However, further support and resources are required to better support maternal decision making and the management of children's illnesses. The findings from this study identified that despite UK initiatives to reduce antibiotic prescribing (Department of Health, 2019b), some clinicians are still apparently prescribing antibiotics to meet maternal expectations and reassure anxious mothers. Mothers fundamentally want reassurance from a trusted healthcare professional, who can provide and offer appropriate support without using valuable and limited GP

resources. Although this was a UK based study, the findings have implications for all healthcare systems; AMR is increasing globally and due to widespread global travel, the risk of different resistant organisms arriving in the UK and in other countries, is a serious public health concern (Hawkey, 2015). With the increase in AMR affecting all countries and populations across the globe, further interventions and actions need to be taken to reduce inappropriate antibiotic usage.

Finally, misuse of antibiotics has led to the very real and significant threat of AMR, affecting all aspects of public health. Children are often recipients of antibiotics, thereby increasing the risk of AMR developing, with detrimental consequences regarding future healthcare outcomes. Existing public health strategies to improve public knowledge and understanding of AMR need to be more effective and refined. Further initiatives are needed to increase AMR knowledge and healthcare professionals and policy makers need to acknowledge the drivers influencing maternal decision making and its complexity. Antibiotics are powerful symbols of recovery that drive antibiotic seeking behaviour. Everyone has a responsibility to use antibiotics appropriately and healthcare professionals must ensure clear and appropriate messaging is provided. If AMR is not addressed, modern medicine as we know it may cease to exist. The silent pandemic of AMR could have far more deadly consequences than the 2020-21 global COVID-19 pandemic, with the potential to revert to a pre- antibiotic era, changing healthcare as we currently know it. Mothers have a vital role as custodians of their children's health. Healthcare services and professionals need to ensure timely and accessible resources are readily available to mothers, thereby supporting and aiding their decision making. Only by ensuring we are working with mothers, not against them, can we influence and change their expectations to receiving antibiotic prescriptions. Antibiotics need to be preserved and protected now to safeguard future generations, or there is a risk that the children of today may have a less healthy future.

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# Appendices

## Appendix 1. Bosley *et al.* (2017)

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Bosley et al (2017) A systematic review to explore influences on parental attitudes towards antibiotic prescribing in children, *Journal of Clinical Nursing* 27(5-6), 892-905  
doi: 10.1111/jocn.14073

## Appendix 2. Characteristics and Key Findings of Literature Review

Author/s Year	Country	Study Aim	Setting and participants	Study Design Methods	Key findings	Study Limitations
Al-Ayed (2019)	Saudi Arabia	To investigate the general knowledge regarding the use of antibiotics, as well as the attitudes related to the administration of these drugs to children, amongst parents of children in the paediatric age-group	544 parents- more fathers than mothers web-based questionnaire sent through WhatsApp	Quantitative cross-sectional study- questionnaires	Majority of parents purchased antibiotics without prescription and those who did obtain it through prescription, rarely followed the instructions of their Dr	Mostly urban and not representative of country Recall bias
Alrafiah <i>et al.</i> (2017)	Saudi Arabia	To assess Saudi parents' knowledge, attitude, and practice (KAP) regarding the use of antibiotics in upper respiratory tract infections in children	385 via twitter	Quantitative cross-sectional study- questionnaires	Lack of parental knowledge resulted in inappropriate attitudes and practices	Used twitter so not representative of population
Al-Saleh, Abu Hammour, Abu Hammour, W. (2019)	Dubai	To assess parental knowledge, attitude, and practice (KAP) towards the use of antibiotics in Dubai and to reveal the associated factors.	467 parents of children visiting Children's Specialty Hospital in Dubai	Quantitative cross-sectional study- questionnaires	Older parents have more experience of using antibiotics and exposure to education opportunities (from Dr) Self admin rates higher in younger parents	Self-administered questionnaire- might have felt pressure into completing it 1 hospital- unable to generalise findings
Al-Shawi <i>et al.</i> (2018)	Saudi Arabia	To study the misconceptions of parents about the use of antibiotics and perceptions, attitudes, and behaviour toward antibiotic use and identify the factors affecting this	1030 parents' schools in 3 cities, Eastern Province, Saudi Arabia	Quantitative cross-sectional study- questionnaires	67% self-administered ab- child not ill enough for hospital/pay for Dr time 37% used leftover ab Trust Dr's main source of info	Mostly urban and not representative of country Recall bias
Alsuhaibani <i>et al.</i> (2019)	Saudi Arabia	To evaluate parents' awareness toward antibiotics, use in upper respiratory tract infection in children	405 parents -online questionnaire via WhatsApp to target population	Quantitative cross-sectional study- questionnaires	Parents had lack accurate KAP about antibiotics parental self-prescribing tendency, asking, and seeking a doctor who is prescribing antibiotic	Use of internet, so not representative of population- chose 1 region? Why
Bert <i>et al.</i> (2016)	Italy	To investigate the general knowledge regarding the use of antibiotics, as well as the attitudes related to the administration of these drugs to children, amongst parents of children in the paediatric age-group	1247 parents, 7 Italian cities, Outpatients	Quantitative cross-sectional study- questionnaires	lack of knowledge regarding the use of antibiotics, which results in bad habits and inappropriate attitudes when it comes to giving antibiotics to their children	Selection bias for the most introspective persons are less prone to participate in the survey.

Author/s Year	Country	Study Aim	Setting and participants	Study Design Methods	Key findings	Study Limitations
Coxeter, Mar and Hoffmann, (2017)	Australia	To explore parents' beliefs about antibiotic necessity, quantify their expectations of antibiotic benefit, and preferences for shared decision making	401 questionnaires- 37 interviews Country wide- landlines phoned	Mixed methods- survey and interviews	Want to be involved in decision making Overestimated antibiotic benefits on illness duration	Recall bias
El Khoury, Ramia and Salameh, (2017)	Lebanon	To assess their knowledge and practices toward antimicrobial agents administered to their children for Upper Respiratory Tract	1,037 participants from 25 primary schools. 10 public and 15 private schools Mount Lebanon (largest area)	Quantitative cross-sectional study- questionnaires	Lack of knowledge in use and misuse of antibiotics	Does not include parents of children under 3 years Mostly well-educated parents/private schools can't generalise
Hammour, Al-Saleh and Abu Hammour, (2019)	Dubai	To assess the parents' knowledge, attitudes and practices (KAP) towards the use of antibiotics for childhood upper respiratory tract infections	467 parents of young children, large children's hospital	Quantitative cross-sectional study- questionnaires	Poor knowledge, frequent use of purchased antibiotics, and not following Dr advice common	Can't generalise population attending hospital OPD so may have previous experience
Lakshmi, Geetha and Vijayasamundeeswari (2019)	India	To assess the knowledge, attitude, and practice among mothers on antibiotic use in under-5 children with respiratory tract infection	240 mothers attending paediatric OPD	Quantitative cross-sectional study- questionnaires	Generally poor knowledge, and poor practices, frequent use of purchased antibiotics	Can't generalise population attending hospital OPD so may have previous experience
Mallah <i>et al.</i> (2020)	Lebanon	To assess the association between level of knowledge and beliefs about antibiotics, and antibiotic misuse in Lebanon	1,421 parents from 11 schools	Quantitative cross-sectional study- questionnaires	Inadequate knowledge of antibiotics, including use for treating viral infections. Likely to purchase antibiotics	Localised to suburban population not generalizable Respondents may be well-educated parents/private schools can't generalise
Paredes <i>et al.</i> (2019)	Lima, Peru	To describe the knowledge, attitudes, and practices about the use of antibiotics and to correlate low knowledge and self-medication with demographic characteristics	224 parents at primary health care centres	Quantitative cross-sectional study- questionnaires	Common use of purchased antibiotics and use of leftover/stock piling-poor compliance Influenced by access to healthcare and costs	self-reported information and recall unable to generalise to population (only parents accessing clinics, so may have reason)
Saleh Faidah <i>et al.</i> (2019)	Saudi Arabia	To explore parents' self-directed practices towards the use of antibiotics for upper respiratory tract infections	572 parents from schools	Quantitative cross-sectional study- questionnaires	Limited antibiotic knowledge Common use of purchased antibiotics and use of leftover/stock piling-poor compliance	Unclear how many schools were involved self-report and possible recall bias May not have completely understood English
Shah, N., and Rahim, M. (2017)	Kuala Lumpur, Malaysia	To assess the knowledge, attitudes and practices (KAPs) of parents on the use of antibiotics among children for upper respiratory tract infection	169 parents recruited from kindergartens (18)	Quantitative cross-sectional study- questionnaires	Generally limited antibiotic knowledge and some poor compliance	Convenience sampling so not representative of population May be bias as questionnaires completed at home/time

