

**Attitudes to Upper Respiratory Infections, Antibiotics and Bacterial Resistance:
Managing common respiratory infections and promoting the appropriate use of
antibiotics by the general population**

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Thesis submitted for the degree of Doctor of Philosophy

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Abstract

The public, as the users of antibiotics, can contribute to the control of bacterial resistance. National and international campaigns have recommended public education to promote the judicious and safe use of antibiotics, and in particular, reducing antibiotic use and misuse in upper respiratory tract infections. Campaigns, however, have not been informed by detailed understanding of public attitudes to the problem. Although previous studies have explored lay perceptions of common infections and antibiotics, public attitudes to bacterial resistance, beliefs about antibiotic use in relation to bacterial resistance and the attitudes towards respiratory tract infection influencing antibiotic use are under researched. This thesis addresses this gap using a grounded theory approach. Semi-structured interviews with members of community groups were conducted across South East Wales. By analysing patterns and connections between various beliefs this thesis shows that historical antecedents and beliefs about dirt and germs act as prototypes for current beliefs about resistant infection. Most respondents did not feel that they have a personal role in either the cause or control of bacterial resistance. Lay beliefs about aetiology resided in both traditional and biomedical models. There was a reliance on medicines, and specifically antibiotic attachment, which contributed to self-medication and expectations for antibiotics during upper respiratory tract infection (URTI). Promoting public engagement in the control of bacterial resistance requires a number of approaches to behavioural change. In relation to antibiotic use efforts to promote adherence to antibiotic regimes need to address beliefs about antibiotics, forgetfulness and practical barriers to adherence but also to reduce public expectations for antibiotics for upper respiratory tract infections by enhancing understanding about the microbial causes of URTI. Efforts to reduce antibiotic use, however, need also to address the wider meaning and the reliance on antibiotics. Public engagement in the control of infection through hand washing should be promoted as an effective way to reduce the risk community acquired resistant infection.

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Chapter 1: Setting the Scene

1.0 Introduction

This thesis explores public attitudes towards three important topics; infection, bacterial resistance, and antibiotics. Infections are a common cause of illness. There are numerous types of infection, variations in aetiology, treatment options, and consequences for individuals and society. Within a single study, it is impossible to collect and analyse in-depth data on the full extent of human attitudes, understanding and experience relating to all types of infection. This study therefore focuses on public beliefs about upper respiratory tract infections (URTIs), and attitudes towards antibiotics within the context of URTI. This decision has been made because antibiotic use in URTI is an area of particular concern in relation to bacterial resistance (antibiotic use drives bacterial resistance, and antibiotics are overused for RTIs). This thesis explores lay beliefs about the aetiology of URTIs and the associated illness behaviours. Beliefs about bacterial resistance and the public's perceptions of their potential contributions to the problem of resistance are explored. Finally, attitudes toward antibiotics and the ways in which antibiotics are used in the home are evaluated.

This investigation spans the disciplines of medical sociology and health service research. It is based on a central premise that health beliefs are socially constructed and are fundamental in determining individual responses to illness and attitudes towards medicines and treatment. The intention of the thesis is not to uncritically accept the assumptions of a biomedical model, but to explore attitudes from the

individual's perspective. This approach facilitates a greater understanding of the attitudes of the general public, the nature and origins of lay beliefs, and the likely behavioural responses. For the purpose of this study lay attitudes were conceptualised as possessing three components; affective, cognitive, and behavioural (Payne and Walker, 2002). Feelings and beliefs about infections, both general and specific, were assumed to influence illness behaviour. However, it was acknowledged that beliefs are not always consistent with behaviour (Payne and Walker, 2002).

The aim of this introductory chapter is to discuss the rationale for the study, to state its aims, and to position the study within a scientific context. The cultural context of the sample is described, and finally, the structure of the thesis is outlined.

1.1 Rationale and Aims of the Study

The control of bacterial resistance and resultant resistant infections are of national and international importance. It is a problem which traverses both primary and secondary health care contexts (Department of Health (DoH), 2000; World Health Organisation (WHO), 2000).

The growth of bacterial resistance is costly both in human and financial terms. Infections caused by resistant bacteria may increase both the length and severity of illness and associated suffering. Less safe, more expensive drugs may need to be used, increasing the risk of side effects and costs (DoH, 2000). Patients with resistant infections may also need to be isolated which potentially has negative

psychological consequences (Newton et al, 2001). Mortality rates from resistant infections are greater than those caused by bacteria which are sensitive to antibiotic therapy (Holmberg et al, 1987).

The financial consequences of acquiring resistant bacterial infections are indeed considerable. Longer duration of hospitalisation and additional drug therapy creates additional cost to health service providers (DoH, 2000). For example, in 1995 an outbreak of MRSA in a district general hospital in the United Kingdom (UK) was estimated to cost in excess of £300,000 (Cox et al, 1995). A case control study showed that the length of hospital stay by patients with bacteraemia caused by penicillin resistant *S.pneumoniae* was more than double that of bacteraemia caused by penicillin susceptible *S.pneumoniae* and treatment costs were more than treble (Einarsson, 1998). When both the human and financial implications of bacterial resistance are considered it is not surprising that it has become a major public health concern.

Controlling resistant infections has presented major challenges to health care providers because of the ease by which resistant microbes are spread (DoH, 2002). Resistant infections that were once believed to be confined to hospitals and predominantly affecting those with increased vulnerability due to compromised immunity are now presenting threats to the public of all ages in community settings.

The causes of bacterial resistance are multiple, but in particular the overuse and inappropriate use of antibiotics contribute to selective pressure on microbes. The use of antibiotics can lead to situations where sensitive microbial populations are

destroyed and resistant ones thrive. Specific concerns about the use of antibiotics in minor self-limiting viral respiratory tract infections (such as URTI) include inappropriate prescribing and self-medicating with antibiotics left-over from a previous illness. Other concerns related to antibiotic use are poor patient adherence to antibiotic therapy and environmental pollution with antibiotics disposed in household waste or sewage systems (Macfarlane et al, 1997; Blazquez et al, 2002; Kümmerer and Henninger, 2003).

The UK government's efforts to control bacterial resistance initially adopted a 'top down' approach. Initiative for monitoring and surveillance in terms of both nature and extent of resistant infections were focused on the National Health Service (NHS). National strategies also focused on the antibiotic prescribing habits of clinicians and reducing cross infection in hospitals.

Concerns about, and difficulties in controlling, bacterial resistance have continued despite these national initiatives. As a result, efforts to control antimicrobial resistance have broadened and now consider the public's potential contribution in reducing the burden and spread of resistant infections. National reports have suggested that educating the public is a primary way in which antibiotic use can be optimised (Madle et al, 2004). Nationwide educational campaigns have targeted reducing the public expectations for antibiotics in common respiratory tract infections, such as the common cold and influenza. Preliminary evaluation of these campaigns suggests a mixed response, perhaps because they are not based on thorough appraisal of public attitudes towards bacterial resistance (Finch et al, 2004; Parsons et al, 2004). For many years, health psychologists have recognised that

knowledge may not predict behaviour and that behavioural change is in fact a complex multi-stage event affected by many factors including the beliefs, expectations, and motivations of individuals (Finch et al, 2004). Providing broad information slogans about the risks of behaviour may not lead to behavioural change (Elder et al, 1999).

Patients are, rightly, no longer conceptualised as the passive recipients of care. They have been redefined essentially as consumers (Newman and Vidler, 2006). Co-operative working between the public and health care providers is now an integral element within the management and development of NHS services. Importantly, negative lay beliefs towards health care contribute to poor adherence with prescribed treatment and suboptimal use of health services (Munro et al, 2007). Recent quantitative research has suggested that lay knowledge of URTI may not be consistent with the current accepted scientific explanations (Friedman et al, 2003). Furthermore, Pill and Stott (1982) suggested that one of the most misunderstood determinates of illness behaviour is the interpretation the public attach to their symptoms. Lay beliefs contribute to the illness behaviours adopted by individuals and to their expectations of consultation with a clinician. Research from the clinicians' perspective report that patients often have unrealistic expectation for antibiotics in URTI and that, in order to optimise antibiotic use and to reduce their overuse, patients need to alter their expectations and attitudes to both URTI and antibiotics (Belongia and Schwartz, 1998). In addition, when antibiotics are prescribed, misunderstandings between patient and clinician have the potential to deter adherence to medication regimes (Britten et al, 2000). Providing a more detailed understanding of patient attitudes towards URTI, antibiotics, and bacterial

resistance may therefore have two possible benefits. It may help inform clinicians of the patient's perspective, which may facilitate easier shared decision making during patient-clinician consultation, and secondly it may help inform campaigns which aim to promote the judicious use of antibiotics. The aims of the study were therefore to:

1-Describe public attitudes (knowledge, feelings and behaviours) associated with URTIs, bacterial resistance and antibiotics.

2-Explore how best to engage the public in activities that may contribute to the control of bacterial resistance.

1.1.1 Funding and Personal Note

This PhD was funded through a studentship offered by Cardiff University. As a qualified nurse, I was aware of the problems associated with hospital acquired resistant infections, but my knowledge revolved primarily around infection control issues. I possessed little knowledge about the true nature, severity, and origins of bacterial resistance, nor was I fully aware of the importance of adherence to antibiotic regimes and the potential role for the public in helping to control the problem. The seriousness of the problem accompanied with feelings of guilt about the inadequacy of my own knowledge fuelled my enthusiasm for the study.

1.2 The Scientific Context of the Study

This section provides an explanation of the scientific context of the study including the current state of knowledge relating to the three key areas of interest. Scientific beliefs about the nature of microbes and infection are described. The natural history of common respiratory tract infections is discussed and the use of antibiotics for

such infections evaluated. The development of antibiotics and the natural origins of bacterial resistance are explored. Factors contributing to bacterial resistance and resistant infections are identified. The concept of adherence to medication regimes is introduced and current strategies for reducing the threat of bacterial resistance are highlighted.

1.2.1 Bacteria and Infection

There are four main categories of micro-organism; bacteria, viruses, fungi, and protozoa. It is believed that bacteria were the first micro-organisms to emerge on the planet, having appeared some 300 billion years ago. Bacteria are microscopic single celled organisms. They are easily spread and transmitted from one place to another in the air, water, or on the surface of fomites (objects carrying infection e.g. bedding and work surfaces). Bacteria are widespread in the environment and live on and within animal hosts. Most bacteria are harmless to humans, and most have valuable roles within the ecosystem. For example, bacteria degrade organic compounds and they are used in fermentation of alcoholic beverages and as yeast in cooking. Other bacteria which reside within the body have positive health benefits. Harmless bacteria live within the nose, mouth, bowel, and on the skin. These resident bacteria are known as 'normal flora' and are considered commensal, because they share the available nutrients with the host. Commensal bacteria have a number of positive health benefits, for example in the gut they aid digestion by assisting in the breakdown of waste products. Commensal bacteria also play an important role in stimulating immune system development in neonates. In addition, the large numbers of commensal bacteria reduce the risk of illness by occupying the niche that would otherwise be occupied by potentially pathogenic bacteria. Some commensal

bacteria, in certain circumstance can, however, cause disease, for example, individuals with compromised immune systems are more susceptible to infection.

Bacterial infection can be defined as “*the production of harmful effects by microbes in close contact with the body*” (Mitchinson et al, 1996, p113). Bacterial infections and infectious illnesses are historically associated with high levels of morbidity and mortality in otherwise well people as well as more vulnerable groups (Tomes, 1998).

1.2.2 Respiratory Tract Infections (RTIs)

RTIs are one of the most frequent reasons for consultations in Primary Care (Covington et al, 2004). About one quarter of the UK population will seek medical advice for a RTI each year (Ashworth et al, 2005). The initial aim of this study was to capture attitudes towards common respiratory tract infections. No pre-definition about what was common in terms of either upper or lower respiratory tract infection framed the enquiry. The aim was to allow respondents to talk about whatever respiratory infection they had experience of. Respondents in my study typically talked about URTI, a point to which I will return in chapter 3.

Traditionally, research literature has distinguished between upper and lower respiratory tract infections. Upper respiratory tract infections (URTI) are often considered synonymous with the common cold, but may also include viruses affecting the ears, nose, and throat (Smith, 2000). Table 1.1 demonstrates the variety of URTI that commonly occur and the type of microbe most likely to cause the illness. Most URTIs are viral in aetiology. Although rarely fatal, URTI have a

significant impact on the nation's health and economy due to the vast number of work and school days lost.

Table 1.1 The Causes of URTI

URTI	Common cause (type of microbe)
The common cold	Rhinoviruses Corona viruses
Pharyngitis and tonsillitis	70% are caused by viruses
Otitis media	Viral and secondary bacterial invaders
Sinusitis	Viral and secondary bacterial invaders
Acute Epiglottitis	Bacterial
Oral cavity infections	Candidiasis-fungal Caries-bacterial Periodontal disease-bacterial
Laryngitis and tracheitis	Commonest cause viral but may be bacterial

Lower respiratory tract infections (LRTI) are less common than URTIs, but are generally considered to be a more significant health concern, especially in the elderly, because they are associated with more severe, debilitating, and life threatening infection. Table 1.2 lists some of the more common LRTI and their causes. LRTI may be either viral or bacterial. LRTI are a common cause of infant mortality in developing countries (Scott et al, 2008).

In reality the distinction between upper and lower respiratory tract infections is somewhat arbitrary as the respiratory tract is a continuum from nose to alveoli. Thus, any microbe can cause disease in more than one part of the respiratory tract. Infectious agents, however, may have a preferred site or focus for their colonisation e.g. rhinoviruses often colonise the nasopharynx.

Table 1.2 LRTIs and their Causes

Lower Respiratory Tract Infections	Common Cause
Whooping cough	Bacterial
Bronchitis	May be viral or bacterial (secondary bacterial infection possible)
Bronchiolitis	75% due to synytial virus
Pneumonia	Children- mainly viral (possible secondary bacterial infection) Adult- bacterial causes more common

1.2.3 Antibiotics: Modes of action and adverse affects

An antibiotic is a substance which is antagonistic to the growth or life of micro-organisms (Cunha and Cuhna, 2008). Most substances currently designed for clinical use, and known as antibiotics, are in fact the products of micro-organisms although some are synthetically produced (Greenwood et al, 2003). Popularly known as, ‘magic bullets’, and heralded as one of the greatest advances in modern medicine (Kunin, 1993), the development of antibiotics changed modern medicine and the meaning of illness (Levy, 1992). For the first time, many previously fatal bacterial infections could be treated successfully. Antibiotics have been significant in reducing morbidity and mortality internationally although improvements in immunisation, sanitation and diet have in fact made greater contributions to health (WHO, 2000).

The search for antibiotics began in the late 1800s, following the growing acceptance of Pasteur’s germ theory of disease (Greenwood et al, 2003). Scientists began to explore ways of removing and destroying microbes without unacceptable toxicity to the patient. One of these scientists was Fleming. Fleming’s chance discovery that penicillin fungi could destroy some types of bacteria marked a new era in medicine.

Several years later Foley and colleagues in United States of America (USA) were able to use Fleming's findings to develop penicillin into a commercially viable product and the mass production of penicillin began. In the years that followed pharmaceutical companies began to invest large amounts of time and resources into developing anti-bacterial agents. The development of new classes of antibiotics was rapid, peaking in 1970-80s. The number of antimicrobial compounds is now believed to be over 150 (WHO, 2000).

Wide variations in the consumption of antibiotics have been reported across Europe. There are many factors that may contribute to this, including the incidence of community-acquired infections, cultural and social determinants, health care provision and utilisation, knowledge about antibiotics, pharmaceutical marketing and regulation (Cars et al, 2001).

The basis of all antimicrobial chemotherapy lies in the concept of selective toxicity. Bacterial cells differ from mammalian cells in that they have cell walls, structurally different ribosomes and unique metabolic pathways. Antibiotics exploit these differences so that bacterial cells are harmed but not the host cells. Because of their selective toxicity, antibiotics have a high therapeutic index (its ratio of toxic dose to therapeutic dose). In other words, the therapeutic levels of drugs are below any level likely to cause a toxic effect in the host.

Antibiotics can be classified as either bacterialstatic (inhibiting) or bactericidal (destroying). Broadly speaking, whether an antibiotic inhibits or kills bacteria depends on its concentration. The minimal concentration of drug that inhibits

bacterial growth is called the minimum inhibitory concentration (MIC). As the concentration of antibiotic is increased above the MIC, bacteria will stop replicating. The lowest concentration of antibiotic required to kill the bacterium is known as the minimum bacterial concentration (MBC). The MBC can be 2-8 times that of the MIC. Antibiotics for which achievable blood concentrations often exceed MBC of common pathogens are classified as bactericidal antibiotics, whereas antibiotics whose concentrations readily exceed the MIC but not MBC are classified as bacterialstatic. Categorising antibiotics in this way is not without its difficulties, since there is a unique relationship between each bacterium and the antibiotic. Antibiotics that are bacterialstatic against one bacterium may be bactericidal against another. For example, penicillin is bactericidal against streptococci but is bacterialstatic against enterococci.

Antibiotics can also be divided into two major classes based on their pharmacodynamic (the action and breakdown of the drug within the body) properties:

- Concentration dependant drugs e.g. amino glycosides and fluroquinolones
- Time dependant drugs e.g. B-lactams (Greenwood et al, 2003)

Pharmacodynamic classifications have important implications for planning drug regimes for two reasons; optimising the therapeutic success of the treatment and reducing the exposure of bacteria to suboptimal antibiotic concentrations. Exposure to suboptimal concentrations of antibiotics is believed to increase the risk of bacterial resistance by either applying selective pressure on the bacteria to mutate, or by enabling resistant bacteria to survive and proliferate (Hawkey, 1998).

In concentration dependent antibiotics, high drug levels should be the goal of therapy. This is best achieved by consuming a high dose once a day. In contrast, time dependant drugs are most effective when the serum concentration is higher than the pathogen's MIC for a significant proportion of the dosing interval. In this case, frequent dosing maintains therapeutic levels and is critical in bacterial eradication. Time dependant antibiotics are best taken 4-6 hourly. The importance of both finishing the full course of antibiotics and taking them at the correct intervals is thus evident. Optimising both the appropriate prescription of antibiotic regimes and adherence to dosing intervals on the basis of pharmacodynamic processes could reduce the emergence of antibiotic resistance in general (Burgess, 1999), a point to which I will return later.

Antibiotics have limited therapeutic benefit in viral illness (Glasziou et al, 1997; Fahey et al, 2004; Arnoll and Kenealy, 2002; Del Mar et al, 2002). Despite this, the estimated number of antibiotics prescribed for RTIs in 1997 was 818 billion world-wide (Carbon and Pax, 1998). Respiratory tract infections account for 75% of community antibiotic prescriptions in the UK (Levy, 1998). The use of antibiotics in such cases presents the consumer with the risk of potential adverse reactions and additional costs for both consumer and health service providers (Little et al, 2001). Antibiotic prescribing rates in UK peaked in 1995 (Ashworth et al, 2005). Although concerns about antibiotic prescribing still exist, recent research has reported a decline in prescribing rates by over a quarter between 1995 and 2000, mostly accounted for by reduced antibiotic prescribing for common respiratory infections. This reduction is believed to have occurred for two reasons; partly because clinicians

are prescribing antibiotics less frequently, but also because there are fewer consultations for RTI (Ashworth et al, 2005).

Like most medicines, all antibiotics have the potential to have negative adverse reactions. There are three main types of adverse reactions:

- Drug hypersensitivity
- Toxicological hazards
- Microbial effects

Hypersensitivity reactions range from urticaria (rash) to anaphylactic shock. Direct toxicity may affect the cellular process of the host e.g. kidney and liver function may alter. Microbial effects can lead to alterations in the normal bacterial flora of the upper respiratory tract, gastrointestinal and genitourinary tracts permitting the growth of opportunistic pathogenic organisms, leading to symptoms such as diarrhoea. Conversely, adverse reactions are not just dependant on the drug itself but also a number of idiosyncratic and host related factors, such as, genetic makeup, integrity of the body's elimination system (renal and liver function), and existing medical disorders. Adverse reactions are normally tolerated because the benefits of treatment often outweigh the toxic effects (Dancer, 2004). Newer antibiotics (those developed in the last 25 years) have reduced toxicity to therapeutic ratio compared to that of older antibiotics and adverse reactions are less likely and less severe when newer classes of antibiotics are used (Dancer, 2004).

1.2.4 The Scientific Basis of Bacterial Resistance

Bacteria have developed strategies to evade the therapeutic effects of antibiotics and to survive despite the presence of antibacterial substances. This ability is called resistance. Bacteria may be considered resistant if “*their growth is not halted by the maximal level of an antibiotic that is tolerated by the host*” (Hawkey, 1999, p28).

Bacterial resistance is also known as antibiotic resistance and resistant bacteria are commonly referred to by the media as ‘superbugs’ (Walsher and Joffe, 2006).

Resistant infections are infections caused by resistant microbes. Bacterial resistance has been described as a major threat to public health as treatment failure leads to increased morbidity and mortality (WHO, 2000).

Although resistance can be found in all micro-organisms, bacterial resistance is the greatest concern because they are widely prevalent throughout our environment, in both hospitals and communities (Twommey, 2000). An individual may develop an antibiotic resistant infection either by contracting resistant bacteria to begin with, or by having a resistant microbe emerge in the body once antibiotic treatment has commenced.

Not long after the commercial production of penicillin had begun resistant infections were being reported. The first resistant bacterium to be recognised was *Staphylococcus Aureus*. However, in the 1950s and 1960s resistant bacterial strains had little consequence for medicine because new antibiotics were rapidly developed to combat them. It was not until the 1970s that antibiotic resistance became a more serious threat to public health. At this time bacterial resistance was considered to be mainly restricted to hospitals and general practitioners (GPs) were generally

unconcerned about treatment failure among their patients due to antibiotic resistance. While clinicians remained complacent, bacterial resistance expanded to a number of commonly used antibiotics. By the late 1990s some resistant infections were becoming increasingly difficult to treat (Neu, 1992). A number of bacteria have now developed resistant strains. Methicillin Resistant *Staphylococcus Aureus* (MRSA) was the first resistant bacteria identified and has rapidly become a major cause of hospital acquired infection (Standing Medical Advisory Committee (SMAC): Subgroup on antimicrobial resistance, 1998). MRSA has been widely reported in the media and consequently is perhaps the most publicly acknowledged resistant bacteria (Walsher and Joffe, 2006). Resistant infections, however, are now not confined to hospital settings and are an increasing concern within the community (Salim et al, 2003).

The increased prevalence of antibiotic resistance is an outcome of evolution. Changes in the genetic makeup of the microbe have led to the emergence of bacteria which are able to resist antibiotic therapy. There are two ways in which resistance can occur: 'innate' or 'acquired'. Changes in the microbe are a response to the biological drivers common to all creatures through the processes of survival and reproduction. Innate resistance is when a bacterium has generally always had a property that makes it escape the effects of an antibiotic. Acquired resistance occurs due to a chance mutation of genetic material that happens to code for some feature that enables the bacteria to be less prone to harm from antibiotics. Acquired resistance occurs when a bacterium that was previously sensitive to antibiotics develops resistance.

Any population of organisms, bacteria included, naturally includes variants with unusual traits. In resistant bacteria, this is the ability to withstand antibiotics. When a person takes an antibiotic, the drug kills the defenceless bacteria, leaving behind, or 'selecting', those that can resist it. Whenever antibiotics are used, there is selective pressure for resistance to occur as the resistant bacteria survive when the sensitive ones do not. In these situations the surviving bacteria have ample resources in terms of nutrients and space to rapidly develop into colonies of resistant bacteria. When antibiotics are used frequently this process is repeated with the result that more organisms develop resistance to more antibiotics. Although bacterial resistance is a natural phenomenon, humans have put immense pressure on bacteria to mutate. The widespread and large scale use of antibiotics in animal husbandry and horticulture coupled with excessive use of antibiotics in medicine is believed to be the major contributory factor to the growth of bacterial resistance (WHO, 2000). The response of bacteria has been to adapt. In order to survive microbes have become resistant. The emergence of resistant bacteria should not have been a surprise to scientists. Even before antibiotics were developed, Darwin hypothesised that nature itself drove species to adapt to changes in the environment in order to survive. The need to survive is a powerful natural force.

"It's not the strongest of the species, nor the most intelligent, but the one most responsive to change that survive" (Charles Darwin 1809-1882).

Another key factor contributing to the prevalence of resistant infections is the ease by which they are spread. Health care environments such as hospitals and nursing

homes have been areas of particular concern (Standing Medical Advisory Committee :Sub-group on antimicrobial resistance, 1998) and easily become contaminated with pathogenic microbes and transmit infection from one person to another. Most resistant infections occur in those who are otherwise immuno-compromised, such as the elderly, babies, or those with other underlying pathological conditions. Hospital populations are particularly vulnerable to resistant infections because most are either very young or elderly and have medical conditions. In addition, poor infection control and hygiene practices within hospitals have been blamed for the spread of resistant bacteria (DoH, 2004; DoH 2004a).

1.2.5 The Publics' Influence on Bacterial Resistance: Antibiotic Prescribing and Adherence Behaviours

Clinicians are believed to have contributed to the emergence of bacterial resistance by inappropriately prescribing antibiotics - for example, by prescribing antibiotics when the infection is likely to be viral, and by prescribing sub-therapeutic doses or courses of treatment (Col and O'Connor, 1987; Belongia, 1998; Finch, 1998; Wise et al, 1998). However, blame cannot solely be placed with prescribers. Patients' expectations of their consultation are known to influence the prescribing habits of clinicians (Britten and Ukomunne, 1997) and in particular antibiotics prescribing. (Mangoine-Smith et al, 1999; Braun and Fowles, 2000; Belongia et al, 2002; Pechère, 2001; Vinker et al, 2003). This is discussed further in Chapter 2.

Bacterial resistance is also influenced by sub-optimal adherence to antibiotic regimes and misuse of antibiotics in the home (Davey et al, 2002; Pechère, 2001; Rao, 1998). 'Adherence' can be defined as the extent to which patients follow the instructions

provided (McGavock, 1996) and is the term used throughout this thesis. However, other authors have used alternative terms to describe the degree to which patients follow the doctor's treatment instructions, most commonly, 'compliance' and 'concordance'. 'Non-compliance' has been defined as patient behaviour that does not follow the physician's instructions. The use of the term 'compliance' has been criticised for implying that the patient is a passive recipient of care, but the term is also associated with blame (Kardas, 2002). In more recent years academic interest in reflecting the collaborative nature of the patient-physician interaction has called for the use of the term 'concordance'. 'Concordance' can be defined as a therapeutic alliance between the doctor and patient (Weiss and Britten, 2003).

Adherence to antibiotic therapy requires the patient to attend to two elements.

Firstly, the full course of medication needs to be consumed, and secondly, the timing between doses needs to be optimal (Urquhart, 1992). The therapeutic importance of errors in the dosing regimens vary from minor to serious depending on the infecting organisms, drug used, and severity of the illness. However, dosage timing is especially important with antimicrobial agents because protracted intervals between doses compromise the efficacy of the antibiotic and may facilitate the emergence of resistant bacteria (Urquhart, 1992). The presence of sub-lethal concentrations of drugs caused by sub-optimal adherence to medication regimes may exert selective pressure on the pathogens to mutate without eradicating them. Predictions about the correlation between sub-optimal doses and the emergence of resistant bacteria are currently only theoretical having only been tested in the laboratory settings (Zinner et al, 2003).

Sub-optimal adherence to medication regimes is not restricted to antibiotics. For decades, poor patient adherence to treatment has been recognised as problematic. Hippocrates (460 BC – 370 BC) cautioned, “*keep watch also on the fault of patients which often makes them lie about the taking of things prescribed*” (cited in Hussar, 1987, p971). However, since the late 1940s, adherence to medication regimes have been recognised as therapeutically important (Urquhart, 1992). Poor adherence to medication regimes is believed to occur in 30-50% of all patients regardless of disease, prognosis, or setting (Vermeire et al, 2001). The consequences of poor adherence to any treatment regimes are reduced effectiveness of the treatment, which has potentially negative effects on the well being of the patient and increased treatment costs.

There is an extensive body of literature exploring the reasons for low levels of adherence to medication regimes (Greenberg, 1984), most of which relates to chronic illnesses. Almost 200 different patient and physician related variables believed to influence adherence have been studied, but none have been consistently reported as being predictive of adherence (Vermeire et al, 2001). Patient factors leading to poor adherence may be considered as either unintentional or intentional. Unintentional adherence is due to either poor mental or physical competence, whereas, intentional decisions not to follow medication instructions are the result of psychological and behavioural determinates (McGavock et al, 1996).

Studies which have explored antibiotic adherence are reviewed in Chapter 2 of this thesis, but it is perhaps worth describing here some factors which influence adherence to medication. Lay beliefs about medicines are strong predictors of

adherence. Unnatural products are often view as dangerous – there are concerns about addiction, side effects and dependence. The patient’s own knowledge beliefs and experience are also influential, as is the social context of the patient’s illness e.g. constraints of everyday life, social support and attitudes of the wider community (McGavock et al 1996; Vermeire et al, 2001). Poor communication and inadequate provision of information are frequently cited to influence adherence. However, studies that measure the effectiveness of communication often involved asking patients what they have been told in a consultation, leading to recall bias. Misunderstandings between lay beliefs and professional beliefs may also lead to low adherence; poor communication styles may compound this problem. The more responsive the clinician is to the patient, the higher the levels of adherence are likely to be (McGavock et al, 1996; Rietveld and Koomen, 2002; Sanson-Fisher et al, 1992; Vermieire et al, 2001).

A number of psychological explanatory models have been used in attempts to understand the cognitive processes underpinning patients’ decisions to adhere to medications regimes. These models tend to be concerned with the patients’ beliefs, attitudes and perceptions which underpin illness behaviour and have been developed from a number of different theories including social learning theory, attribution theory and information processing models. Probably the two of the most widely acknowledged models are the Health Belief Model (Rosenstock, 1974) and the Theory of Planned Behaviour (Ajzen and Fishbein, 1980; Ajzen, 1988; Ajzen, 1991). The Health Belief Model was originally reported by Rosenstock (1974), modified by Janz and Becker, (1984) and later extended by Rosenstock during the late 1980s (Marks et al, 2000). However, models have limitations. Social cognition

models are based upon the assumption that people make rational conscious decisions and that these result in rational behaviour. These models have not been found to predict behaviour very accurately partly because habitual behaviour occurs without conscious thought. In addition, these models emphasise individual behaviour rather than the social context. Ingram (1993) has pointed out that most human behaviour occurs in social situations which impose implicit and explicit constraints on the range of responses the individual will adopt (Payne and Walker, 2002).

1.3 Efforts to Control Bacterial Resistance

Internationally and nationally a number of strategies have been implemented to reduce bacterial resistance (WHO, 2000). Strategies include surveillance of resistant infections and antibiotic use, the development of new antibiotics, reduction of antibiotic use in agriculture and horticulture, reducing disease burden through vaccination, and infection control measures (Finch et al, 2004). National policies in the UK have also promoted the more judicious use of antibiotics by clinicians (Standing Medical Advisory Committee, 1998). National and international reports suggest that correct and judicious use of antibiotics can be promoted by educating health care providers and the public (Finch et al, 2004). In the UK, instructional information for patients is provided on the external packaging of dispensed antibiotics and within the packaging in the form of a patient information leaflet. In addition, reducing the inappropriate use of antibiotics by altering patient expectations for them during URTI has been promoted through national initiatives such as the ‘Andybiotic’ campaign’ (DoH, 1999), and the recently launched “Getting Better without Antibiotics” campaign (DoH, 2008). These campaigns focus on colds and influenza to promote the idea that antibiotics are of no value for viral illnesses

and that the overuse of antibiotics may make antibiotics ineffective in the future. These campaigns typically use posters displayed in General Practitioner (GP) surgeries and leaflets as a means to disseminating information. Although information provision may influence knowledge, and some educational interventions across Europe have had some success in improving public knowledge of antibiotics (Finch et al, 2004), the effectiveness of solely providing information as a way of promoting behaviour change has been questioned (Ajzen, 1991; Payne and Walker, 2002). Parson et al's (2004) early evaluation of the effectiveness of the UK national campaign found it to be ineffective, having made no significant change to public understanding, knowledge or expectations for antibiotics. Pechère (2001) argues that no effective strategy to educate and promote the correct use of antibiotics in the community has yet been developed.

1.4 The South East Wales Context

Sociologists suggest that the characteristics of a community are affected by economic, cultural, social, political and historic influences (Giddens, 1993). These influences play a role in shaping the attitudes and behaviour of both individuals and communities. Having adopted an interpretative approach to this study, which argues that knowledge is influenced by context, it is important to describe and understand the social geography of the setting for the thesis.

South Wales represents a geographical area spanning from the Severn estuary, westwards to the Vale of Glamorgan and northwards to the Powys border. It encompasses eight unitary authorities (Merthyr Tydfil, Caerphilly, Blaenau Gwent,

Torfaen, Monmouthshire, Newport, Cardiff, Vale of Glamorgan, and Rhondda Cynon Taff) (Figure 1.1).

Socio-economic inequalities are known to manifest in health differences between advantaged and disadvantaged socio-economic groups (Black, 1980). Typically, these health differences are discussed in terms of morbidity and mortality, access to health care services and service use. However, inequalities may also be evident in the knowledge, beliefs and behaviours of individuals.

Dicks (2000) describes South Wales as possessing a tripartite culture with distinctive areas, the rapidly developing cities on the coastal plains, the deprived communities inhabiting the South Wales valley areas (referred to within this study as post-industrial areas) and relatively affluent rural communities (Dicks, 2000). It was with this in mind that three different geographical and cultural areas were selected for recruitment namely; urban, (Cardiff) post-industrial (Blaenau Gwent and Caerphilly) and rural (Monmouthshire).

Cardiff, the capital city of Wales, is situated on the southernmost coastal plain. The population of 315,100 represents 10.7% of the total population of Wales.

(http://new.wales.gov.uk/location/south_east_wales/?lang=en). Cardiff contains some of the most affluent and deprived electoral wards in Wales. The economic activity of Cardiff encompasses a combination of light industry, tourism, and service industries.

Blaenau Gwent and the unitary authority of Caerphilly are situated within the valleys area of South Wales. Blaenau Gwent covers an area of approximately 9000 hectares with a population of 73,000 and Caerphilly has a population of 170,000. Both unitary authority areas have high levels of social and economic deprivation. The South Wales Valleys have the greatest concentration of deprived electoral wards within Wales without the balance provided by wards that are more prosperous, as in the case of Cardiff (Kenway et al, 2005). These areas are categorised as post-industrial because their history and culture has been shaped by the growth and subsequent demise of the coal mining, textile and steel industries. Rapid industrial expansion during the industrial revolution and then post-war decline has led to the high levels of economic migration both in and out of the area. Economic depression has persisted for many years and some communities within the valleys have high numbers of socially excluded individuals who have little opportunity to access jobs, services, and adequate housing. 73 of the 100 most deprived wards in Wales are within the 'Valleys' areas of South Wales (<http://www.archive.official-documents.co.uk/document/welshoff/wwolmain/e-chp1.htm>).