Author/s Year	Country	Study Aim	Setting and participants	Study Design Methods	Key findings	Study Limitations
Souto-López <i>et al.</i> (2020)	Spain	To explore the parent-related factors underlying antibiotic misuse/overuse and their implication in the development of resistance in the paediatric population	30 participants in 5 focus groups recruited schools (region)	Qualitative focus groups	Clinician relationship important, but compliance with correct antibiotic practice poor More likely to seek antibiotics due to anxiety	Unable to generalise to population
Szymczak <i>et al.</i> (2017)	USA	To capture what parents, think about the risks and benefits of antibiotics for their child's acute respiratory tract infection	109 recruited from 4 health care clinics, large City	Qualitative interviews	Reluctance to give antibiotics, defer to clinician Wants reassurance	Bias as waiting to see clinician Difficult to generalise to population
Teck <i>et al.</i> (2016)	Kuala Lumpur, Malaysia	To assess the knowledge, attitude, and practice of parents regarding antibiotic usage for treating upper respiratory tract infection among children	320 from primary health clinic	Quantitative cross-sectional study- questionnaires	Limited knowledge, some will seek antibiotics, but also follow Dr advice	Study conducted in urban area- unable to generalise Recall bias possible
Wang <i>et al.</i> (2019)	Shanghai, China	To assess the knowledge and attitude towards antibiotics usage among young parents to identify contributing factors of antibiotics usage for parents	1368 recruited from vaccination clinic of community health centres	Quantitative cross-sectional study- questionnaires	Most follow advice, but frequent use of purchased antibiotics, and poor practices	May be more compliant as follow vaccination programmes

### **Appendix 3. Bosley *et al.* (2019)**

A journal article has been removed due to  
copyright restrictions.

Bosley et al (2019) Using local communities to  
establish geographical boundaries for case  
studies, *Nurse Researcher* 29(4)

doi: [10.7748/nr.2019.e1623](https://doi.org/10.7748/nr.2019.e1623)

## **Appendix 4. Topic Guide**

### **Maternal Attitudes to Antibiotic Use: A Community Based Case Study**

#### **Welcome and Introduction**

Welcome and thank you for agreeing to take part in this focus group and for coming along today. We really appreciate you taking the time to participate as your views are really important to us. The purpose of this focus group is to find out what you think about using antibiotics for your children and what may influence these views.

We need and value your views and comments on this, because these are the ones that really matter if we are going to understand how we can reduce the number of antibiotics currently used, to ensure they continue to work effectively.

We will record today's group discussion and once transcribed all of your names will be removed so any quotes from the discussions can be used in reports but no-one, apart from the study researchers, will know who said what. Anything that is said in today's focus group should remain confidential. If you change your mind about taking part in the study you can do so without giving a reason, however due to the nature of the focus group your data will still be used up to the point of withdrawal, but no direct quotations will be used.

If there are any questions or discussions that you do not wish to answer or participate in, you do not have to do so; however please try to be as involved as you feel you can be.

So now to just to run through some ground rules for the group:

1. So, we don't miss any important points, we ask participants to speak one at a time.
2. We are interested in your views, so there is no right or wrong answer
3. You do not have to speak in any particular order
4. Does anyone have any questions before we start?

#### **Opening questions**

- Can you tell me if you have taken your child to see the GP in the last 12 months? If so, was your child prescribed antibiotics at this time?
- Can you talk to me about the last time you received antibiotics for your child?

#### **Follow on questions**

#### **Knowledge**

- What sorts of things do you think antibiotics can be usefully prescribed for?

- How often would you go to your GP for antibiotics if your child had a runny nose or green nasal discharge?
- Would your request for antibiotics be affected by your GP telling you that your child had a viral or a bacterial infection? If so, why/why not?
- What has been your experience of receiving antibiotics for firstly, yourself and secondly, your child?
- How well informed about do you feel about when is the right time to ask for antibiotics? Can you tell me more about this?

#### **Attitudes**

- Can you tell me if you think antibiotics should be given to all children who develop a fever? Why/why not?
- What do you think about using antibiotics which may have been left over from another time?
- How often do you completely follow all the GP's instructions and advice relating to taking antibiotics? Can you tell me more about this?
- Can you tell me where you go to find information on child health for your children and do you feel it is helpful?
- What do you think about other non-medical measures used at home to manage illness? Can you tell me more about them?

#### **Beliefs/Perceptions**

- What factors would make you more likely to take your child to see the GP?
- What might discourage you from going to see the GP?
- Has your GP ever refused to prescribe you antibiotics when you have asked for them? Can you tell me more about this? How did it make you feel? Have you ever been asked to wait a few days to see if your child needs antibiotics? If so, can you tell me about this? What do you think about this advice? What factors might make you try to insist that your GP prescribes antibiotics for your child as a precaution, even if no diagnosis is confirmed?
- Have you ever directly asked your GP to prescribe antibiotics and if so, can you tell me about your experience of this?
- How do you feel about antibiotics being prescribed to children?
- Are there any circumstances when you feel they should always be prescribed or never be prescribed? If so, can you give me some examples?
- **High concern for antibiotic use**
- What factors might make you less likely to give an antibiotic when it was prescribed?
- What factors might make you more likely to give an antibiotic when it was prescribed?
- What do you know about the development of antibiotic resistance in your child/community? How does this make you feel?
- Are concerned that antibiotics might affect your child's natural ability to fight infection? If so why/why not?

- What do you feel about your GP recommending antibiotics for your child over the phone?
- What factors do you think may influence your GP's decision about whether or not to prescribe antibiotics?

**Family Pressures**

- What sort of things influence your decision making around the health of your child and why?
- Can you describe any barriers you have come across relating to taking time off work to care for your child when they are unwell? Do these things influence your request for antibiotics?

## Appendix 5. GP Invitation to Participate Letter

Helen Bosley  
PhD student,  
Oxford Institute of Nursing, Midwifery and Allied Health Research  
Gipsy Lane, Headington  
Oxford  
OX3 0FL  
Tel: 07825351837  
Email: [15129061@brookes.ac.uk](mailto:15129061@brookes.ac.uk)

Dear Practice Manager,

Invitation to take part in a research study:

### **Maternal Attitudes to Antibiotic Use: A Community Based Case Study**

I work in the community for Oxford Health NHS Foundation Trust as the Infection Prevention and Control Matron. However, I am also studying part time for a PhD at Oxford Brookes University and my research study is exploring maternal attitudes to requesting and using antibiotics for their children. The study will be conducted in OX4 and I am writing to all the GP practices in this postcode to request some information.

Overuse of antibiotics is a serious global health concern, and a significant proportion of the antibiotics used each year in the UK are prescribed for children. However, the specific role of mothers in requesting antibiotics for their children has not been studied in the UK. Therefore, this study aim is to explore what factors may influence mother's attitudes to requesting antibiotics for their preschool children.

The study will be conducted in two phases and the first phase is concerned with quantitative data collection. I would therefore like to obtain some basic data from GP practices from January to December 2016 (1 year).

This would include:

- the number of GP consultations for children under 5 years (pre-school)
- the number of children treated with antibiotics following consultation
- the conditions the antibiotics were prescribed for

Data should be number only and no patient identifiable information included.

This data will provide a baseline for the second phase of the study which will involve focus groups and interviews with mothers on attitudes to antibiotics for their children.

I would like to support the practice to discuss, assist and provide any help I can with data collection. I have had some initial discussions with some practices and there has been positive feedback and interest in this research area.

The study has ethical approval through Oxford Brookes University and is being sought via NHS ethics at this time.

Please could you indicate if you are able to participate and provide this data and I will arrange a convenient time to visit the practice and discuss the study in more detail?

Kind regards

Helen Bosley

Chief Investigator

OxINMAHR, Colonnade,  
Oxford Brookes University  
Telephone: 07825351837  
Email: 15129061@brookes.ac.uk

---

REPLY

We would be interested in taking part in the research on mother's attitudes to antibiotic prescribing

Yes

No

Please contact me on:

Address: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Telephone: \_\_\_\_\_

Email: \_\_\_\_\_

Signed: \_\_\_\_\_

Name: \_\_\_\_\_

## Appendix 6. Ethics Approval

### Faculty of Health and Life Sciences

#### Decision on application for ethics approval

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The Departmental Research Ethics Officer (DREO) / Faculty Research Ethics Committee (FREC) has considered the application for ethics approval for the following project:

**Project Title:** Maternal attitudes to antibiotic use: a community-based case study

**FREC Study Number:** 2016/15

**Name of Applicant:** Helen Bosley

**Name of Supervisor:** Professor Debra Jackson

Please tick  
 one box

1. The Faculty Research Ethics Committee gives ethical approval for the research project.

Please note that the research protocol as laid down in the application and hereby approved must not be changed without the approval of the DREO / FREC

2. The Departmental Research Ethics Officer / Faculty Research Ethics Committee gives ethical approval for the research project, subject to the following:

3. The Departmental Research Officer / Faculty Research Ethics Committee cannot give ethical approval for the research project. The reasons for this and the action required are as follows:

H. ABBOTT

Signed: ...Hazel Abbott ... ..

Approval Date: .....7 February 2017 .....

Designation: Departmental Research Ethics Officer

*(Signed on behalf of the Faculty Research Ethics Committee)*

Date when application reviewed (*office use only*): 15 November 2016 .....

## Appendix 7. Invitation to Participate Playgroup Leaders

Helen Bosley  
PhD student,  
Oxford Institute of Nursing, Midwifery and Allied Health Research  
Gipsy Lane, Headington  
Oxford  
OX3 0FL  
Tel: 07825351837  
Email: [15129061@brookes.ac.uk](mailto:15129061@brookes.ac.uk)

Dear Play group/ Meeting group leader,

Invitation to take part in a research study:

### **Maternal Attitudes to Antibiotic Use: A Community Based Case Study**

I am a registered adult and children's nurse and work in the local community NHS Trust as the Infection Prevention and Control Matron. I am also studying part time for a PhD at Oxford Brookes University and am interested in improving antibiotic prescribing in the community.

We know that overuse of antibiotics is a serious health concern, and a significant proportion of the antibiotics used each year in the UK are prescribed for children. However, the specific role of mothers in requesting antibiotics for their children has not been studied in the UK. Therefore, this study aim is to explore what factors may influence mothers' attitudes to requesting antibiotics for their preschool children.

This letter is to invite members of your group to take part in a research project which aims to gain some understanding of what may influence mothers regarding antibiotic prescribing for their children.

I would like to attend one of your meetings to discuss the research further. I would like to recruit some mothers to participate in either a small focus group or one to one interview and would agree a convenient date and time with you. Would you be able to facilitate this please?

Accompanying this letter is a study participant information sheet telling you more about the research, what we are aiming to do and what it would mean to you if any mothers agreed to take part. However, study participants will be unable to withdraw any focus group information once supplied or any data once it has been analysed. They are under no obligation to take part and are free to withdraw even if they do agree, at any point. This would have no impact on any care or access to clinical services.

I would be grateful if you could complete the reply slip below and return in the pre-paid envelope enclosed in this letter. If you are agreeable, I will contact you to arrange a visit.

Thank you for taking time to read this letter and information sheet.

Kind regards

Helen Bosley

Chief Investigator

OxINMAHR, Colonnade,

Oxford Brookes University

Telephone: 07825351837

Email: [15129061@brookes.ac.uk](mailto:15129061@brookes.ac.uk)

---

REPLY

We would be interested in taking part in the research on mothers' attitudes to antibiotic prescribing

Yes

No

Please contact me on:

Address: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Telephone: \_\_\_\_\_

Email: \_\_\_\_\_

Signed: \_\_\_\_\_

Name: \_\_\_\_\_

## **Appendix 8. Participant Information Sheet**

### **PhD Research Project**

#### **Study title: Maternal Attitudes to Antibiotic Use: A Community Based Case Study.**

The aim of this study is to explore mother's attitudes and expectations in relation to antibiotic prescribing for their children.

I am a registered general nurse and children's nurse and am studying for a PhD at Oxford Brookes University and would like to invite you to take part in my research study. Before you decide I would like you to understand why the research is being done and what it will involve for you. This information sheet will provide you with the study information and I will also be able to answer any questions you may have.

Talk to others about the study if you wish and ask me if there is anything that is not clear. Please take time to read the following information carefully.

#### **What is the purpose of the study?**

The study is exploring mothers' experiences of antibiotic prescribing for their children and I would like to know your thoughts and experiences relating to this. I am interested in finding out what information is available to mothers about when children should take antibiotics and how this could be improved.

Antibiotics are used widely in treating illnesses and there is a concern they are being overused, leading to development of resistance in some bacteria. The majority of antibiotics used in the UK are used in the community by GPs and a significant number are used to treat young children. The study is in 2 stages. The first will involve small group discussions and the second will be one to one interviews about mother's experiences about antibiotic prescribing for their children. You will be invited to take part in either a focus group or interview depending on your preference.

#### **Why have I been invited to participate?**

You have been invited to take part in the study as you are a mother of pre-school children living within the OX4 postcode area and I want to hear your views about antibiotic prescribing in children.

The OX4 area has a diverse range of cultures and population groups which can provide useful insights into what mothers think about antibiotic use in children. All mothers living or accessing services in OX4 are eligible to be take part provided you can speak English.

## **Do I have to take part?**

It is up to you to decide whether or not to take part. If you do decide to take part, you will be given this information sheet to keep and be asked to sign a consent form. If you decide to take part, you are still free to withdraw at any time and without giving a reason.

## **What will happen to me if I take part?**

There are two parts to the study. Mothers will be invited to tell me their views about antibiotic prescribing for children either by joining a group discussion (known as a focus group) or by participating in a one-to-one interview. Mothers, who do not participate in the initial focus groups, will be invited to take part in the one-to-one interviews. This is to ensure that the study does not use up too much of individual participant's time, as well as to ensure that as broad a range of views is captured as possible.

The purpose of the focus group is to capture information regarding mothers' attitudes to antibiotic prescribing in children. Following this, the one-to-one interviews will explore any issues uncovered by the focus groups in greater depth. Focus groups will comprise about 6-8 mothers, plus the researcher and facilitator. They will be held in a local location, within community venues such as community or church halls.

Interview participants will be given the option for the interview to be held at their home or a local venue at a convenient time and place for them. Both focus groups and interview discussions will be digitally (audio) recorded. The focus groups/interviews will last around one hour. All recorded data will be destroyed as soon as the data has been transcribed and anonymised. Refreshments will be available for the focus groups and interviews depending on the location.

## **What are the possible benefits of taking part?**

The study will identify mothers' experiences with regard to antibiotic prescribing for their children. This study will provide an opportunity for mothers to discuss their feelings and become more informed and aware of the issue. This information will also be used to inform health care professionals, to help them understand more about maternal attitudes towards the use of antibiotics in their pre-school children. This may produce significant benefits for child health care, by reducing unnecessary antibiotic use and increasing the effectiveness of the antibiotics that are prescribed.

## **What are the possible disadvantages of taking part?**

You will be required to give up a couple of hours of your time to travel to and take part in the focus group. However, travel expenses will be reimbursed to all participants if incurred. Mothers will also be able to bring children to focus groups and interviews if they are unable to arrange childcare.

### **Will what I say in this study be kept confidential?**

I follow research ethical and legal practices and all information about you will be handled in confidence, subject to any legal limitations.

All information which is collected about you during the course of the research will be kept on a password protected computer and is strictly confidential. Interviews will be audiotaped and transcribed. All identifiable information will be removed at the transcription stage. The audiotaped interview will then be destroyed. The transcripts will only be viewed by myself as chief researcher and the supervisory team. Data will be stored securely in a locked cabinet or on an encrypted computer device, in accordance with the Data Protection Act 1998. Following Oxford Brookes University policy, data will be kept securely in paper or electronic form for ten years after the completion of the research project. Anonymous quotations from the interviews may be used when the research is written up or published.

There are of course limits to confidentiality, if the research team become concerned at any stage about an individual's safety or wellbeing or felt they may be at risk of significant harm, I would discuss this with you and refer our concerns to a safeguarding professional.

### **What should I do if I want to take part?**

If you would like to take part, please contact myself as the chief investigator on the contact information below. I will contact you to arrange a time to attend the focus group or interview. You will then also be asked to sign a consent form agreeing to take part in the study.

### **What will happen to the results of the research study?**

The information obtained in the study will be used in the researcher's PhD dissertation, which will be published. Some aspects of the study may also be published in journals and presented at conferences. When the results of the study are written up or published, your identity will not be disclosed, and all direct quotations will remain anonymous. Please contact me if you would like to receive a summary of the findings. The study is due to finish in 2021 after which a final summary report will be available.

### **Who is organising and funding the research?**

The research is being conducted by Helen Bosley, a PhD student at Oxford Institute of Nursing Midwifery and Allied Health Research (OxINMAHR) which is part of Oxford Brookes University.

## Who has reviewed the study?

The research has been reviewed and approved by the Faculty Research Ethics Committee, Oxford Brookes University.