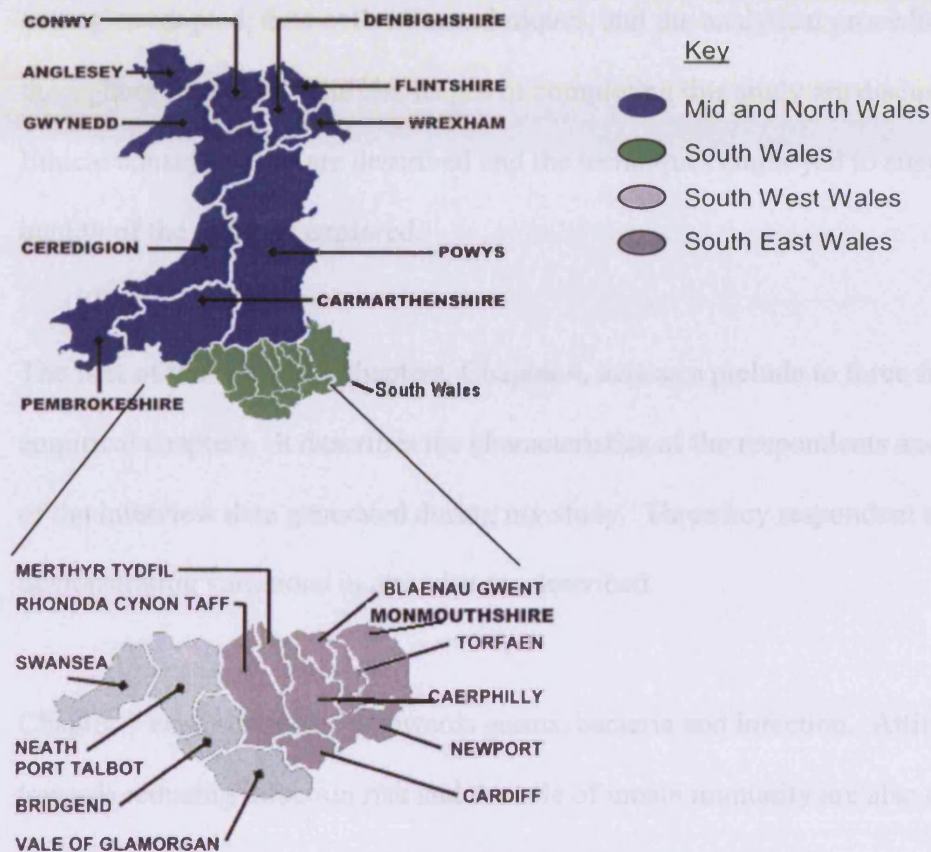
Monmouthshire is primarily a rural unitary authority area covering 88,000 hectares, with a population of 84,879, over half of whom live outside the main towns. The main economic activity in Monmouthshire is farming and agriculture with some light industry and tourism and most electoral wards are classified as having low levels of deprivation (Census, 2001).

The burden of ill health in Wales does not fall equally across all groups.

Monmouthshire has the lowest rates of mortality and morbidity, followed by Cardiff.

Residents of Blaenau Gwent and Caerphilly experience the highest rates of mortality and morbidity among the populations sampled during this study (Census, 2001).

Figure 1.1 Unitary Authorities of Wales and South East Wales



(Adapted from <http://www.data-wales.co.uk/unimap.htm>).

1.5 Structure of the Thesis

This thesis comprises of eight chapters. Following this background and introduction, Chapter 2 more formally reviews literature relevant to the empirical work in this study. The literature review is divided into three sections. Firstly, previous studies exploring lay beliefs relating to RTI are evaluated. Secondly,

literature exploring beliefs about, and use of antibiotics for URTI, is examined, and studies of antibiotic adherence in URTI considered. The final section of the literature review considers studies describing patient attitudes towards bacterial resistance and resistant infections such as MRSA.

Chapter 3 describes the development of the research methods, the sampling strategies adopted, data collection techniques, and the analytical procedures used throughout the study. The challenges of completing this study are discussed. Ethical considerations are described and the techniques employed to support the quality of the findings explored.

The first of the empirical chapters, Chapter 4, acts as a prelude to three further empirical chapters. It describes the characteristics of the respondents and the nature of the interview data generated during my study. Three key respondent subgroups demonstrating variations in attitudes are described.

Chapter 5 explores attitudes towards germs, bacteria and infection. Attitudes towards reducing infection risk and the role of innate immunity are also explored. This chapter asks whether we, the public, are waging an indiscriminate, essentially futile war on microbes? Hostility towards microbes is counterpoised by more positive perceptions about the role of bacteria in maintaining health and their essential role in the wider ecosystem. A lack of confidence in innate immunity is highlighted. This chapter then turns its focus to public attitudes towards the threat of bacterial resistance and resistant infections. Uncertainty about the causes and consequences of bacterial resistance are explored and a lack of individual ownership for the control of resistant infections identified and discussed.

Developing the theme of infections, Chapter 6 reports on respondents' attitudes towards URTI. Although related to attitudes towards infections in general and resistant infections, attitudes towards URTI have been discussed separately to aid clarity. Comparisons are made between attitudes to the concepts of URTI, illness experience and behaviours. Self-care behaviours, advice seeking, and triggers for consultation with a health care professional are described and analysed.

Chapter 7 focuses on attitudes towards antibiotics. This chapter describes lay beliefs about how antibiotics work and their disadvantages. Self-reported patterns of adherence to antibiotic therapy are discussed, the reasons for modifying treatment regimes identified, and lay logic underpinning adherence behaviours debated.

Chapter 7 concludes by presenting a typology of antibiotic user behaviours in the community.

In the final chapter of this thesis, the main theoretically interesting themes from previous empirical chapters are synthesised and patterns and connections between conceptual themes highlighted. The multidimensional nature of lay meanings attached to the term 'resistance' are described. Respondents' uncertainty and a lack of ownership for bacterial resistance are explored drawing on social psychology theories of diffusion of responsibility and bystander apathy. Health care professional and public beliefs are compared and contrasted. The potential of social marketing is explored and the role of the media in disseminating information about bacterial resistance is discussed. Debates consider the influence of prototypes of infection and the panacea of hygiene on lay attitudes towards resistant infection. The meaning

of medicines beyond their therapeutic ability is explored and the influence of medicalisation on public attitudes debated. The typology of adherence behaviours presented in Chapter 7 is used as a basis for discussing potential ways in which adherence to antibiotic therapy may be improved. Having explored the key analytical themes from the data, some of the issues relating to the methodology are revisited, along with an appraisal of the strengths and limitations of the study. Finally, the practice and policy implications of the findings are discussed.

Chapter 2: Literature Review

2.0 Introduction

The purpose of this literature review is to provide the academic context for this study. This thesis aims to explore three substantive areas, namely public attitudes towards upper respiratory tract infections, antibiotics, and bacterial resistance.

Given the multiplicity of empirical literature within these three areas, this literature review cannot comprehensively cover all the empirical evidence. Rather, the aim of this review is to provide a selective account of studies most pertinent to these topics within the context of primary health care in the UK.

Table 2.1 Electronic Databases Searched

Data Base	Search Dates
Ovid MEDLINE R	1966-June 2008
Allied and Complementary Medicine (AMED)	1985-June 2008
Sociological Abstracts	1979-June 2008
Applied Social Science Index and Abstracts (ASSIA)	1987-June 2008
British Nursing Index (BNI)	1985-June 2008
Cumulative Index to Nursing and Allied Health Literature (CINAHL)	1982-June 2008
EMBASE	1980-June 2008
International Bibliography of Social Sciences (IBSS)	1957-June 2008

I searched eight electronic bibliographic databases (see Table 2.1) to chart the academic interest in these topics. I chose to search these databases from their

earliest possible date as I considered historical data might be valuable in highlighting changes or stability in beliefs.

Three searches were conducted. The first search (referred to in Table 2.2 as search strategy 1) combined the search terms knowledge, attitudes, perception/s, belief/s, awareness, understanding, with the terms bacterial resistance, antibiotics resistance, drug resistance, MRSA, hospital acquired infection/s, superbugs, public, lay, consumer and patient. A separate search (search strategy 2) was conducted combining the search terms respiratory tract infection/s, cold/s, flu, otitis media, chest infection, sore throat, tonsillitis, public, lay, consumer, patient, knowledge, attitudes, perception/s, belief/s, awareness, understanding, illness behaviour, remedies, cures, treatment. Finally, search strategy 3 combined the terms, antibiotic/s, use, attitude/s, knowledge, beliefs, adherence, compliance and concordance with the terms upper respiratory tract infection/s, cold/s, flu, otitis media, chest infection, sore throat, and tonsillitis. All searches were limited to papers written in English. Table 2.2 summarises the number of relevant papers found following each search.

Table 2.2 The Number of Relevant Papers Identified

Search strategy	Number of relevant papers identified
1	7
2	45
3	47

Most of the relevant articles identified by these searches were empirical, quantitative studies. The identification of qualitative research using electronic data bases is known to be potentially inefficient due to the 'imaginative' use of titles in qualitative papers, variable quality of abstracts, and the indexing practices used to construct article databases (Shaw et al, 2004). In an attempt to find papers that may not have been retrieved during electronic searching, I scrutinised the bibliographies of identified individual articles and a further 7 articles were identified and retrieved in this way. In addition, colleagues, usually experts in the field, provided advice on key authors and papers in the field.

This chapter uses a thematic approach to reviewing the literature and is organised into four main sections. The first section critiques studies exploring lay beliefs about the causes of respiratory tract infection, with a focus on studies of URTI. Within this section, sociological and anthropological studies are counterpoised with biomedically oriented research. Reflecting chronological developments of research in the field, the review moves to the second section which considers studies exploring illness behaviour during URTI. The third section summaries relevant research which explores attitudes towards antibiotics and how antibiotics are used in the home – particularly concentrating on adherence behaviours. The fourth and final section summarises the research in the field of lay beliefs of bacterial resistance and resistant infections. The chapter concludes with a summary and identifies gaps in research literature.

2.1 Lay Beliefs about the Causes of URTI

Academic interest in lay beliefs about infectious illness in developed countries took off during the 1960s. Early sociological studies such as those by Mabry (1964) and Helman (1978) describe lay explanatory models of respiratory tract and other infectious illness. Mabry (1964) used a mixed methods approach (a combination of quantitative and qualitative techniques) to explore lay beliefs related to five 'common symptoms' of illnesses including 'heavy chest colds' in both rural and urban North American populations. Mabry's (1964) respondents believed that the major cause of heavy chest colds was exposure to cold and wet weather and that exposure was often considered to reflect carelessness on the part of the sufferer. Whilst Mabry's research suggested a lay belief in an element of personal responsibility to avoid making oneself vulnerable to common infections, Mabry also reported that some respondents possessed fatalistic attitudes towards their risk of infection, as illustrated by '*frequent*' comments from respondents, such as '*I don't know-it just happened I guess*' (p378).

Beliefs about exposure to cold, wet and windy weather causing illness are part of traditional beliefs systems that stress the importance of homeostasis and equilibrium. Traditional beliefs hold that good health results from an internal equilibrium of the bodily functions. Conversely, illness occurs when the body becomes out of balance due to a variety of factors such as excessive work, high levels of activity or exercise (lack of rest), too little exercise, unhappiness, stress, poor diet, or poor environmental conditions (Blaxter, 2004). Beliefs about the effect of weather and cold or damp environmental conditions, often referred to as the 'hot-

cold' classifications of illness, attributes illness to an imbalance in the self-regulating systems of the body due to extremes of temperature (Baer et al, 1999).

Another concern about the disruption of equilibrium expressed by Mabry's sample was the belief that stress, causing an imbalance in the body, increased an individual's risk of contracting a 'heavy chest cold'. The lay beliefs described by Mabry's sample were not, however, restricted to traditional belief systems. To a lesser extent, respondents in Mabry's study described beliefs about germs and viruses causing heavy chest colds reflecting a biomedical model of infection. The biomedical model, which has been the dominant model of medicine throughout the 20th century (Sharf and Street, 1997), sees the body functioning in a mechanical way, and illness as the result of changes in physiological process due to injury, chemical imbalances, genetic defects, and microbes such as bacteria and viruses. Although the traditional model and the biomedical model are often described as two discrete models of health and illness, traditional beliefs emphasising equilibrium are to some extent consistent with biomedicine: biological homeostasis is vital for the effective functioning of many body systems, and stress has been shown to reduce immune system effectiveness.

Mabry (1964) reported that notably, men and people from rural areas were less likely to cite microbes as a potential cause of infection than urban or female respondents. The differences between rural and urban populations in Mabry's study may have been confounded by variations in the socio-economical status between the two samples: rural respondents resided within deprived areas and the urban respondents

within areas of relative affluence. It is likely that differences in educational attainment also existed between rural and urban respondents, but detailed demographic data relating to education were not provided in Mabry's paper. Furthermore, the interview schedule used a combination of open-ended questions, such as, "*Now how about these heavy colds. Why do you think it happened to you?*" (Mabry, 1964, p 375) and closed questions. The technique used to analyse detailed qualitative data generated by open-ended questions is not described.

More than a decade after Mabry's findings were published, Helman (1978) described 'folk beliefs' of infection, consistent with those described by Mabry (1964), comprising of ideas consistent with both the hot-cold classification of illness and a biomedical model. Helman's study is one of the only detailed explorations of lay beliefs about infectious illness carried out in the UK and was particularly focused on RTIs, such as influenza, coryza (common cold), bronchitis, and sinusitis, but also included urinary and gastrointestinal tract infection. Helman classified his respondents' definitions of infectious illness as either 'colds and chills' or 'fever'.

'Colds and chills' were described as conditions where the sufferer physically felt cold, such is often experienced with the common cold. Beliefs about hot-cold imbalances were predominant within lay theories of causation relating to colds and chills. Exposure to cold, wet, and windy environmental conditions was believed to increase individuals' susceptibility to illness. Consistent with Mabry's findings, illness in these circumstances was perceived to be the fault of the sufferer. Going outside without wearing a coat or going outside with wet hair are two examples of

the kind of irresponsible behaviour which were unlikely to be met with a sympathetic response. Helman's respondents described 'fevers' as conditions that result in the body feeling or becoming hot and caused by germs. Germs were 'enemies' of the body, external to the sufferer, beyond individual control, and, as such, a sufferer was blameless for the illness experienced.

Helman's work does have a number of limitations. The study is almost thirty years old and may not reflect contemporary lay beliefs. The paper does not meet the current conventions of a qualitative paper, in that illustrative quotations are scarce so there is little evidence on which the reader can judge if the author's conclusions truly reflect the data. In addition, sampling strategy is poorly described and demographic details of participants are scarce, for example, age and gender are not stated. Finally, Helman himself acknowledges the risk of researcher bias within his study as he admits "*it is based on my own experience, as well as on interviews*" (Helman 1978, p109).

Although Helman's work is widely known and cited, the interest it generated in understanding lay beliefs of infection was not sustained. For more than a decade following Helman's work there was limited research in this area. Then, during the 1990s, interest in lay beliefs about respiratory tract infections was revived probably promoted by a growing concern about antibiotic use and consultation rates for minor self-limiting infections. During late 1990 and early 2000, a number of anthropological and sociological studies exploring a variety of URTIs were conducted, such as, Klonoff and Landrine (1994), Johnson et al (1994), Baer et al

(1999), Weller and Baer, (2001), Jónsson and Haraldsson (2002), and Lee et al (2003). These studies generally reflect the synchronous existence of traditional beliefs about illness (in particular beliefs consistent with the hot-cold classification of illness) and biomedical principles of infection in the same way as earlier qualitative studies had done. Klonoff and Landrine (1994), however, report an additional dimension of traditional beliefs previously unreported in studies of URTI: beliefs about spiritual and mystical causes of infection

Before the advent of modern medicine, spiritual and mystical beliefs about illness were common. Gods and spirits were believed to cause and cure illness in a number of ancient civilisations as well as during the Middle Ages and the Renaissance. These beliefs are known to persist in modern day amongst some ethnic communities (Baer et al, 1999). It is possible that cultural diversity of the North America population sampled by Klonoff and Landrine influenced their findings. Other studies sampling populations within developing nations have reported beliefs about supernatural and spiritual causes of illness residing alongside beliefs about exposure to extremes of temperature, severe weather and microbial causes (Kauchali et al, 2004). While Klonoff and Landrine (1994) categorised their 100 respondents as either 'white' ($n=42$) or 'black.' ($n=58$), details of the exact cultural and ethnic characteristics are not reported.

The popularity of sociological and anthropological approaches to studying lay beliefs of URTI declined during the late 1990s when positivistic approaches to studying the topic became increasingly popular and researchers focused on

describing lay beliefs about microbial causes of RTI. Surveys conducted during this time, with predominantly female North American samples; report the lay public were uncertain of the microbial causes of URTIs (Collett et al, 1999, Braun et al, 2000: Belongia et al, 2002; Lee et al, 2003; Friedman et al, 2003). Taken together, these studies found a wide variation (44-93%) in the proportion of respondents who believed viruses caused colds, but fewer of the respondents in these studies believed that bacteria cause URTI (Collett et al, 1999, Braun et al, 2000: Belongia et al, 2002; Lee et al, 2003; Freidman et al, 2003). Variations in type of sample and data collection methods may contribute to the wide variations found in these studies. For example, Collett et al, (1999) used a convenience sample ($n=100$) split across two rural areas and conducted structured interviews. Braun et al (2000) and Belongia et al (2002) conducted a random- dial telephone survey. Friedman et al, (2003) conducted a postal survey of parents of children registered with day care centres ($n=398$).

Traditional beliefs about the aetiology of URTI being caused by hot and cold extremes have also been reported by recent quantitative surveys (Mainous et al, 1997; Collett et al, 1999; Vingilis, 1998; 1999a, 1999b; Braun and Flowles, 2000; Braun et al, 2000; Freidman et al, 2003; Cho et al, 2004; Daly et al, 1997), although to a much lesser extent than the earlier qualitative work had done. Traditional beliefs are undoubtedly more likely to be expressed in qualitative research as respondents are encouraged to freely express all their beliefs.

Despite reporting that a considerable proportion of the public were aware of microbial causes of URTI, some recent studies have concluded that the public hold 'misconceptions' about the causes of URTIs, (Reis and Wrestle, 1994; Maionous et al, 1997; Collett et al, 1999; Vingilis, 1998; 1999a; Braun and Flowles, 2000; Braun et al, 2000; Freidman, et al 2003; Cho et al, 2004). The academic assumption that lay beliefs are misconceptions appears to be based not on the public's poor knowledge of microbial aetiology per se, but in the multi-dimensional character of lay explanatory models. In other words, the public recognises microbial causes but considers there in relation to a range of other factors. It is the multi-dimensional nature of lay models verses a mono-dimensional biomedical model that appears to be the key incongruence between lay and biomedical models of URTI.

A comparison of early anthropological, sociological and recent biomedical oriented enquiry suggests that although lay beliefs about infection are comprised of a synergy of traditional and biomedical beliefs, the predominance of traditional beliefs has declined. The timing of this shift in emphasis corresponds with changes in the methods, approaches and the aims of studies. Recent quantitative surveys have inherent limitations in that they generate limited fixed response to the lines of questioning which are predominantly biomedically orientated. Restricting responses into predetermined categories may not enable respondents to report the diversity or complexity of their beliefs or to indicate which beliefs were most pertinent to them. Consequently, it is impossible to know whether the changes are real or an artefact of data collection methods.

2.2 Illness Behaviour Associated with URTIs

Mechanic (1962) has used the term ‘illness behaviour’ to describe the way individuals respond to symptoms. The following section summarises research evidence describing illness behaviour for URTIs. It comprises of two sections: the first deals with how individuals’ self-care (this is then split into two further sub-sections: self-caring with non-pharmaceutical remedies and self-caring with pharmaceutical remedies), and the second section reviews studies which have explored the public’s use of primary care services when suffering an URTI.

2.2.1 Self care

Although previous studies have recognised that the lay populace has an extensive repertoire of self-care tactics when ill (Levine and Geol, 1998; Vingilis et al, 1999b), some studies have acknowledged that the public also recognise that URTIs do not require treatment because colds will resolve on their own (Vingilis, 1999b; Braun et al, 2000). Self-care is the action taken by individuals during minor and acute ailments to relieve symptoms and expedite a return to good health. For the purpose of this review, self-care includes the consumption of non- pharmaceutical and pharmaceutical remedies without consultation with a clinician. It also includes care extended to children and family members (DoH, 2005).

Self care with non-pharmaceutical remedies:

Non-pharmaceutical methods of self-care for URTIs includes reducing activity levels, keeping warm, changes in diet and fluid intake, the use of home remedies

(herbal remedies or remedies made in the home from common food stuffs) and dietary supplements. For generations, rest has been advocated as a suitable response to URTI and a way of promoting recovery (Mabry, 1964; Mellor, 1973). In Mellor's words, "*It is a mistake to take things to suppress a cold, which is nature's way of forcing you to rest*" (Mellor, 1973, p83). Of course rest can take different forms, for example some might describe it as time spent in bed (Baer et al 1999, Braun et al 2000, Vingilis, 1999b) and others as time away from normal employment or educational commitments (Deschepper et al, 2002). Older adults (average age 59 years) have been found to be more likely to 'stay at home and rest' than younger adults, perhaps reflecting variations in the acceptability of rest, differences in daily responsibilities, or differences in belief of the value of rest amongst adults of different ages (Thumin and Wims, 1975).

For more than two decades, taking hot food, keeping warm, and increasing oral fluid intake have been reported as ways of promoting recovery during URTI and other infectious illnesses (Helman, 1978; Deschepper et al, 2002). Furthermore, actions such as resting and taking additional fluids are supported by a recent national campaign aimed at reducing expectations for antibiotics during URTI (DoH, 2008) (see caption at the bottom of Appendix 15).

Helman (1978) describes increasing oral intake of fluids as being aimed at restoring the wet/dry balance of the body and, therefore, consistent with traditional beliefs. Drinking extra fluids is also described as having a role in the removal of germs from the body through the kidneys and urinary tract (Helman, 1978). Helman also

described diet as having a role to play in recovery from infection. Helman's work identified a lay belief in destroying germs through starving them and famously popularised the folk idiom "*feed a cold, starve a fever*" (Helman 1978, p121). There is no biomedical evidence that germs can be destroyed by starvation, but reduced appetite may nevertheless be a natural physiological response to an infection rather than a conscious decision by the individual to starve germs.

There has been limited research on the use of home (folk) remedies during URTI (Pound et al, 2005). Previous studies have shown the use of traditional remedies such as goose fat, Friar's Balsam (a herbal remedy) (Helman, 1978), peppermint, pine needles, honey tea, castor oil and cod liver oil, (Plotkins and Post, 1999). Ways of relieving nasal decongestion include steam inhalation and humidification (Pachter et al 1998; Segall, 1990; Johnson and Helman, 2004), eucalyptus and camphor ointments (such as, Vicks Vapour Rub) (Pachter et al, 1998; Baer et al, 1999), and elevating the head of the bed (Pachter et al, 1998). Honey and lemon drinks are also used for their perceived ability to relieve symptoms (Segall, 1990; Johnson and Helman, 2004) and chicken soup to aid general recovery (Pachter et al, 1998). Folk remedies such as these are reported to be the first response of minor illness in North American inner city samples (Plotkins and Post, 1999).

Studies both in the USA and UK have identified inter-generational differences in the use of home remedies. In the USA, Stroller et al (1993) report that, among older respondents, home remedies were used for many complaints including sore throat, fever, stomach-ache, joint pain and cough. Similarly, Blaxter and Paterson's (1982)

two generational study of Scottish women found that the older generation (those born in the 1920's) were more likely to report the use of home remedies than their daughters. The extent to which home remedies are used in the 21st century is under-researched, perhaps because they are not considered important to health care providers (Pound et al, 2005).

Dietary supplements, such as increased consumption of fruit juice or vitamins (particularly vitamin C) have been reported as beneficial during URTI in a number of different cultural settings (Baer et al 1999; Helman, 1978; Solberg et al, 2000). The use of homeopathic remedies in the UK for colds is not uncommon (Esmile and Bond, 2003) and the use of Echinacea, in particular, is widely reported (Caruso and Gwaltney, 2005).

Self-care with pharmaceutical products;

Over the counter medicines (OTCMs) (for the purpose of this review OTCMs include medicines that can be purchased under the guidance of a pharmacist, as well as medicines which can be purchased from general retail outlets) are commonly used during URTI (Verbrugge and Ascione, 1987; Braun et al, 2000; Vingilis et al 1999a; Vingilis et al 1999b). For example, in one telephone survey ($n=620$), 52% of respondents reported that they self-medicated with OTCMs during URTI (Vingilis, 1999b). Although antibiotics may also be considered pharmaceutical remedies, these prescription only medicines are discussed in section 2.3. OTCMs are an important part of self-care because they are easily available in that they do not require a consultation with a clinician, although their use may follow advice from a

pharmacist, a clinician (Esmile and Bond, 2003) or as the result of lay advice (Verbrugge and, Ascione, 1983).

The most commonly used OTCMs are reported to be analgesics and anti-pyretics, decongestants, cough suppressants, expectorants, and lozenges (Thumin and Wims, 1975; Helman, 1978; Vingilis et al, 1999a; Vingilis et al 1999b, Esmile and Bond, 2003). Very often people will use a number of OTCMs simultaneously to treat different symptoms (combinations of antipyretics, decongestants, and cough suppressants) (Helman, 1978). Sufferers' efforts to relive multiple symptoms simultaneously are further supported by recent studies indicating the use of multiple action medications (Vingilis et al, 1999a) which are being marketed increasingly by the pharmaceutical industry.

Despite evidence of widespread medicine use, the lay public appear to remain unsure whether the benefits of medicines outweigh their disadvantages (Stimson and Web, 1975; Blaxter and Paterson, 1982; Calnan, 1987; Fallsberg, 1991; Britten, 1994). Wazaify et al (2005) reports that half of respondents claimed to resist the use of OTCMs for what they perceived to be minor illness. Reservations about OTCMs include perceptions that their effectiveness is reduced with continued use, concerns about dependency, interference with body's normal healing process, and side effects (Wazaify et al, 2005). Contradictions in reports of the public's level of confidence in medicines could be explained by varying methods of data collection used by different researchers. Van der Geest and Whyte (2002) argue that during surveys

respondents 'pay lip service' to the success of modern medicine and tend to over report beliefs about the efficacy of medicines.

2.2.2 The Use of Primary Care Services for URTI

Studies using self-reported data suggest that members of the public rarely consult a clinician for URTI (Helman, 1978; Vingilis et al, 1999a, Vingilis et al 1999b; Braun and Fowles, 1999; Braun et al, 2000). This supports the idea that an 'illness iceberg' exists where the majority of illness is dealt with in the community and not by clinicians (Kleinman, 1980). However, data from primary care indicates that URTIs remain a common reason for consulting a clinician (McCormick et al, 1995).

There are a number of reasons why patients might consult a clinician during URTI: the need to rule out complications, to obtain advice or reassurance, hope of receiving some type of medication (in particular antibiotics), the illnesses lasting longer than expected, a belief that the illness would last longer if medical help were not sought, and specific symptoms such as persistent severe cough, and green phlegm or nasal discharge, both of which are associated with patients' perceived need for antibiotics (Branthwaite and Pechère, 1996; Mainous et al, 1997; Butler et al, 1998; Hong et al 1999; McKee et al, 1999; Vingilis et al, 1999b; Solberg et al; 2000; Rollnick et al, 2001; Stivers et al, 2003; Kuzujanakis et al, 2003; DeElla and Rohren, 2001). These concerns tend to be heightened in children, but for children concerns about fever and abnormal behaviour also trigger consultation during URTI (Kai, 1996; Stoddart et al, 2006). A desire for antibiotics and an expectation of receiving them is widely reported to motivate consultation with a clinician for URTI (Brett and Mathieu,

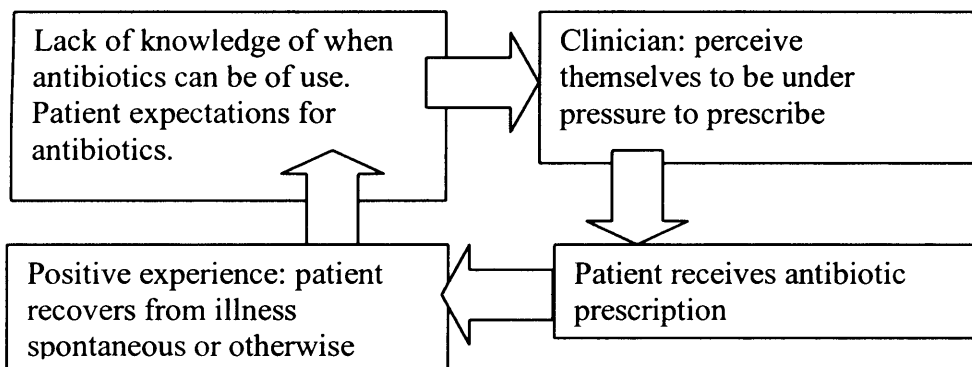
1982; Mayefsky, 1991; Branthwaite and Pechère, 1996; Vingilis et al, 1999a; Butler et al, 1998a; Braun and Fowles, 2000; Braun et al, 2000; Solberg et al, 2000; van Duijn, 2006). However, Welshen et al, (2004) reports that in patients expecting antibiotics the receipt of information and reassurance was perceived as equally important as receiving antibiotics in terms of overall patient satisfaction.

Studies attempting to explain the reasons for patients' expectation for antibiotics suggest a lack of knowledge of when antibiotics are beneficial, and positive past experience of antibiotic use in similar situations: those who received antibiotics for URTI and believe them to be effective are more likely to indicate plans to use them in subsequent illness. Patient expectations for antibiotics may, therefore, be partly associated with the prescribing habits of clinicians (Barden et al, 1998). Primary care research in the Netherlands has reported that diagnostic labelling is a relevant factor in GPs antibiotic prescribing decisions (van Duijn et al, 2007b). Clinicians' who labelled respiratory tract symptoms as infection, are reported to be more likely to prescribe antibiotics.

Other studies exploring the clinicians' perspectives suggest that patient expectation for antibiotics positively influences prescribing decisions (Palmer and Bauchner, 1997; Scott et al, 2001). There is a medicalising effect of antibiotic prescribing, and the cycle of events surrounding prescribing decisions described by Little et al (1997) is summarised in Figure 2.1.

Although studies have shown that clinicians experience patient pressure to prescribe, European and UK studies also indicate that clinicians overestimate patient desire for an antibiotic (Altiner et al, 2004; Butler et al, 1998; Watson et al, 1999; Hong et al, 1999; McKee et al, 1999; Wilson et al, 1999; Solberg et al 2000). A study in the Netherlands reported that patients suffering from symptoms consistent with viral URTI were more likely to be prescribed antibiotics if they displayed signs of an inflammatory response, such as pyrexia, were perceived as ‘more’ severely ill by the clinician and were more likely to receive antibiotics when the clinician assumed the patient expected antibiotics for their symptoms (Akkerman et al, 2005a; Akkerman et al, 2005b).

Figure 2.1 The interaction between patient expectations for antibiotics and prescribing decisions



Butler et al (1998b) (one of the few relevant qualitative studies conducted in Wales) explored the prescribing behaviour of clinicians and the expectations of patients presenting with sore throats. Data from patient interviews ($n=17$) indicated that two thirds consulted for reassurance, explanation or advice, a third wanted antibiotics (particularly in cases of green phlegm), and most would be satisfied with a non-

antibiotic outcome. Mothers were, however, less likely to be satisfied with a non-antibiotic solution for their children than for themselves.

A study of a general population using a random digit-dial telephone survey ($n=620$) and logistic regression reported two significant predictors of consultation with a clinician for colds and flu: attitude and self-rated health (Vingilis et al, 1999b). The odds of reported clinician consultation were almost four times greater for respondents who generally felt it necessary to consult for colds compared to those who generally did not feel it necessary. Not surprisingly, self-rated health was inversely related to consultation. Perhaps of more interest was the finding that scientific knowledge about colds and flu was not a significant predictor of consultation, a finding which Vingilis et al (1999b) claim is consistent with other studies examining the relationship between knowledge, attitude and practices.

Studies which report factors that trigger consultation with clinicians do, however, possess some weaknesses. Most studies exploring decision making regarding consultation have used patient populations, that is, patients have been recruited from primary care practices as they consult. One of the potential disadvantages of this approach lies in the fact that patients' behaviour may be in response to URTIs that are perceived as unusual or severe in some way. As previously indicated, population surveys have reported that most would not consult for a cold.

2.3. Lay Attitudes towards Antibiotics and their use During URTI

2.3.1 Mixed Views of Antibiotics

Positive perceptions of antibiotics have existed for generations. Literature tracing their historical development identifies antibiotics as revered medicines (Le Fauna, 1999). Over time, this positive image of antibiotics appears to have changed very little. A European study of public beliefs identified antibiotics as ‘savours’ and ‘dependable’ (Pechère, 2001), and a recent Scottish survey ($n=351$) reported that most respondents (91%) were ‘happy’ to take antibiotics (Emslie and Bond, 2003). Lay views about antibiotics are not, however, entirely positive and include perceptions that antibiotics are ‘mysterious’, ‘aggressive’ and ‘frightening’ (Pechère, 2001). Specific public concerns are levelled at the potential side effects including allergic reaction, diarrhoea, dizziness, headaches, and rashes (Branthwaite and Pechère, 1996; Collett et al, 1999; Pechère, 2001; Eng et al, 2003). Studies have reported that patients with concerns about adverse reactions are less likely to be prescribed antibiotics (van Duijn et al, 2007a).

The public’s mixed view of antibiotics could reflect limited knowledge of when they can be of use and how they work. Analysis of quantitative data from a large random sample from England, Wales and Scotland ($n=10981$) concluded that the public lack knowledge of the effective and harmful effects of antibiotics (McNulty et al, 2007). But previous studies have not actually identified lay beliefs about the mechanisms contributing to the occurrence of side effects, although there are suggestions that the public are aware of the potential negative effects on commensal flora. For example, Eng et al (2003), report beliefs that antibiotics kill ‘good’ bacteria and are generally

‘unhealthy.’ Other studies have identified that the public believe antibiotics to have a negative effect on the body’s immune system (Branthwaite and Pechère, 1996; Pechère, 2001; Barden et al, 1998; Collett et al, 1999). Pechère et al (2001) reported that 59% of people sampled during a random telephone survey across eight countries (UK, France, Belgium, Italy, Spain, Turkey, Thailand, Morocco and Colombia) believed that antibiotics can undermine immunity, in the sense that antibiotics alter the response of the body in some way. Similarly, the negative effect of antibiotics on immunity are described by parents of children with otitis media (Jónsson and Haraldsson, 2002), that is, parents believe that repeated use of antibiotics can lead to antibiotics becoming ineffective because of changes in the body (Barden et al, 1998; Collett et al, 1999).

Interestingly, parents appear to have greater concerns about giving antibiotics to children than they do taking antibiotics themselves or giving them to other adults (Branthwaite and Pechère, 1997; Palmer and Bauchner, 1997). Palmer and Bauchner (1997) reported that 92% of parents were worried that children were receiving too many antibiotics. Despite these reservations, parents in an Icelandic sample were still willing to administer antibiotics to children on emotional grounds because the child was 'suffering' rather than concerns about the infection itself (Jónsson and Haraldsson, 2002). This may suggest that antibiotic use may be influenced by factors unrelated to beliefs about the effectiveness of antibiotics.