Contact for Further Information

If you require further information, please contact:

Helen Bosley

Chief Investigator

:OxINMAHR, Colonnade,

Oxford Brookes University

Telephone: 07825351837

Email: [15129061@brookes.ac.uk](mailto:15129061@brookes.ac.uk)

Research supervisory team

Director of Studies: Professor Debra Jackson email: [djackson@brookes.ac.uk](mailto:djackson@brookes.ac.uk)

Professor Jane Appleton email: [jvappleton@brookes.ac.uk](mailto:jvappleton@brookes.ac.uk)

Dr Cathy Henshall email: [chenshall@brookes.ac.uk](mailto:chenshall@brookes.ac.uk)

In the event of concerns about the conduct of the research, please contact Hazel Abbott, the chair of the Faculty Research Ethics Committee at [heabbott@brookes.ac.uk](mailto:heabbott@brookes.ac.uk)

Thank you for taking time to read the information sheet

Date: 15th March 2017

---

## REPLY

I would be interested in taking part in the study:

Please contact me on:

Address: \_\_\_\_\_

Telephone \_\_\_\_\_

Email: \_\_\_\_\_

Signed: Name \_\_\_\_\_

## Appendix 9. Flyer for Study



**Invitation to take part in a research study**  
Are you able to help in a research study into Maternal attitudes towards antibiotics?

**What is the study**  
To explore mothers' experiences of antibiotic prescribing for their children

**What does the study involve**

- About 45 mins- 1 hour participation in a focus group or one to one interview

**Why is this important?**  
Antibiotics are used widely in treating illnesses in young children and there is a concern globally they are being overused.

**Who can participate**

- All mums with children under 5 years of age who can speak English

For more information please contact :  
Helen Bosley email [15129061@brookes.ac.uk](mailto:15129061@brookes.ac.uk)

**What you should know**

- All information is confidential and anonymised
- All interactions will be at a mutually convenient location
- Ethics approval

## Appendix 10. Participant Mothers' Demographics

Please would you complete the following basic demographic data

### Age

18-21

21-25

26-30

31-35

36-40

41-45

46-50

### Ethnicity

White or Caucasian

Black

Asian

Other.....

### Educational status

tick all that apply

Secondary school

College

Diploma

Degree

Other.....

**Marital status**

Married/Partner

Divorced

Single

**Number of children parent to**

1

2

3

4 or more

All data will be anonymised, aggregated and summarised

Many thanks for your answers and support for the study

## Appendix 11. Consent Form- Focus Group

**Full title of Project:** Maternal Attitudes to Antibiotic Use: A Community Based Case Study

**Name of Chief Researcher:** Helen Bosley, PhD student

**Contact address**

Oxford Institute of Nursing, Midwifery & Allied Health Research (OxINMAHR); Faculty of Health & Life Sciences,  
Oxford Brookes University, Oxford, OX3 0FL

<http://www.oxinmahr.com>

Telephone: t: 07825351837 or email [15129061@brookes.ac.uk](mailto:15129061@brookes.ac.uk)

**Please initial box**

Research supervisory team

Director of Studies: Professor Debra Jackson

email: [djackson@brookes.ac.uk](mailto:djackson@brookes.ac.uk)

Professor Jane Appleton email: [jvappleton@brookes.ac.uk](mailto:jvappleton@brookes.ac.uk)

Dr Cathy Henshall email: [chenshall@brookes.ac.uk](mailto:chenshall@brookes.ac.uk)

- |  |                          |
|--|--------------------------|
| <p>1. I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily</p>                                | <input type="checkbox"/> |
| <p>2. I understand that my participation is voluntary and that I am free to withdraw from the focus group at any time, without giving reason. However, it is not possible for focus group data to be withdrawn once it has been collected.</p> | <input type="checkbox"/> |
| <p>3. I agree to take part in the above study.</p>   | <input type="checkbox"/> |
| <p>4. I understand that the focus group will be audio-recorded</p>   | <input type="checkbox"/> |
| <p>5. I agree to the use of anonymised quotes from the focus groups being used in any reports or publications from the study</p>   | <input type="checkbox"/> |
| <p>6. I agree that any of my data gathered in this study may be stored (after it has been anonymised) and may be used for future research</p>  | <input type="checkbox"/> |

---

Name of Participant

---

Date

---

Signature

---

Name of Researcher

---

Date

---

Signature

## Appendix 12. Consent Form- One to One Interviews

**Full title of Project:** Maternal Attitudes to Antibiotic Use: A Community Based Case Study

**Name of Chief Researcher:** Helen Bosley, PhD student

**Contact address**

Oxford Institute of Nursing, Midwifery & Allied Health Research (OxINMAHR); Faculty of Health & Life Sciences,  
Oxford Brookes University, Oxford, OX3 0FL

<http://www.oxinmahr.com>

Telephone: t: 07825351837 or email [15129061@brookes.ac.uk](mailto:15129061@brookes.ac.uk)

Research supervisory team

**Please initial box**

Director of Studies: Professor Debra Jackson

email: [djackson@brookes.ac.uk](mailto:djackson@brookes.ac.uk)

Professor Jane Appleton email: [jvappleton@brookes.ac.uk](mailto:jvappleton@brookes.ac.uk)

Dr Cathy Henshall email: [chenshall@brookes.ac.uk](mailto:chenshall@brookes.ac.uk)

1. I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily
2. I understand that my participation is voluntary and that I am free to withdraw from the interview at any time, without giving reason. However, it is not possible for interview data to be withdrawn once it has been processed.
3. I understand that the interview will be audio-recorded
4. I agree to the use of anonymised quotes from the interview being used in any reports or publications from the study



## Appendix 13a. Example of Transcripts -themes, sub themes and codes

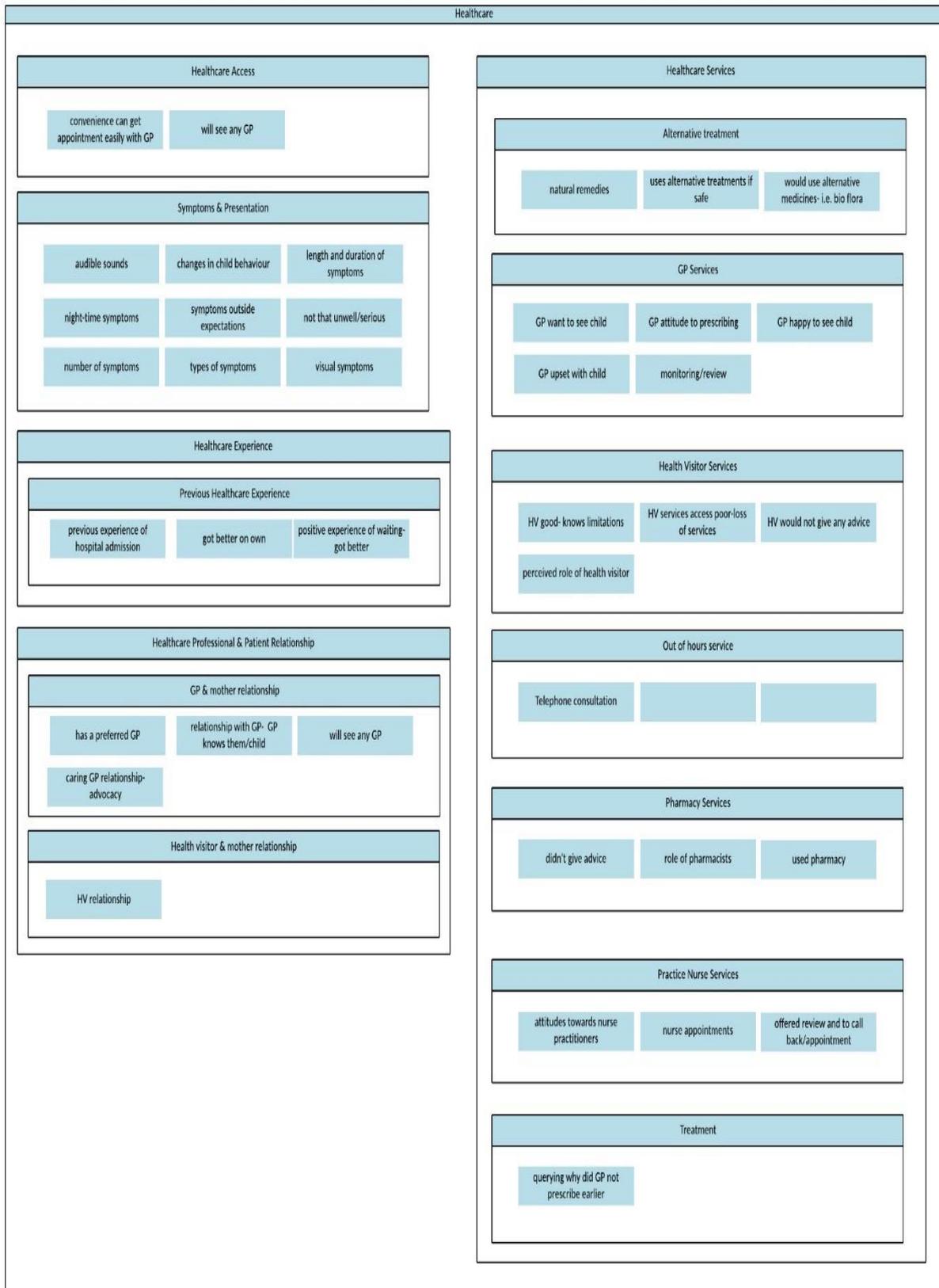
Transcript	Codes generated	Sub themes	Themes
<p>FG1:P1: she was <i>sick and had a high temperature</i> and I didn't know that they wouldn't give anything for ears</p>	Symptoms and presentations	Presentation of illness and initial treatment	Recognising and responding to illness
<p><b>I: Do you know who your GP is in your practice or do you see the same GP or do you see different ones?</b></p> <p>FG1:P1: No to be fair, we rarely ever go to the GP's very often, <i>so always a different one</i>. I'm at DMC so I think it's the same thing. I've found the <i>major problem is the receptionists</i> getting them to answer the phone, not the GP's themselves, but that's a bit topical (general agreement) and then with <i>the chest infection</i> she has quite a <i>bad cough</i> and so he did <i>give antibiotics</i></p>	<p>Continuity</p> <p>GP Services</p> <p>Diagnosis</p> <p>Symptoms, severity</p>	<p>Importance of relationship</p> <p>Experience and accessibility</p> <p>Importance of being seen</p>	<p>Maternal expectations and experiences of healthcare services</p>
	Trust in antibiotics	Antibiotics as a safe and trusted treatment option	Symbolism of antibiotics