The ambiguous nature of lay attitudes towards antibiotics is further supported by recent qualitative work. Deschepper et al (2002) categorised attitudes of Dutch and Flemish respondents ($n=69$) to antibiotic use for URTI in four ways; ‘being safe

rather than sorry', 'antibiotics if there is no alternative', 'rather not but accepting' and 'refusing.' Attitudes categorised as 'being safe rather than sorry' represented participants who felt that antibiotics were needed to treat illness perceived as potentially serious. The category 'antibiotics if there is no alternative' represented those with a strong aversion to antibiotics but those who felt that antibiotic use could be justified in the right circumstances. The 'rather not, but accepting' participants were sceptical about antibiotics and left decisions about their use to the doctor. Participants categorised as 'refusing' were those who were sceptical about antibiotics and took steps to restrict their personal use of them. Although these categories suggest a mixture of positive and negative views, they tend to emphasise reservations about antibiotics.

It is somewhat difficult to generalise public attitudes towards antibiotics as lay views vary amongst samples from different countries (Branthwaite and Pechère 1996), as does antibiotic use (Cars et al, 2007). Branthwaite and Pechère (1996) surveyed ($n=3610$) informants from five European Union countries (UK, Belgium, France, Italy, Spain) and Turkey. In Belgium interviewees described antibiotics as frightening, mysterious and aggressive, in Italy antibiotics were considered not very dependable, and in France and the UK attitudes towards antibiotics indicated an element of respect. Later work by Pechère (2001) reported that public concern about antibiotics was relatively moderate in the UK (33%) compared to other European countries.

2.3.2 Perceptions of Antibiotic Efficacy During URTI

It is important for the scientific community to have a good understanding of public beliefs about when antibiotics can aid recovery from infection as these beliefs are likely to affect expectations for antibiotics. Some members of the public believe that they know when antibiotics are needed for themselves and their children (Belongia et al, 2002). Cals et al (2007) reported that 38% ($n=935$) respondents from a cross-sectional internet panel in the Netherlands agreed with a statement, 'I usually know when I need antibiotics'. Despite this, studies typically describe public knowledge of antibiotics as poor and that the public hold a number of misconceptions about the type of illness which antibiotics can effectively treat (Pechère 2001; Belongia et al, 2002; Kuzujanakis et al, 2003).

Studies exploring lay beliefs about the efficacy of antibiotics have broadly adopted two approaches. Respondents have been either questioned about the type of microbes antibiotics are believed to be effective against (typically limiting responses to bacteria, viruses, or both bacteria and viruses) or studies have explored lay ideas about the effectiveness of antibiotics for specific URTIs, for example, questions such as 'are antibiotics useful for a cold?'

Empirical evidence suggest that, despite the widespread use and popularity of antibiotics, public uncertainty about the efficacy of antibiotics in illnesses caused by different microbes has existed for the past 30 years and possibly longer (Pechère et al, 2007). A recent UK survey (the largest face to face questionnaire about public knowledge of and attitudes to antibiotics in Britain, ($n=7120$)) confirms

misconceptions and uncertainties about which type of microbe antibiotics can effectively treat (McNulty et al, 2007). For example, this study found that 80% of the respondents believed that antibiotics can treat bacterial infections, but 54% incorrectly believed that antibiotics can kill viruses. These findings are similar to a recent Internet based questionnaire in the Netherlands where 84% believed that antibiotics can effectively treat bacterial infections and 48% of respondents believed that antibiotics are effective in treating viral infection (Cals et al, 2007). The misconceptions that antibiotics are effective in treating viral illness are widely demonstrated in countries both within and outside Europe (Branthwaite and Pechère, 1996; Chan, 1996; Butler et al, 1998; Watson et al, 1999; Hong et al, 1999; McKee et al, 1999; Wilson et al, 1999; Solberg et al, 2000; Scott et al, 2001; Haltiwanger et al, 2001; Belongia et al, 2002; Friedman et al, 2003; Mangoine-Smith et al, 2004), and suggest that the public are unaware of the differences between different types of microbe.

One weakness of surveys exploring lay beliefs by associating specific microbes with antibiotic use lies in the assumption that respondents possess a basic understanding of the scientific concepts of viruses, bacteria and antibiotics. Questions such as, 'are antibiotics effective against viruses?' assume the respondent not only understands the terms antibiotic and viruses, but also that their understanding is consistent with the researcher's definitions. The early work of Helman (1978) draws us to question such assumptions. Helman (1978) found that the public did indeed believe that antibiotics kill germs, but the term 'germ' was not used in the strict biomedical sense. As with other areas of medicine, lay meaning attached to medical

terminology is known to differ from meaning attached by clinicians (Spiro and Heidrick, 1983; Gibbs et al, 1987). To interpret lay attitudes to antibiotics, bacteria and viruses, one first needs to unravel the lay meanings attached to the concepts being explored.

A large multinational survey ($n=5379$) indicated that most respondents (87%) thought that antibiotics reduced recovery time for RTI (Pechère, 2001). More patients believe that antibiotics are necessary for cough and sore throat compared to doctors (van Duijn et al, 2002). Studies focussing of specific URTI have described antibiotics as being perceived, by patients, as either, needed, useful or prescribed for a number of different URTI including, common cold, sore throats ('strep throat'), cough, influenza, ear ache (ear infections, otitis media), flu, bronchitis and pneumonia (Palmer and Bauchner 1997; Pechère, 2001; Collett et al, 1999; Belongia et al, 2002; Emslie and Bond, 2003). UK studies similarly report beliefs that antibiotics can be effective treatment for various types of URTI (McNulty et al, 2007a; Esmile and Bond, 2003). Certain types of URTI and specific symptoms are reported as more likely to be perceived as needing antibiotics than others. Pechère (2001) reported that 37% of respondents would expect antibiotics to be prescribed for a common cold, compared to 72% for a sore throat and 64% for flu. The need for antibiotics is not only associated with beliefs about microbes and specific URTIs, but also with perceptions of the severity of infection. Antibiotics may not be viewed as needed for a 'slight' cold but may be perceived as needed for a 'heavy' cold (Esmile and Bond, 2003) and with specific symptoms such as severe cough, green or thick catarrh (Pechère, 2001).

2.3.3 Adherence to Antibiotic Regimes: The extent of the problem

Although self-reports indicate that most patients adhere to antibiotic treatment regimes, sub-optimal adherence (also known as non-adherence) remains a concern both nationally and internationally. In a 'global' sample (which did not include the UK) 10-47% of respondents self-reported not finishing the full course of antibiotic therapy (Pechère, 2001). However, large variation between countries is known to exist, and data from an earlier study indicate self-reported adherence during URTI as highest in UK (91%) and lowest in Spain (58%) (Branthwaite and Pechère, 1996). Differences in access to antibiotics, economics and variation in health service provision within different countries are likely to influence reports of the levels of antibiotic adherence. A multinational systematic review reported mean adherence with antibiotic therapy as 62%, although individual study estimates of adherence ranged from 9.5% to 100% (Kardas et al, 2007). Adherence rates are also reported to vary depending on the illness being treated: being highest during RTI (72%) and lowest in diarrhoeal infections (40%) (Kardas et al, 2007). Recent UK studies indicate that 89% of patients reported completing the full course of antibiotics (McNulty et al, 2007b).

Accurately measuring adherence presents a number of challenges to the researcher as does reviewing literature quantifying antibiotic adherence rates. Adherence is not dichotomous. Few studies state operational definitions of adherence and operational definitions vary between studies making direct comparison between studies difficult (Vermeire et al, 2001). There is no universally accepted definition of what degree of adherence is sufficient for optimal antibiotic effectiveness (Vermeire et al, 2001).

Indeed, it is likely that any definition of adequacy in dosing depends on the illness being treated and the antibiotic prescribed because of variation in aetiology and in the pharmacodynamic and pharmacokinetic properties of different classes of antibiotics (Sanson-Fisher et al, 1992). An international forum on antibiotic resistance (Finch et al, 2004) recommends that data concerning antibiotic use should be analysed by type of infection and by class of antibiotic, although very few studies of adherence have attempted to do this.

Different methods of measuring adherence, such as, self-report, pill count, covert observation, and urine analysis are likely to produce different results. For example, self-reports are believed to overestimate adherence rates compared because participants may be tempted to provide socially acceptable responses (Yoos, 1984). The limitations of pill counts (which may use either manual or electronic monitoring systems) lie in the fact that counting tablets or recording when a medication container is opened, records only the amount of medication removed from the container, or the opening of the container, but may not indicate actual consumption of the actual medicine. Furthermore, if the patient knows that their medication use is being monitored this may also alter their behaviour and not provide a true reflection of their usual medication taking practice. Estimates of antibiotic consumption using urine analysis, although overcoming some of the difficulties of other measurement techniques, are affected by individual metabolic and biochemical responses which can lead to individual variations in drug levels. Finally, covert observation, although potentially providing a more accurate report of medicine consumption, is usually considered unethical as informed consent is central to research governance. Despite

this, studies have explored adherence to antibiotic regimes whilst withholding the complete aims of the study from participants (Cockburn et al, 1987).

2.3.4 Modifying Antibiotic Treatment Regimes: Sub-optimal adherence

Although a recent European study reports that a 'vast' number of respondents believe that antibiotics should be taken exactly as prescribed (Pechère, 2001), other studies report that patients alter antibiotic regimes in a number of ways (Favre et al, 1997; Hoppe et al, 1999; Carey and Cryan, 2003). Table 2.3 summaries the different ways in which antibiotic regimes may be modified by patients.

Table 2.3 Modifications to Antibiotic Regimes Leading to Sub-optimal Adherence

- | |
|---|
| <ul style="list-style-type: none">• Failure to commence therapy as advised
Failures to collect the prescribed course of treatment
Failure or delay in starting therapy• Altering dosage and intervals between doses
Periodic dose increase
Reducing number of daily doses used
Changes in the time interval between doses• Early cessation of therapy• Self medication with incomplete courses |
|---|

Sub-optimal adherence may occur in a number of ways. The prescription may not be filled, the course of therapy not used, or the start of the course may be delayed (Kardas, 2002; McNulty et al, 2007b). Although health professionals generally consider failure or delay in commencing a course of antibiotic therapy to be problematic because of potential negative effects on the individual's recovery from infection, in terms of promoting bacterial resistance not consuming a course of antibiotics, or delaying the start of the course (presuming that the consumers

subsequently follows the treatment regimes) may have little significant affect on bacterial resistance (Hoppe et al, 1999). Early cessation of therapy, that is not completing the full course, has been reported both the UK and globally (Favre et al, 1984; Branthwaite and Pechère, 1996; Hoppe et al, 1999; Pechère, 2001; Kardas, 2002; Carey and Cryan, 2003; Kardas et al, 2007; McNulty et al, 2007). Another common form of sub-optimal adherence during RTI is to unintentionally omit one or more doses (Kardas, 2002). Periodic dose increase has not been widely reported, but patients have been reported as taking additional doses at the beginning of a course of therapy, possibly in an attempt to relieve symptoms when they are at their worst (Kardas, 2002).

Although academic interest in antibiotic adherence commenced in earnest in the 1960-1970s, the issue of self-medication has only recently received major attention. Self-medication itself, however, does not necessarily indicate sub-optimal adherence. In some countries (including some countries of the EU) antibiotics can (illegally) be obtained without a prescription and in these cases self-medication at least has the potential to enable adherence to the manufacturer's instructions or those provided by the pharmacist. However, in the UK, antibiotics can only be obtained legally with a prescription; therefore, most self-medication is likely to occur in situations where the patient has 'leftover' 'antibiotics stored in the home (McNulty et al, 2006). Using 'leftovers' implies sub-optimal dosing in that it is unlikely that a complete course of therapy is either available or consumed (McNulty et al, 2006; Kardas et al, 2007) and consequently is categorised as sub-optimal adherence. It is possible, however, for UK citizens to purchase antibiotics using the Internet or

whilst travelling to other countries (Grigoryan et al, 2007). No studies appear to have explored the extent of self-medication in the UK with antibiotics obtained via the internet or travelling abroad.

Several studies have reported self-medication with 'leftover' antibiotics during RTIs (Pechère, 2001; Carey and Cryan, 2003; Grigoryan et al, 2006; McNulty et al, 2006; Grigoryan et al, 2007; McNulty et al, 2007b). Although differences in access to antibiotics makes direct comparisons between UK and other European countries difficult, antibiotic self-medication is reported to be lower in UK than in other countries (McNulty et al, 2007). A recent UK study has reported that 31% of respondents kept antibiotics in case they needed them for a subsequent illness and 8% in case the illness reoccurred (McNulty et al, 2007b). In the same study 5% reported having taken antibiotics without advice from a clinician and, of these, 46% were taken for URTI. Both 'global' and UK surveys show that the public often keep leftover antibiotics in the home (McNulty et al, 2007b; Kardas et al, 2007), although the actual number of respondents intending to use leftover antibiotics in the UK appears to be low. McNulty et al (2007b) reports that 6% of respondents keep antibiotics but only 44% of these had the intention of using leftover antibiotics in subsequent illness. Self use in relation to delayed prescribing was not reported.

The drivers for self-medication are at present under-researched, however studies have reported that self-medication occurs when consumers experience similar symptoms to those which the antibiotics had been previously prescribed (Pechère, 2001; McNulty et al, 2007b). McNulty's large UK random population survey

($n=7120$) reported that high educational attainment and being more knowledgeable about antibiotics were independently associated with keeping unused antibiotics in the home and subsequent self-medication. Respondents who kept left-over antibiotics tended to be younger adults (16-24 years old) and female (McNulty et al, 2007b). Although the large sample used by McNulty et al (2007b) improves the generalisability of their study, self-reports may yield different results to studies which measure observed behaviour.

2.3.5 Influences on Antibiotic Adherence Behaviours

For the purpose of this review, the factors influencing antibiotic adherence behaviour have been grouped into 3 categories; the characteristics of the consumer (including beliefs about the illness and antibiotics), the characteristics of the course of treatment, and the characteristics clinician and consultation

The characteristics of the consumer and the illness experience;

The influences of patient characteristics such as gender and social economic factors have been inconsistently reported and reviews have concluded that these are not key predictors of antibiotic adherence (Sanson-Fisher et al, 1992; Kardas, 2002;). Age, however, has been reported to influence adherence. Although most studies explore adherence to antibiotic therapy in adults, sub-optimal adherence in children has been recognised since the 1960s (Bergman and Werner, 1963). Older children are more likely to be compliant than younger ones (Hoppe et al, 1999). Adult adherence rates are reported to be lower in working adults (18-54 years) and higher amongst adults over 75 years of age (Branthwaite and Pechère, 1996).

Several reasons for early cessation of therapy are reported. Stopping a course of therapy once symptoms begin to decline is widely reported (Yoos, 1984; Urquhart 1992; Branthwaite and Pechère, 1996; Pechère, 2000; McNaulty et al, 2007b).

Concerns or experiences of side effects also lead to intentional early cessation of therapy as can lapses in memory, which are described as a major influence on sub-optimal adherence (Kardas, 2002; Yoos, 1984; Pechère, 2000).

Characteristics of the course of treatment;

Studies have consistently reported that longer courses of therapy and courses where more frequent doses are required are more likely to result in lower adherence rates (Bergman and Werner, 1963; Yoos, 1984; Cockburn et al, 1987; Hoppe et al, 1999; Claxton, 2001; Perez-Gorricho, 2003; Carey and Cryan, 2003; DeBellis et al, 2004). The association between length and frequency of dose and poor adherence is likely to be due to forgetfulness and accommodating the doses into the daily routines respectively. Pharmaceutical companies have developed a number of once daily and twice daily oral antibiotics in order to address this issue (Kardas, 2002). The form of antibiotic (tablet, suspension, or cream) can also influence adherence, particularly in children. Large and difficult to swallow tablets are particular obstacles to adherence (Bergman and Werner 1963; Demers et al, 1994).

The characteristics of the clinician and consultation;

Several aspects of the doctor-patient interaction have been described as influencing adherence to treatment regimes, including the content and manner in which information is communicated to patients (Sharpe and Mikeal, 1979). During

consultation with a clinician a patient will often receive advice about the medicine and how to take it, although clinicians are not the sole source of advice (information and instruction are also typically included in the packaging of the medication, and information may also be given by the dispensing chemist). Provision of information is known to positively influence adherence (Cockburn et al, 1987; Favre et al, 1997), but how it is delivered and received will determine the effectiveness of information provision (Sanson-Fisher et al, 1992).

Patients treated by younger doctors were reported to be more compliant than those treated by older doctors and those that had not been in practice as long (Cockburn et al, 1987). Familiarity with clinicians has also been shown to positively influence adherence. Pechère et al (2002) explored patient attitudes to consultations and categorised them in four ways. 'Involved' patients (patients who are more active in the consultation process leading to joint decision making) were significantly more compliant than other groups. 'Deferent' patients saw the doctors as expert and relied on the doctors' decision-making ability. 'Ignored' patients found doctors condescending, did not trust doctors and exaggerated symptoms in order to receive antibiotics. 'Critical' patients doubted clinicians' competence and experience. Admitted non-adherence to antibiotic regimes was higher in 'critical' and 'ignored' groups. Later work by Pechère using data from a multi-national survey (although not including the UK) to develop a typology of 'psychographic profiles' of adherence behaviours provides further evidence of how attitudes towards clinicians and the consultation process affect antibiotic adherence (Pechère et al, 2007) 'Compliance

believers' admitted to non-adherence but were positive about the medical care they received. 'Theoretical compliance believers' were characterised by a belief in the importance and value of adherence but their behaviours did not reflect this. Patients in this group were generally positive about doctors but were likely to question their ability and claim to have trouble remembering to take doses. 'Compliance non-believers' were the least convinced of the importance of adherence and the most likely to save antibiotics for future use. Members of this group were more likely to be male, single and between 18-29 years of age. The final group, designated as 'low confidence in doctors', had the poorest opinion of their health care and were most likely to admitted non-adherence. Patients in this group were more likely to be female 39-49 years of age. The highest proportion of 'compliance believers' resided within South Africa, USA and European countries. Respondents with the lowest confidence in doctors were more likely to be resident in Russia and Turkey.

2.4 Public Awareness and Beliefs about Resistant Infections

There have only been a few studies exploring lay perceptions of resistant infections, but some evidence can be gleaned from studies exploring antibiotic use more generally and is included here where relevant. Although there are many different types of resistant infection, most studies explore lay beliefs about MRSA. Studies of hospital patient populations in the UK and North America have reported considerable patient awareness of MRSA (43-84%) (Collett et al 1999; Hamour et al, 2003; Gill et al, 2005; Duncan and Dealy, 2007). High levels of public awareness of MRSA are confirmed by a recent population survey in which 79% of public agreed with the statement 'antibiotic resistance is a problem in British hospitals'

(McNaulty et al, 2007a). Patient groups appear to be generally aware that MRSA is a pathogenic micro-organism: when provided with a number of pre-defined options, 68% ($n=113$) correctly identified MRSA and superbugs as a 'multi-resistant bacterium' (Hamour et al, 2003). However, there appears to be some public uncertainty about the characteristics of the microbe involved. MRSA has been described by the public as a 'bug', 'germ', 'virus', 'bacteria' and as 'a nit' (Newton et al, 2001; Gill et al 2006).

MRSA has been associated with unhygienic hospitals and to a lesser extent, with poor standards of care, inadequate hand washing, surgical procedures, and in particular surgical wounds (Newton et al 2001; Hamour et al, 2003; Duncan and Dealy, 2007). Beliefs about MRSA are not, however, entirely confined to hospital settings. Hamour et al (2003) reported that 44% of the informants surveyed believed that MRSA could exist in the wider community. These findings, however, need to be considered in light of its limitations of a small convenience sample of hospital patients ($n=113$) which is unlikely to be generalisable to the wider population. Despite public awareness of MRSA, previous studies fail to specify whether lay beliefs systems recognise that MRSA is not the only resistant micro-organism but one of many resistant microbes threatening public health.

Although poor hospital hygiene and other health care related factors (listed above) are perceived as the main causes of MRSA, a number of individual factors are also believed to contribute to contracting a MRSA infection. The risk of contracting MRSA infection is believed to be increased if the individual's immunity is

compromised in some way. Interestingly, consistent with the fatalistic views of infection described by Mabry (1967) and Helman (1978), contracting a resistant infection is considered by some to be just ‘bad luck’ (Newton et al, 2001).

There have been no detailed studies examining the link between public awareness of antibiotic use and resistant infections. Pechère et al, (2001) reported that no respondents mentioned antibiotic resistance as a negative consequence of taking antibiotics, but other studies (Emslie and Bond, 2003; Eng et al, 2003; McNulty et al, 2007b) have demonstrated that some members of the public are aware that the use of antibiotics can contribute to the occurrence of resistant infections. Cals et al (2007) reported that 92% agreed with the statement “*bacteria become less susceptible (resistant) to antibiotics*” (p 944). McNulty et al (2007 b) asked respondents whether they agree or disagree to 11 statements related to bacterial resistance and antibiotic use. Most respondents knew that overuse of antibiotics increased resistance and considered resistant infections a growing concern. Little is known about the nature of public understanding of the connection between antibiotic use and the occurrence of bacterial resistance. In addition, lay meaning of the term ‘resistance’ has not been clearly described. Researchers appear to assume that the public attach the same meaning to the word resistance as they do themselves.

Public concerns about resistant infections have been reported (Palmer and Bauchner, 1997, Esmile and Bond, 2003). Newton et al's (2001) qualitative study reported that half of their hospital patient population sampled perceived MRSA as serious ($n=9$), and were fearful about contracting MRSA infection. Patient populations have a

number of concerns about MRSA including reduction in the effectiveness of antibiotic treatment, contagion, prolonged hospital admission, and recurrent infection (Newton et al, 2001). Although the findings of Newton et al (2001) are not statistically generalisable, other studies have confirmed patients concerns about MRSA (Hamour et al, 2003). Despite reports of concerns about bacterial resistance in hospital samples, studies sampling community populations have reported low levels of personal concern and a sense that bacterial resistance was unlikely to affect them personally. Emslie and Bond's (2003) indicate that almost half (45%) of respondents did not feel that MRSA mattered to them personally and McNaulty et al (2007) reported that 19% of respondents did not know or disagreed with the statement 'antibiotic resistance could affect me or my family'. The reasons for the belief that bacterial resistance is something that is unlikely to effective individuals in the community are not, however, clear.

A variety of beliefs about how MRSA can be controlled have been reported. Patient populations have described hand washing (54%) as 'important' in reducing the spread of resistant infections and to a lesser extent the use of gloves, aprons and isolation rooms (Hamour et al, 2003). A more recent study has reported even greater levels (91%) of the public believe that hand washing is the most effective way to reduce resistant infections (Duncan and Dealy, 2007). However MRSA has also incorrectly been believed to be spread in the air (Duncan and Dealy, 2007).

Although patients may be aware that isolation reduces the spread of infection, their actual understanding of the modes of transmission and prevention are limited (Newton et al, 2001). Perceptions of the controllability and curability of MRSA are

therefore 'not highly developed' (Newton et al, 2001). Although public awareness of the role of antibiotics in resistance are reported along with a number of factors influencing resistant infections (previously discussed), public beliefs about the mechanisms by which antibiotic consumption can lead to antimicrobial resistance are at present under-researched.

2.5 Summary

Studies undertaken from anthropological and sociological perspectives have consistently indicated that lay explanatory models of respiratory tract infection combine ideas consistent with traditional and biomedical belief systems. Within dominant cultures and health care systems in developed Western countries, lay beliefs systems recognise exposure to extremes of temperature, disruption of the homeostasis of the body and exposure to microbes as causing a variety of respiratory tract infections. Recent biomedically oriented studies have increasingly focused on eliciting beliefs about the microbial causes of URTI. Misconceptions have been described where the beliefs expressed do not match the biomedical model of illness, for example when confusion between bacterial and viral aetiology is identified.

There are a number of illness behaviours adopted by sufferers of URTI. People most commonly treat their own illness using a number of self care tactics ranging from resting to using a variety of home remedies and over the counter medicines.

Medicine use, in particular the use of OTCMs, is the main way in which URTIs are dealt with in the community. Although most would not consult a clinician in typical cases of URTI, some members of the public may consult a clinician in some

circumstances. Patients may consult a clinician because of concerns about their children, specifically out of fear that if left untreated, the illness may develop into something worse, and when they experience symptoms which they perceive as indicating the need for antibiotics, such as a productive cough. Patients' inappropriately high expectations for antibiotics for URTI are reported by studies sampling clinicians, and these expectations influence clinician prescribing decisions. However, there is incongruence about the level of expectations between studies from the clinicians' perspective and studies reporting patient's perspectives. Some researchers found that clinicians overestimate patients' expectations for antibiotics, claiming that patients' desire for reassurance and advice are more important reasons for consulting.

Public attitudes to antibiotics vary. Some reports indicate that antibiotics are highly revered medicines, with many members of the general public believing that antibiotics are safe and effective in treating URTIs. There is, however, an important public view that indicates reservations about antibiotic use.

The body of literature exploring adherence to antibiotic therapy comes primarily from the USA and Europe. Reviewing literature relating to adherence presents some challenges as problems of social-desirability bias and varying operational definitions and different ways of measuring adherence makes direct comparison between studies difficult. Reported levels of antibiotic adherence vary but recent surveys demonstrate that sub-optimal adherence is common both nationally and internationally.

Sub-optimal adherence takes several forms: not starting a course of therapy, altering the dose or dosage intervals, not finishing the full course of therapy and self-medication with incomplete courses. A large number of factors influence adherence including memory, age, concerns about side effects, and declining symptoms. A number of patient and clinician factors influence behaviour including the patient's knowledge and beliefs about the illness and antibiotics, the clinician–patient relationship, and characteristics of the course of treatment.

Although the body of evidence surrounding public knowledge and opinions of MRSA is small, and the lay meaning of the term 'resistance' generally unexplored, reports indicate that the public are familiar with the term 'MRSA' and the term 'superbugs'. However, studies also suggest little public understanding of the causes or consequences of MRSA or bacterial resistance. In the UK, MRSA is almost exclusively associated with hospitals. Public concern about MRSA and resistant infection vary from extreme worry to ambivalence and minimal concern. In UK hospital based populations, confusion and lack of knowledge about the cause and severity of MRSA and the relationship between bacterial resistance and antibiotic use is widespread. Only a few studies have reported public awareness of the link between antibiotic use and resistance. Crucially, few studies have explored public understandings of antibiotic resistance beyond hospital acquired MRSA. The impact of the use of antibiotics in the home, or awareness of how the public can contribute to the cause and control of bacterial resistance, has not yet been adequately addressed.

Chapter 3: Methods

3.0 Introduction

This chapter is concerned with methods adopted for the collection and analysis of data. It begins with a description of the technique of grounded theory, which was used for the empirical research described in this thesis. The use and rationale for the initial maximum variation sampling strategy and delayed theoretical sampling are described. This is followed by a discussion of the recruitment procedures and data collection. Data management is critically evaluated in terms of the advantages and disadvantages of using Computer Assisted Qualitative Data Analysis Software (CAQDAS). Attention is then drawn to the analytical procedures used. There is then a description of the use of literature within this study, followed by discussion of relevant ethical issues. The chapter concludes with a discussion of the methods used to establish the trustworthiness of the study.

3.1 The Research Question and Approach

The aim of the study described in this thesis was to gain new perspectives and a deeper understanding of the public's attitudes towards infection and antibiotic use, focusing specifically on common respiratory tract infections and resistant infections. This was considered important because the public, as consumers of antibiotics, play an important role in the development of bacterial resistance. Interventions aimed at reducing antibiotic prescribing will need to build on understanding of the public's perspectives. This study was designed to build upon previous empirical enquiry, where it existed, and also to draw these inter-related phenomena together.

A grounded theory approach was selected for two reasons. Firstly, socio-economic inequalities may manifest in health differences between advantaged and disadvantaged socio-economic groups (Black, 1980). These inequalities may affect the illness experience of the population and may be influential in any decision making process, as do geographical differences, differences in access to health care services, health care provision, and use. Furthermore, these inequalities may affect the knowledge, beliefs and behaviours of individuals. The social dimension of health and health service provision was, therefore, considered an important dimension. To meet the aim of the study, rich, thick data that preserved the social context of respondents' lives needed to be collected. A quantitative approach was considered unsuitable because when textual data is quantified, the social context of the study may be lost (Glaser and Strauss, 1967). Although other qualitative research traditions can enable exploration of attitudes, the benefits of a grounded theory approach lie in its association with sociology. The aim of grounded theory is to describe the key context-based psychological and structural processes that occur in social settings (Glaser and Strauss, 1967) and to illuminate social forces affecting the phenomena being studied (Schwartzman and Strauss, 1973). Secondly, lay beliefs about resistant infection outside hospital acquired MRSA were relatively unknown and new insights into the continuing problem of poor antibiotic adherence sought. According to Stern (1995), "*the strongest case for the use of grounded theory is in investigations of relatively uncharted water, or to gain a fresh perspective in a familiar situation*" (p 930). For these reasons a grounded theory approach was considered the most appropriate procedure to answer the research question.

3.2 Grounded Theory and the Research Approach

Grounded theory was developed by Glaser and Strauss in the late 1960s. The basic precept of grounded theory is that the theory must '*emerge*' from the data.

Grounded theory processes are iterative; researchers move between data collection and analysis in a cyclical process. Transcribed data is coded and categorised with categories then condensed to form major constructs. The links between constructs are explored enabling the generation of hypotheses and eventually a theory relating to the phenomena. Throughout the analytical process, analysts make memos (theoretical notes) recording their analytical thoughts, constantly compare data and undertake theoretical sampling.

Grounded theory, however, is not a single unified approach but a set of approaches that have evolved since its original description (Locke, 2001). Not only have the ideas of Strauss and Glaser diverged in the last decade but other authors have laid claim to their own, separate and distinct models of grounded theory, for example, Turner (1981), Rennie et al (1988), Kools et al (1996), Clarke (2005) and Charmaz, (2006). Whilst these models share common features (for example, using coding, constant comparison and theoretical sampling), variations in procedures and underpinning philosophies exist. Versions of grounded theory differ in their approach to the saturation of codes, the use of memoing and diagrams as analytical tools, and the language used to describe procedures. Table 3.1 identifies a number of different models of grounded theory drawn from available literature. Whilst only able to represent a summary of complex models of grounded theory, the table illustrates some of the more apparent variations and commonalities between the

different models of grounded theory with particular attention to variations in language and approach to analysis, theoretical sampling, memoing and categorisation processes. Table 3.1 also identifies the philosophical underpinnings of the different models of grounded theory where they are known. The model of grounded theory adopted for the present study was based on the approach of Charmaz (1983, 1990, 1995, 2000, and 2006). The grounded theory method used was also consistent with the minimal standards for studies claiming to be grounded theory recommended by Murphy et al (1998) (Appendix 1).

3.3 Interpretative Grounded Theory

The study for this thesis was guided by an interpretative epistemology, an approach which postulates that human beings “*are complex, unpredictable and reflect on their own behaviours*” (Green and Thorogood, 2004, p12). Interpretive studies attempt to understand phenomena through the meanings that people assign to them, how phenomena are influenced by context, and how context influences the phenomena (Locke, 2001). Grounded theorists working within an interpretive paradigm typically adopt a reflexive stance believing that the researcher, his/her knowledge, beliefs, values, and interaction with participants will influence the interpretation of data. Theoretical analyses are thus interpretative portraits of a reality, not objective reports (Charmaz, 2006).

Table 3.1: Key Features of Selected Models of Grounded Theory

Author	Summary of the analytical procedures and variations of terminology	Memoring	Theoretical sampling	Epistemology
Glaser and Strauss (1967)	Open coding Focused coding Comparing incidents applicable to each category Integration categories and the properties Delimiting the theory Writing the theory	yes	yes	Symbolic interactionism
Turner (1981)	Develop categories Saturate categories Abstract definitions Use the definitions Exploit categories fully Note, develop and follow up links between categories Consider the conditions under which the links hold Make connections to existing theory Use extreme comparisons to the maximum to test emerging relationships.	yes	yes	Not discussed
Rennie et al (1988)	Open categorising of meaning units Clusters and categories Moving towards parsimony through the determination of a core category recycling earlier items in terms of a core category Sorting memos	yes	Theory based data selection	Not discussed
Strauss and Corbin (1990, 1998)	Open, axial and selective coding Asking questions Code for process Using a coding paradigm Explanatory matrix Central category	yes	yes	Objectivist
Dimensional analysis Kools et al (1990)	Dimensionalizing/ designation Differentiation Integration/ reintegration Explanatory matrix as corner stone	no	yes	Natural analysis
Situational Analysis Clarke (2005)	Wider context as vital Emphasis on using diagrams, charts during analysis	Yes/ diagrams	yes	Constructionist
Charmaz (2006)	Codes, categories and themes Creating and refining the research and data collection questions Raising terms for concepts Asking more conceptual questions Make further discussions and clarify conceptual thoughts through writing and rewriting	yes	delayed	Social constructionist

3.4 Sampling

Traditional grounded theory (Glaser and Strauss, 1967) requires that the study sample should target those most likely to inform the emerging theory. This is known as theoretical sampling. Theoretical sampling itself, however, needs a starting point (Charmaz, 2006).

Maximum variation was sought on the basis of three variables, age, socio-economic deprivation, and type of community. Capturing variation in ages was an important consideration because it is known that beliefs and values are not static but evolve over the life course (Sheldon, 1998), and therefore it was likely that different generations would have varying relevant attitudes and experiences and the level of community deprivation was considered important because of variations in socio-economic influences on health (previously mentioned). Finally it was felt that in South Wales urban, rural and post-industrial areas (valley) communities differ in relation to cultural identity (Dicks, 2000).

Three key groups of antibiotic consumers were identified: children under 5 years of age; adults of working age (those considered legally adults i.e. over 18 years old and those under the lowest retirement threshold required for receipt of the UK state pension) and older adults (those who had reached retirement threshold or were older) (Table 3.2). Children under 5 years of age, and older adults were of interest because they consult most frequently for CRI and are prescribed the greatest number of antibiotics (McCormick et al, 1995; Wrigley and Majeed, 2002). Although adults of working age are known to receive fewer prescriptions of antibiotics compared to other age groups. Working age adults constitute the largest number of antibiotic

users (because they account for the largest proportion of the population) (Wrigley and Majeed, 2002). Studies measuring antibiotic prescribing rates in relation to contact (consultation) within primary care report that adults of working age received as many prescriptions for URTI as do other age groups (Akkerman et al , 2004).

Table 3.2: The Sampling Strategy

Characteristics of Interest	Area and Recruitment Target			
	Urban	Rural	Post-industrial	
Parents of children under 5 years of age	1	1	1	Plus additional theoretical sampling
	1	1	1	
	1	1	1	
Adults of working age (18-60 years of age)	1	1	1	
	1	1	1	
	1	1	1	
Older adults (Over 65 years of age)	1	1	1	
	1	1	1	
	1	1	1	
Legend				
Classification based on Townsend Scores	Areas of high deprivation			■
	Areas of average deprivation			■
	Areas of low deprivation			■

3.4.1 Issues Surrounding Research with Children

Although the initial sampling strategy attempted to reflect the heterogeneity of the South Wales population, children and teenagers below the ages of 18 years were not included. Data from this age group were collected through parents. This data however, represents parents' attitudes to their children's health and use of medicines, as opposed to the children's own views. Although there is clear value in exploring children's views, I did not gather data directly from them in this study for several reasons. Firstly, ethical and child protection issues were considered. Undertaking individual interviews with children can be problematic as lone researchers can be

vulnerable to child protection concerns. Secondly, children may feel uncomfortable about participating in interviews, which may in turn affect the quality of the data. In addition, there were concerns about how effectively data from children could be compared to that of adults, as language and cultural reference are distinct to each group (Punch, 2002). Ultimately, the scope of the study was confined by resources and time.

3.4.2 The Socio-Demographic and Geographic Basis of Sampling

Initially, three unitary authorities in South Wales were selected from which to recruit, one urban, one rural, and one from within the post-industrial areas of the South Wales valleys. Within these three broad areas, electoral wards were selected using Townsend Material Deprivation Scores (referred to forthwith as Townsend Scores) from the National Census (2001) to identify areas of varying prosperity. Existing census categories of deprived (referred to in this study as areas of high deprivation); median (referred to as average deprivation) and affluent (referred to as low deprivation) were identified. Within each unitary authority three electoral wards were selected, one from each of the above categories.

Consideration was given to the location and proximity of each ward. In order to maximise homogeneity within the selected ward, wards surrounded by areas of similar economic status were targeted. It was hoped that this would make it more likely that the members of the community groups reflected the general socio-economic status of that particular area.

Polit and Beck (2006) suggest that lack of planning can constrain flexibility within research designs. The initial sampling strategy was valuable in enabling detailed planning for recruitment. I was able to select appropriate electoral wards and draw up a list of community gatekeepers at an early stage. Intricate planning, however, gave me the impression that recruitment would be a smooth, systematic process. In reality, waiting for responses from community group ‘gatekeepers’ and volunteers (recruitment is discussed in section 3.4.5) left my aspirations for a smooth recruitment process unfulfilled. It proved difficult to recruit from some pre-specified groups, for example working age adults from electoral wards of low deprivation and rural areas of high deprivation. As a result, I did not meet my objective of maximum variation outlined in Table 3.2. I was also aware that collecting data according to a pre-planned route had the potential to force the analysis into irrelevant directions (Strauss and Corbin, 1998). However, beyond the decisions concerning the preliminary purposive sampling, delayed theoretical sampling was undertaken.

Theoretical sampling involves exploring data, constructing theoretical hypotheses and then re-examining initial ideas through further data collection. In this sense theoretical sampling involves both inductive and deductive reasoning (Charmaz, 2006). Charmaz (2006) describes the particular form of reasoning used during grounded theory as ‘abductive’. “*Abductive inference entails considering all possible theoretical explanations for the data, forming hypotheses for each possible explanation, checking them empirically by examining data and pursuing the most plausible explanation*” (Charmaz, 2006, p104). (Delayed theoretical sampling is discussed further in section 3.7.5)

3.4.3 Recruitment

Once geographical areas had been selected I planned to recruit individuals with characteristics consistent with those defined by the initial sampling strategy. Using the Internet as a resource, unitary authority and other local websites were searched to identify existing community groups and clubs. Letters were then sent to group leaders explaining the purpose of the study and asking permission for me to attend a group meeting in order to explain the study and invite potential respondents to participate in person.

A wide variety of organisations were approached, for example, mother and toddler groups, sports clubs and community education centres. Appendix 2 describes the community groups approached and the nature of the approaches. In the later stages of the study, community groups were purposively selected because of their likelihood to have members possessing the characteristics sought during theoretical sampling. For example, when I wished to target young men I approached football clubs.

Gaining access was a time-consuming activity. Initially, I hoped to visit groups in close proximity to each other or within easy travelling distance, within the same day, thereby reducing travel time and costs of fieldwork. As things turned out, I often travelled long distances to recruit respondents at the convenience of the group leader, even if it meant large detours or travelling back and forth to the same town several times during the same day. 'Gaining access' was not a single event, but was constantly re-negotiated, and often required multiple letters, telephone conversations

or making appointments to meet with gatekeepers to discuss the study in person.

Once permission from the group leader was obtained, I was able to canvass for willing respondents. Gatekeepers acted as my 'sponsors'. They helped bridge the gap between myself and group members by initiating early introductions. Their support in recruitment was invaluable, as the extract below illustrates.

(Excerpt from Field Diary 03/04/06) (Recruitment at a playgroup)

The leader of the group called for quiet and addressed the mums in the room, introducing me as 'Nurse Nancy'. She explained that I was looking for mums to talk to me about what it was like when their children had colds. She then thrust a cup of tea in my hand and I moved around the room introducing myself to small clusters of mums, giving out information/recruitment packs and answering questions.

Having gained access to a community group I introduced the study and myself in person. I asked potential respondents to take information packs and to contact me if they felt that they might be willing to participate. Information packs contained a letter of invitation and written information about the study (Appendix 3), a 'potential participant reply slip' (Appendix 4), and also a university-addressed envelope.

Recruiting in person seemed to have some unanticipated benefits. Participation in the study appeared to be encouraged by my own enthusiasm.

(Excerpt from Field Diary 21/4/06). (Second visit to playgroup)

I was asked about the success of my earlier recruitment activities. Having said that I had had several responses, the playgroup assistant said "I'm not surprised; you can see how enthusiastic and committed you are, just by your face and listening to you"

This encouraging comment stayed with me throughout the recruitment phase of the study and spurred me on whenever I felt that I didn't have the energy to face another group of strangers. Attending group meetings in person did, however, have some disadvantages. On occasions members of community groups made incorrect

assumptions about the reason for my attendance and, as a result, some were unreceptive to my recruitment efforts. For example, during a visit to one playgroup a small group of three mothers displayed body language which suggested that they objected to my presence. When I approached this small cluster of mothers, one mother commented that she had thought that I was trying to sell something. In order to reduce the risk of my presence at group meetings being incorrectly interpreted, group members were provided with prior warning and information about my recruitment visits whenever possible. Posters were distributed at community centres and information about my visit was included in community newsletters.

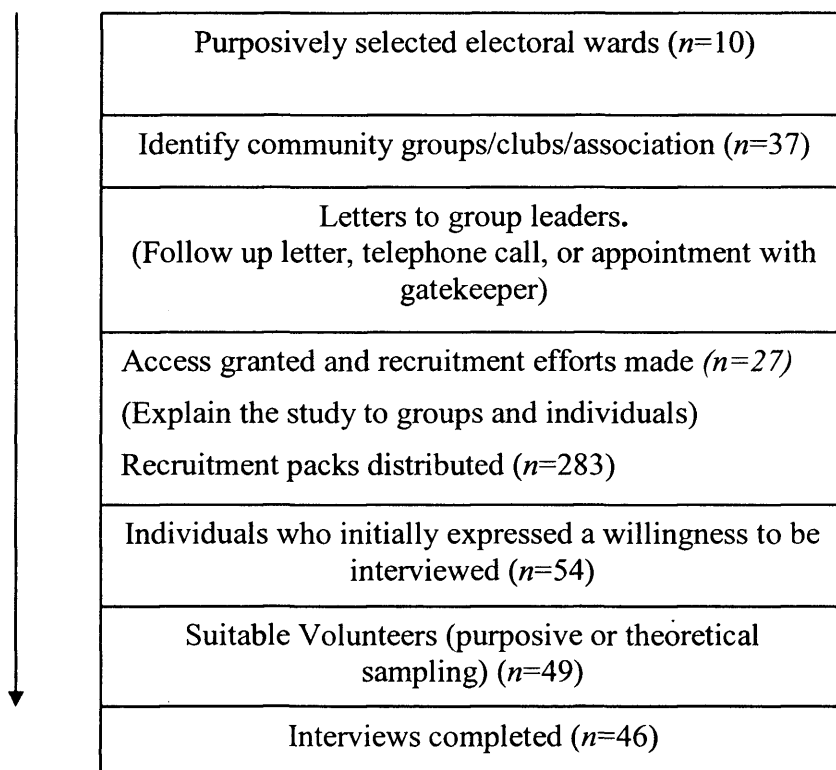
Although face to face recruitment was the aim, this was not always practical. Some groups, for example, a municipal golf club and did not have regular group meetings. In these cases the managers were asked to distribute information packs to group members and I then waited for responses. This strategy had limited success. Figure 3.1 summarises the recruitment process and quantifies the number of community groups approached, information packs distributed and responses received from those willing to participate in the study.

Recruitment commenced in the areas closest to my base and then, as the study progressed, expanded to other areas of South Wales. Starting 'close to home' was beneficial in minimising the amount of time I spent out in the field alone while my confidence in finding new places and interviewing strangers developed. It also meant that, if I had needed to, I could have rapidly returned to my base to sort out any technical problems, such as equipment difficulties. Whilst this did not occur, it was a valuable emotional prop in the initial stages of the study.

Young adults (under 25 years of age) (identified as a target during theoretical sampling) from rural and post-industrial areas of high deprivation were particularly difficult to recruit. Many of the gatekeepers of community groups from areas of high deprivation did not reply to my letters or other attempts to make contact. Recruitment activities were, therefore, expanded to include a single electoral ward within the unitary authority of Caerphilly, with some success. In addition, Townsend Scores indicated that there were no areas classified as low deprivation within post-industrial areas.

Successful recruitment did not always lead to data collection. Respondents sometimes changed their minds, became unavailable or failed to attend arranged meetings. This resulted in wasted journeys and on one occasion the interview was abandoned.

Figure 3.1: The Recruitment Process



3.5 Data Collection

Demographic data such as age, gender, number of children in the family and area of residence were collected on forms (potential participant reply slip) returned by respondents indicating their willingness to participate in the study (Appendix 4).

During the initial stages of the interview, respondents were asked a few simple questions about their experiences of post-compulsory education, current occupation and employment history. Collecting this kind of demographic data facilitated theoretical sampling by enabling individuals to be placed within their wider socio-economic, geographical and cultural context.

3.5.1 Interviewing Respondents

Semi-structured interviews were used to collect in-depth data eliciting respondents' own interpretations of their illness experiences of common respiratory infections. The varied socio-economic, educational and personal background of the sample precluded the use of a standardised interview because it was unlikely that any single structure would be suitable for all (Fielding, 2003). Semi-structured interviewing allowed the rephrasing of questions to meet individual needs. An interview guide was used to ensure key topics were included in each interview. The interview guide was revised and restructured at several points during the study (for example, following pilot interviews, following initial data collection and as theoretical sampling continued). Version 1 of the interview guide can be seen in Appendix 5. As the study progressed, the interviews became more focused on those topics that were most likely to support the development of the emergent categories. The interviews were, therefore, loosely conversational but focused around key predetermined themes, with opportunities for the interviewer to prompt and probe

when seeking clarifying details. Probes are open questions that enable further and deeper exploration of a concept or idea. They were used to rephrase questions in situations where the participant was unable to offer a response or to enable further exploration of something the participant had mentioned during the course of the interview. Prompts provided participants with several response options following a question. They were used to enable participants to respond to questions they had been previously unable to answer. The aim being to trigger memory and to draw out ideas which participants may have been initially reluctant to share with the interviewer. In this way the interviews became more than “*ordinary conversation*” and “*examined hunches, events, views and feelings*” (Charmaz, 2006, p26).

Four pilot interviews were conducted. The purpose of pilot interviews was to facilitate the development of the interview guide, test the general feasibility of the study, and to highlight any unforeseen difficulties with the fieldwork. Pilot interviews also enabled me to practise my interviewing skills and build confidence in data collection (Fielding, 2003; Polit and Beck, 2006). The data generated from the pilot interviews was analysed along with other data as it was considered a suitable quality to justify its inclusion in the main study. However, these respondents were not recruited through community groups but through their association with members of staff within the department in which I was studying. They all, however, lived within areas targeted in subsequent recruitment.

The length of the proposed interviews appeared crucial in respondents’ decisions to participate in the study. The initial participant information sheet stated the interview would be no longer than 90 minutes. Several respondents expressed that this would

deter them from participating. As a consequence the information sheet was reworded to allow participants to negotiate the duration of the interview, with the average time being indicated as 45-60 minutes. Interviews actually lasted between 20-120 minutes.

Social interactions such as interviews are an opportunity for impression management (Goffman, 1959) in which interviewees are required “*to demonstrate their competence in the role in which the interview casts them*” (Dingwall, 1997, p58). Fielding (2003) suggests that respondents tend to rationalise their responses, may be overly polite, may be worried about being ‘shown up’, eager to impress, or attempt to anticipate the answers they imagine the interviewer wants to hear. Respondents, therefore, may either consciously or subconsciously adapt the truth in some way. In this study, illness accounts indicated several of these problems, including concerns about providing correct answers. Evidence of altered truth is difficult to determine, however, inconsistent and contradictory accounts (the nature of the accounts generated is discussed in chapter 8) may perhaps indicate that respondents attempted to provide accounts that maintain a moral order (Goffman, 1959). Problems from social desirability bias, however, can occur with other methods of data collection, such as focus groups. Furthermore, face-to-face interviews allowed the interviewer to probe the truthfulness of respondents’ reported beliefs and behaviours. Whilst this may raise questions about the status of interview data, representations of the world generated in this way should be acknowledged as a valid, but not the only valid, representation possible.

R19: err this is getting relatively difficult err is a virus a type of germ? So you got viral infections haven't you, so you got viral and bacterial, is that right? (38-year-old mother, average deprivation rural ward).

R3: Um (pause) well I suppose that it means that some bacteria has got into my system and is um attacking my system and I have to try and fight it. That's not a very good answer! (34-year-old mother, average deprivation urban ward).

Three respondents implied that they had intentions to prepare for the interview, or reflected that they wished they had because they found the questions difficult. These statements probably reflect an eagerness to impress and to provide 'correct' answers. It is likely that prior preparation for an interview would alter the respondents stated beliefs and knowledge about the topic. However, no respondent admitted that they had actually prepared for the interview.

R33: I was going to read all this up before you came (laughs hysterically) because I don't know anything about this, I was (laughs)

NH: Have you heard of resistant bacteria?

R33: Oh! I should have read up about this. That's quite a difficult one (21-year-old mother, high deprivation urban ward).

Common respiratory infections include a number of non-specific symptoms and several medically defined illnesses. It was felt unlikely that lay members of the public would be familiar with the terms 'common respiratory infection' or 'respiratory tract infections' even though they would undoubtedly have had experience of these types of infection. I recognised that my nursing background and familiarity with the currently accepted scientific determinates may influence how I conceptualised CRI. The opening question was, therefore, designed to allow the respondents to reflect upon whatever RTI was common to theme without leading them to reflect on any particular symptom or illness (See Appendix 5 for a description of the interview schedule).

Respondents were read a list of symptoms associated with a variety of common non-specific minor respiratory illnesses and were asked to reflect on their feelings when they started to feel unwell from any of the symptoms. The benefits of this approach were that respondents were given the opportunity to talk about whatever illness episodes they chose, or whichever came to mind. It also generated data on lay classification of common infections. In addition, the opening question aimed to signify to respondents that the interview was concerned with personal experience. I wanted to encourage respondents to reflect upon their personal experiences and not to think of respiratory tract infections, antibiotics or bacterial resistance purely as theoretical concepts in isolation. The benefits of asking respondents to talk about their experiences as opposed to theoretical ideas were recognised by Blaxter (1983). I hoped that reflecting on personal experience would enable interviews to flow, respondents to talk freely and rich data to be generated.

The relationship between the interviewer and the interviewee has the potential to influence data. Cornwell (1984) has argued that when the researcher and research participant are relative strangers, such as in this study, respondents are more likely to give socially acceptable views reflecting the moral standpoint of the wider population. Sociologists have also commented on the influence of other variables on fieldwork relationships-typically gender, age, and ethnicity (see for example Oakley, 1981). Although a lack of shared socialisation may limit the researcher's ability to fully comprehend the respondent's perspective, accounts of fieldwork relationships may overstate the importance of obvious social categories. Perhaps what is of more importance, to the respondents at least, is the researcher's personality and their overall performance during the interview (Bloor and Wood, 2006). I used several

tactics to minimise these potentially disruptive influences. I gave careful explanation of the focus of the interview both verbally and in the participant information sheet. If asked, I did admit to being a qualified nurse (but not practising as a nurse at the time of data collection). I attempted to put respondents at ease by informing them (before the interview commenced) that there were no wrong or right answers to the questions and by being as unselfconscious and as relaxed as I possibly could, although in the early stages this was difficult. Respondents were also encouraged to give open and honest responses. Pill and Stott (1982) recognised that respondents found it more difficult to talk about abstract concepts than their own health experience. Therefore, whenever possible, respondents were asked to reflect on their personal experiences. For example, in the opening question I asked respondents to tell me what they did when they started to feel unwell with a CRI, in the hope that individuals would tell me their story, to give a personal narrative account of their experiences.

Some respondents asked about my own biography and some for advice on health-related issues. Traditionally, research texts encourage the interviewer to avoid disclosures during interviews in order to maintain objectivity and to minimise response bias (Polit and Beck, 2006). Feminist researchers, however, question whether it is possible to remain completely neutral during interviews, arguing that there should be an equal and reciprocal relationship where personal information is shared by both parties (Oakley, 1981). My initial ideas about how I should approach interviewing were traditional, that is, the interviewer is there to gather data not to provide specialist information. However, I found myself repeatedly questioned by respondents and felt obliged to provide some medical information from time to time.

One respondent (R32) was adamant that the interview relationship should be reciprocal. The interviews, therefore, became more than just a question and answer session.

R32: What do you think of that? I think I am entitled to ask your opinion? (72-year-old man, low deprivation urban ward).

When questioned about either the study or myself, I gave open and honest answers. Where respondents sought health advice I referred them to their local health care service, feeling that this protected all parties' best interests. I declined to answer questions about the research topic until interviews had been completed. I continued to audio record these later conversations in case any theoretical significant data was generated.

3.6 Data Management

Forty-six interviews were conducted of which 44 were audio recorded. In two cases the recording device failed. In these two cases, additional detailed field notes were made immediately following the interviews. All data were anonymised on transcription.

A Computer Assisted Qualitative Data Analysis Software (CAQDAS) package called NUD-IST (Non-numerical Unstructured Data-Indexing, Searching and Theorising) was used to enable the rapid retrieval of data, rigorous and transparent coding, memoing and annotating within transcripts (Keller and Laurie, 1995). Using NUD.IST also facilitated comparisons between codes and categories. Theory building itself was, nevertheless, an entirely manual process (Charmaz, 2006).

Dissonance between NUD-IST and grounded theory, however, presented a challenge. NUD-IST requires the researcher to use '*a top-down approach*', starting with the identification of concepts or nodes, which are then broken down into hierarchies of smaller concepts, and are then re-included in the higher order ones (Weitzman and Miles, 1995; Kelle 1997). For grounded theory, ideally, the process is reversed in that open codes are amalgamated.

Open codes (also referred to as initial coding) (Charmaz, 2006) are created at the beginning of the analytical process (in grounded theory coding occurs at several stages of analysis). Coding can be usefully described as indexing (Bloor and Wood, 2006). "*Indexing (coding) is a process where the researcher applies meaning to raw data by assessing key words or phrases*" (Bloor and Wood, 2006, p101). During open coding fragments of data-words, lines segments or incidents are scrutinised for their analytical importance and assigned a title which reflects the nature of the data. These codes are subsequently compared, contrasted and amalgamated during focused codes (discussed later).

The operating programme of NUD-IST demands that the researcher imposed a hierarchy at the very start of open coding. This imposition may be disadvantageous as it has the potential to limit an emerging theory that may not be hierarchic but linear, cyclical or network in nature (Lonkila, 1995). In order to overcome this difficulty, and to assist the development of a suitable node tree before any data was inserted into NUD-IST, the first 21 transcripts were subjected to a preliminary manual coding exercise. An Interview Summary Sheet (Appendix 6) was used to capture the main issues arising in each transcript and codes were hand written into

the margin of the transcripts (Miles and Humberman, 1998). This enabled initial schemes of emerging codes and categories to be created and recorded by hand. The category and code schemes (or Nodes Tree in NUD-IST terms) were then inserted into a NUD-IST project. This starting point was advantageous for three reasons. Firstly it reduced, to some extent, the top down approach that using NUD-IST would have imposed. Secondly, it minimised making alterations to the node tree, which can be time consuming. Thirdly, it enabled me to immerse myself into the data before exploring data electronically, thus establishing my connection with the data at an early stage.

Once open coding had begun in earnest, hundreds of codes were created. At one point there were 327 nodes coded from just fourteen transcripts. The node tree was extremely complex at this stage. Codes then had to be collapsed to make the data manageable. The final node tree used can be seen in Appendix 7. Buston (1997) warns that when using CAQDAS coding can become unnecessarily obsessive and detailed - a criticism not unlike that of Glaser (1992) regarding the Strauss and Corbin (1990, 1998) model of grounded theory. Glaser's criticism therefore, suggest that overly detailed coding may not be just an issue when using CAQDAS but with coding within some models of grounded theory.

I was also aware of some more general concerns about the use of CAQDAS (Kelle, 1997; Webb, 1998). Firstly, it has the potential to change the feel of the analysis.

“Paper, pencil, scissors, paste, bundles of index cards, and poster walls may give you a different touch and feel of your research than desktop computers screens... and may be more importantly to inspire your creativity than even the nicest computer programmes”

(Personal memo by Heiner Legeiwe cited in Strauss and Corbin 1998, p. 276).

CAQDAS has also been criticised for alienating the researcher from the data.

Having listened to every recorded interview several times, transcribed each one myself and worked with the data both manually and within an NUD-IST project, I believe I know the data intimately. I did not feel alienated in any way and could remember respondents’ accounts and characteristics often without looking at memos. As Glaser and Strauss (1967) recommend, I had become immersed in the data.

3.7 Analytical Processes

Data analysis, although described here as a linear process, was cyclical. The analysis moved from open, focused, axial and theoretical coding while I simultaneously made constant comparisons between data, searched for disconfirming evidence and conducted theoretical sampling. Analytical processes, however, were applied flexibly to avoid the procedures dominating the analysis and blocking the analytical flow (Strauss and Corbin, 1998).

3.7.1 Open, Focused and Axial Coding

Several different tactics were used to facilitate open coding. At the beginning of the study, line by line scrutiny of the data ensured that I examined the detail of the data and helped me to avoid jumping to conclusions. During the later stages, analysis of data and coding was conducted paragraph by paragraph. The transition from line by

line to analysis by paragraph was a natural evolution, as I became even more familiar with the data, the node tree and the emerging theory. However, when new or interesting data presented itself, I returned to a line-by-line approach. During focused coding, open codes were collapsed into the codes which made most analytic sense and codes became more conceptual.

Axial coding took place alongside open and focused coding. Axial coding is not coding in the true sense of the word, but the process of relating categories to their subcategories and linking categories at the level of properties and dimensions (Creswell, 1998). In essence, axial coding involves reassembling data which has been fractured during open coding to form a more complete explanation of the phenomena. For example, having established strong analytical direction through open and focused coding that cleanliness was perceived by respondents to be important (amongst other factors) in preventing infection. The properties of the data coded as 'cleanliness' were compared with the properties of data coded as 'causes of infection'. This comparison demonstrated strong beliefs that dirt and germs were very closely associated; that dirt was perceived as the major causes of infection and hygiene as the key way of preventing infection. Respondents' emphasis on cleanliness appeared consistent with their beliefs about aetiology. Axial coding was facilitated by NUD-IST's capabilities to rapidly retrieval of coded data and cross-reference data between nodes using a number of Boolean searches.

3.7.2 *Theoretical Coding*

Theoretical codes are conceptualisations of how substantive codes relate to each other. Theoretical coding enables the researcher to “*weave the fractured story back together*” as theory is developed (Glaser 1978, p72). Theoretical codes evolved into the main conceptual themes presented in the empirical chapters. Having outlined the overarching theoretical scheme, the theory was refined. It was reviewed for internal consistency and for gaps in logic by going back and exploring data, codes, categories, memos and mind maps. Categories were reviewed to ensure they were fully developed through theoretical sampling. The theoretical scheme did not initially flow in a logical manner. Memos and mind maps were constantly reviewed and the thesis redrafted numerous times until the emerging theoretical ideas were clearly defined.

3.7.3 *Constant Comparison, Memoing and Disconfirming Evidence*

Three fundamental processes spanned the entire analysis; making comparisons, memoing, and searching for disconfirming evidence. Simple data counts were also used as a way of surveying the entire data set (Seale 1999).

Constant comparison is a rigorous strategy for producing rich theoretical accounts (Seale, 1999). Constant comparison was undertaken in four stages. Firstly, codes and were compared and grouped together as categories emerged. Categories and their properties were then compared and integrated. The third stage was represented by theoretical saturation (discussed below). The fourth stage was writing the theory. During this final stage, categories and their interactions were used to develop chapter

headings, properties were used to develop sections headings, and the coded data were used to provide examples (Seal, 1999).

I recorded my analytical ideas as memos. Memo writing was a pivotal intermediate step between data collection and finalising theoretical ideas. Charmaz (2006) describes memos as vital in keeping the researcher involved in analysis of data and helping researchers increase the level of abstraction. Memo writing took three forms. I recorded my analytical thoughts within the NUD-IST project as annotations attached to documents (in interview transcripts), or attached to nodes. I also made hand written analytical notes, in what I called my 'analytical diary'. This diary was essentially a portable notebook, which accompanied me during data collection and during meetings. I also created mind maps, (also known as spider diagrams) (Appendix 8) which were used to visualize the properties and conditions of codes and categories which were linked to and arranged around a category, concept or idea. Mind maps were particularly valuable when making comparisons. Multiple mind maps were constructed and early versions were compared to more recent ones. The benefits of visual methods lie in their ability to support imagination and creativity in analysis (Clarke, 2005). However, the use of mind maps represented my personal mode of working and was not an attempt to undertake Situational Analysis as described by Clarke (2005) (see Table 3.1).

3.7 4 Disconfirming Evidence: Scrutinising unusual cases

Data were scrutinised for disconfirming evidence in the form of unusual (also known as deviant or negative) cases (Strauss and Corbin, 1998; Charmaz 2006). Unusual cases were defined as those cases which possessed features common to many of the

cases but also demonstrated new features or the absence of features previously recognised. The aim of searching for unusual cases within data was to provide alternative explanations and modify developing theoretical ideas. Seale calls *this* “*an active fallibilistic approach*” (Seale, 1999, p75). It involves testing the provisional hypotheses by scrutiny and comparison with unusual cases until all the data can be incorporated into the emerging theory (Silverman, 2005). The scrutiny of unusual cases is believed to be advantageous in demonstrating that the data has been treated comprehensibly, that is, that every element of the data collected was incorporated into the developing theory. The identification and analysis of unusual cases can strengthen the trustworthiness of the research, but discriminating between incidents that marked new categories and those which were unusual cases was difficult. Methodological literature acknowledges this problem but gives little guidance about how to resolve the situation (Stern, 1994). In reality, I relied on the emerging picture to decide such questions.

3.7.5 Delayed Theoretical Sampling and Theoretical Saturation

Some grounded theorists recommend that theoretical sampling should be used from the start of a study (Strauss and Corbin, 1998). Others warn that this approach has the potential to bring about premature closure to analysis (Charmaz, 2006). In this study theoretical sampling was delayed until 21 interviews had been conducted selected on the basis of maximum variation (described previously). During theoretical sampling, respondents were selected on the basis of their potential to facilitate the development of categories. Following analysis of initial interviews, recruitment activities were targeted towards groups most likely to contain

individuals possessing the characteristics of interest. The process of data collection was, therefore, controlled by the emerging theory. For example, early analysis suggested that young adults from areas of high deprivation possessed different views to middle class parents and that men may have different views to women. To further develop the categories emerging in the data, recruitment efforts targeted young adults and men.

Delayed theoretical sampling had two pragmatic advantages; firstly, I was able to conduct the initial interviews rapidly because I did not need to transcribe and analyse each interview immediately after each episode of data collection. Initial recruitment was successful in some areas; several interviews were conducted a week and occasionally several during a single day. I felt it was important not to delay data collection once recruitment had begun because I feared that the respondents who had responded positively during my intensive initial recruitment efforts might lose interest in taking part. Secondly, Charmaz (2006) recommends delayed theoretical sampling because it enables the researcher to have a clear picture of the developing theory before additional data is collected. Delayed theoretical sampling facilitated a very focused approach to both recruitment and data collection in the later stages of the study.

From the outset of the study it was impossible to say exactly how many individuals would be needed to develop the emerging theory. After 46 interviews theoretical saturation had been reached and the decision to stop sampling was taken.

Theoretical saturation refers to the point at which gathering more data about a particular theoretical category “*no longer spark new theoretical neither insight nor*

reveals new properties of core theoretical categories” (Charmaz, 2006, p113). In this study when similar instances were seen time and time again and no new insights revealed categories were considered saturated.

3.7.6 The Use of Literature

Early writing on grounded theory suggests that researchers should avoid gaining too much prior knowledge of the issues being studied. Conducting a literature review prior to data collection is believed to increase the risk of the researcher making premature assumptions about data (Charmaz, 1983). However, later work has recognised that this is impossible and in some ways undesirable. In order to write a proposal and protocol for the study and to develop a suitable research question, exposure to the body of scientific evidence surrounding the topic is essential (Strauss and Corbin, 1990; Glaser, 1992; Charmaz, 2006). A limited literature review was, therefore, conducted prior to data collection. After this, literature was not explored until ideas, categories and questions began to emerge from the data. The literature used in this study was then specifically selected to aid in the exploration of the data, to sensitise the researcher to it and to place the emerging theories within the context of the wider scientific knowledge, that is, to act as a comparison and to stimulate questions. Charmaz (1983) refers to this as a ‘delayed literature review’.

3.8 Data Presentation

The findings of the study are reported in a style described by Charmaz (2006) as ‘show and tell’. Each of the empirical chapters contains descriptions of the findings, illustrative verbatim quotations from interview transcripts and potential explanations

about the meaning situated, where possible, within existing literature. In effect the findings and discussion are synthesized together. This approach was chosen because it reflected the actual process of analysis. Presenting data separately from analysis and discussion would mean artificially separating data from theoretical ideas. Indeed the process of writing was part of the analytic process. Theoretical ideas were drafted and redrafted as new data emerged.

3.9 Reflexivity

Reflexivity is concerned with being sensitive to the ways in which the researcher and the research process shape the collection and analysis of data. Being reflexive is about acknowledging the influence of prior assumptions, personal characteristics and experience on enquiry (Bloor and Wood, 2006). Traditional grounded theory suggests that the researcher is, can or should be, a ‘tabular rasa’ or blank slate (Glaser and Strauss, 1967), able to put aside all that they know and all they have experienced to conduct a study from an unbiased and objective stance. This goes back to the writings of Husserl and Heidegger who described epoche. Epoche is known as bracketing in phenomenological terms (bracketing is the suspension of preconceptions, interpretations, and explanations held by the researcher) (Polit and Beck, 2006). The ability of researchers to do this has, however, been questioned (Clarke, 2005; Charmaz 2006). Clarke suggests that a researcher “*comes to a project already knowing in some ways, already infected, already affected,*” (Clarke, 2005, p12).

Many characteristics of the interviewer and his/her biography (gender, race, age and social class) can affect the nature of the data generated and the researcher's interpretation of it (Fielding, 2003). In order to enhance the trustworthiness of the findings, I questioned my personal and intellectual assumptions. I kept records of thoughts and feelings in my analytical diary and engaged in open discussion with my supervisors and colleagues about all aspects of the study, in particular data analysis. This enabled a personal exploration of my perspectives and subjective elements of the enquiry. It was apparent that my nursing background had influenced my knowledge base and beliefs, which in turn had influenced my early analytical thoughts. I made conscious efforts not to measure the respondents' beliefs against my own or that of biomedicine.

3.10 Ethical Issues

The British Sociology Association (BSA) ethical guidelines were adopted as a framework for ethical decisions (<http://www.staffs.ac.uk/schools/humanities-and-soc-sciences>). The central principles of these guidelines are that the researcher should do no harm and respect confidentiality, anonymity and privacy. In order to meet research governance requirements, the Southeast Wales Local Research Ethics Committee was approached and asked to consider if the study required ethical approval. The response from the committee was that the study fell outside their remit and did not need approval (Appendix 9), as I did not plan to recruit via the National Health Service. Ethical approval was subsequently gained from the Cardiff University Medical and Dental School Research Ethics Committee (Appendix 10).

Respondent's real names were not used when transcribing data, and so respondents were allocated a numerical code. Real names referred to by respondents during interviews, for example, when referring to their children, doctors or health care providers were omitted during the transcription process. All data were kept secure on password protected computing networks and access to original data was restricted to the researcher. In accordance with the Data Protection Act (1998), data was only used for the purpose for which consent was gained.

Written informed consent was gained from all respondents prior to the interview (Appendix 11). Informed consent implies a responsibility on the part of the researcher to fully explain the nature of the research and the respondent's role (Polit and Beck, 2006). Written information about the study was provided to potential respondents (Appendix 3) and an opportunity to ask questions was given prior to asking respondents to sign the consent form.

3.11 Critiques of Grounded Theory Studies

The rise in popularity enjoyed by grounded theory has presented some dilemmas. Strauss and Corbin (1994) themselves predicted that grounded theory "*runs the risk of becoming fashionable*" (p277) and as such may be vulnerable to uncritical acceptance and poorly defined application. Some researchers who report that they have adopted a grounded theory approach have received criticism for their lack of adherence to methods explicated by the originator, for defining grounded theory simply as a set of procedures without appreciating the wider scientific context of interpretative inquiry (Wilson and Hutchinson, 1996) or as a general approach without understanding its philosophical underpinnings (Benoliel, 1996). There have

been suggestions that very few 'real' grounded theory studies have actually been conducted as the methods used by some researchers who label their approach as grounded theory are not always consistent with the key features of the methodology (Eaves, 2001; Richards and Richards, 1991). The lack of clear definition of key concepts (such as 'categories') within grounded theory may be partly to blame for the lack of standard approach (Stern, 1994; Charmaz, 1990).

Other criticisms of grounded theory have arisen when researchers fail to acknowledge its epistemological assumptions and minimise its relation to existing sociological theory (Charmaz, 1990). In this study, this problem was addressed by adopting a reflexive approach. By keeping detailed notes in the form of memos and a journal, analytical decisions were clarified and linked to existing theory as well as to my own prior assumptions.

There are drawbacks of using grounded theory, but these are common to all qualitative methods. Lofland and Lofland (1984) argue that the main problem is the risk of premature commitment to a set of analytical categories before the researcher has gained a comprehensive knowledge of the data. One tactic to reduce this risk is to use delayed theoretical sampling. A further drawback of grounded theory is the likelihood that the heavy reliance on coding typically conducted using computer assisted analysis software as a first step of analysis results in a narrow analytic strategy (Coffey et al, 1996). In response to this criticism, Kelle (1997) points out that researchers' actually use two methods during analysis: indexing (which could be considered coding) and the constant comparisons of concepts. Whether or not CAQDAS is used, these analytical procedures are the same. In this study, although

initial coding was rather mechanistic, a flexible and reflexive approach was adopted with open and axial coding occurring simultaneously.

3.12 Trustworthiness

There is continuing debate over whether qualitative and quantitative methods can, or should, be assessed using quality criteria (Seale, 1999). Anti-realists (those who believe that multiple perspectives of the world can be constructed during the research process) argue that because the underpinning paradigm of qualitative or naturalistic research is very different from that of quantitative positivistic research, that they should not be judged using the same measures (Mays and Pope, 2006). In qualitative research, the idea of reliability has been largely superseded by the idea of trustworthiness (Morse et al, 2002). Trustworthiness has several dimensions, credibility, dependability, confirmability, transferability and authenticity (Lincoln and Guba, 1985). Measures of credibility may be considered comparable with internal validity in quantitative terms, confirmability as objectivity, and transferability as generalisability.