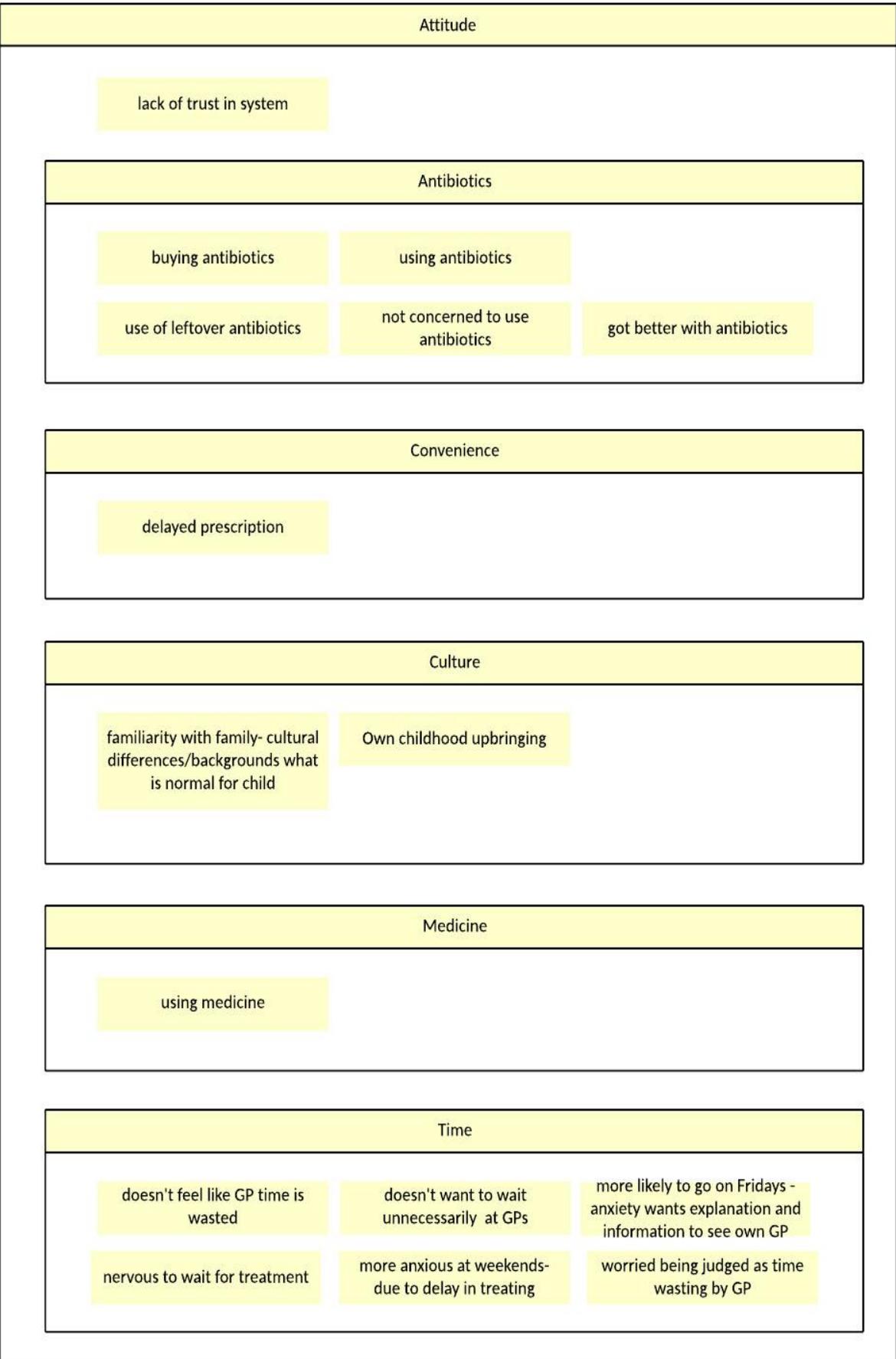
# Appendix 13b. Example of Coding Transcript

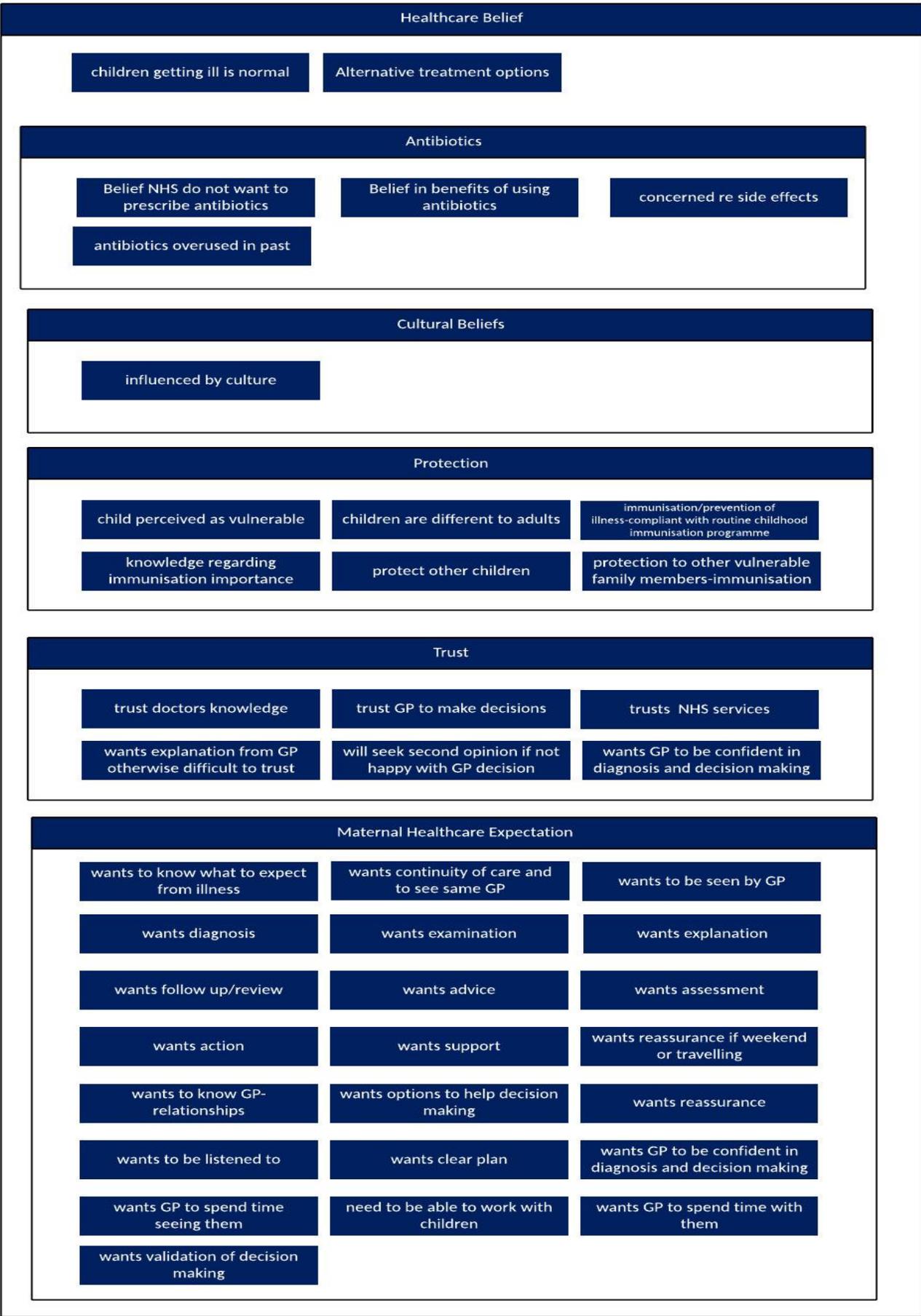
48 doctor...<sup>querying decision</sup> how he can prescribe medication...<sup>querying belief</sup> how can he believe me  
 49 when I say last night he had 40 degrees' temperature when he is all  
 50 <sup>likely</sup> over the place, with energy running around. <sup>illness</sup> Nobody believes me! <sup>belief perception of judgment</sup>  
 51 He had at one point a urine infection, they discovered by mistake, so  
 52 let's try it maybe. <sup>reassurance</sup> Everybody was saying he's perfectly fine, but  
 53 we're going to try it, so ok let's try it. When the result came, they  
 54 were perfectly <sup>shock</sup> shocked they didn't believe it and he didn't have no <sup>responsiveness to illness</sup>  
 55 pain no fever and he was with urine infection e.coli. <sup>lack of belief</sup>  
 56 I: so you went to the doctor. What were the symptoms to make you  
 57 go the doctor to start with?  
 58 Background noise and some interruption  
 59 FG M6 : so he had 40 degree temperature in the night....  
 60 I: so temperature ...ok <sup>responsiveness to illness</sup>  
 61 4:40  
 62 FG M6 : yes and I give paracetamol to bring down, but went to <sup>alternatives</sup>  
 63 doctor as not really sure if alright or not. The doctor said yes he's <sup>reassurance</sup> <sup>reassurance</sup>  
 64 fine, but let's take a urine sample to be sure, but he's fine. I think it's <sup>safety net</sup> <sup>safety net</sup>  
 65 not perfects but it's alright. When the result came and the doctor  
 66 was shocked. He said it's fine. We do another one and then go to <sup>shock</sup> <sup>reassurance</sup> <sup>safety net</sup> <sup>checking result</sup>  
 67 the hospital. everybody had the result in their hands saying it's  
 68 e.coli. the doctor had 3 lab tests saying he has E.coli, so like give him <sup>wants treatment</sup>  
 69 something. Don't take general opinion that he is fine. He doesn't <sup>wants action</sup>  
 70 look fine. <sup>illness</sup> <sup>responsiveness to illness</sup>  
 71 I:so the symptoms were the temperature