Mays and Pope (2006) suggest that rigour, and thus quality, can be achieved through the systematic conduct, interpretation and communication of research. Other methods for supporting the validity of qualitative studies include triangulating data, respondent validation, and the production of an audit trail (Lincoln and Guba, 1985). Other qualitative researchers such as Seale (1999) recommend the use of reflexivity, inter-rater checks, attending to disconfirming evidence, analytic induction, simple counts and tabulation as ways of demonstrating the comprehensive use of data. Creswell (1998) recommends that qualitative researchers engage in at least two of

eight possible verification procedures; prolonged engagement in the field, triangulation, peer debrief, unusual case analysis, reflexivity, member checks, thick description or external audit.

In this study, the systematic and rigorous application of the principles of qualitative research and that of grounded theory were considered the principle means of ensuring trustworthiness of this study. However, a number of additional techniques were adopted; searching for unusual cases (previously discussed), comprehensive use of data demonstrated by counts and tabulation, and inter-coder checks for coding reliability.

Simple counts were used during analysis as a way of surveying the whole data set (Silverman, 2005). Where counts have been conducted they are reported in this thesis either in tables or within the main text. The use of tables in this thesis demonstrates the comprehensive use of data in that the reader can see the breadth, variation or similarity of the responses (Silverman, 2005). The tables help the reader evaluate the appropriateness of conclusions and the fit between the data and the emerging theory.

Inter-rater checks (referred to in this thesis as inter-coder checks) are a way of supporting the reliability of the coding scheme (Seale, 1999). Inter-coder checks enable researchers to assess the degree to which the codes are likely to convey shared meaning with others. The aim is to convince the reader that coding is logical and consistent. Seale (1999) also suggests that collaborative working during this process may generate new ideas about the nature of the data. In this study, the

reliability of the coding was supported through blind inter-coder checks. My supervisor independently coded 20% ($n=9$) of the transcripts. The coding decisions of my supervisor were compared to my coding decisions and node tree. Coding discrepancies did occur and these were resolved through discussion between coders resulting in codes and categories being redefined.

3.13 Summary

The aim of the study was to gain new insights and a deeper understanding of public attitudes towards infection, specifically CRI, resistant infections, and antibiotics. A grounded theory approach based on the model advocated by Charmaz (2006) guided the methods used within this thesis. The underpinning epistemology was consistent with an interpretive paradigm. Data collection and analysis were iterative.

Maximum variation sampling preceded theoretical sampling.

Respondents were recruited via community groups within areas of high, average and low deprivation. For some subgroups sampling was hindered by recruitment difficulties. Forty-six intensive semi-structured interviews were conducted. Data management was assisted by the use of NUD-IST software.

Initial coding was followed by focused, axial and theoretical coding. Constant comparison was the central activity during analysis with memos and mind maps facilitating theoretical development. Unusual cases were sought to enhance, refine and challenge emerging theories. Literature was used to sensitise the researcher to the data. However, to avoid framing ideas before analysis had commenced, an in-depth review of literature was not conducted at the start of the study.

The literary style of the empirical chapters reflects the analytical processes in that description of the findings are presented alongside excerpts of data which are situated within existing literature and theoretical explanations. A reflexive approach was adopted to enable me to explore my personal biases and assumptions.

BSA ethical guidelines informed the ethical decisions within the study. Ethical approval was gained from Cardiff University Medical and Dental School Research Ethics Committee.

Being aware of a number of criticisms of grounded theory studies, I made particular effort to make explicit the epistemological assumptions of the study and to maintain a reflexive approach to analysis aimed at overcoming the risks of premature commitment to analytical categories. Furthermore the trustworthiness of the study was promoted through the systematic and rigorous application of the principles of grounded theory, the use of simple counts and tabulation demonstrating comprehensive use of data, and by inter-coder checks of a number of transcripts.

Chapter 4: Prelude to the Empirical Chapters: Respondent characteristics and the nature of their accounts

4.0 Introduction

The aim of this study was to explore public attitudes towards infection and antibiotics, with a particular focus on bacterial resistance and the use of antibiotics for common respiratory tract infection. This short prelude sets the scene for the following three empirical chapters. It describes the socio-demographic characteristics of the respondents and identifies key subgroups within the sample referred to throughout the empirical chapters. In addition, this chapter also discusses the nature of the respondents' accounts. This chapter concludes by presenting a typology of respondent accounts (factual, responsible, uncertain, and inconsistent).

4.1 Respondent Characteristics

The respondents in this study represent a group of volunteers from four unitary authorities within South Wales. Forty-six individuals who were members of community groups were interviewed. The respondents resided in widely different communities: within areas of high, low and average deprivation and within rural, urban and post-industrial regions of South Wales (illustrated in Table 4.1.)

Respondents' ages ranged from 18-89 years. 70% were female. 63% were not in employment at the time of interview, of whom, 32% were mothers who spent their days caring for their children and the family home (at home mother or 'house wife')

full time, and 3% were retired. Most respondents were part of the indigenous population, having lived in Wales their entire lives ($n= 40$).

Table 4.1 Respondents' Characteristics by Area

Area	Deprivation level of electoral ward	Female	Male
Urban	High	6	1
	Average	4	0
	Low	3	4
	Total	13	5
Rural	High	0	0
	Average	8	1
	Low	4	0
	Total	12	1
Post- industrial	High	5	5
	Average	2	3
	Low	0	0
	Total	7	8
Age in years	18-25	8	5
	26-59	19	6
	>60	5	3
	Total	32	14

Of the six respondents who were not part of the indigenous population, five had migrated from England to South Wales for economic reasons or for the perceived benefits of a rural lifestyle. One respondent was an Eastern European migrant who had lived in South Wales for four years.

Initially, and consistent with the initial sample frame, data were coded according to the type of area in which respondents resided, that is rural, urban or post-industrial, and according to the level of deprivation attributed to electoral wards by the 2001 Census. Data were also coded on the basis of age, sex, and parental status-whether

or not the respondent had children and age of children, either under 5 years of age or between 5-16 years old. Excerpts from transcripts used to illustrate analytical points in subsequent chapters are labelled to reflect respondents' demographic characteristics. The term 'mother' or 'father' is only applied to respondents who have children between 0-16 years of age.

Data were also coded for social class, using an adapted version of the Registrar General's Occupational Social Classes (1980) (Appendix 12). This is a six-point scale and social class is allocated on the basis of the respondent's highest occupation (previous or current). In the later stages of analyses, education was acknowledged as a potential influence on health beliefs, and at this stage, data were coded to allow comparison of those with and without experiences of post-compulsory education.

Initially, community-wide, socio-economic deprivation appeared to influence particular attitudes. However, following close scrutiny of the respondents' demographic characteristics, three distinct subgroups reporting similar attitudes to the main research concepts emerged (notwithstanding a number of unusual cases, which are highlight in subsequent debates). These subgroups were labelled as respondents with health or science background, 'middle class parents' and 'young adults'. Table 4.2 describes each respondent's socio-demographic characteristics and places each respondent within their subgroup classification.

There were 11 respondents who had a health or science background. These individuals all had some level of professional training or qualifications within the fields of either biomedicine or health science. However, there were no practising

physician (doctor), nurses or allied health care professionals within the sample. Individuals in this subgroup were aged between 26-72 years of age. Four members of this group were retired, two were biomedical scientists, three had nursing backgrounds, one had a background in dietetics, and one had trained as a paramedic. One respondent had worked within health care in both clinical and administrative roles. Respondents from this subgroup typically lived in areas of low or average deprivation.

The subgroup classified as 'middle class parents' comprised of 14 respondents who tended to fall broadly within the Registrar General's Occupational groups II and III. Respondents in this subgroup were aged between 29-43 years of age and resided primarily within areas of relative low to average deprivation. Most respondents within this subgroup were mothers of children between the ages of 3 months and fifteen years. Two were fathers.

The subgroup, 'young adults' comprised of 15 individuals most residing in urban and post-industrial areas of high deprivation. One member of this subgroup lived in an area of average prosperity. The age range of this group was 18-25 years. Only one 'young adult' was employed at the time of interview. Few had any experience of post-compulsory education. Five were mothers whose main occupation was caring for their children; of these two were single parents.

Classifying respondents into these subgroups did present difficulties. Subgroup membership was not always exclusive. For example, two respondents (R2 and R25) were classified as having a health or science background and as middle class parents.

However, after close examination of the data, both these respondents were allocated to the health or science background subgroup because the data indicated that their scientific knowledge framed their wider beliefs. Six respondents did not fit into any of the defined subgroups. These respondents were classified as 'others.' All were older adults from 58-89 years of age. These respondents had various backgrounds. Three were male and two females. They demonstrated a variety of beliefs. Data generated by these respondents was dealt with using the same analytical rigour.





Table 4.2 Respondents' Characteristics and Subgroup Classification

ID	*Age	sex	P	Area	TS	Current occupation	Previous occupation	OSC	PCE
R1	64	F		U	AD	Retired	'House wife'	6	N
R2	30	F	<	U	AD	Biomedical Scientist	Unknown	1	Y
R3	34	F	<	U	AD	At home mother	Journalist	2	Y
R4	56	M		PI	AD	County Counsellor	Postman	4	N
R5	56	M		U	LD	Retired	Pharmaceutical Chemist	1	Y
R6	33	F	<	R	LD	At home mother	Bank Clerk	3	Y
R7	38	F		U	LD	Bio-chemist	Student	1	Y
R8	63	M		PI	HD	Retired	Industrial Fireman	2	N
R9	62	F		U	HD	Part-time retail assistant	'House wife'	5	N
R10	36	M	<	U	HD	Industrial Mechanic	Student	4	Y
R11	18	F	<	U	HD	At home mother	Since leaving school	6	N
R12	35	F	<	R	AD	At home mother	Nursery Assistant	5	N
R13	36	F	<	U	LD	Sports Coach(part-time)	Teacher	2	Y
R14	38	F	>	R	LD	At home mother	Marketing Consultant	1/2	Y
R15	29	F	<	U	HD	At home mother	Office assistant/secretary	3	N
R16	29	F	>	U	AD	Hospital Administrator	Homeopath	2	Y
R17	34	F	<	U	LD	Maternity leave	Customer advisor (insurance)	3	Y
R18	18	F	<	U	HD	At home mother	Since leaving school	5	N
R19	38	F	<	R	AD	Restaurant Owner	Unknown	2	Y
R20	89	F		R	AD	Retired	Factory Worker	5	N
R21	57	F		R	LD	Lecturer (child health)	Nurse	1	Y
R22	32	F	<	R	AD	At home mother/ Nursery Group Leader	Nursery Nurse	3	Y
R23	23	F	<	U	HD	At home mother	Since leaving school at 18 years of age	6	N
R24	29	F	<	R	A	Maternity leave	Company Director	1	Y
R25	40	F	>	R	LD	consultant (health and safety)	Occupational Health Advisor	1/2	Y
R26	33	F	<	R	AD	Maternity leave	Bank Clerk	3	Y
R27	54	F	>	R	AD	English Teacher	Unknown	1	Y
R28	30	F	<	R	AD	Maternity leave	Retail assistant	5	N
R29	24	F	<	PI	HD	Maternity leave	Retail assistant	5	N
R30	26	F		PI	AD	Beautician	Nurse	1	Y
R31	56	M		U	LD	Retired	Industrial Chemist	1	Y

R32	72	M		U	LD	Retired	Lecturer in Health and Social care(background dietetics)	1	Y
R33	21	F	<	U	HD	At home mother	Nursery Assistant	5	N
R34	60	M		R	AD	County Councilor	Retail Assistant	5	N
R35	36	F	<	PI	AD	Hair Dresser (self - employed)	Hair dresser	4	N
R36	43	M	>	PI	AD	Builder (self employed)	Since leaving school	4	N
R37	63	F		PI	HD	Retired	Nurse	1	Y
R38	18	F		PI	HD	Unemployed	Since leaving school	6	N
R39	19	M		PI	HD	Unemployed	Since leaving school	6	N
R40	18	M	<	PI	HD	Unemployed	Since leaving school	6	N
R41	22	M	<	PI	HD	Unemployed	Since leaving school	6	N
R42	25	M	<	PI	HD	Unemployed	Army	6	N
R43	21	M		U	AD	Insurance Clerk	Since leaving school	6	Y
R44	46	M		PI	AD	Work Based Trainer	Para-medic	1	Y
R45	19	F		PI	HD	Unemployed	Since leaving school	6	N
R46	19	F		PI	HD	Unemployed	Since leaving school	6	N

Legend

Respondent subgroup classification

	Health and science background
	Middle class parents
	Young adults
	Others

ID= Respondent code *= Age in years	Parental status (P) < Children under 5 years of age > Children 5-16 years of age
Post Compulsory Education (PCE) N= no Y=yes	
Townsend Score (TS) LD=Low Deprivation AD=Average Deprivation HD=High Deprivation R=Rural U=Urban PI= Post-industrial	Occupational Social Class (OSC) 1 Professional occupation 2 Managerial/technical occupations 3 Skilled occupations-none manual 4 Skilled occupations-manual 5 Partly-skilled occupations 6 Unskilled occupations

4.2 Factual, Responsible, Uncertain and Inconsistent Accounts: Artefacts of lay beliefs systems?

Soon after data collection began, it became apparent that the respondents' accounts varied considerably, not just in terms of what was reported, but also the manner in which beliefs and experiences were expressed. Indeed, many respondents expressed beliefs and experiences differently within the same interview. These differences were not surprising, given the complexity of the interview data and variations in the personal context of individual accounts (Cornwell, 1984; Shaw, 2002). The following section explores previous ways of classifying interview data by Cornwell (1984) and Britten (1996). A new typology of interview accounts, generated from this study, is then presented.

Cornwell's (1984) ethnographic study of health beliefs classified illness accounts as 'private' or 'public.' 'Private' accounts were given when people were narrating personal experiences and these were more likely to be elicited when trust had developed between the respondent and interviewer. In contrast, 'public' accounts, according to Cornwell, occur in response to formal and direct questioning. They reflected beliefs and values that were likely to meet with public approval. Public accounts were concerned with norms, morality, responsibility, acceptability and the legitimacy of the illness.

In her qualitative exploration of lay views of medicines, Britten re-classified Cornwell's 'private' and 'public' accounts as 'orthodox' and 'unorthodox', based primarily on the presence or absence of medical or self legitimatisation within interview accounts (Britten, 1996). Britten's criteria for orthodox accounts included

medical legitimisation, (for example, citing medical opinions as justification for actions), the absence of self legitimisation, not referring to personal views (not using 'I believe'), and deferring to the interviewer's expertise (asking if answers were correct). Unorthodox accounts were characterised by self-legitimation, absence of medical legitimisation, checking the interview was 'off the record', and appealing to alternative healing traditions, such as complementary medicine.

In my study, no attempt was made to formally classify accounts using the criteria suggested by either Cornwell or Britten. Eliciting unorthodox/ private accounts was unlikely to occur in this study because private accounts are more readily elicited in a trusting and open relationship between respondent and interviewer which has been built over time and multiple encounters (Britten, 1996). Cornwell reflects that she was only able to generate private accounts after interviewing participants on several occasions over lengthy periods. In my study, the researcher remained a relative stranger to the respondents. Only single interviews were conducted and opportunities to develop relationships with respondents were limited.

It is not possible to determine the extent to which the respondents' accounts in this study were public or private 'orthodox' or unorthodox', but reflection on the nature of the accounts led to the development of a new taxonomy comprised of factual, responsible, uncertain, and inconsistent accounts.

4.2.1 Factual Accounts

Factual accounts were provided primarily by respondents with a health or science background, and some middle class parents, when they were talking about isolated abstract concepts. For example, when discussing resistant infections respondents would cite one or more facts, probably gleaned from their professional training, and possibly supported through exposure to scientific media reports. Respondent 32 (R32) who is a retired lecturer in health and social care provides an excellent example of a factual account of how antibiotics work.

NH: Do you have any ideas about how antibiotics work?

R32: Yeah I have something of an idea. By antibiotics we really mean Bactericides in other words we rule out viruses, so that's what we are talking about. You have pathogenic bacteria creating the problem, and thank god for Fleming and his success because there is now a variety of chemicals, Mother Nature provides them, once again note, instead of going to gravestones and rubbing lichens on your skin, we now have penicillin. Thanks to that although we have a range of pathogenic bacteria we now have almost a complete set of antibiotics to treat them, MRSA included, just about. Well I've never really thought about it (reasons why some individuals experience diarrhoea as a side effect of antibiotic therapy). Again. I can't speak from person example. But if we think about diarrhoea in general then we are normally talking about a transit time of 24-36 hours isn't it. Well if you've got diarrhoea then it means that the transit time is radically reduced whereas we have to liquefy as much as possible and absorb and then most of that water is reabsorbed and I don't need to tell you this but my understanding is that there is a variety of reasons that can account for the fact that, that normal process is not taking place (72-year-old man low deprivation urban ward).

4.2.2 Responsible Accounts

Responsible accounts were characterised by appeals to the interviewer to confirm whether their answers were correct, or when respondents cited formally received medical advice as rationale for their actions. This suggests that these respondents were providing, what they perceived to be acceptable answers, rather than their personal opinion about the topic being discussed.

R1: Because the doctor says take this course of antibiotics even if you feel better, please take whatever is left, so that's what I always do (64 year-old female, average deprivation urban ward).

R32: Oh yes, absolutely. If I am having any sort of treatment whether it's my optician, my dentist, my GP, co-operation and trust is essential between the two individuals and (GP) said I want you to do this and stick to it. He need say no more. I did exactly what he advised me to. (72-year-old man, low deprivation urban ward).

Responsible accounts serve a purpose of presenting the speaker as socially responsible. Lay explanations are often orientated toward gaining the legitimacy afforded by appealing to medical rationality and wider social norms (Radley and Billing, 1996). For example, respondents who were aware of the need to reduce antibiotic consumption claimed to have rarely consumed antibiotics themselves and made hostile comments about those whom they believed were frequent antibiotic users ($n=14$). Shaw (2002) suggests that the public redefine their thinking before an encounter with a professional, in order to present their case in the most scientifically legitimate format.

R37: You should talk to my niece really, she's terrible, she's always down the surgery with her kids and they're always on antibiotics (63-year-old woman, high deprivation post-industrial ward).

4.2.3 Uncertain and Inconsistent Accounts

Uncertain accounts were typified by long pauses, raised intonation, unfinished sentences, avoidance of eye contact and questioning the interviewer. Some respondents also plainly stated that they were 'unsure'.

NH: Do you have any ideas about why taking the full course of antibiotics is recommended?

R11: I suppose it (illness) could get worse. (Pause). I'm not sure (18-year-old mother high deprivation urban ward).

NH: You've mentioned bacteria and viruses, can you tell me a little more about what you know about them?

R33: I would have said it's the same. (Pause) thing... isn't it? What's the difference? (21-year-old mother, high deprivation urban ward).

Respondents' uncertainty could be a result of limited knowledge or perhaps being in receipt of mixed messages from health education campaigns and the media.

Previous multi-national quantitative studies have demonstrated that members of the public possess little scientific understanding of the nature of antibiotics and their use in treating the common cold (Pechère, 2001). However, in most qualitative research projects, respondents are asked to think on their feet, and the limits of memory are likely to affect the responses. Indeed, many respondents commented that memory influenced their accounts.

Some respondents' accounts were inconsistent. For example, during the interview a respondent may indicate that they adhered to prescribed antibiotic regimes but subsequently reported storing unused antibiotics.

NH: When do you stop taking the antibiotics?

R1: When they've all gone, even if you feel better, because that's what the doctor says. Because the doctor says take this course of antibiotics even if you feel better, please take whatever is left, so that what I always do.

(The respondent later in the interview talks about antibiotics that she had stored and the reason why she kept them)

R1: I don't know why. I think it's because I feel better, I stop taking the pills and put them in the draw, don't feel well, think oh I've got antibiotics in the draw I'll take those (64-year-old woman, average deprivation urban ward).

Such inconsistencies may reflect changes in the individual's behaviour over time (discussed in Chapter 7), as well as confusion or misunderstandings about the

aetiology of infection and how antibiotics work, lapses in memory previously mentioned or misunderstanding of the question. Inconsistencies might also occur due to the severity of the illness being discussed at that point in the interview or depending on who is being treated - themselves or their child. Discursive psychologists propose that talk is more than a simple reflection of the 'workings of the mind' but part of a process whereby the individuals make health experiences 'socially intelligible' (Radley, 2004). The contradictory elements and expressions of uncertainty are therefore an important component of conversations about health. These elements are not deficiencies but are tools used by respondents to establish understanding and are part of a broader process of 'meaning making' (Radley, 2004). Similarly, Blaxter (1983) in her study of working class women noted that during interviews informants simultaneously developed understanding: 'alternatives were tried out, rejected, associated with each other, or traced from one period of life to another'. It is likely that the inconsistencies and uncertainties expressed during interviews represent the dynamic and emerging nature of beliefs that were developed during the course of each interview.

Another factor likely to influence inconsistent accounts is the unpredictable relationship between knowledge, feelings and behaviours. Psychologists report that attitudes do not always enable behaviours to be predicted (Gross, 1996).

Inconsistency in accounts may also be influenced by the "*complex, subtle, sophisticated, and amalgam*" nature of lay beliefs (Kangas, 2002, p89). The lay public are not passive recipients of knowledge: they make sense of illness by using a number of resources such as experts and media in order to explain personal experience. Several explanatory models may be synthesised in to a single belief

systems. Differences between explanatory models that have not been fully consolidated within the respondents' conceptual framework may result in the expression of inconsistent accounts.

Inconsistent accounts created difficulties when using simple counts and tabulation. Where respondents contradicted themselves, the total number of episodes of a particular response was not always consistent with the total number of participants. For example, a number of respondents stated that they completed the full course of antibiotics only later in the interview to acknowledge that they had some left other antibiotics stored in the home. This implied that in fact they did not always adhere to treatment regimes. As a consequence, at times, the total number of behaviours exceeded the total number of respondents in the study because multiple behaviours were reported.

Respondents' views rarely fitted exclusively into one of the categories. Furthermore, the nature of the accounts changed with the topic of conversation. Some single interviews reflected characteristics consistent with all four components of the taxonomy; that is, they were factual, responsible, uncertain and inconsistent at times. It is likely that certain topics or questions were more likely to produce certain types of accounts. For example questions about germs are more likely to produce factual or uncertain accounts (knowledge) but questions about behaviour are more likely to produce responsible or inconsistent accounts.

The changing nature of accounts may also be an artefact of the way in which attitudes are organised within the mind. Abelson and Carroll (1968) proposes that

many attitudes are organised within the mind as ‘opinion molecules’ each contain a belief, a feeling and behaviour. The study was designed to explore three central concepts simultaneously, and this may have influenced the multiple nature of accounts. The complexity of lay beliefs was perhaps amplified and expressed through the variations in the nature of accounts. In these terms, factual, responsible, uncertain, and inconsistent accounts may simply be artefacts of the ‘bricolage’ (Busby et al, 1997) of complex, multi-dimensional beliefs systems.

4.3 Summary

Respondents in this study came from a variety of socio-economic backgrounds, with a spread of age but were predominantly middle class mothers between 30 and 40 years. Three key subgroups of respondents emerged from the data, respondents with a health or science background, middle class parents, and young adults. It was not possible to categorise all respondents in this way; a small group of respondents were categorised as ‘others’.

Although the respondents’ accounts displayed particular characteristics which were categorised to form a typology of; factual, responsible, uncertain, and inconsistent accounts. These categories were not mutually exclusive, single accounts could often be applied to two or more categories. The multi dimensional nature of accounts may be related to the way beliefs are structured within the mind, or could be a consequence of artefacts of complex belief systems.

Chapter 5: Infection and Resistance: A world of unseen dangers

5.0 Introduction

The discovery of antibiotics “*transformed doctors, and indeed the publics’*, *perceptions of medicine. In the public imagination, antibiotics came to symbolise the almost limitless beneficent possibilities of science*” (Le Fanu, 1999; p 5). Yet, despite advances in medicine and improvements in hygiene, sanitation, immunisations, and diet, infection remains a common cause of illness and the recent emergence of resistant infections has presented a new threat. Most scientific research has, thus far, attempted to understand the nature of microbes, bacterial resistance and how best to control infection. Little is known about how members of the public perceive infection. Few studies have explored lay attitudes to the increasing threat from bacterial resistance, and how the public can play a fuller part in containing the problem of bacterial resistance, and resultant, resistant infections.

Our attitudes are shaped by our experiences (Blaxter, 1983). All respondents in this study reported experiencing some type of common, predominantly upper respiratory tract infection (discussed in chapter 6). However, none of the respondents had personal experience of resistant infection, although a few did provide accounts of the experiences of friends and family members ($n=3$).

R30: Yeah, my cousin went in to hospital. He had been ill for years and years and years and he went into hospital and he died because um his resistance was low, anyway because of his illness, anyway, and he had been in hospital for quite a while. And the next thing I knew was he had the superbug, and then he died. And I know other people who have caught it as well (26-year-old woman, average deprivation post-industrial ward).

This chapter explores respondents' beliefs about common infections and their prevention. It begins with a broad exploration of attitudes towards microbes. Views indicating hostility towards germs are counterpoised against more positive attitudes of 'good bacteria'. Respondent awareness of the body's own immune defences and their knowledge and beliefs about preventing infection are discussed before examining specific wider beliefs about bacterial resistance and resistant infections. The role of the media in perpetuating beliefs about bacterial resistance is highlighted. The chapter ends by exploring respondents' lack of ownership for the control of resistant infection. The key findings of this chapter in relation to public beliefs about bacterial resistance have been published in the *Journal of Antimicrobial Chemotherapy* (Appendix 14).

5.1 'Germ Warfare'

In this study, self reported attitudes towards infection and its prevention were described in terms of aggression and hostility, grouped together here as 'germ warfare'. Within this conceptual theme two sub-themes are explored. Firstly, hostile attitudes in relation to a perceived association between dirt and germs are described. Secondly, respondents' awareness and beliefs about how their personal risk of contracting infection can be reduced is discussed.

5.1.1 *Demonising Germs*

Respondents typically referred to the causes of infection using a variety of terms interchangeably, but most used the term 'germs'. 'Germ' is an historical term used to refer to the 'seed' (cause) of infection (Tomes, 1998). In this study germs were described as tiny organisms ($n=3$), microorganisms ($n=5$), microbes ($n=1$), tiny little

creatures ($n=2$), 'bits' ($n=1$) and pathogens ($n=1$). The term 'germ' was also associated with specific microbial organisms, such as, bacteria and viruses (discussed in a later section). The use of the term germs positioned respondents' beliefs about the causes of infection with the current accepted biomedical model of infection. However, a few respondents talked specifically of germs causing wound infection, suggesting that perhaps other types of infectious illness were associated with causes other than germs ($n=4$).

R18: It's just bits that have gone into it (wound), dirt and germs (18-year-old mother, high deprivation urban ward).

R10: Basically an attack on the body systems by a pathogen, getting into the blood stream.

NH: What do you mean when you say pathogens?

R10: Basically, alien organisms or alien to the body (36-year-old father, high deprivation urban ward).

R15: Ummm (silent pause) I suppose perhaps outside organisms invading the body, perhaps picking up a cough from someone (29-year-old mother, high deprivation urban ward).

R17: No. I just picture things like the Domestos advert, just germs really (23-year-old mother, low deprivation rural ward).

R24: Whenever I hear the word infection I always think of bacteria, so I just, to me an infection is, I suppose something bad, bacteria going on inside your body. Something that you have picked up from somewhere, which is attacking a certain part, I suppose (29-year-old mother, low deprivation rural ward).

Germs were also described as 'bugs' ($n=11$), a metaphor which has historical antecedents. During the 1800s, science commentators likened microbes to insects, worms and parasites (Tomes, 1998) and it is possible that these scientific descriptions have persisted within lay metaphors.

R34: Well I suppose I think of some sort of bug or other that is playing havoc with my immune system. That's the only way I can describe it (60-year-old man, average deprivation rural ward).

Some respondents reported emotive attitudes towards germs. Negative feelings about germs were strongly expressed not just by the language used by respondents to describe them, but also by non-verbal cues, such as facial expressions and intonation. Germs were described as 'horrible little things' ($n=3$), invaders ($n=4$), intruders ($n=1$), and as attacking the body ($n=11$). Frequent use of war metaphors portrayed microbes as aggressive invaders of the human body and depicted conflict between man and microbe.

R36: Germs are attacking and breeding. Something invasive is going on. Some part of your body or in some system, yeah all the bad, bad stuff (36-year-old man, average deprivation post-industrial ward).

R34: I have just gone through a knee replacement and there was a time during that when I thought that I had an infection there. Because after a week it (knee) started to give me a lot of pain and it was very hot. And I just thought that there may be something there doing battle, and maybe it's the bug kicking against the immune system, fighting each other (60-year-old man, average deprivation rural ward).

R36: There are lots of little bugs or soldiers, whatever you want to call them, and they got to be caught and treated (43-year-old father, average deprivation post-industrial ward).

Hostile attitudes towards microbes are not new. Tomes (1998) described how, in the 1870s, exponents of the germ theory painted alarming portraits of environments saturated with invisible enemies. Literature from the nineteenth and early twentieth century portrays microbes as lethal agents of destruction (Helman, 1978; Tomes, 1998; Simonneaux, 2000). These negative images appear to have persisted throughout generations. In this study, the positive roles of germs were infrequently

mentioned by respondents. Public anxiety about infections and germs are, nevertheless, somewhat understandable as infectious disease remains a risk to public health. Negative attitudes towards microbes were extreme at times, and affected behaviour in social settings. One respondent talked of her 'germ phobia.'

R24: I definitely don't eat out of the same bowl as anyone else if there are picky things (nibbles, peanuts, crisps, finger foods) because I have a germ phobia (29-year-old mother, low deprivation rural ward).

Germs were believed to exist widely within the environment and outside of the human body. They were described as being 'all around us' ($n=7$) in the air ($n=5$), in houses ($n=7$), parks ($n=2$), and gardens ($n=2$). Germs were associated with pets ($n=9$) and particularly with dirt ($n=37$).

R1: Bacteria and dirt, if you get dirt in a cut the bacteria in the dirt causes it to go funny (64-year-old woman, average deprivation urban ward).

R33: Just from having done food hygiene and things like that, that bacteria is about dirt not being hygienic enough, isn't it? (21-year-old women, high deprivation urban ward).

Consistent with their hostile attitudes towards germs, some respondents also indicated negative attitudes towards dirt, dirty environments, and even dirty people. They described their own or other people's efforts to remove dirt and germs from their environment.

R24. I know that he (father-in-law) isn't the cleanest person in the world either. Someone really needs to say something to him (29-year-old mother, low deprivation rural ward).

R37: Everything you touch is dirty isn't it. We're almost on the psychiatric thing now where everybody is madly cleaning everything. It's sort of there so clean it. I remember my friend when she was pregnant. She took one boy to Porth (funfair), you know with the rides and everything, and she was there with a bottle of disinfectant before she would let him go on it. We used to stand still and she used to hose us down with disinfectant, that sort of thing, you know (63-year-old woman, average deprivation post-industrial ward).

Negative perceptions of dirt are not uncommon in Westernised societies but do not necessarily equate with scientific principles. Although dirt can indeed harbour micro-organisms, few microbes are actually pathogenic. In addition, a lack of visible dirt does not equate with an absence of microbes. Millions of microbes can exist on objects which are visibly clean. Therefore, contact with dirt does not necessarily lead to infection and visible cleanliness will not always prevent it.

Negativity towards dirt, however, is not only associated with disease but also with low status and failure. Dirt, dirty people and environments are socially unacceptable (Curtis et al, 2003). It is likely, therefore, that respondents' negative perceptions of dirt may influence their perceptions of germs and vice versa.

When probed about the nature of germs, most respondents expressed a belief that germs were ultimately bacteria ($n=35$) and that all bacteria were harmful ($n=29$).

Table 5.1 lists the microbial causes of infection reported by respondents when prompted to do so during interviews and shows that relatively few respondents recognised viruses as a cause of infection. In reality, viruses are common causes of infection, particularly for respiratory tract infections. Only one respondent mentioned fungal infections, despite common minor infections, such as Athlete's Foot and Thrush, being fungal.

Table 5.1: Microbial Causes of Infection Reported by Respondents

Causes of infection	Number of respondents
Germs	31
Bacteria	29
Virus	13
Fungi	1

Few respondents were able to describe differences between bacteria and viruses, despite all respondents acknowledging familiarity with both terms. Uncertainty about the differences between microbes of varying types may have influenced respondents' use of the more global term 'germs'. The interjection of numerous combinations of different descriptors when referring to microbes and infection (some respondents referred to 'germs', 'bacteria' and 'bugs' within single definitions of infection) supports the idea that respondents were generally uncertain about the nature of microbes.

NH: Do you have any ideas about different types of germs?

R14: Not particularly, no, not a thing (laughs) (38-year-old mother, low deprivation rural ward).

NH: Do you think there are any differences between those two organisms (bacteria and viruses)?

R2: Yes, I know that there is, but I don't know what the difference is (30-year-old woman, average deprivation urban ward).

In contrast, and unsurprisingly, respondents with a scientific background reported a more sophisticated awareness of the differences between bacteria and viruses.

R5: Well yeah, bacteria are single celled, viruses, I think, it's where the DNA is, I presume. I'm trying to dredge it back. I know that bacteria are prokaryotic and they don't have a nucleus but they have a cell wall. I'll have to try to think about

viruses. But they are different. They work in different ways and they replicate their DNA differently (56-year-old man, low deprivation urban ward).

5.2 Defences against Germs

The following section discusses respondents' beliefs about how their personal risk of contracting infection could be reduced and evaluates lay beliefs about the extent to which the body has the ability to protect itself.

Respondents' beliefs about avoiding infection were classified on the basis of a dual typology originally described by Harris and Guten (1979) and later used by Pill and Stott (1985). Ideas about avoiding infection were classified as either health practices (lifestyle efforts to avoid infection e.g. taking exercise and diet) or preventative procedures (ways of avoiding infection or reducing infection risk). Pill and Stott (1987) described preventative procedures as the use of NHS services (such as screening). In contrast personal health practices were described as lifestyle choices deemed to have the potential to prevent illness. In this study, virtually none of respondents talked of using NHS services as a way of preventing infections, although one did mentioned being 'tested for MRSA' when they were admitted to hospital. This is likely to reflect the context of this study as most professional services such screening occurs for serious, preventable or chronic illness. An additional category, 'other factors', was used to categorise several unusual cases including those respondents who believed that psychological and constitutional factors such as being 'run down' or 'stressed' could influence one's likelihood of infection. Table 5.2 identifies the various health practices and preventative procedures that respondents believed could reduce their risk of infection.

Table 5.2: Health Practices and Preventative Procedures to Reduce Risk of Infection:

The number of respondents mentioning each practice or procedure

Health practices (Healthy lifestyle)			Preventative procedures			Other factors
Diet	Exercise	Rest and sleep	Home hygiene	Hand washing	Avoiding others	
40	15	18	13	5	9	6

5.2.1 Health Practices

Many respondents referred to ‘keeping healthy’ and having a ‘healthy lifestyle’ as being pivotal in reducing their infection risk by strengthening the body. Adopting a ‘healthy lifestyle’ involved a variety of choices relating to diet, exercise and rest.

R28: If you were less healthy then you’d be more likely to pick it up. I suppose fresh veg and exercise. I am aware that you should keep yourself healthy and it’s up to you how much you do really (30-year-old woman, average deprivation rural ward).

Dietary choices in particular were central to respondents’ beliefs about optimising health. Many respondents advocated consuming a ‘balanced’ diet high in fresh fruit and vegetables. A number of respondents indicated that they aimed to eat five portions of fruit or vegetables a day reflecting the message of an ongoing health education campaign. Diets high in fruit and vegetables have been advocated as part of a healthy lifestyle because of their ability to reduce the risk of some cancers and cardiovascular disease for many years (Lampe, 1999). A small number of respondents in this study believed that ensuring their diet contained fresh fruit and vegetables was one way of optimising their intake of vitamins, and vitamins were perceived as affording them protection against infection.

R1: Yes I think there probably is, with the vitamins there are in fresh vegetables, as long as you cook them properly, that will ward off infections and fruit as well, with vitamin C and vitamin B1, in some things, isn't there? That's supposed to be good for you. All the vitamins in fresh food, I'm sure helps. I'm sure it does (64-year-old woman, average deprivation urban ward).

In addition to the consumption of fresh fruit and vegetables, some respondents used dietary supplements to maximise their vitamin and mineral intake ($n=7$). In particular, vitamin C was identified as being able to reduce the risk and also the duration of infections, such as colds and influenza. The therapeutic effectiveness of vitamin C in reducing infection risk and the length of illness are, however, contentious. Studies have reported that in otherwise healthy individuals, the benefits of taking vitamin C supplements are limited (Douglas and Hemilä, 2005).

Foods that were perceived as 'natural' in origin, 'home made' or 'organic' were believed to have greater health benefits than other foods ($n=5$). In recent years, organic foods have enjoyed increased popularity following a number of food safety scares (Enticott, 2003). In this study respondents demonstrated sophisticated ideas about the body's energies being misdirected at toxins contained within food rather than on combating infection. Studies of populations in rural England have reported beliefs that the consumption of natural or organic foods can "*immunise the body against illness*" (Enticott, 2003, p259).

R24: I'm not saying that we never eat chips or open a tin of beans because that would be completely untrue, but we do on the whole eat organic foods, cook most of our meals from scratch using fresh food, fresh fruit and vegetables, fresh meat. I don't particularly like using pre-packaged foods that are full of additives. I don't think that that does your body any good. I think that that reduces your resistance. If you have things going into your body that shouldn't be there, then your body is trying to fight the things that shouldn't be there so that makes you more vulnerable to picking up infections because your body is already working hard getting rid of

toxins without trying to fight off infection (29-year-old mother, low deprivation rural ward).

Many respondents expressed a belief in the value of keeping fit and taking exercise as a way of promoting health by strengthening the body. For more than a decade there has been a steady accumulation of evidence confirming the benefits of exercise in terms of physical and mental health which has been widely publicised (Lampe, 1999).

5.2.3 Preventative Procedures

Middle class parents and respondents with a science or health background were more likely to describe how preventive procedures could reduce risk of infections. The preventive procedures described comprised of three key elements; ensuring the home was clean, hand washing, and avoiding crowded places or those with existing infection.

Some respondents acknowledged the importance of home hygiene as a means to reduce the risk of infection ($n=13$). Considering the close association between dirt and germs, beliefs that home hygiene has a role in the prevention of infection were not surprising. During the industrial revolution the importance of hygiene was rigorously promoted, driven by the mass movement of populations into crowded industrial towns, where infectious disease was rife. At the same time germ theories of disease became widely accepted and, as a result, modern industrial societies developed hygiene oriented cultures (Tomes, 1998).

Parents, in particular, described the importance of keeping the home clean. Most mothers in this sample adopted traditional female roles; they stayed at home to care for children and took responsibility for the maintenance of the home environment and family health. Some mothers reported their cleaning priorities as ensuring high standards of cleanliness in kitchens and bathrooms. Some indicated that urine and faeces presented particular risks to health and consequently the cleaning of bathrooms was of particular importance. Although few respondents in this study discriminated between different types of dirt, some did clearly express that exposure to human excrement was more unacceptable than exposure to environmental dirt such as soil. Indeed the term 'dirt' is defined in two ways, as soil or excrement (Collins Pocket Dictionary and Thesaurus, 1993).

R36: I am always shouting at the kids because it's very important (hand washing). From a personal hygiene point of view, if (child) doesn't wash his hands after going to the toilet, or eats with his mouth open, then we give him a really hard time. But when we are on our own, we've been digging in the garden and he is having a cup of tea then I don't give him such a row (43-year-old father, average deprivation post-industrial ward).

R35: Well at the end of the day I think that there are a certain amount of bacteria that you get used to. Toilet bacteria I don't think you ever get used to (36-year-old mother, average deprivation post-industrial ward).

Increased aversion of certain types of dirt may be explained by Douglas's theory of disgust. Douglas (1970) suggests that disgust is a by-product of the way individuals organise their lives. Individuals place objects into categories and objects that 'don't fit' may be classed as dirty, polluting or disgusting. For example, soil in the garden is in the right place and not particularly dirty, but if soil is brought into the kitchen, it is in the wrong place and can lead to feelings of disgust. Douglas (1970) suggests that faecal matter is perceived as neither inside nor outside the body and as such it

threatens peoples' ideas about what is and what is not part of them. Data from this study suggests that some members of the public had aversions to dirt, even when dirt was in the correct place. For example, handling soil in the garden was perceived by some to be unacceptable.

R21: I encourage the students to plant some seeds, we have a small garden area and patio with lots of pots, and I had several of them (students) that said 'oh where are the gloves', 'I am not touching that dirt', sort of afraid of the natural environment as if it's all bugs and horrid things are in soil and going to harm them (57-year-old woman, low deprivation rural ward).

Some mothers also indicated that cleaning became increasingly important when there was a new baby in the home and acknowledged that babies were more susceptible to infection than other family members. The increased attention to cleaning when there is a new baby in the home may suggest that parents are more amenable to hygiene related behaviour change following child birth (Curtis et al, 2003). Mothers in this study also reported their use of antibacterial cleaning products more than others respondents, because these were believed to be more efficient destroyers of germs ($n=13$).

R35: With the baby around I think that's it's important to be clean. You've caught us on our cleaning day today. We like Detox. I spray it over the high chair and wipe it off and it's quick and easy and then I don't have to worry about things being clean so much (36-year-old mother, average deprivation post-industrial ward).

A few respondents were aware of the importance of food hygiene in reducing the risk of 'tummy bugs' (gastrointestinal infections). Three respondents had attended food hygiene courses.

Being clean means more than just removing dirt and germs. In addition cleanliness has a moral value. Generations of Western populations have been socialised to the idea that being clean is good and desirable. The idiom ‘cleanliness is next to godliness’ was first used by the Reverend John Wesley in the eighteenth century (Harris and Sachau, 2005). The importance of hygiene may not be related to just a desire to rid the environment of dirt and microbes but also because attention to hygiene has a moral value and to have a clean home is socially desirable (Curtis et al, 2003).

To a much lesser extent hand washing was cited as an important method of reducing risk of infection ($n=5$). Surprisingly, soap was not mentioned by many respondents, despite its important properties in augmenting the effective removal of microbes from the skin. One respondent did mention using antibacterial ‘hand wash’ (soap).

R24: My big bug bear is hand washing because I know that is how we pass on, especially colds, we pass it on mouth, eyes, nose and I think if you have got dirty hands and you are touching other people. I do this all, all the time (puts hands around her mouth) (laughs) (29-year-old mother, low deprivation rural ward)

R15: Washing hands I feel is very important. My kids always wash their hands before meals, before food, so if there are any germs on them then hopefully they get washed away as well (21-year-old mother, urban high deprivation ward).

Failure to wash hands, however, has been reported in both community and health care settings (Curtis et al, 2003). Most studies examining this issue have explored the hand washing behaviours of health care professionals (Pittet and Boyce, 2001). Studies conducted in health care settings have suggest a number of reasons for lack of hand washing, including, lack of education, high workload, time pressures, lack of staff, lack of guidelines, lack of suitable hand washing facilities, allergies and

damage to skin from hand washing solutions (Pittet and Boyce, 2001; Whitby et al, 2006). There have been very few studies which have investigated hand-washing behaviour in general populations or the perceptions underpinning hand washing behaviours, such as beliefs about infection and microbes. Curtis et al, (2003) in their observational study in the Wirral UK, reported aesthetics as a key reason for hand washing in the home - the emphasis being a desire to be visibly clean. The invisibility of germs may therefore negatively influence hand-washing behaviour. Whitby et al (2006), sampling children, mothers, and nurses, similarly reported that hand washing was motivated by a desire to remove visible dirt in children and mothers but was also undertaken ritualistically after going to the toilet.

As well as paying attention to environmental and hand hygiene, respondents also described how it was possible to reduce the risk of infection by avoiding places where the risk of contagion was perceived as high. Crowded public places such as schools, buses, and waiting rooms were believed to heighten infection risk.

R22: I don't know, just being where there lots of people, anywhere where there's lots of people you are more likely to catch an infection, to pick it up (32-year-old mother, average deprivation rural ward).

Young adults were least able to suggest how they could or would reduce their personal risk of infection compared to other groups. This led me to hypothesise about the younger generations' ability to self-care, and their access to, and receipt of, health messages. In comparison, middle class parents demonstrated sophisticated ideas about how to reduce their personal risk. These respondents typically had higher rates of post-compulsory education than young adults and, due to their age,

were more likely to have greater experience of ill health. However, ideas on prevention may also have been influenced by respondents' beliefs about the causes of infection. 'Working classes' have been reported more likely to feel that illness was unpreventable (Calnan, 1987). Nearly a fifth of respondents (most of whom were young adults) had fatalistic views of infection believing that, to some degree, infections occurred by chance, and there was little that individuals could do to avoid them.

NH: Are there things that you can do to avoid catching infections?

R45: Nothing really, it's just bad luck (19-year-old woman, high deprivation post-industrial ward).

5.2.4 Disruption of Equilibrium: Increased infection risk

A minority of respondents recognised other factors that could influence general health and therefore one's risk of infection. Psychological factors such as having a 'positive outlook' were reported as preventing infection because they were viewed as a way of strengthening the body ($n=1$). Other ways of promoting good health and thus reducing risk of infection included avoiding stress ($n=2$), exposure to fresh air ($n=1$), drinking water ($n=1$), ensuring adequate rest and sleep ($n=1$), and avoiding being 'run down' ($n=1$). These minority beliefs are consistent with traditional models of disease causation based on the idea that disruption of equilibrium within the body can cause illness (Blaxter, 2004).

R12: I don't know apart from when I've been run down or when the children are tired and feeling run down, they seem then to pick up infection after infection. When their bodies are a bit rundown (35-year-old mother, average deprivation rural ward).

5.2.5 Bodily Defences

The human immune system has the ability to eliminate foreign microbes from the body, thus protecting individuals from infection. Most respondents implied an awareness of the word 'immunity,' but many were uncertain about how the immune system functioned. Consistent with the Latin origin of the word immunity (protection) a number of respondents talked of the role of the immune system in 'repelling', 'removing' or 'fighting' infection ($n=4$) and protecting the body ($n=18$). Blood ($n=7$), antibodies ($n=3$), red ($n=2$) and white blood cells ($n=6$) were mentioned as having a role in immunity but few respondents were able to describe their role or function.

R16: Infection, the body has some foreign invader, which your immune system is fighting. Wherever the infection is will be swollen, your white blood cells will be there fighting against the infection trying to get rid of it (29-year-old woman, average deprivation urban ward).

R21: Well I think the blood is racing around to protect us and it is the white blood cells race to put up a barrier and then obviously other series of the immune systems are drawn into the system as well to try to protect yourself really (57-year-old woman, low deprivation rural ward).

R3: Um (pause) not really. I mean, I suppose what happens is my body is being attacked by viruses that it's never met before. Therefore, it's trying to create antibodies to fight it off, but because it hasn't met the viruses before it's taking a while to make the antibodies to fight (34-year-old mother, average deprivation urban ward).

Most respondents were unaware that the symptoms experienced during CRI, such as runny nose, cough, and pyrexia, were the result of the body's immune response. However, some respondents did suggest that these symptoms might be a means by which the body secretes infection and removes germs. Phlegm, mucus and sweat

were believed to have a role in 'washing out' ($n=2$), 'getting rid of' ($n=4$), expelling ($n=1$), or 'destroying' infection ($n=1$).

R16: I think the mucus is being produced to try and remove it (infection) out of your system. It's a way of clearing it. It's your body trying to remove it, to make you sweat; expel it (22-year-old woman, average deprivation urban ward).

R43: I suppose that when your nose runs that is, it's kind of washing out the germs (21-year-old man, average deprivation urban ward).

Uncertainty about the mechanisms of immunity may be rooted in the actual meaning of the word. Historically, the term immunity referred to political obligations and responsibilities bestowed on individuals and communities. It inferred state power, immunity from prosecution, taxation, or culpability. It had no biological significance until 1880 when Metchnikoff used it to characterise the human physiological mechanisms of dealing with disease. Metchnikoff's experiments and scientific theories were influenced by concepts of the dynamics between aggression and response, which were central to the evolutionary conceptualisations of the natural world amongst scientists in the latter part of the nineteenth century (Cohen, 2003). Cohen (2003) argues that Metchnikoff's use of the word immunity has provoked misconceptions amongst non-scientists. Indeed, respondents in this study consistently used metaphors of war when describing the nature of infections and the role of immunity. If Metchnikoff had possessed an awareness of the benefits of microbes and the role of commensal flora in maintaining health, he may have described immunity as a symbiotic relationship between man and micro-organisms and not as a relationship of conflict.

When asked if there were any positive benefits of infection, most respondents were adamant that there were none. Following further questioning however, some respondents indicated that infection could enable individuals to develop immunity to illnesses by stimulating the immune system. The principle they were describing is similar to that of vaccination programmes. Stimulation of the immune system was regarded as a means of keeping the immune system ‘ticking over’. It is possible that modern health education messages reflecting the need to remain physically active are being transposed in to lay models of immunity.

R31: I used to think the sooner I get what's going around the better, that's good for my immune system, jolly good yeah it keeps it active, so when it comes to avoiding, I'm not really sure that avoiding contact with sickness is a good thing because to a certain extent I want to keep my immune system effective at a low level (rather than trying to avoid becoming infected in the first place (56-year-old man, low deprivation urban ward)).

5.3 ‘Good Bacteria’

A minority of respondents indicated that bacteria could make positive contributions to society, the effective functioning of some parts of the human body, and the ecosystem. The following section explores attitudes towards probiotics, the beneficial attributes of microbes, and some respondents’ concerns about being ‘too clean.’

In order to prompt alternative reflections on bacteria, that is, beliefs which were not associated with hostility and negativity previously discussed, respondents were asked if they had heard of ‘good or friendly bacteria’ and probiotics. (The health benefits of consuming foods containing probiotics have been widely promoted by

food manufacturers). A probiotic is a live microbial feed supplement containing strains of bacteria which are believed, although controversially, to beneficially affect the host by improving intestinal microbial balance and as such to support effective bowel functioning (Brown et al, 2005). In this study, the vast majority of respondents acknowledged an awareness of the concept of 'good' or 'friendly' bacteria. Most had seen advertisements for food products containing probiotics ($n=38$), but were unable to explain what good bacteria actually are or what their potential benefits are believed to be. A small number of respondents (those with a health or science background and middle class parents) indicated that good bacteria play a positive role in the gut, by aiding digestion and reducing the risk of contacting gastrointestinal infections caused by other bacteria ($n=6$).

R24: Only what I have read about. Good bacteria in your gut promotes(Pause). I'm not very medical so it's difficult. I just presume that good bacteria help your body work better. I assume you need good bacteria to fight off bad bacteria. I suppose in your bowel you need good bacteria because if you had bad (bacteria), then you would have diarrhoea (29-year-old mother, low deprivation rural ward).

R15: I've only really heard about them in relation to particular foods that are coming up, like Yakult has got good bacteria in it and things like that. I have to say that we don't take them but I have read a lot about them. The yoghurt drinks and that Yakult like a little drink (29-year-old mother, high deprivation urban ward).

R16: Um, well certainly they (bacteria) are in your digestive tract, simply by the advert and they help break down food (29-year-old woman, average deprivation urban ward).

Virtually none of the respondents indicated an awareness of the role of bacteria in the ecosystem and in food manufacturing processes, such as fermentation. Only two respondents indicated an awareness of the essential role of bacteria in the decomposition of organic matter.

One respondent considered to be an unusual case believed bacteria to be ‘good’ because they had led to the development of antibiotics. However, the ‘good’ here reflected positive beliefs about the efficacy of medicines, as opposed to bacteria.

R2: I haven't heard a lot about good bacteria. I know that there are good bacteria because um. I think it was, Jennings who came up with antibiotics in the first place. He grew bacteria and err (laughs). I know it to be the creation, the start of antibiotics, in my mind all I can see is 150 years ago someone working with a petite pipette and one of those little glass dishes growing bacteria, yeah. Therefore, that must be good bacteria (33-year-old mother, average deprivation urban ward).

Less negative views of microbes were provided by several middle class parents who, although reporting beliefs that cleanliness was a key way of reducing the risk of infection, also believed that excessive cleaning within the home could be detrimental to health ($n=7$). Some of these mothers questioned the use of antibacterial cleaning products ($n=3$).

R14: We were never as hygienic as we are today. We didn't have antibacterial sprays like we do today and I would imagine that our bodies were a lot more capable of fighting off infections and things than perhaps they are today. We are almost too clinically clean. There's antiseptic wipes, you name them, and we've got them everywhere now. And whilst it's nice to think that things are clean, I am not sure if we need to be that clean (38-year-old mother, low deprivation rural ward).

R13: People these days live in too clean an atmosphere. There is too much emphasis on sparkling clean houses and all this you know. We need to be clean but I think that some people are almost paranoid about it (36-year-old mother, low deprivation urban ward).

Some respondents felt that parents could be overprotective of children and that environmental dirt posed limited risk to health.

P35: Put it this way. This baby of ours goes out in the garden and gets stinking dirty rotten. We had a load of manure by there last weekend he ate a pound of it to be

honest, and I don't care because when I grew up we were always getting covered in mud and dirt and it didn't kill me. I think that sometimes we are too protective over the kids like don't get dirty, don't do this, don't do that. I mean that I was brought up on a farm and we were out in everything, every single day and we weren't ill (43-year-old father, average deprivation post-industrial ward).

Six respondents with experience of asthma and a rural mother expressed beliefs that are associated with what has been termed 'the hygiene hypotheses. The hygiene hypothesis is controversial, but suggests that increasing prevalence of asthma and allergies may be a result of reduced exposure to microbes in childhood due to excessive cleanliness (Ramsey and Celedón 2005; Weiss, 2008). The concerns expressed about being overly clean may therefore reflect respondents' exposure to recent scientific debates about the rise of asthma within the UK.

5.4 The Threat of Bacterial Resistance

Having explored respondents' attitudes to bacteria and infection in general, I will turn my attention now to respondents' attitudes towards bacterial resistance and resistant infection. Data analysis revealed three themes within this topic: uncertainty about the causes and consequences of bacterial resistance, how the public acquire knowledge about resistant infection through the mass media, and lack of ownership for the control of resistant infection

5.4.1 Uncertainty about the Causes and Consequences of Bacterial Resistance

Although respondents reported a number of potential causes of resistant infections, data analysis demonstrated that respondents were generally uncertain about both the causes and consequences of bacterial resistance. Three key sub-themes emerged from data: 'I really don't know the cause of them', the role of antibiotics, and 'that's

the thing you get in hospital' (perceptions of resistant infections as something caused by and contained within hospitals).

'I really don't know the cause of them'

Most respondents were initially unable to respond to broad questions about the nature of bacterial resistance or resistant infections. Following prompts, however, most did acknowledge that they had heard of MRSA ($n=38$). However, MRSA is only one of a number of resistant bacteria (DoH, 2002). One respondent talked of E-coli as a resistant infection, possibly due to an outbreak of E-coli in South Wales, which was widely reported in media shortly before data collection. Many referred to MRSA as the 'hospital bug' ($n=27$). Comparatively few respondents had heard of bacterial resistance or antibiotic resistance ($n=13$). Some young adults, however, explicitly stated that they had not heard of MRSA, superbugs, bacterial or antibiotic resistance ($n=7$). Occasionally the terms 'superbugs' and 'bacterial resistance' were used synonymously, but others were confused as to whether these terms related to the same concept. Uncertainty about the connection between bacterial resistance, resistant infection and terms popularised by the media, such as MRSA and superbugs, may have contributed to the initial uncertainty about the interview topic.

R17: (MRSA) It's quite a scary one isn't it? But superbugs, I'm not quite sure about that are they the same? I've heard things on the news and in the newspaper, like MRSA. I'm quite concerned about that myself but I can't really say what it is (34-year-old woman, low deprivation urban ward).

R44: Nothing, I don't know nothing but what I hear on the telly. And they say that people go into hospital and end up worse than they did when they went in there but other than that I don't know a lot really (46-year old man, high deprivation post-industrial ward).

Following further questioning focusing on the term MRSA respondents reported a number of specific causes of resistant infections. These are summarised in Table 5.3. Data from initial interviews suggested that some of the respondents held beliefs about bacterial resistance which were broadly congruent with current scientific knowledge (beliefs about the role of antibiotics and bacterial mutation are discussed in a later section). However, following theoretical sampling, early hypotheses were modified to reflect the fact that most respondents were uncertain about the nature of bacterial resistance. This uncertainty was partly expressed through raised intonation, pauses and questioning of the interviewer. Many respondents directly indicated their uncertainty by using phrases such as, 'I'm not sure', or 'is it something to do with.....' Young adults from areas of high deprivation (18-26 years of age) expressed most uncertainty about the causes and consequences of the problem.

NH: Can I ask you a few things about bacterial resistance?

R40: Yeah but whether or not I'll know anything I don't know.

NH: Does the phrase bacterial resistance mean anything to you?

R40: What do you mean? Within your own blood cells structure, yeah? Yeah it means that you can fight it off. The actual antibiotic or your own body can fight this, yeah

NH: Have you heard of MRSA?

R40: Yeah

NH: What does that mean to you?

R40: Well it's a superbug and it's very common in hospitals at the moment, um. It's down to lack of cleaning and what have you isn't it. Lack of staffing I would put it down to (18-year-old man, high deprivation post-industrial ward).

R34: I really don't know the origin of them; they talk about cleaning hospitals better. I do not have a clue, whether it's airborne or whatever. I'm not sure. I just know its severe (60-year-old man, average deprivation rural ward).

R46: Dunno. I heard about that flesh-eating bug, is that it? (19-year-old woman, high deprivation post-industrial ward).

R21: I don't actually know very much about it (MRSA). But having been in hospital and everyone was talking about it and there must be something in place to prevent it? It can be carried by people. I know that because some hospitals actually test you for it. But I don't know what it is. I just know that it is serious (57-year-old woman, low deprivation rural area).

Table 5.3: Causes of Resistant Infections: The number of respondents mentioning each cause.

Cause of resistant infection cited	Respondents' background	
	Health and science (n=11)	Other (n=35)
Poor hospital hygiene	11	29
Antibiotic use;		
Not completing the full course of antibiotics	11	4
Over prescribing of antibiotics	8	6
Repeated use of antibiotics	0	6
Poor standards of health care (including hand washing)	3	7
Use of antibiotics in animals	1	1
Antibacterial cleaning products	1	0
Antibiotic use in other countries	2	1
Flowers in hospitals	1	0

Many respondents reported fear of MRSA and associated bacterial resistance with severe infection and even death. Fear of resistant infections and anxiety about being admitted to hospital ultimately led some to refuse hospital admission.

R30: I begged them last time that they wanted to take me into hospital not for me to go because I am afraid of going into hospital now. I am terrified of it (MRSA) and everyone feels the same (58-year-old woman, average deprivation post-industrial ward).

The association between hospitals and dirt is discussed in a later section, but avoidance behavior may be explained by the theories of disgust. Curtis and Biran (2003) propose that disgust of 'dirt' is an innate behavioural response, which protects individuals from exposure to potentially harmful environments and people.

Six respondents connected bacterial resistance with potential failure of antibiotic therapy. However, these respondents generally related treatment failure to the body's response to repeated antibiotic use and not to changes in the characteristics of bacterial populations due to mutation. These respondents believed that antibiotics become less effective with repeated use because of changes within the body - the body becomes 'immune' or 'used to' them. Not receiving enough antibiotics, or receiving antibiotics that were not strong enough, or of the wrong type, were also cited as reasons for treatment failure. As previously discussed, most respondents had little understanding of the central role their own immunity plays in resolving infection, and respondents also appeared to overestimate the effect of antibiotics (independent of their own immune system); a point which I will return to later.

R17: Is it like the wound stays; is it like the wound stays infected? (34-year-old mother, low deprivation urban ward).

R24: I think that if you take too many antibiotics that they are not going to do the job they are suppose to do when you really need them. Because your body does build up an immunity to them, doesn't it? (29-year-old mother, low deprivation rural area).

One respondent mentioned her suspicion that hospital flowers had a role in the occurrence of resistant infections, although she was unable to describe the mechanisms by which flowers contributed to the problem. The link between flowers and infection within hospitals has been debated in health literature and the media. Claims have been made that water contained within flower vases can act as a reservoir for gram-negative bacteria which may be resistant to some antibiotics (Gould et al, 1998).

Gender differences did not appear to influence awareness of bacterial resistance. Gender stereotypes suggest that men have a greater knowledge and interest in science and women traditionally undertake the health care roles within families (Tariq, 2000), but in this study individual differences appeared more important than gender differences. Women with a science background demonstrated greater awareness of the concept of bacterial resistance than women of other backgrounds, as did their male counterparts. One unusual case was noted. A male respondent from a high deprivation urban ward with no science background reported sophisticated scientific ideas about bacterial resistance although the cause of resistant infections in this case were described within the context of tuberculosis in developing countries. This atypical respondent's highly considered beliefs were likely to be the result of the individual's personal interest in the topic.

R10: Well, basically its people, predominantly in Third World countries being prescribed antibiotics to overcome TB but not completing the course. So the TB is still in the body and eventually with enough people and enough exposure then the TB develops immunity to the antibiotic being used. It's the exposure of the bacteria to the antibiotics that actually kills off the infection. So the infection continues to be at low level but basically you get a mutation in the bacteria that gives it a tolerance to the antibiotic (36-year-old man, high deprivation urban ward).

Eleven members of the subgroup scientists and four middle class parents and one parent from a high deprivation urban ward described the adaptation and mutation of bacteria in association with antibiotic use. A few indicated that the consumers of antibiotics contribute to the problem by not finishing the full course of therapy but none referred to the importance of taking antibiotics at the prescribed intervals. Sub-optimal adherence to antibiotic regimes (not finishing the course), was associated with two consequences: not completely eradicating the infection (which could lead

to infection being passed to others, lasting longer than expected, reoccurrence of the same infection, or increasing the severity of illness), and to a lesser extent bacterial mutation leading to bacterial resistance.

R13: I know that the infection can mutate if you don't finish the course and can come back twice as bad as it was (36-year-old mother, low deprivation urban ward).

Some blamed prescribers for the overuse of antibiotics believing that antibiotics are prescribed too often, too easily and inappropriately.

R34: I have read quite a lot about the over prescribing of antibiotics and maybe they are right. I think that generally my view tends to be we have over prescribed and things as MRSA and the superbugs are around probably as a result (60-year-old man, average deprivation rural ward).

Although the over prescribing of antibiotics has been widely reported in the scientific literature and is believed to influence the occurrence of resistant bacteria (Hawkey, 1998), recent evidence reports substantial reductions in antibiotic prescribing within primary care (Ashworth et al, 2005). This trend was acknowledged by respondents indicating that, in their experience, antibiotics were not prescribed as frequently as they had been in the past.

R17: They (antibiotics) are not really offered as much as they used to be. They (doctors) don't seem to offer them that much (34-year-old mother, low deprivation rural ward).

One respondent was concerned that the use of antibacterial cleaning products played a role in the occurrence of bacterial resistance and that it is possible to 'be too clean'. It was noted, however, that this respondent had experience of asthma and held

beliefs in line with the hygiene hypothesis (discussed earlier in this chapter).

Antimicrobial cleaning products do present a hypothetical risk to antimicrobial resistance reservoir in the community, but there is currently little conclusive evidence to support this (Aiello and Larson, 2003).

'That's the thing you get in hospital'

Although respondents cited a variety of causes of resistant infection (see Table 5.3), the majority of respondents believed that MRSA was a problem caused by and contained within hospitals and that it was associated with poor environmental hygiene. Blame was often placed with the NHS at policy and institutional levels, at cuts in funding and resources.

R33: I thought that was just to do with the basic hygiene because um, people aren't being cared for properly like they used to be in hospitals. I mean wards aren't clean, you know, floors aren't washed; toilets aren't cleaned (21-year-old mother, high deprivation urban ward).

Few respondents expressed awareness that bacterial resistance was a common community problem or that resistant infections could affect those who were not in hospital. Although two respondents did recognise the role of hospital visitors and patients as potential carriers of resistant microbes and that resistant bacterium have the potential to occur everywhere, including the home. To a large extent, however, respondents also appeared ignorant of other factors contributing to the problem of resistance.

R14: Well I really don't know. I think it was obvious in a place like that (hospital) with all the dirt around that it was going to cause a problem whether its superbugs or normal bacteria, it was a dangerous place to be, I felt. I suppose people presumably are carriers, where bacteria exist on day to day things that you come into contact with. Presumably they live in the same way as other bacteria live and if you don't clean or let them in. Well you can't kill them all because they are everywhere and I presume that's why they can be carried in, they exists on everything, they're in every element of your life. And the problem is with hospitals is the throughput of people. I presume. So you're going to get them more and more in those kinds of places, if you're going to get it anywhere (38-year-old mother, low deprivation rural ward).

Respondents cited several factors that were believed to increase an individuals' personal risk of contacting a resistant infection including being frail or elderly ($n=12$). These beliefs were consistent with the accepted biomedical principle that most healthy individuals will not develop infections when they are exposed to resistant bacteria because innate immunity affords them considerable protection. Other factors perceived as increasing individuals' susceptibility to resistant infections were having open wounds and, by implication, having a surgical operation.

R10: People in hospitals are there for medical treatment anyway and sometimes requiring surgery which tends to give the body the hell of a pummelling, so err your resistance is weakened (36-year-old father, high deprivation urban ward).

R16: Old people are more vulnerable, open wounds... because they are in a more vulnerable state (29-year-old mother, average deprivation urban ward).

Several respondents criticised health care professionals believing that poor standards of practice contribute to the problem of resistant infections. Although the actual number of respondents criticising health care professionals in this context was small, their tone was one of absolute condemnation. Several respondents reported failure

of health care professionals to wash their hands as contributing to the spread of resistant infections.

R37: The standards of hygiene and I'm not just blaming cleaning staff. I am blaming nurses as well because the standards of nursing these days I think is absolutely outrageous. I mean years ago wards were scrubbed from head to foot. Now what do they do? Give the bed a quick wipe over and shove the next body in it, it's disgusting. I think staff that are in hospitals today have gone right down the drain. They now say if you go into hospitals to tell the doctors to wash their hands (63-year-old women, post-industrial ward).

5.4.2 The Public's Acquisition of Knowledge: Media images of resistant infection

The media was reported to be the main source of information regarding resistant infection. Eight respondents, all with a health and science background, reported they had learnt about bacterial resistance through their professional training. No respondents reported receiving information about bacterial resistance from public health education campaigns or from health professionals. Three respondents were unable to state the source of their knowledge. Table 5.4 lists the sources of media information about resistant infections cited by respondents.

R35: Nothing. I don't know nothing but what I hear on the telly and they say that people go into hospital and end up worse than they did when they went in there but other than that I don't know a lot really (43-year-old father, high deprivation post-industrial ward).

Table 5.4: Media Sources of Information about Resistant Infections

Source	Television	Newspapers	Radio	Internet
Number of times mentioned	30	11	3	1

Information about resistant infections was also assimilated during everyday conversation with acquaintances, friends and family ($n=7$), and through conversations with other hospital in-patients ($n=4$). Social influences are known to be an important factor in the development of attitudes to health and illness, although gaining information in this way may serve to disseminate factually inaccurate information (Radley, 2004).

The type of media that is accessed by respondents is likely to influence their knowledge. Young adults are more likely to watch recreational television programmes, whilst older age groups are more likely to watch news or factual media such as documentaries (Couldry, 2006). Likewise, the reading habits of individuals may also have a role to play in individuals' exposure to information about bacterial resistance. Young adults and those from lower social classes are reported to read less (The literary Trust, 2006). The internet has been reported as a source of lay health knowledge, particularly for chronic illnesses (Hardey, 1999). In this study, a number of respondents said they would use the Internet to explore health-related topics, but only one respondent reported actually doing so for information about MRSA infection rates prior to hospitalisation. On this occasion the search for information was reported as ineffective. Searching the internet for a specific topic requires personal motivation, searching skills, and access to internet facilities. The low levels of internet use to search for information about bacterial resistance may suggest that resistant infections were of little personal importance and interest.

5.4.3 Lack of Individual Ownership for Resistant Infection.

Individuals in this study lacked a sense of ownership for both the cause and control of resistant infections. Three sub-themes are explored in the following section.

Firstly, respondents' perceptions of personal vulnerability are explored under the theme 'I don't worry about it' followed by respondents lack of individual ownership under the theme of 'there's nothing I can do'. The section concludes by exploring perceptions of the individuals' capacity to help control resistant infections and ideas about who has responsibility for controlling the problem under the theme 'it's not my responsibility'.

'I don't worry about it'

Early data analysis suggested that respondents appeared to have few concerns about resistant infections. However, the process of dual coding highlighted a discrepancy between coders. Following further scrutiny of data and discussion among coders, the code 'lack of concern' was redefined as two separate but inter-related issues: 'perceptions of importance' and 'personal risk'. Respondents' lack of concern was then coded as a low sense of importance for some, and as a low sense of personal risk of contracting resistant infections for others. The belief that bacterial resistance is personally unimportant has been previously reported in UK surveys (Newton et al, 2001). In particular, young adults stated that bacterial resistance did not concern them. This may be associated with the relative good health enjoyed by young adults compared to other groups and low probability of hospitalisation.

R19: Don't think it affects us on a day-to-day basis so we don't think about it. Well, not a lot really (38-year-old mother, average deprivation rural ward).

Others indicated a low sense of perceived risk of contracting a resistant infection.

Low perceptions of vulnerability to resistant infection in the home were echoed by respondents across all subgroups. Weinstein (1987) suggests that unrealistic optimism about susceptibility to illness is based on a belief that if the problem has not happened then it is unlikely to occur.

R10: I can't say that I lose, I haven't lost any sleep over it. In general, terms, yes, you're aware of the problem; you know that the problem exists but it's generally vague and not a cause for immediate concern. I don't think that it affects me (37-year-old man, high deprivation urban ward).

Perceptions of risk were related to the likelihood of the participant needing to be admitted to hospital. Most respondents did not perceive resistant infection as something that affected them within their own homes. When hospitalisation was considered likely or possible, the perceptions of risk increased. This is not surprising given that most respondents believe that resistant infections were caused by and contained within hospitals.

R26: I would worry about going into hospital but I don't worry about it (MRSA) every day. But if I had to go into hospital for an operation, I would be very scared of getting MRSA (33-year-old woman, average deprivation rural area).

'There's nothing I can do'

Few respondents talked about the individual's potential contribution to controlling bacterial resistance through adherence to medication regimes, by working with

clinicians to limit antibiotics to essential indications, or in preventing the spread of infection through simple procedures such as hand washing.