3

## Appendix 14. Examples of theme development from the initial coding







## **Appendix 15. A Research Protocol: Understanding Maternal Attitudes to Antibiotic Use: A Community Based Case Study**

### **Introduction**

#### **Why is antibiotic use in the community important?**

The use of antibiotics is a core and integrated component in modern healthcare and is used widely in a variety of treatments including organ transplantation, bowel surgery and some cancer treatments<sup>1 2</sup>. The global widespread use of antibiotics in healthcare as well as their use in animal health and food production, has led to a serious overuse and abuse of antibiotics. In fact, antimicrobial resistance (AMR) is developing faster than new antibiotics are being developed. Very few new antibiotics have reached the market in the last 30 years, as finding new antibiotics is becoming increasingly difficult and expensive<sup>3</sup>. This is primarily due to the difficulties in demonstrating efficacy or unacceptable side effects. New antibiotics also have to demonstrate they are not inferior to existing drugs before they are granted a licence. The cost of developing drugs for short term use, which is the role of antibiotics, does not incentivise drug companies to committing their resources for what may be a poor financial return<sup>4</sup>.

Overuse of antibiotics and inappropriate prescribing has resulted in rapid development of AMR, which is now considered to be one of the most significant threats to patients' safety worldwide. This is due to the increasing ineffectiveness of available antibiotics to treat the most common infections, which in turn results in decreased treatment options where antibiotics are vital. Without effective antibiotics, even minor surgery and routine operations could become high-risk procedures, leading to increased duration of illness and ultimately premature mortality<sup>2 5</sup>. A review on antimicrobial resistance published in 2016 found there are currently 700,000 people who die every year due to resistant infections and it is estimated that by 2050 the world will face an additional 10 million deaths due to AMR infections at a cost of \$100 trillion to the global economy<sup>5</sup>.

In response to the threat of AMR, the UK government has published the Five-Year Antimicrobial Resistance Strategy 2013 to 2018<sup>1</sup>. This strategy includes key actions to improve the knowledge and understanding of AMR, including provision of better information, intelligence, supporting data and developing more effective early warning systems to improve health outcomes. Another action is to conserve and steward the effectiveness of existing treatments and stimulate the development of new antibiotics<sup>1</sup>. Research has shown that many doctors still prescribe antibiotics far more often than necessary and a significant number of patients fail to complete a full course of antibiotics, sometimes saving tablets for later self-medication<sup>6</sup>. This may occur as patients with a viral illness will often feel naturally better within a few days, regardless of antibiotic treatment and therefore stop taking the antibiotics. There are still a significant number of patients who believe that antibiotics are effective against viruses<sup>7</sup>.

This research is supported by a report by the Parliamentary Science and Technology Committee<sup>3</sup> (2014), which identified that there is considerable pressure from patients to receive antibiotics, but poor public awareness of AMR and the potential risks associated with increasing AMR.

In 2015, PHE published the second annual report from the English Surveillance Programme for Antimicrobial Utilisation and Resistance (ESPAUR) <sup>8</sup>, which showed in 2014, the majority of antibiotics in England were prescribed in general practice (74%). Total antibiotic prescribing, which is measured using defined daily doses (DDD), a standardised measure of antibiotic consumption, continues to increase in the NHS by 6.2% (16.1 to 17.1 DDD per 1000 inhabitants) between 2011 and 2014 and 2.1% between 2013 and 2014. However, this increase has been at a slower rate from 2013 to 2014 than in previous years. The total number of prescriptions dispensed has decreased, whilst total antibiotic consumption in primary care has increased. This suggests higher doses or longer course lengths in general practice prescriptions.

Antibiotics are prescribed in about 1 in 5 GP consultations with about 25% being prescribed to a child between the ages of 1 and 14 years <sup>9</sup>. Most childhood illnesses are caused by viruses rather than bacteria <sup>9</sup> often spontaneously resolving without medical intervention, as in the case of the common cold or in childhood illnesses such as chickenpox. Clinicians report patients apply pressure for antibiotics to be prescribed, mostly on behalf of their children<sup>10</sup>. Inappropriate prescribing of antibiotics by clinicians can reinforce the belief that antibiotics ought to be prescribed and are effective in circumstances when they are not <sup>11</sup>. The need to educate both clinicians and parents regarding appropriate use of antibiotics is vital in safeguarding existing effective antibiotics for the future.

#### **Why is an exploration of maternal attitudes needed?**

Previous studies have examined the attitudes of parents towards antibiotic use in their children. Although it is recognised that fathers play an increasingly active role in childcare, the primary care provider in the vast majority of cases is the mother. They often make basic decisions on behalf of their children regarding health care<sup>12</sup> and play a vital role as role models for the family and their children, regarding beliefs and attitudes towards health <sup>13</sup>. Mothers adapt to meet the expectations of the mother's role, within their own culture and it is important for them to be perceived by others as good mothers <sup>14</sup>. Therefore, their own identity, health literacy and culture is a crucial issue in the understanding of their attitudes and expectations around antibiotic use for both themselves and their children.

The knowledge, attitudes and perceptions of parents (both fathers and mothers), regarding the use of antibiotics for treatment of their children has been explored in various different countries, including USA and Europe and the Middle East <sup>15 16 17</sup>. These studies have cited the importance of the patient/clinician relationship, the influence of the private health care insurance system and the availability of antibiotics to purchase as factors influencing antibiotics expectations. The UK has a unique healthcare system, which is free at the point of care<sup>18</sup>. This study will explore which factors influence maternal attitudes to antibiotic expectations within the UK primary care health system. The population of some communities is evolving and changing to reflect global migration and therefore the study will also explore the influence of ethnic diversity and culture on decision making.

### **Why is the study location important?**

According to the Office of National Statistics<sup>19</sup>, the population of OX4 is the most diverse in Oxfordshire. Although Oxford itself is not as ethnically or economically diverse as other cities in the country, in relation to the surrounding area, OX4 does have a rich, diverse and multi-cultural population. This population includes families with young children, and professional and non-professional people with an unemployment rate of 6.1% against the current national average of 4.9%. Housing is a mix of private and rental properties with 13.2% of properties provided by the local authority, compared to 7.5% in England. Most residents are aged between 16-49 years with about 8% aged between 0-16 years old. There is a range of ethnic diversity, with approximately 11.7 % recorded as Muslim, which is higher than Oxford in general.

### **Aim of this study**

The aim of this study is to explore maternal attitudes and expectations in relation to antibiotic prescribing for their children.

### **Objectives:**

1. To review published literature to gain an insight into prescribing practices in pre-school children and what influences mothers' beliefs that antibiotics for their children are required.
2. To collect quantitative antibiotic prescribing data for children under five years of age and perform descriptive and statistical analysis of data.
3. To collect qualitative data from focus groups and interviews with mothers of children under five, and complete thematic analysis of data.
4. To integrate and complete comparative and theoretical analysis of the quantitative and qualitative data, including further detailed synthesis.

### **Method**

#### **Study design**

This research will use a case study approach, which is used widely in health and social science research and is defined as exploration of a phenomenon, within a defined context, utilising a selection of data sources and which allows exploration of multiple aspects. This study will use an instrumental case study approach which is used to provide insights into an issue or to refine a theory<sup>20 21</sup>. In this study the area of OX4 (the case) has a diverse population from which to explore factors influencing mothers towards antibiotics prescribing for their children.

A mixed-methods approach, involving collection and analysis of quantitative and qualitative data will be used. This approach enables 2 or more perspectives<sup>22</sup> to be addressed and provides a better understanding of a research problem than either research approach alone. This provides a validity and consistency of research findings, generated by utilising different data sources. Completing the quantitative data analysis first will provide a general overview of the local population's demographic information which will then inform the qualitative phase of the research and enrich the data<sup>23 24</sup>.

Qualitative data will be collected from mothers residing in OX4 on their attitudes towards antibiotic prescribing for their children via focus groups and semi- structured interviews.

### **Setting, Access and Recruitment**

There are 8 GP practices within OX4; each will be contacted directly (following ethics approvals), study information will be provided, and each practice will be invited to participate in the research. The focus of the study will be on mothers of pre-school children (0-5 years) as they are more likely at this age to develop viral illnesses<sup>7</sup>.

Upon attainment of relevant ethics and research and development approvals (University Faculty Research Ethics Committee and National Research Ethics Service (NRES)), mothers of pre-school children living in the OX4 postcode will be invited to participate. Initial recruitment will involve contacting leaders of pre-existing community group meetings to discuss the study and seek their permission to access the meetings i.e. play groups, child health clinics, ethnic community groups. Following this, mothers will be invited to take part in local focus groups or one to one interviews. The researcher will provide the participants with written information about the study and there will be additional opportunity for participants to ask any questions relating to the study before consent will be sought. Ideally about 8 focus groups (one for each GP practice area) will be held across the case with 6-8 participants in each, lasting about 1-hour<sup>25 26</sup>. This is generally believed to be the optimum composition as it is a small enough a group to for everyone to participate but large enough to capture wide range of views. All mothers, who are primary care providers for pre-school children, will be eligible to be included in the study. Study participation is voluntary, informed consent will be obtained, and information will remain anonymised and confidential.

### **Confidentiality and Ethics Approval**

The three basic principles of ethical research; respect for persons, beneficence and justice will be followed<sup>27</sup>. Participants may experience anxiety and concern regarding their decision making and advice contact numbers and a health professional will be available for support. The researcher will make it clear that participation will be voluntary, and the participant will be free to withdraw at any time. The researcher will ensure they are treated respectfully and fairly and provided with clear information regarding the aim of the study. Participants will be asked to provide informed consent, once they have been provided with all the relevant study information.

All data (digital recordings and transcriptions) will be securely stored within the University in line with its Data Protection policy, with access only to the research team. The data will be transcribed and double checked; following which recordings from the focus groups will be destroyed. Confidentiality of data will be maintained by ensuring all data used is de-identified and presented so that no one person can be identified. Data will be securely stored, as per University regulations, for 10 years.

Ethics application has been obtained from the University Faculty Research Ethics Committee and is being sought with the National Research Ethics Service ((NRES) application 217969).

### **Phase One: Literature Review (to meet objective 1):**

A review of relevant literature will be used to identify, and critically evaluate the findings of available published literature relating to the research study. The review will include all relevant research conducted worldwide between the years 2006-2016 exploring knowledge, attitudes and practices of parents regarding use of antibiotics in primary care for their children. Only studies directly exploring the knowledge, attitudes and practices of parents towards antibiotic prescribing in children will be included. This time range was chosen to reflect the increased growing awareness and current concerns being raised by AMR globally.

The literature will be analysed using a thematic framework to identify any common themes regarding mothers' attitudes to antibiotic prescribing in their children. This will enable the themes to be explored in the case study and a comparison of the data completed.

### **Phase Two: Quantitative data of nature of GP consultations (to meet objective 2):**

Each GP practice, within the OX4 postcode area, will be visited by the researcher and quantitative data requested for the preceding 12 months. This timeline is to ensure a whole year's worth of data is available, which will provide a more balanced picture of frequency and reasons for consultations. It will incorporate the winter, when there is likely to be more consultations due to increased incidence of viral illnesses e.g. common cold. However, sometimes viral activity can increase throughout the year and therefore by gathering data for a whole year any increased cases will be identified, which may be reflected in GP consultations.

The literature will also be reviewed for basic demographic information, which will allow comparison with the case. The quantitative data obtained will be descriptive and include demographic information, the reason for and number of visits and number of antibiotics prescribed for preschool children.

The data collated will include:

- the number of visits for child
- number of antibiotics prescribed for children under 5 years old
- the reasons for the prescribing

Authorisation for data will be sought from the GP practices. This data will be anonymised and will form a background to the study. GP practices will also be visited, and data collated on the range of information available to mothers on prudent antibiotic use, and antibiotic effectiveness for viral illnesses including information leaflets, posters and advice contact numbers. This data will identify information sources available to mothers in the community which may support or influence their decision making, understanding, knowledge and expectations of receiving antibiotics for their children. This information will be collated by visually identifying available information and discussion with practice staff and will be used as a foundation to assess whether adequate education and support is provided for mothers. This additional information may inform further exploration in the semi-structured interviews and identify possible approaches to improving maternal expectations.

### **Phase 3: Focus Groups, semi- structured interviews with mothers (to meet objectives 3 and 4)**

The first stage of the qualitative phase will be to use focus groups to identify issues or ideas, which can be thematically analysed and explored further. By initially using focus groups, the study will be able to capture a lot of broad information regarding mother's attitudes to prescribing which can then be analysed to allow more informed and focussed individual semi structured interviews. This approach to collecting data, enables direct targeting of a research topic<sup>25 26</sup> and will allow the knowledge, attitudes and practices of mothers towards antibiotic use to be explored, identifying influences which may affect opinions, beliefs and motivation of participants. A disadvantage of focus groups can be that sometimes participants may feel uncomfortable in discussing sensitive topics publicly. This can in turn influence the output data<sup>25</sup>. However, in this study, mothers will be talking to other mothers in a familiar environment and therefore any hierarchy within the focus group should be minimal. The benefits of focus groups sessions in promoting discussion and sharing ideas will outweigh any disadvantages. If any concerns or safeguarding issues are identified during the qualitative phase, they will be addressed via the local arrangements i.e. county council safeguarding teams and GPs'.

Once consent has been obtained from participants, a date will be arranged on which the researcher and a facilitator will return to conduct the focus group. The role of the researcher is to coordinate and organise the focus groups, facilitate interaction between group members and support discussion providing clear explanations of the purpose of the group, and helping people feel at ease, and facilitating. The role of the facilitator is to assist the researcher, during the focus groups and may include, taking notes throughout the discussion and managing any interruptions to manage the continuity of group discussion<sup>26</sup>.

All mother and toddler community groups identified in the case study area will be contacted for inclusion in the study.

However, there will be a convenience sampling strategy for the study. Convenience sampling is a type of non-probability sampling that relies on data collection from participants who are conveniently available to take part in study. This sampling strategy is practical and efficient<sup>28</sup>. The study will attempt to capture community groups from across all the 8 GP practices in the case study area, including community mother and toddlers' meetings and community meetings from different ethnic groups. This approach will ensure that the participating mothers are representative of the broad and varied community living in the case. This convenience sampling will include maternal age, income, ethnicity, education and will be informed following the analysis of the quantitative data from phase two and the literature review in phase one.

The content of the focus group discussion will be semi-structured, in order to address the study objectives and will use prompts from the topic guide. The topic guide questions may be altered depending on the findings that arise from phase one and two of the study, regarding use of antibiotics for common childhood illnesses in the community with the idea to prompt discussion. The focus groups will be digitally recorded and transcribed for analysis. The composition of the focus group participants will be documented. This will include basic demographics characteristics (e.g. age, ethnic diversity) and be de- identified to individuals, however it will show if the participants are representative of the general community population of OX4.