R31: Um worries me in terms um, am I anxious about it? No, because I don't think there is very much I can do about it. I do think that, ummmm, compared to global warming, its concerning, definitely, and it should be acted and researched (36-year-old man, high deprivation urban area).

Fatalistic views of infections are likely to have contributed to the lack of individual ownership. Helman (1978) described how individuals suffering from common infections were perceived themselves as having a low sense of responsibility for their illness because infection was an inherent risk for all and outside of individual control. It is possible that these beliefs are being transposed onto beliefs about bacterial resistance.

Hospitals were also represented as outside the public's sphere of influence, despite the growth of consumerism within the NHS. Controlling resistant infection was perceived as requiring the actions of others through enforcement of hygiene practices and financial investment.

R22: It's the people that run the place (hospital), it's their job to make sure that everybody is doing their hygiene. I think when it comes down to it. It's up to the managers of these places to do their best to instil in their staff there is a danger and they must be careful (32-year-old mother, average deprivation rural ward).

R17: Give more money to the cleaners and get better cleaners. I listen to the Jeremy Vine show quite often, Radio 2, he's done a few chat shows about MRSA and had people phoning in and just talking about their experiences of how filthy the hospitals were and one woman she had to clean the room herself (34-year-old mother, low deprivation urban ward).

'It's not my responsibility'

Respondents perceived themselves as having little responsibility for the control of bacterial resistance, not only because they considered 'germs' as being outside their control, but also because the standards of hygiene and resources within health care services were outside their field of influence. The majority of respondents believed that the responsibility for tackling issues relating to bacterial resistance rested with the government and NHS managers ($n=33$).

R37: I blame the government for cutting back. I can think of a number of people who have gone into hospital and they got MRSA. Where did they get it from? They didn't take it in with them (63-year-old female, post-industrial ward).

R39: It's very common in hospitals at the moment. Um, it's down to lack of cleaning and what have you, isn't it, a lack of staffing, that's what I would put it down to (21-year-old father, high deprivation post-industrial ward).

NH: Who has responsibility for sorting these superbugs out?

R36: Well I would say the government first and foremost. They have got the power to enforce legislation on the rest of us and they've got money and resources to do things about it, whereas no one else in the country really has. So the responsibility, kind of, lands on their table (43-year-old father, average deprivation post-industrial ward).

In contrast, respondents with science backgrounds described responsibility for controlling resistant infections as residing not just with governmental authorities but also with society as a whole (that is, among the general public, health service providers, and the scientific community). In addition, 'five middle class mothers' and a father from an urban ward with relatively high levels of deprivation (all of whom had completed post-compulsory education) also felt that responsibility for resolving the problem rested with members of the public, albeit led by government agencies.

R10: Well I think that there is personal responsibility but I also think that governments have responsibility as well; they have to lead the way (37-year-old man, high deprivation urban ward).

R24: It's everybody's problem, everybody needs to be more aware of being clean but I suppose ultimately it's the government's problem because the government has to be able to deal with it. It has to start from the government (29-year-old mother, low deprivation rural ward).

Fitzpatrick et al (1984) argue that while the middle classes have a greater sense of individual health responsibility, the working classes emphasise collective responsibility particular through the state. This distinction of responsibility on the basis of class has been questioned as they are based on post-war studies (Taylor-Gooby, 1985). In this study, respondents tended to reflect beliefs consistent with Fitzpatrick et al's (1984) theories, in that individuals from areas of low deprivation emphasised personal or public responsibility. Only one respondent from an area of high deprivation was adamant that the general public should have some responsibility for the control of resistant infections.

R5: I would probably say that it's generally public and I would of thought, after that thing just like hospitals generally and I think that the first thing has to be the public. The public first of all because if they don't tackle it (bacterial resistance) it won't make any difference and then I guess you get the other thing like hospitals and general cleanliness (56-year-old man, low deprivation urban ward).

5.5 Summary

Data from this study indicated that most respondents demonise germs and had little understanding of the nature of germs. Powerful metaphors of war depict an ongoing battle to rid the environment and our bodies of germs. Germs were seen as unwelcome invaders who enter our bodies making us unwell. Adopting a healthy lifestyle through diet and exercise were perceived as fundamental in strengthening

the body against infection. Dirt and germs were closely associated and the removal of visible dirt within the home was considered a vital mechanism protecting individuals from infection. However, the role of hand washing in reducing the spread of infection was rarely acknowledged. Ideas about the function of innate immunity in affording protection from infection were underdeveloped and contained little scientific foundation.

Few respondents acknowledged the positive roles of micro-organisms within the body, the ecosystem and the manufacture of food. However, there does seem to be heightened awareness of the potential benefits of 'good bacteria' through the commercialisation of some yoghurt-based probiotic foods/drinks.

Images of infection acted as a prototype for resistant infections. Dirt was a cause of resistant infection just as it was the cause of other infections. In resistant infections, however, hospital dirt was to blame and the infection perceived as serious.

Anxiety and fear relating to resistant infection was promoted by the media but also was found to have historical antecedents. Anxiety about dirt and germs has taken on a new dimension becoming a fear of hospitalisation. Fear of dirt, however, is not irrational as it is a protective mechanism.

Respondents demonstrated a lack of individual ownership for bacterial resistance and resistant infections. They did not perceive themselves as having a role in its causes or control. Perceptions of importance and personal risk in the community were low. As hospitals are outside of individuals' spheres of influence and

responsibility, it was not surprising that respondents had little sense that they had a valuable role to play in the control of resistant infections. Most believed that responsibility for resolving the problem of bacterial resistance lay predominantly with the government and the NHS.

Chapter 6: Overcoming Infection: Experiences of Respiratory Tract Infection

By pounding brow and swollen lip
By fever's hot and scaly grip
By those two red redundant eyes
That weep like woeful April skies
By racking snuffle, snort, and sniff
By handkerchief after handkerchief
This cold you wave away as naught
Is the damnedest cold man ever caught!

(Ogden Nash: 1902-1971)

6.0 Introduction

The aim of this chapter is to describe lay attitudes towards URTI. The chapter is divided into three main sections. Firstly, beliefs about aetiology are described and an ethnomodel of beliefs about URTI is proposed. Within this section, perceptions of URTI as 'normal' illness are also discussed. In the second section, the multiple beliefs surrounding aetiology are counterpoised with uniform self-care responses. In the third section, reports of advice seeking behaviour are analysed. The third section particularly focuses on the triggers for consultation, and the transformation of URTI from 'normal' illness to 'real' illness and the impact of 'parenthood' is also discussed.

6.1 Experiences of Respiratory Tract Symptoms

While health care professionals often define URTIs as minor, acute self-limiting illnesses (Smith, 2000), for the individual experiencing them, they can be unpleasant and accompanied by a number of debilitating symptoms, as illustrated by Nash's poem.

Most respondents reacted to the opening question, '*Can you remember a time when you had a cough, sore throat, runny nose, or perhaps ear ache? What did you do when you began to feel unwell?*' by readily giving a detailed account of their experiences of the common cold or by describing their symptoms and behavioural responses. Only a few respondents gave their illness a label or diagnosis. Illness accounts were not confined to the common cold. Respondents described a variety of URTIs during their interviews such as tonsillitis and earache (see Table 6.1). In addition, a few respondents described their experiences of lower respiratory tract infections. For example, one respondent, having started to talk about experiences of the common cold, went on to provide an account of his recent bronchitis. In another instance, a mother, midway through her interview, reflected upon an episode of Bronchiolitis which one of her children had experienced. This meant that although the opening question enabled a variety of experiences to be gathered, it also led to narratives about experiences of illnesses that went beyond typically viral URTIs. To deal with this at the analysis stage, data were coded into different types of respiratory infection. It was anticipated that this would enable commonalties and differences between types of respiratory infection to be acknowledged. However, very few differences emerged.

Table 6.1: Types of Respiratory Tract Infection Reflected upon by Respondents

Type of URTI described	Number of respondents.
The common cold	30
Undefined symptoms consistent with the common cold	16
Tonsillitis	7
Ear ache	5
Flu	3
Sore throat	6
Sinusitis	3
Type of LRTI described	
Bronchiolitis	1
Bronchitis	1
Pneumonia	1
RTI not categorised as either URTI or LRTI	
Chest infection/ bad chest	2

Some respondents' accounts were also fragmented by ad hoc reflections upon illnesses unrelated to respiratory tract infections. On these occasions respondents were steered back towards the interview topic. Data unrelated to respiratory tract infections are not described in this thesis.

During recruitment, it was not uncommon for potential respondents to state that they felt that they could be of little help to the research because they rarely caught colds. Roughly half of the respondents said that having a cold was a rare occurrence for them ($n=21$).

R10: I'm lucky I don't tend to get that many colds (36-year-old father, high deprivation urban ward).

Respondents' self-evaluations of the frequency of which they caught colds, that is the idea that colds occur infrequently, are not consistent with epidemiological

studies. The common cold is, as the name suggests, common. It has been estimated that each person will experience 3-4 colds a year, and in children this may rise to as many as 7-8 episodes each year (Hajat, 2004). An expression of limited experience of respiratory tract infection could be a way in which the respondents confirmed their good health to both themselves and the interviewer. However, not all respondents presented themselves always in such good health. Eight respondents said they suffered from frequent colds.

R25: We've got colds all of the time. We just manage to clear one up and we are back (40 year old mother, low deprivation rural ward).

6.2 Lay Beliefs about URTI: An 'ethnomodel'

Respondents described a variety of beliefs about the causes of URTIs and a number of factors perceived as contributing towards the likelihood of contracting a cold. On analysis, these were categorised in three ways; as beliefs relating to hot-cold influences, other traditional beliefs, and microbial causes. Although beliefs about hot-cold imbalances may be considered as consistent with ideas of humoral pathology (the balance of the humors being central to health), they are discussed separately here because data did not indicate any perceived connection between the ideas related to hot-cold influences and disruption in the equilibrium of the body in others ways, such as stress or too much work.

The following section describes an ethnomodel of URTI. Formed from the Greek word 'ethnos' meaning nation or pertaining to the people, the term ethnomodel is used to reflect how the lay explanatory model is embedded within social and cultural characteristics of the population. To aid clarity, categories within the model are

described here in a linear fashion (no hierarchy of importance intended). However, data analysis indicated that elements from each category existed synergistically, in that respondents combined elements of traditional and biomedical models into a single ethnomodel

6.2.1 Hot-cold Influences

Environmental conditions were frequently reported to affect the risk of URTI. Many respondents stated that exposure to cold, wet, or damp external environmental conditions, such as winter weather or seasonal changes, caused or contributed to the occurrence of URTI ($n=39$). Going outside in the rain without a coat, or going outside with wet hair was perceived as irresponsible and likely to increase the risk of 'catching a cold'.

Unfavourable internal environmental conditions were also thought to increase the risk of URTI. Excessively hot environments were perceived as detrimental, and fresh air from good ventilation as beneficial ($n=5$). However, these beliefs were not solely consistent with beliefs about hot-cold influences. Some respondents believed that excessive warmth enabled micro-organisms to incubate and multiply. Air conditioning, in particular, was believed to create environmental conditions that promote the growth of micro-organisms ($n=2$). Cigarette smoke was also believed to increase the risk of infection ($n=1$). Beliefs about hot environmental conditions appear, therefore, to be consistent with beliefs about hot-cold influences in general and microbial causes of infection.

R46: I have to walk all the way down here, everyday in the rain. When it's cold and windy my jacket does get wet and then when I go home I have to wear a wet jacket, so I've got a cold all the time (19-year-old woman, high deprivation post-industrial ward).

R32: Well um your temperature is affected. So what I try to do if I get a cold is to make sure that I don't get my body chilled to a great extent because as well as being on the skin in terms of the external aspect, the lungs are affected just as much aren't they and that is a risky area isn't it. So I try to avoid it as much as is practically possible. Try not to expose myself as much as possible to being cold and certainly not allow my body to be getting cold and wet. I'm not talking about hypothermia of course, but chilled. Nor indeed to get too hot. I try and avoid central heating. All I do is wrap up warm in order to avoid getting chilled, but that being said keeping out of hot, and by that implication somewhat dry atmospheres (72-year-old man, low deprivation urban ward).

R14: I always get colds when I'm in work. It's so hot and that makes the germs breed (43-year-old mother, low deprivation rural ward).

Interestingly, unlike earlier studies, such as those by Mabry (1965) and Helman (1978), no respondents mentioned damp or draughty homes as having a role to play in RTI. This may be explained by improvements in the standards of living accommodation over the last three decades (Howden-Chapman, 2004).

Some respondents placed blame for contracting URTI on the sufferer. Individuals who allowed themselves to be exposed to unfavourable weather conditions for example, by not wearing suitable outdoor clothing, were perceived to be at 'fault' for their illness. In this respect, public perceptions about the role of cold and wet weather and individual responsibility to avoid exposure appear to have changed little since the 1970s (see Helman, 1978). Respondents from different generations shared these beliefs.

R45: My ma always says that if I go out with wet hair I'll get a cold. It'll be my own fault. She's always going on at me about stuff like that (19-year-old woman, high deprivation post-industrial ward).

6.2.2 Other Traditional Beliefs Focused on Equilibrium

Other traditional beliefs about the causes of URTI were reported, although to a much lesser extent than beliefs about hot-cold influences. For example, respondents reported that being ‘run down’, getting too little sleep or rest, or indeed too much, or too little exercise increased an individual’s risk of contracting infection. Perceived personal physical frailty and traits which were considered to be hereditary or congenital and therefore outside of individual control also increased perceptions of increased infection risk. For example, one respondent explained how she suffered from frequent colds because she had had a ‘weak chest’ since childhood.

R12: (why do you catch cold?) I don't know, apart from when I've been run down or when the children are tired and feeling run down, they seem to pick up cold after cold, when their bodies are a bit run down (35-year-old mother, average deprivation rural ward).

6.2.3 Beliefs about Microbes and URTI

In addition to traditional beliefs, most respondents stated that microbes (often expressed as ‘germs’ or ‘bugs’ - see chapter 5) have a role to play in the development of URTI. Several respondents spontaneously identified microbial causes for URTI ($n= 11$), but many did not offer these explanations without prompting from the researcher. Ten respondents initially stated that they did not know what caused URTI. Prompts and probes were used to elicit more information about respondents’ beliefs about the role of bacteria and viruses in colds. These are summarised in Table 6.2.

Table 6.2 The Microbiological Causes of URTI reported by respondents following prompts

	Viruses	Bacteria	Bacteria and viruses	Parasites
The number of times a specific cause was mentioned	20	14	12	1

Many of the respondents identified viruses as causing colds ($n=20$). This finding is consistent with survey research of beliefs about URTI (Branthwaite and Pechère, 1996). All respondents who had a health or science background identified that viruses are the cause of colds. Many respondents, while recognising the potential for microbes to cause colds, indicated that they were uncertain as to whether bacteria, viruses or both were the causative agents. Fourteen respondents indicated they believed that colds were caused by bacteria and, in one unusual case, parasites. These findings support the idea that, to some extent, the public have misconceptions and uncertainty about the cause of colds and other URTIs (Branthwaite and Pechère, 1996; Mainous et al, 1997; Vingilis, 1998; 1999a, 1999b; Collette et al, 1999; Braun and Flowles, 2000; Freidman, et al 2003; Cals et al, 2007). Respondents made connections between environmental conditions and their risk of contracting an infection.

Many respondents described colds as contagious, something that you could ‘catch from someone else’. Colds were described as ‘going around’ communities, schools or workplaces. Many respondents believed that colds were transmitted by ‘coughs’ and ‘sneezing’ ($n=32$). Ideas that coughing and sneezing are routes for contagion and contamination have been widely published since the 1940s when there was a

drive to reduce all infectious illness because of high levels of absenteeism from the work place (Tomes, 1998). The findings of my study suggest that these beliefs about airborne contagion are still prominent within lay schema. Biomedical knowledge about the route of infection has, however, progressed over time. Although the airborne spread of respiratory viruses does contribute to the spread of URTI, hand to mouth or nose contamination is now known to be the major route of transmission (Niffenegger, 1997). Only three respondents indicated an awareness of the role of hand contamination in the spread of colds, a point to which I shall return later.

Many respondents believed that the risk of 'catching a cold' was increased by situations that brought individuals into close proximity to others, such as crowded places ($n=25$). Helman (1978) described this as the social aspect of infection. He described how germs are perceived as having no free existence outside the realm of humans: people always transport them and, therefore, their survival depends on social relationships. These beliefs are, however, at odds with ideas about hot-cold influences, which do not suggest social contagion is required for a respiratory tract infection to occur.

R20: Virus? I don't know how they are caused. You see, when you think about it, people say I picked up a virus. I don't know how they are caused. I just caught it (89-year-old woman, average deprivation rural ward).

R1: Um, the only part of my lifestyle that I catch these things is when I travel on the train. It's just the heat on the trains and everybody coughing and sneezing that's where I get mine from (64-year-old woman, average deprivation urban ward).

R23: I know (name of child) coughs and wipes her nose on everything and that's not good. She's not allowed but she wipes it on me and then (sibling) will come over and want a cuddle and that's one germ just gone all over the place. And you can't stop them from kissing and cuddling and breathing all over each other. You can't

stop it anyway because they're in the air. Kids sneeze and germs fly everywhere (23-year-old mother, high deprivation urban ward).

Mothers believed that children were at higher risk of contracting colds than they were themselves, because the young by nature are more vulnerable and because their children attended nursery, schools, and playgroups ($n=14$). This supports the ideas that colds are contracted through close proximity with others. Research has shown that cross infection occurs frequently in childcare centres (Lee et al, 2005). However, apart from close proximity, in general, high infection rates in childcare centres may also be associated with the increased risk of hand to mouth transmission in children (who naturally explore their worlds by placing objects in their mouth), and other aspects of childhood behaviour such as wiping their nose on others (illustrated in R23 excerpt cited previously).

R28: Yeah, where (name of child) goes, she gets a load of colds from the nursery (30-year-old mother, average deprivation rural ward).

Two young adults insisted they had 'no ideas' about the aetiology of colds and were unable to respond to prompts. Lack of response in these few cases could be explained by a reluctance to share their beliefs with an interviewer. However, a lack of awareness of the cause of colds has been reported in North American samples (Mabry, 1964). The accounts in these unusual cases were typified by short succinct replies to questions and a lack of eye contact with the interviewer.

6.2.4 'I'm not ill, I've got a cold'

Almost half the respondents indicated that the symptoms of URTIs, and particularly the common cold, were not always perceived as 'real illness' ($n=16$). URTIs were

considered by many to be a 'normal' event, and part and parcel of the human condition. The frequent occurrences of URTI, their self-limiting and non-serious nature is likely to have contributed to these perceptions.

R32: I try to carry on normally. I'm not ill. I've got a cold (72-year-old man, low deprivation urban ward).

The classification of respondents' views of URTI as 'normal illness' as opposed to 'real illness' was drawn from the work of Cornwell (1984) who identified a tripartite classification of illness in an English suburban sample. 'Normal illness' was classified, as infectious diseases that children were expected to get such as chickenpox and non-serious infections in adults including URTI. 'Real illness' was classified as severe or life threatening illness. 'Health problems' that were not illness were conditions attributed to natural processes, such as changes in the body that occur due to ageing. In my study, perceptions of URTIs as a 'normal' state of being and not a real illness could have emerged from a belief that URTIs were not infections. Infection was perceived by some as 'real illness' and more serious than a common cold.

R1: Well I think that a cold is a virus based, and infection is well..., whatever. I don't think of a cold as an infection. Infection is something more serious like the flu (64-year-old woman, high deprivation urban ward).

This suggests a distinction in beliefs: infections are believed to be caused by microbes, whereas URTIs are believed to be caused by a variety of factors. These ideas resonate with Helman's (1978) work, who noted how the terms bugs, germs, or viruses are not used in the strict biomedical sense, but are rooted in folk

classification of fevers and chills. According to Helman, people commonly believe fevers are caused by germs, whereas colds are considered to be caused by environmental factors and are considered less serious. As germs are not the sole cause of URTI, perhaps then they are not perceived as infections in the same sense as other illnesses. This underlines the importance of explicit definitions and careful use of terms in health educational campaigns.

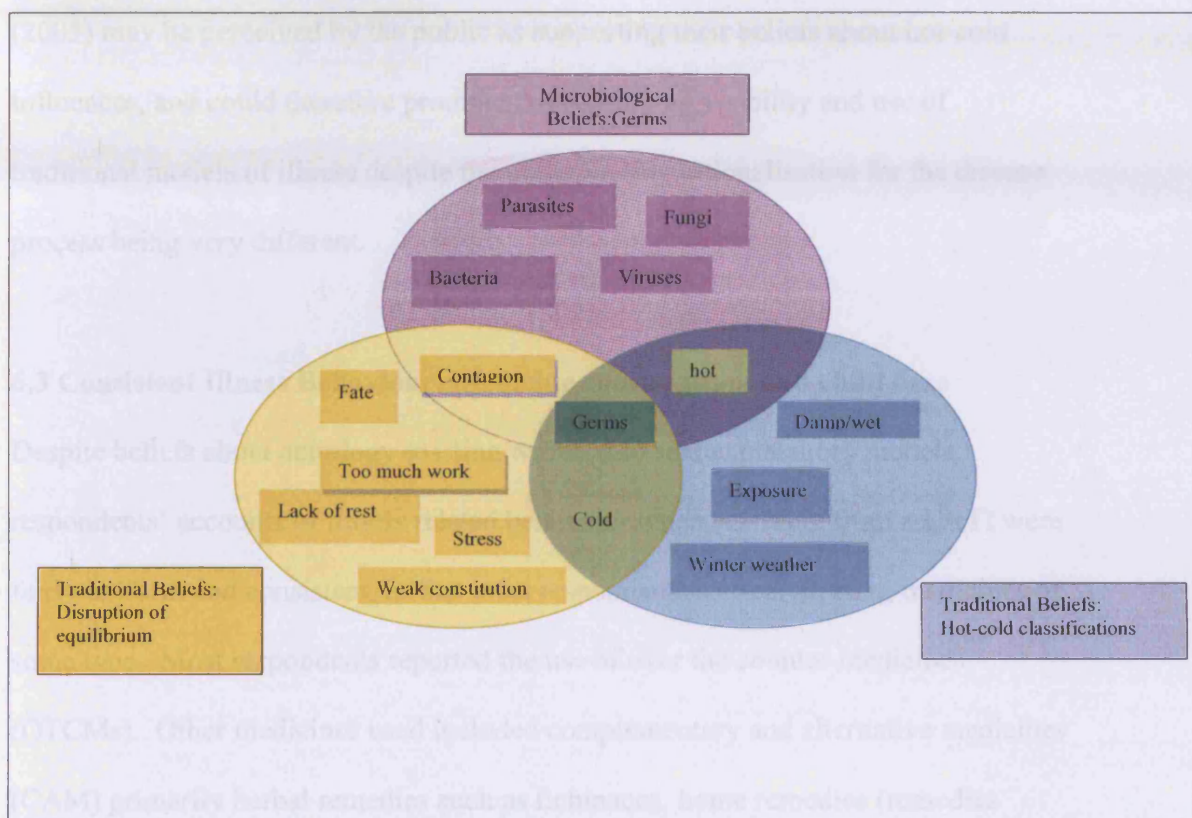
6.2.5 A Synergy of Belief: An 'ethnomodel of RTI

Explanatory models such as traditional beliefs, including hot-cold influences, and biomedical explanations (microbial beliefs) emerged during different historical periods and support distinct views about the natural world, health and illness. The respondents in this study drew upon and amalgamated concepts from different belief systems to construct their explanations of a variety of URTIs, and related symptoms. No single model appeared to be the most favoured. The venn diagram in Figure 6.1 illustrates categories and relationships of respondents' beliefs about the possible causes of URTIs and positions them within their underpinning belief system. It shows how ideas from different models of illness are synthesised together within the lay explanatory model depicted by respondents in this study.

The simultaneous use of concepts from different models of illness suggests that new understanding and scientific evidence have become incorporated within existing lay logic. Cornwell (1984) draws on the work of Habermans (1971) to distinguish between traditional legitimisation of illness, which is tied to religious, philosophical

and moral belief systems, and modern legitimisation that is scientific, technical and founded in empirical evidence.

Figure 6.1: An Ethnomodel of URTI



Cornwell (1984) proposes that as part of a process of medicalisation, traditional or existing lay beliefs are influenced by exposure to scientific evidence. It is this exposure to scientific evidence that results in traditional legitimisation becoming ‘modernised’. The degree of transformation of lay beliefs depends on the individual and context. The explanatory model of URTI reported by respondents in this study suggests that transformations from traditional to modern do not occur in all cases, nor do they occur in a complete sense. New scientific evidence is synthesised within

existing models of illness rather than replacing it. Indeed, new scientific evidence may in fact support existing lay beliefs. For example, recent empirical evidence from a randomised, controlled study, links exposure to cold with the occurrence of the common cold (Johnson and Eccles, 2005). The findings of Johnson and Eccles (2005) may be perceived by the public as supporting their beliefs about hot-cold influences, and could therefore promote the continuing visibility and use of traditional models of illness despite the underpinning rationalisation for the disease process being very different.

6.3 Consistent Illness Behaviour: Medicine consumption and child care

Despite beliefs about aetiology existing within different explanatory models, respondents' accounts of illness related behaviour when suffering from a URTI were fairly uniform and consistent, in that most respondents self-cared using medicines of some type. Most respondents reported the use of over the counter medicines (OTCMs). Other medicines used included complementary and alternative medicines (CAM) primarily herbal remedies such as Echinacea, home remedies (remedies made of common food stuffs, such as honey and lemon), dietary supplements in the form of vitamins and minerals, and in a very small number of cases, prescription medicines. To a lesser extent a number of behavioural strategies such as altering daily routine or reducing activity levels or taking time off work were also reported (Table 6.3).

Table 6.3: Self-care Responses used During URTI

Self-care response	Total number of times mentioned
OTCMs	45
Behavioural strategies	27
CAMs	19
Home remedies & dietary supplements	12

Respondents' reliance on self-care was not surprising. Self-care has been described as an integral element of illness behaviour and as a 'lifelong habit' (The Proprietary Association of Great Britain (PAGB), 2005). Medical professionals and politicians also consider self-care both appropriate and desirable for minor illness. A number of recent national initiatives such as The NHS Plan (DoH, 2000) and NHS Direct (PAGB, 2005) have aimed to promote self-care in minor illness. In this study, self-care primarily involved the consumption of medicines, in particular OTCMs, and to a lesser extent CAMs. A minority of respondents did report self-medicating with prescription medicines, predominantly antibiotics. This is discussed in Chapter 7.

Nearly all respondents reported self-medicating with one or more OTCMs when they began to experience symptoms indicative of URTI ($n=45$). There were a number of popular OTCMs used during URTI. These included analgesics, decongestants, lozenges, cough mixtures as well as commercial preparations, which claim to have multiple effects. The array of OTCMs used by respondents in this study is illustrated in Table 6.4. Some respondents, however, did not refer to any specific OTCM, but suggested they used 'tablets' or 'medicine'. Parents reported similar

patterns of OTCM use for their children, although most clearly made the point that they would use preparations specifically marketed for children.

R40: Usually, I take the lemon flavour type Beecham's Powder type thing; the paracetamol based ones (18-year-old father, high deprivation post-industrial ward).

R17: Yeah, probably would have had some cold and flu tablets or some cough medicine (34-year-old mother, low deprivation urban ward).

R11: I put Vicks by here and Vicks on her back and I put this with that in here (glass bowl with water and Olbas oil) and what else did I do? I gave her Calpol and Nutrafen (Nurofen) (18-year-old mother, high deprivation urban ward).

The wide spread use of OTCMs within this sample is likely to reflect their popularity within the general population. Previous studies have found that self-medication with OTCMs is the most common response to self-limiting illness (Blenkinsopp and Bradley, 1996; Gabe et al, 2004). North American studies have reported OTCM use in 43%-91% of cases of URTIs (Vingilis et al, 1999a; 1999b; Braun and Fowles, 2000; Curry et al, 2002).

The popularity of OTCMs may be related to people perceiving these preparations as cures. Some respondents talked about OTCMs as having the property of 'getting rid of' the illness ($n=5$). Other studies have reported lay perceptions of OTCMs as having the ability to shorten illness rather than just relieve symptoms (Johnson and Helman, 2004). Clinical studies, however, question the therapeutic benefits of many OTCMs. For example, cough medicines have been found to be no more effective than a placebo (Schroeder and Fayeh, 2002). One reason for such confusion may be the imprecise words used by pharmaceutical companies in their marketing. The term

'remedy' is commonly associated with cure rather than relief of symptoms (Johnson and Helman, 2004).

R9: I immediately go for Strepsils first, because they get rid of, they help, but then I would do, because I forget all about these to be quite honest, Lemsip and the Beechams Powders (62-year-old woman, high deprivation urban ward).

Table 6.4: OTCMs used by Respondents

<p>Analgesics Paracetamol/Calpol for children Ibuprofen/ Nurofen/ Nurofen for children Disprol Anadin/ Anadin Ultra</p>
<p>Lozenges Locketts Tunes</p>
<p>Cough mixtures/ linctus Tixylix, Benylin Simple linctus Friar's Balsam</p>
<p>Preparatory cold and flu remedies Beecham's Powders Lemsip Night Nurse</p>
<p>Decongestants (Systemic) Sudafed Decongestants (inhalations) Vicks vapour rib and nasal spray Olbas oil Carvol Wright's inhaler</p>

Many respondents in this study did not provide a rationale for their use of OTCMs, even when directly questioned. Many, however, conveyed a sense of normality and habit in their choice of OTCM as they talked about what they 'normally' or 'usually' did.

R41: When it's me I normally just get the nasal thing that you stick up your nose and that's about it because with me I don't really care so much (22-year-old man, high deprivation post-industrial ward).

R13: I use paracetamol mostly, its habit really, very much and I tend to keep to the same brand of Calpol for the children (36-year-old, low deprivation urban ward).

Other respondents reported adopting self-care practices that their parents had used.

This suggests that OTCM use is learnt behaviour, with specific OTCMs recommended by one generation to the next. 'Modern' and 'traditional' values may be communicated to others through medicine taking (Van der Geest and Whyte, 1989).

R16: My mum, we've both trained in aromatherapy so I suppose that's where the oils come from. Even when I was a child I remember my mum sticking my head over a bowl of water and a towel over my head and I still do that now (29-year-old woman, average deprivation urban ward).

OTCMs also served an important function in relation to social and economic activity. Taking 'time off', or getting relief from normal daily responsibilities was, for many respondents, socially unacceptable, difficult, or simply impossible.

R43: I know that some people go sick when they have a cold but I don't think it's necessary (to be absent from work). I always go in regardless but then when I get home I would probably just put my feet up and get an early night (21-year-old man, average deprivation urban ward).

As a result of social pressures, many respondents 'worked through' URTIs continuing with their normal daily responsibilities despite being unwell. The social pressure experienced by respondents to continue with their normal responsibilities despite illness is consistent with Parson's theory of the sick role first publicised in 1951. 'Sick role theory' (Parson, 1951) purports that ill individuals are granted

exemption from normal social roles by a medial authority. Most respondents in this sample did not consult a clinician in cases of URTI, and therefore their illnesses were generally not medically legitimised. They may, as a consequence, have made more extensive efforts to continue with their normal daily responsibility and attempted to facilitate this through self-medication with OTCMs.

‘Working through’ URTIs was rationalised not only on the basis of perceived limits on the legitimacy of taking time off. Several self-employed respondents also expressed that it was unacceptable for economic reasons to be absent from work when suffering from a cold.

R35: We're self-employed you see, we can't just take time off when we like. If we don't work we don't have any money. So we have to carry on regardless, no matter how we feel (43-year-old father, average deprivation post-industrial ward).

As well as being easy to access and convenient, the popularity of medicines has also been attributed to their cost-effectiveness (Nichter and Vuckovic, 1994; Bradley et al, 1998; Vuckovic, 1999). In my study however, the cost of OTCMs was not considered a positive feature. On the contrary, some respondents from areas of high deprivation ($n=3$) commented on the expense of these medicines. One single mother discussed the financial burden of purchasing OTCMs in some detail.

R11: What I do is usually just that one thing and may be just that (picks up a jar of vapour rub and shows me) and I've got the expensive one as well, I have. But they said to get a vaporiser that you plug in and I did and it cost eight pound for a plug in one and it didn't touch her. It's a lot of money for something that didn't work. I probably spend about twelve pounds every time she has a cold. I don't see why the doctors can't prescribe something. It's a lot of money (18-year-old mother, high deprivation urban ward).

6.3.1 Child Care

Many mothers described the difficulties in getting relief from their childcare responsibilities when they were ill. This problem was particularly challenging for mothers with limited support networks and in particular single mothers. Some mothers simply felt that they did not have access to adequate support to enable them to change their daily routine to accommodate their illness.

R12: I got three children to look after and a mother-in-law and work, I can't. I just have to get on with it. I can't take time out I can't go to bed so I just carry on and get on with it (35-year-old mother, average deprivation rural ward).

R26: I don't keep the kids away from other kids if they are ill or whatever or if they got a cough. We just carry on regardless, kind of get on with it really (33-year-old mother, average deprivation rural ward).

R11: I don't have time to be ill; no one will look after her if I don't (talking about her child) (18-year-old mother, high deprivation urban ward).

Some parents also encouraged children to maintain their normal activity by attending school or nursery when suffering from colds and sore throats. Here, the use of OTCMs appeared to have a social role. 'Dosing up' with OTCMs was seen as useful in enabling the child to continue normal activity ($n=5$). This reduced the burden of care, allowing parents to fulfil their usual daily responsibilities. Indeed, Alloey et al, (2004) has reported that medicines may be used as a way of coping with illness when social pressures require the individual to continue as normal.

R19: I think, if it's just a cold, its best to dose them up and send them to school as normal and I can go to work (38-year-old mother, average deprivation rural ward).

However, the majority of mothers in this sample were not currently employed and did not talk of administering medication to their children as a way of enabling them

to continue with work. Most mothers reflected the ease in which their child's illness could be accommodated by the parents, which is consistent with the findings of Cornwell (1984). Most mothers in my sample, who were not working outside their home, resided in rural wards, which were areas of average or low deprivation. These respondents, in Vuckovic's (1999) terms, appeared to suffer less of a 'time famine' in the face of childhood illness than working parents.

6.3.2 Reservation about Medicines

Despite the universal use of OTCMs, a minority of respondents indicated that they had reservations about overly liberal use of medicines. Some middle class parents described their use of OTCMs as conditional; they were used only in 'severe' cases or as a 'last resort'. Two respondents stated they chose not to consume any medicines, (although one later contradicted this statement by naming several OTCMs which they had used in 'severe' cases) despite experiencing fairly unpleasant symptoms, and two respondents believed that overusing OTCMs medicines reduced their effectiveness.

R14: I don't tend to use them unless I have to. I had a bad cough with the last one and I had some kind of pastille they were something that my dad had found, they were some herbal thing (38-year-old mother, low deprivation rural ward).

R17: I didn't take anything at all. I just had to go to bed. Honey and lemon, that's all I was taking (34-year-old mother, low deprivation urban ward).

R14: I always try to keep my drug intake to a minimum and try not to take too much if I can. Because I think it's very easy just to pop pills and then when you really need them they don't have the effect on you, because you body has got used to them (36-year-old mother, low deprivation rural ward).

Another unusual respondent expressed her reservations about pharmaceutical remedies in general, believing that they were not tailored to individuals' needs.