The next step will be to incorporate any identified themes into subsequent semi-structured interviews, which will allow further in-depth exploration. Advantages of interviews include the researcher having direct control over the flow of the data collection process, including being able to clarify any issues during the interview if necessary. The researcher is also able to explore themes in much more details in an interview rather than a focus group. However, the process of interviews does require more time to gather the data in comparison to other data collection methods<sup>29</sup>. Mothers, who have not participated in the focus groups, will be invited to take part in the interviews and consent will be sought. This is to ensure participants are not fatigued by the study, but also to ensure as broad a range as possible of individual views is captured. All discussions will be digitally recorded and transcribed.

## **Data analysis**

### **Quantitative data**

The quantitative data will undergo descriptive statistical analysis using a statistical package for social science (SPSS). It is simple to use, and data can be added directly into the programme.

### **Qualitative data**

Thematic analysis is a method for identifying, analysing, and reporting patterns (themes) within data<sup>30</sup> and will be used to analyse the transcript data from the focus groups and semi-structured interviews. It enables comparison across the data, as well as within each individual participant responses<sup>31</sup>. This will enable new themes to be developed, which can be added to and included in the knowledge base. The emerging themes will be reviewed and linked together for further analysis. Data will be managed using Microsoft Excel ® 2016 worksheet as a framework and transcripts double coded within the research team, to ensure rigour in the data analysis process.

### **Rigour and Validity of data**

Due to the nature of qualitative research, it can be criticized as being biased, small scale, anecdotal, and/or lacking rigor<sup>32</sup>. In order to ensure the research data is valid and rigorous several processes will be employed. The data will be systematically analysed using established computer data management software NVivo9.methodology. This will minimise human error. All qualitative data will be digitally recorded and transcribed to improve accuracy, and objectivity<sup>33</sup>.

During this phase, the research will transfer from the MPhil stage to the PhD component. The PhD stage will involve detailed analysis of focus groups and interview data, which will allow the emergence of themes and reporting patterns within the data<sup>34 35</sup>. This will enable an overall detailed comparative and theoretical analysis of the identified themes from the quantitative and qualitative data, and subsequent interpretative synthesis of data findings. The study results will aim to provide a clearer understanding of the drivers influencing mother's expectations for receiving antibiotics for their pre-school children, from a range of diverse demographic backgrounds. It will also identify possible interventions, which may support a reduction in unnecessary antibiotic prescribing in the community.

## Appendix 16. Bosley *et al.* (2021)

A journal article has been removed due to copyright restrictions.

Bosley et al (2021) Mixed methods case study exploring primary care antibiotic prescribing practices and material expectations of using antibiotics in children, *Contemporary Nurse* 57(3-4), 245-257

doi: 10.1080/10376178.2021.1994865

## Appendix 17. Bosley *et al.* (2020)

A journal article has been removed due to copyright restrictions.

Bosley et al (2020) The influence of perceived accessibility and expertise of healthcare professionals, and service austerity, on mothers' decision-making, *Health Soc Care Community* 29(2), 526-534

doi: [10.1111/hsc.13115](https://doi.org/10.1111/hsc.13115)

## Appendix 18. Key Demographic Information Relating to Participant Mothers' Quotes

Participant identifier	Age of mother	Nationality	Ethnicity	Highest Educational status	Marital status	No. of children	Age of child
<b>Focus group participants</b>							
FG 1 P1	36-40	British	White	Degree	Married	3	5 years, 3 years, and 7 months
FG 1 2	31-35	NZ	White	Diploma	Married	3	6 years 3 years, and 6 months
FG 1 P3	41-45	British	White	Degree	Single	2	5 years and 9 months
FG 2 P1	36-40	British	White	Degree	Married	1	2 years
FG 2 P2	31-35	Spanish	White	Degree	Partner	1	2.5 years
FG 2 P3	31-35	Romanian	White	Degree	Married	1	14 months
FG 2 P4	31-35	Dutch	White	Degree	Married	1	3 years
FG 2 P5	31-35	Pakistani	Asian	Doctorate	Married	1	2 years
FG 3 P1	26-30	British	White	Degree	Married	2	4.5 years and 6 months
FG 3 P2	36-40	British	White	Degree	Married	2	4 .5 years and 9 months
FG 3 P3	26-30	British	White	College	Single	2	4 years and 2 years
FG 3 P4	36-40	British	White	Degree	Married	3	7 and 4 years and 18 months
FG 4 P1	26-30	British/German	White	Degree	Married	2	2.5 years and 11 months
FG 4 P 2	36-40	Romanian	White	Degree	Married	2	10 years and 2.5 years
FG 5 P 1	26-30	British	White	College	Married	2	6 years and 1 year
FG 5 P2	46-50	British	Black	Degree	Single	1	2.5 years
FG 6 P1	26-30	British	White	Secondary school	Partner	1	1 year
FG 6 P2	26-30	British	White	Secondary school	Partner	1	14 months
FG 6 P3	26-30	British	White	Diploma	Married	1	18 months
<b>Interviewees</b>							
MI 1	36-40	Italian /Peruvian	White	Degree	Married	2	4 and 2 years
MI 2	31-35	Hungarian	White	Degree	Married	1	2 years
MI 3	36-40	British	White	Degree	Married	1	1 year
MI 4	36-40	British	White	Diploma	Married	1	4 years
MI 5	31-35	Israeli	White	Degree	Married	1	1 year
MI 6	31-35	British/ Guatemalan	White	Degree	Married	4	6,4,2,1 years
MI 7	36-40	Spanish	White	Degree	Married	1	2 years
MI 8	26-30	Hungarian	White	Degree	Married	1	20 months and pregnant
MI 9	36-40	British	White	Degree	Married	2	8 and 3 years
MI 10	36-40	British	White	Degree	Married	1	2 years
MI 11	41-45	British	White	Degree	Partner	3	5 and twins 2.5 years
MI 12	31-35	British	Mixed White /Asian	Degree	Married	2	4 and 2 years
MI 13	36-40	African	Black	Degree	Single	2	16 and 5 years
MI 14	41-45	British	White	Degree	Married	1	2 years

## **Appendix 19. Publications, Conference Presentations and Travel Scholarship Relating to PhD Research**

### **Study Publications**

Permission has been sought and given from the journal editors for inclusion in this thesis.

**2021**

#### **Chapter 5**

Bosley, H., Appleton, J.V., Henshall, C., Jackson, D. (2021) 'A mixed methods case study exploring UK primary care antibiotic prescribing practices and maternal attitudes to the use of antibiotics in children under five years of age,' *Contemporary Nurse*, pp.1-13. <http://dx.doi.org/10.1080/10376178.2021.1994865>

**2020**

#### **Chapter 6**

Bosley, H., Appleton, J.V., Henshall, C., Jackson, D. (2020) 'The influence of perceived accessibility and expertise of healthcare professionals, and service austerity, on mothers' decision making,' *Health Social Care in the Community*. 00:1–9. <https://doi.org/10.1111/hsc.13115>

**2019**

#### **Chapter 3**

Bosley, H., Appleton, J.V., Henshall, C., Jackson, D. (2019) 'Using local communities to establish geographical boundaries for case studies', *Nurse Researcher*. doi: 10.7748/nr. 2019.e1623

**2018**

#### **Chapter 2**

Bosley, H., Henshall, C., Appleton, J.V., Jackson, D. (2018) 'A systematic review to explore influences on parental attitudes towards antibiotic prescribing in children', *Journal of Clinical Nursing*, 27 (5-6),pp. 892-905. <http://dx.doi.org/10.1111/jocn.14073>

## Conference Presentations

### 2017

- **Poster presentation** - Antibiotic use in young children. What do parents think? A systematic literature review. Infection Prevention Society, International Conference, Manchester, UK, 18-20<sup>th</sup> September 2017.

### 2018

- **Oral presentation** - Understanding Maternal Attitudes to Antibiotic Use: A Community Based Case Study. Oxford Brookes Research PhD Symposium. January 2018.
- **Oral and poster presentation** - Primary care antibiotic prescribing practice for children under the age of five years and mothers' attitudes to managing their child's illness. Healthcare Infection Society International annual conference, Liverpool, UK, 26-28<sup>th</sup> November 2018.

### 2019

- **Oral and poster presentation** - Maternal attitudes to antibiotics: a community case study. Provisional study findings. University of Technology, Sydney, Australia Summer Nursing Faculty PhD Research Event. November 2019.

### Florence Nightingale Foundation Travel scholarship

In 2019, I travelled to Sydney, Australia as part of a Florence Nightingale Foundation Travel Scholarship. The aim of this scholarship was to explore maternal attitudes and expectations in relation to antibiotic usage for their pre-school children in Australia.