Britten (1996) has reported similar reservations about generic medication.

R25: I feel that when you go to a homeopath you have a full and comprehensive consultation and you are not just applying a generic medicine to a generic problem. And I think that is the way that we should be using any kind of treatment (40-year-old mother, low deprivation rural ward).

R7: Well, (long silent pause) I wonder why I don't really like medicines? (Silent pause). I suppose if I thought that we were really sick then I would take them with no quibble. I've had three caesareans so I know what it is to take medication and I've got no problems with taking it. But I need a good reason (38-year-old mother, urban low deprivation ward).

Conversely, one middle class parent expressed reservations about natural remedies and asserted confidence in pharmaceutical medicines. This respondent did not use complementary therapies despite encouragement from friends.

R6: I do have a friend, my next door neighbour and a lady from our church, she felt very strongly that whatever she was taking into her body that she had to be happy with and she wasn't very happy with massive amounts of drugs and whatever in normal medicines. So she is training at the moment to be a homeopath. It's taken her a few years and weekend schools and things like this, so she feels very strongly about them. But I am very sceptical because I have trust in the traditional, proper medicine, the proper medical professional. She has often offered me a consultation and I have kind of avoided offending her by saying 'no I don't believe because I have more faith in the medical profession', it's um its sort of proven medical evidence rather than possible remedies. I just wouldn't trust them. Natural and all that kind of side of it, yeah, that's great but I think I would still be sceptical about whether it works or not (33-year-old mother, low deprivation rural ward).

6.3.3 The use of Complementary, Alternative, Home and Traditional Remedies

In addition to the widespread use of OTCMs, a small number of respondents described their use of CAMs. Several respondents reported self-medicating with herbal and natural medicines although a few had consulted complementary

practitioners ($n=4$). The use of herbal remedies was most widely reported by middle class parents and those with a health or science background. These respondents described self-medication with a variety of teas, tablets and syrups and believed that these both helped prevent and treat a number of different types of URTIs and related symptoms ($n=19$). The types of herbal remedies reported by the respondents are summarised in Table 6.5.

Table 6.5 Herbal Remedies used by Respondents

Remedies	Number of times mentioned
Echinacea	12
Teas:	3
Herbal	2
Camomile Raspberry	1
Black tea	1
White tea	1
	1
Garlic	5
Eucalyptus	3
Aloe Vera syrup	1
Arnica	1
Aconite (Wolf's Bane)	1
Rosemary	1

Almost a quarter of respondents reported using Echinacea. Its use by the public to treat the common cold has been previously reported (Caruso and Gwaltney, 2005). Echinacea originates from central and South Western America and is considered to boost the immune system. Its popularity has grown in line with that of other CAMs, but there is little empirical evidence to support its therapeutic benefit (Caruso and Gwaltney, 2005). There has been a growing popularity in the use of CAMs and consistent with previous studies, respondents residing within areas of average and low deprivation were more likely to report using complementary medicines than

respondents from areas of high deprivation (Sharma, 1992). Only one respondent from an electoral ward with high levels of deprivation reported CAM use.

Variations in the use of complementary therapies across regions may be related to access, local availability, and affordability (Sharma, 1992). Gender also appears to influence the use of CAMs with more women reporting the use of complementary therapies than men, although the reasons for this are unclear.

Respondents often reported a preference for natural therapies - considered by some to be more 'healthy' than mass-produced pharmaceutical products. For these respondents, reservations about OTCMs were related to perceptions of pharmaceutical compounds as 'artificial', 'manufactured', 'unnatural' and 'chemical'. Concerns about the perceived unnaturalness of medicines, the potential side effects and a preference for not 'taking drugs' has been previously reported (Britten, 1996). Perceptions of natural things as always good, and chemical or manufactured things as predominately bad, are miss founded. For example, the naturally occurring compound opium is harmful when abused.

R24: Because I am very aware of chemicals and things that we put into our bodies, that we should not be putting in really. And I know how I feel... That since I have actually cut out, stopped taking so many antibiotics, stopped taking so much caffeine. I drink herbal teas. I know I feel better. So when this homeopathic thing came along I was just starting to become aware of what I really should be putting into my body and when this course became available I thought well yeah, I would give that a go and it has hit home to me a bit more that what I am doing (using homeopathic and natural remedies) is the right thing (29-year-old woman, low deprivation rural ward).

In addition to the use of OTCMs and CAMs, respondents reported using home remedies to reduce symptoms and speed recovery including sugar and onion ($n=1$),

mustard compress ($n=1$), brimstone and treacle and goose grease ($n=1$), although the later two remedies were merely listed as remedies used in the past, rather than remedies currently used. Home remedies also included alcohol, such as 'honey whiskey water and sugar' ($n=1$), brandy ($n=1$), and combinations of common foods such as 'milk and eggs' ($n=1$), raspberry vinegar ($n=1$), Lucozade (carbonated beverage high in glucose), grapes and chocolate ($n=1$). The most popular home remedy was hot lemon and honey drinks ($n=12$).

Compared to the number of respondents that used OTCMs ($n=45$), comparatively few respondents used home remedies ($n=12$). Although home remedies were once important ways of dealing with minor illness, they lost some of their popularity as a result of the growth in commercial pharmaceutical production and the rise of professionally endorsed medicines (Pratt, 1976). As a result, members of the public may now lack the skill needed to prepare home remedies, prefer the convenience of pre-prepared preparations or have no faith in the efficacy of home remedies.

Middle class parents and respondents with a health or science background often considered vitamin supplements, in particular vitamin C, to be beneficial. Often individuals from these two groups would attempt to increase their vitamin intake by either consuming a proprietary preparation in the form of tablets or pastilles or by increasing consumption of fruit or fruit juice.

R19: I usually take fresh juice, orange juice or something; we squeeze quite a lot here for the restaurant so it's quite good to have what's left over. I up juice (38-year-old mother, average deprivation rural ward).

R14: Err, vitamin C essentially, but I try to do that through natural sources like drink orange juice and increase oranges and fruit intake. Because I had run out of fruit completely so kiwis or whatever was available. I try to get my son to eat fruit though it's a bit of a battle (38-year-old mother, low deprivation rural ward).

Taking vitamin and mineral supplements became popular during the 1800's when physicians commonly prescribed vitamins as tonics (Crelin, 2004). The use of vitamin C for URTI has been reported elsewhere (Helman, 1978; Braun et al, 2000), but recent research suggests there is little therapeutic benefit in well-nourished western populations (Hemilä et al, 2007). Other dietary supplements described by the respondents in this study were cod liver oil ($n=1$), 'Omega 3' ($n=1$), and one respondent described supplementing his diet with zinc through consuming pumpkin and sunflower seeds.

Behavioural responses aimed at promoting recovery included keeping warm, taking hot food or drinks, and increasing consumption of fluids. These behavioral responses may be consistent with the hot-cold belief system if they are perceived as restoring the balance between wet/dry and hot/cold states. But these beliefs may also be consistent with a biomedical model of illness: if you are pyrexia you may lose fluid through sweat and increasing fluid intake helps maintain normal fluid balance. Illness behaviour, such as this, has been reported in other North American and UK samples (Patcher, 1989; Braun et al, 2000; Helman, 1978).

R4: Well, mainly the first thing I try to do is errr try to keep, wrap up warm, keep indoors, if I possibly can and I normally take hot drinks. I would probably go to bed, drink lots of liquid, rest and hope that in a couple of days (56-year-old man, average deprivation post-industrial ward).

Respondents reported nasal congestion as a particularly troublesome symptom.

There were a number of tried and tested ways of reducing congestion most of which involved increasing humidity. Some people inhaled steam ($n=12$), one mother placed a wet flannel on the radiator, and one inhaled the steam generated by a household shower. Tilting the head of the bed so that the head was higher than the chest ('propped up' or semi-recumbent) ($n=3$) and saline nasal drops to loosen chest secretions ($n=1$) were also described as ways of relieving congestion.

R32: Relieve the congestion as much as you can. I'm the sort of guy that goes and gets a bath of steaming water and puts a bath towel over my head (72-year-old man, low deprivation rural ward).

Consistent with previous studies, some respondents believed that resting was an effective strategy to deal with colds and other URTIs (Vingilis, 1999). Respondents in this study, however, believed that one could rest without going to bed by 'taking it easy', or 'staying in'. Children, in particular, were perceived to benefit from rest.

R16: when I get a cold I'd usually go to bed (26-year-old mother, average deprivation urban ward).

R12: I'll let them have a day off school and let them rest in bed and give them some Calpol (35-year-old mother, average deprivation rural ward).

6.4 Advice Seeking

Thus far, it has been argued that responses to URTI primarily involve self-care, utilising combinations of OTCMs, CAMs, home remedies, dietary supplements and behavioural strategies. However, respondents also reported consulting health professionals and using prescription medicines. According to Kleinman (1980), health care is comprised of three overlapping sectors, 'professional', 'popular', and

‘folk’. The professional sector encompasses organised healing provided by doctors, nurses and other health professionals. The popular sector includes self-treatment, family care and systems of community care. The folk sector includes non-professional healers and complementary or alternative medicines based upon paradigms outside of the dominant biomedical model. Illness behaviour, however, rarely exists solely in any single sector (Pachter et al, 1989). Data from the present study demonstrate that individuals typically used remedies from two to more sectors, either sequentially or simultaneously. Using multiple solutions to help with URTI may reflect the multidimensional beliefs about aetiology previously discussed.

R14: Well, the worse one I've had for a long time. I get asthma so I increase the dosage of my Salbutamol inhaler. If I had a headache, and I had a bad headache that time, I'll take some paracetamol and um just upped liquids and vitamin C and I drink raspberry and Echinacea to try to kill it off and I've had antibiotics for that as well (38-year-old mother, low deprivation rural ward).

R16: Ok, I start taking Echinacea, the last thing I do is go to the doctor. Um, take some Ibuprofen, if I need it, if I'm in a lot of pain, as soon as I start getting any phlegm at all I'll whack in the Sudafed because I think that's pretty good. I keep warm. I also steam inhale with aromatherapy oils that usually clears it (29-year-old woman, average deprivation urban ward).

The previous sections have focused on exploring the ‘popular’ and ‘folk’ responses to URTI. The following section describes respondents’ reported help seeking behaviour. It moves from analyses of where advice was sought to factors likely to affect decisions to consult a clinician, and analyses attitudes towards the professional sector of health care.

6.4.1 The Demise of the Lay Referral System.

Although twelve respondents stated that they were unlikely to seek any advice for colds and other URTIs because they 'didn't need it', most respondents reported multiple sources of advice. Advice was sort from a variety of health care workers; health visitors ($n=2$), midwives ($n=3$), nurses ($n=3$), NHS direct ($n=5$), or pharmacists ($n=6$) and from doctors, friends/family members, literature or the internet (see Table 6.6). Few respondents reported seeking advice from family members or friends.

Table 6.6: Sources of Advice Mentioned by Respondents for Colds and Other URTIs

Source of advice	Number of times mentioned
Health care workers (nurses, midwives, pharmacists, NHS Direct)	19
Advice not sought	12
Doctor	9
Friend/family	5
Books	4
Internet	2

Health care workers were reported a preferred source of advice over doctors because of pragmatic advantages such as ease of access and longer consultations.

Respondents also preferred to receive informal advice from health care professionals known to them either through repeated contact or socially. This preference may be related to their perception that consulting a GP for URTIs is frowned upon by most health care professionals. Despite recent government investment into developing NHS Direct, very few respondents reported using this service or the Internet as a resource for advice and reassurance.

R10: If I knew someone who was a GP for example and they didn't mind me tapping them up for advice on an unofficial basis then err I'd ask the question. I used to have a friend who was a nurse and I would ring her from time to time for advice (36-year-old father, high deprivation urban ward).

R14: To me, now my best source of information is my midwife and my health visitor and the pharmacist. These are where I go for information the first port of call. I've used NHS Direct (38-year-old mother, low deprivation rural ward).

Many respondents indicated that when they had symptoms of URTI they would 'go to the chemist' or pharmacy ($n=32$), but close scrutiny of the data suggest that going to the local chemist was a way of purchasing OTCMs and other medicinal products; only a few explicitly indicated that they went to a pharmacy for advice ($n=6$). Those who did consult their local pharmacist for advice described the pharmacist as an acquaintance but few knew the pharmacist on a social level before they consulted. Most implied that their acquaintance had grown as a result of repeated visits to the pharmacy. Consulting the local pharmacist was described as 'easy' compared to consulting doctors, who were described as difficult to access because of long waits for appointments and long waits in surgeries. It is also possible that respondents had been encouraged to seek advice from pharmacists by local and national initiatives aimed to enhance the range of care options for minor illness (DoH, 2000).

R40: Oh yes. I use the local chemist for advice quite often. I know her quite well now (18-year-old mother, high deprivation post-industrial ward).

However, seeking advice from acquaintances with health care knowledge was not without its problems. Respondents implied that questioning health care professionals in social situations outside of their professional setting was not entirely acceptable.

R19: We have a doctor who lives over the road and comes here (restaurant) to eat. And he always asks how's the family and I say it's funny you should ask, then ask him about the kids, and he gets so fed up, we are terrible like that (38-year-old mother, average deprivation rural ward).

Several new parents cited their mothers as their preferred source of advice (n=4).

Turning to experienced mothers for advice is consistent with the traditional role of women as family carers. A minority indicated that they would seek advice from members of community other than their mother.

R34: I don't think that I have ever formally (asked for advice) but certainly I have discussed things when one of my friends has been there and they have suggested try this. I find it useful and I have certainly done that before now, so yeah. I have actually acted on the suggestion of others (60-year-old man, average deprivation rural ward).

One respondent, however, expressed her scepticism about advice from other members of the community. This respondent considered lay advice potentially inaccurate and unreliable.

R19: Um I suppose you do (seek advice) a bit with family ...but um, you soon learn that you're better off relying on your own instinct, because it's amazing how many old wives tales there are.....so you do have to take some (advice) and leave the other (38-year-old mother, average deprivation rural ward).

These findings are inconsistent with theories proposed in 60's and 70's that in the event of illness, advice would be sought firstly from close family members and then from authoritarian laymen, and finally professionals (Freidson, 1970). Changes in the initial source of advice from family members to professionals may reflect the dissolution of the nuclear family and wider changes in society. Family support is

believed to increase self-reliance, the absence of which may contribute to an increase in consultation rates (Gabe et al, 2004).

Social factors, such as education, religion and social class may also play a role in shaping illness behaviour. Blaxter and Paterson (1982) reported that those of a higher social class were more likely to see themselves as ill and to consult a doctor. In contrast, working class women saw illness as a normal part of life and were, therefore, less likely to consult a clinician. A more recent study also found that older adults from social class I consult a clinician more frequently than those from lower social classes (MacNiece and Majeed, 1999). However, other studies have reported higher consultation rates in children from social classes IV-V (Saxena et al, 1999) and in adults 75-84 years of age (MacNeice and Majeed, 1999). All parents in this study, regardless of the area in which they lived, stated that they would consult a clinician for an ill child in certain circumstances.

6.4.2 Transition to Real Illness

Respondents seldom reported formally consulting a clinician for URTIs ($n=5$), but a number of symptoms were described as likely to trigger a consultation. These symptoms included green phlegm, severe cough, fever, debilitating illness, and any symptoms lasting longer than expected. These symptoms drew respondents' perceptions of URTIs away from 'normal illness' and into the realm of 'real illness.' Experiences of asthma also influenced some parents' consultation decisions. In the vast majority of cases, a consultation would only be sought as a 'last resort'.

R42: Unless he's really ill then I wouldn't bother going to the doctor (25-year-old father, high deprivation post-industrial ward).

R16: The last thing I do is go to the doctor (29-year-old mother, average deprivation urban ward).

'Coughing up gunk'

The expectoration of coloured, thick, green or copious amount of phlegm (sputum) heightened the respondents concerns about the potential severity of URTIs. These symptoms, and to a lesser extent persistent or severe cough, were likely to trigger consultation with a clinician ($n=13$). Many respondents expressed concerns about productive cough and associated the occurrence of coloured 'phlegm' with infection, which was perceived as needing treatment with antibiotics. A Dutch national survey ($n=7057$) recently reported six patient characteristics independently associated with being prescribed antibiotics, one of which was the 'endorsement' of the need of antibiotics to treat 'green phlegm' (van Duijn et al, 2007a).

R16: If it's not getting better and it's taking a long time and I've still got a lot of phlegm then that's when it might have turned into a chest infection. If it's been over 10 days and I've got a lot of phlegm and I'm coughing up gunk, then I will reluctantly go to the doctor (29-year-old woman, average deprivation urban ward).

R30: The only time I do go for antibiotics is if my phlegm is green then I know that I got to have antibiotics (26-year-old woman, average deprivation post-industrial ward).

The occurrence of coloured phlegm has been previously reported in lay samples as being associated with infection (Butler et al, 1998b) and as requiring antibiotic therapy (Kai, 1996). Misconceptions about the links between green or coloured phlegm is not surprising as European studies sampling clinicians have demonstrated

that yellow and or green phlegm is one of the most important symptoms influencing clinicians' antibiotic prescribing decisions (Hummers-Pradier, 1999). The prescribing decisions of doctors are likely to reinforce lay associations between green phlegm and infection requiring treatment with antibiotics. Current biomedical evidence, however, purports that the occurrence of a productive cough is the result of the body's inflammatory response and is not specifically indicative of bacterial infection. The use of antibiotics for such symptoms may therefore be of questionable benefit (Arnoll and Kenedy, 2002; Eccles, 2005).

Fever Phobia

Fever is defined as “*condition of illness, of high body temperature*” (Collins Pocket Dictionary and Thesaurus, 1993, p206). Fever was described as unlikely to trigger consultation in adults but many parents indicated that they would consult a clinician (doctor, nurse, or midwife) if a child had a fever. Parents perceived fever as indicating severe illness in children and a cause of great concern.

R19: Well with the girls, they seem to have colds all the time so I very much ignore it most of the time um unless she's got a really nasty temperature, something more serious (38-year-old mother, average deprivation rural ward).

Parental concerns about fever, particularly in children, have been recorded for more than two decades (Helman, 1978). Fever is one of the most common reasons for parents seeking medical advice (Crocetti et al, 2001). From a biomedical perspective, however, fever is considered part of the host's immune response to fight infection, and in most cases, does not indicate serious illness (Eccles, 2005).

Unable to 'work through'

Studies conducted during the 1970s report that illness behaviour depends on the extent to which the symptoms interfered with the sufferer's normal pattern of behaviour (Zola, 1973; Herzlich, 1973; Mechanic, 1962). Consistent with the findings of Zola (1973), and the more recent work of Cornwell (1984), respondents in this study reported that they were more inclined to request a consultation with a clinician when their symptoms interfered with their ability to continue with their normal activities ($n=11$).

R31: Yes, I can remember one incident that I was; I think severity, when I was wheezing every time that I coughed and quite badly. If I felt that, if it was in some way um debilitating, yeah if it was severe enough to stop me doing something I needed or wanted to do, then I would go (consult a clinician) yeah (56-year-old man, low deprivation urban ward).

Illness Lasting Longer than Expected

Consistent with previous studies, consultations could also be triggered by any symptoms lasting longer than individuals expected (Brett and Mathieu, 1982; Branthwaite and Pechère, 1996; Vingilis et al, 1999a, Vingilis et al, 1999b; Butler et al, 1998b). Data demonstrated extreme variation in individual expectations of the duration of symptoms from 24 hours to 10 days. The length of time symptoms were experienced before consultation was sought also varied from a few hours to several weeks. Natural history data reports that the mean duration of symptoms for URTI is 7-10 days, but some symptoms can last more than 3 weeks (Eccles, 2005). Some respondents, therefore, expressed unrealistic expectations about the duration of URTIs.

R40: Yeah, if it's been a week or so and it doesn't fade then they say take him round (to the doctors surgery) but wait and see for the first couple of days (18-year-old father, high deprivation post-industrial ward).

Complications of Asthma

Respondents with experiences of asthma were more likely to report consulting a clinician. Triggers for consultation in these cases were concerns that URTIs may precipitate more serious infections or exacerbation of asthma. Parents of asthmatic children reported experiences of children becoming very unwell as a result of URTIs, and in some cases the child was hospitalised. Particularly worrying symptoms in asthmatic children were problems with the child's chest and breathing including wheezing and shortness of breath. Parental concerns about URTIs in asthmatic children are not surprising. Viral illness can cause exacerbation of asthma and childhood asthma is a common cause of hospital admission (Hoskins et al, 1999; Rawlinson et al, 2003).

R23: If (name of child) has anything, I feel, is on her chest then I'll take her straight to the doctors because she's asthmatic and has been hospitalised so she goes straight to the doctors just to check her out (23-year-old mother, high deprivation urban ward).

Worried Parents

Caring for a sick child provoked considerable emotions in parents. Concerns and worries acted as powerful drivers for consultation. Although parents reported that they would rarely consult a clinician if they themselves had an URTI they would consult if their children had similar symptoms. As well as having concerns about particular symptoms, such as fever previously discussed, parents also indicated that a number of other factors influenced their decision to consult for a child, including,

anxiety that the illness could be something more serious than a common cold, a lack of confidence in assessing childhood illness and, to a lesser extent, social pressures.

Ill babies and young children provoked concern and anxiety in all parents participating in this study. The main factor provoking parental concern was a belief that babies and young children were more vulnerable to serious illness because their immature bodies were perceived as less able to cope with illness. Some respondents reported that exposure to health education advice had heightened their awareness about potentially serious childhood illnesses, this in turn prompted concerns about their child's health and triggered consultation ($n=6$). Some parents also mentioned recent campaigns relating to meningitis ($n=9$).

R2: Well, because I think they're much more vulnerable and you're told, both the doctors and the medical practitioners who are around child care, the midwives and everything they say to you immediately if you see any signs or symptom of things, go, and be in touch with your doctor and everybody, and what, obviously they've got much younger and smaller organs etc, etc, they haven't got the capacity for lung infections and things like this. You know, you've got an adult capacity, they have little capacity any build up in there is much more serious than it is with yourself (30-year-old mother, average deprivation urban ward).

Parents in this study sought consultations with a clinician primarily because they wanted to relieve their fears and anxiety about the child's illness and not for any specific treatment. Their expectations of consultation were primarily for information and reassurance ($n= 24/24$ parents).

R24: Definitely when she was a baby it was reassurance as much as anything else because I think you tend to panic, or well I did anyway. She was little I never thought I would ever have children. I needed someone to tell me what was going on. So there was a lot of that. There was reassurance as much as anything else. I just needed someone to say to me she's ok, nothing is going to happen to her. When the

baby was really small I used to think that the doctor must be saying oh my god here she comes again but I just didn't actually care at that point (laughs) (29-year-old mother, low deprivation rural ward).

Parents expressed a lack of confidence in their ability to assess the severity of their child's illness. For first time parents, this was partly related to a lack of experience in dealing with sick children and feeling unable to differentiate between minor and potentially more serious illness. Inexperienced parents (parents with a single child under the age of 5) expressed greater concerns and uncertainty about the nature and severity of the child's illness compared to more experienced parents. These anxieties influenced parent's decisions to consult.

R11: I just sort of take her to the doctor on the first day that she has it really. Just because I worry so much in case it gets any worse. Yeah. I get very emotional probably because she's my first. I don't know how to help her, that sort of thing. I can't do anything for her that hurts (18-year-old mother, high deprivation urban ward).

Experienced parents (parents with more than one child where the second child was over the age of 5), were more confident in their ability to deal with the child's illness and in assessing illness severity.

R14: Yeah I've learnt that the hard way. I suppose you don't really get clued into the difference between this is a sniffle and this is a bad infection, and it's learning to read the symptoms in the child and that's taken a while.

NH: So you feel you could manage that situation now?

R14: Yeah I'm better able to make a judgement call. 18 months ago it would have been a lot harder, when they're that much younger it's much more difficult to make a call yourself, you need to know what's going on (36-year-old mother, low deprivation rural ward).

The second factor contributing to parents' lack of confidence in assessing the severity of childhood illness related to communication problems. The inability of babies and young children to clearly communicate their symptoms verbally, was perceived as limiting parents' ability to accurately assess the severity of the illness ($n=11$).

R35: I will normally phone the doctors, well the NHS help line for advice but that is because he is fifteen months old. If he was three to five we would hold out a bit longer. I hate it really because I can't be bothered with hospitals and doctors. But I take the baby straight away. They can tell you if they are ill or not. (pause). As you know, you start to know them. You know when they are whining and when they're feeling a bit lousy they let you know when they are really feeling ill (36-year-old mother, average deprivation post-industrial ward).

Parents also reported some reluctance to rely on their children's self reports of illness because children were perceived as not always providing accurate accounts of their health state ($n=7$), perhaps attempting to mislead parents in order to get time off school.

R26: Well it's difficult because with (name of child) she's quite often not that keen to go to school so she'll start saying things like, I've got a headache, I don't feel well and don't actually know when to believe her. I tell her that one-day I will send her to school when she's ill because I won't know (33-year-old mother, average deprivation rural ward).

Other interview studies have supported the idea that parents consult clinicians in order to obtain information and reassurance (Branthwaite and Pechère, 1996; Butler et al, 1998; Braun and Fowles, 2000). Britten (1996) reports how some informants were pleased when clinicians provided advice rather than prescribed medicine. These findings are, however, inconsistent with studies conducted from the clinicians' perspective which report patients as having expectations for antibiotics, placing

pressure on them to prescribe (Scott et al 2001; Mazzaglia et al 2003). A recent European study suggests, however, that clinicians tend to overestimate the actual pressure to prescribe antibiotics (Altiner et al, 2004). The findings of my study support the idea that few parents actually wanted or expected any medication even when they consulted for URTIs.

A minority of parents identified societal expectations and a sense of responsibility as reasons for consulting a clinician ($n=3$). Parents expressed a belief that it was their duty to take the child to see the doctor, and not taking a sick child to the doctor may be perceived as neglect. Studies completed more than 25 years ago recognised that taking action was a moral pre-requisite of good parenting (Mechanic, 1978).

However, this idea is at odds with the clinicians' perspective that consultations for URTI are rarely necessary. Consulting a clinician also meant that the responsibility for resolving the child's illness was shared and in some cases respondents indicated that they wanted doctors to take responsibility.

R12: To be honest, I'm probably a really bad mother because unless it's really bad (I'll do) probably nothing. I'd just ignore it and let it go anyway on its own (35-year-old mother, average deprivation rural ward)

R6: Well they can't make that decision themselves can they. You have to make that decision for them and perhaps then it's shifting the blame onto the doctor then, if he doesn't do anything it's not your problem it's the doctor that can't help them, not you that can't help them. Perhaps there is something that can be done for them. Who am I to say that they shouldn't have the privilege of going to the doctor (33-year-old mother, low deprivation rural ward).

6.5 Summary

This chapter argues that beliefs about hot-cold influences, other traditional beliefs, and biomedical beliefs exist in parallel within an ethnomodel of URTI. Despite expressing some uncertainty about the causes of URTIs, respondents consistently reported the dominant response to URTI was to self-care. Most self-care activities occurred within the 'popular' sector of health care in the form of self-medication with OTCMs. Indeed, a key conceptual theme emerging from the data relating to illness behaviour during URTI was the respondents' consistent, reliance on medicines of some type. Medicines enabled individuals to abate social pressures, to continue with their normal activities or responsibilities, and to deal with 'time famine'. There are, however, a number of other potential explanations for the reliance on medicines which are discussed in Chapter 8.

In most cases URTIs caused few concerns and were considered 'normal illness' and advice was not sought. Despite this, a small proportion of respondents said they would normally consult a clinician for URTI. There was a strong reliance on advice from medical professionals in all subgroups and little evidence of an active lay advice system. Normal illnesses were re-defined as real illnesses through the occurrence of specific symptoms; namely expectorating green phlegm, pyrexia, symptoms lasting longer than expected, and an inability to continue with normal activities. Parental anxieties, lack of confidence in assessing the severity of the child's illness and social pressures also triggered consultations. Parents' expectations of the consultation were said to be primarily focused on receiving information and reassurance.

Chapter 7: Drug Offensives against Germs: Public attitudes towards antibiotics

7.0 Introduction

The public, as the consumers of antibiotics, can help to minimise the risk of bacterial mutation and selection of resistant microbes by adhering to antibiotic treatment regimes (Thomas et al, 1998), and by following advice about the safe disposal of medicines (Kummerer and Henninger, 2003). This chapter firstly describes self-reported antibiotic consumption in the community. Following this, the analysis explores public attitudes towards antibiotics. Respondents' confidence in the efficacy and safety of antibiotics is contrasted with their unfamiliarity with the pharmacological mechanisms by which antibiotics work and potential adverse effects. Self reported adherence behaviour is explored and a typology of antibiotic adherence behaviour in the community is presented. A summary of the key findings from this chapter has been published in the journal *Patient Education and Counseling* (Appendix 14).

7.1 Self Reported Antibiotic Consumption

Unsurprisingly, given how frequently antibiotics are prescribed, all respondents in the study reported that they had been prescribed and consumed antibiotics at some point in their lives. Some respondents spontaneously quantified their antibiotic consumption at the start of the interview by stating that they 'rarely,' 'never', or very infrequently used antibiotics ($n=10$). Further data analysis indicated that respondents who claimed to be infrequent users of antibiotics also believed that the repeated use of antibiotics was unacceptable. Consequently these respondents may have underreported their personal use of antibiotics in efforts to provide what they

perceived as socially acceptable answers. Other respondents said they had used antibiotics occasionally ($n=17$), although specific details about number of occasions were not provided. Fifteen respondents did not quantify their antibiotic use. A minority said they regularly used antibiotics or were ‘always on them’ ($n=4$).

Some respondents referred to antibiotics by their pharmacological or proprietary name and others referred to them as simply as ‘tablets’ or ‘medicine.’ Table 7.1 lists the antibiotics named by respondents and the number of times each type of preparation was referred to. Many respondents provided only incomplete names or used incorrect pronunciation, suggesting either unfamiliar names of antibiotics or difficulty recalling this information.

R44: Um, yeah well there's Penicillin and Amoxicillin, there's a child version, isn't there. There's Errythro (pause) mycin um, but tending not to get antibiotics unless it's really vital, so I haven't heard of that many. There's an oxy something (46-year-old father, average deprivation post-industrial ward).

R2: Well, there's one, there's two, that I think I can remember, um, one's something called an, an ansz, zoillin, axozollin or something like that and then there's floxcillin but I don't know. There's two that stand in my mind, because I probably used them a few times, but to be honest I probably don't look at the names of the antibiotics so I don't really have a clue (30-year-old mother, average deprivation rural ward).

Parents also used colour and flavour as a way of distinguishing different types of antibiotic suspensions prescribed for their children. Antibiotics were described as ‘pink’, ‘yellow’, ‘banana’, and ‘orangey medicine’.

R9: When my children used to have antibiotics, when they were little, it was always medicine, pink medicine they used to call it (62-year-old woman, deprived urban ward).

Table 7.1: Antibiotics Named by Respondents: The frequency with which named antibiotics were cited

Antibiotic group	Antibiotic	No. of times cited
Penicillin	Penicillin V	19
	Amoxicillin/Amoxil	11
	Flucloxacillin	1
Tetracycline	Doxyclyline	1
	Oxytetracycline	1
Cephalosporin	Cefalexin/ Ceporex	1
	Cefotaxime	1
Macrolides	Erythromycin	3
	Azithromycin	1
Other	Chloramphenicol (topical)	3

7.2 Confidence in the Efficacy and Safety of Antibiotics

7.2.1 'Getting rid of infection'

Antibiotics were described as a 'medicine' to treat infection. Antibiotics were believed to act 'quickly', to be 'effective', 'strong', 'safe', but also to have life saving properties. Although positive attitudes towards antibiotics were widespread amongst the sample, older adults (>55 years of age) were particularly positive about them. These respondents were likely to have had, and some reported experiences of antibiotics at a time when infectious disease contributed to high levels of mortality and antibiotics were highly revered for their life saving properties.

R1: They get rid of whatever you have got, quickly and easily, and then you're better and they're marvellous things (64-year-old woman, average deprivation urban ward)

R37: I think that when penicillin came in it was my father's saviour. Because I think, penicillin saved my father's life. When he had an accident at work and it was just sort of coming in. It was more or less on a trial basis and he was one of those let's try it because he doesn't have anything to lose, kind of thing (63-year-old woman, average deprivation post-industrial ward).

Most respondents had positive views of antibiotics and were confident in their effectiveness, but all did not share this. Younger adults were more ambivalent about their benefits (being neither overtly positive nor expressing reservations). This may be explained by the fact that young adults are likely to have the least experience of illness, infection and antibiotics when compared to older age groups (Wrigley and Majeed, 2002). Also, a small number of respondents, predominantly middle class parents, expressed reservations about both medicines in general and antibiotics in particular - a point which I shall return to later in this chapter.

Respondents in this study reported having experienced antibiotics in a number of different forms. Most described antibiotics as 'tablets'. Parents also used the term 'medicine' to describe antibiotics in the form of a suspension. One respondent described her experiences of antibiotic 'cream' (topical ointment), and several mentioned antibiotic 'eye drops.' Although very few respondents spontaneously reported their beliefs about the efficacy of different types of antibiotic preparations, one respondent described how she thought that 'cream' was less effective than tablets.

R1: The doctor gave me antibiotic cream once for an ear infection but it didn't work. It cleared up on its own eventually. I was disappointed that she didn't give me tablets (64-year-old woman, average deprivation urban ward).

A few respondents in this study suggested a lack of efficacy of antibiotics when they were the 'wrong type' ($n=3$), or 'not strong enough'. Studies in the developing world found that tablets were perceived as having greater efficacy than other formulations (Etkin, 1992). However, my searches did not identify any previous

studies from western populations linking the type of preparation with efficacy. This topic may warrant further investigation.

Initial questioning suggested that respondents had very limited understanding of how antibiotics worked. However, following prompts, two key mechanisms were reported: antibiotics were believed to either destroy the causal agent ($n=25$), or antibiotics were believed to aid the immune system ($n=8$).

R42: I'm sure antibiotics get rid of infections. Um I think that's what they were for. Because I had an eye infection and I had antibiotics for that, and um it went within two or three days (25-year-old father, deprived post-industrial ward).

R28: Well I have always been led to believe that they just help my immune system fight of the infection. That when they are too big for my own immune system to fight, that's when the antibiotics come in and help you fight the disease or that they help fight the bacteria if you like, with your own system (30-year-old mother, average deprivation rural ward).

R3: Well I think they step in and create synthetic antibodies to fight the disease or the virus that you suffering from and take over from your body's natural immune system (34-year-old mother, average deprivation urban ward).

Respondents' ideas that antibiotics remove or kill the cause of the infection and that they, in some way, help the immune system, are broadly in line with prevailing biomedical knowledge. Indeed, antibiotics either inhibit bacterial reproduction or destroy bacteria, and in doing so may be considered to work in synergy with the individual's own immune system. Unsurprisingly, respondents with a health or science background provided accounts of antibiotic action which were most consistent with scientifically established pharmacological mechanisms ($n=11$). Nine respondents, most of whom were young adults, reported that they did not have any ideas about how antibiotics worked.

Although respondents indicated that antibiotics ‘get rid of infection,’ many were uncertain about the type of microbe or infection against which antibiotics can be effective. Table 7.2 summarises respondents’ beliefs about the type of infection which antibiotics can effectively treat.

Table 7.2 Beliefs about the Type of Microbe Treatable with Antibiotics

	Respondent’s background				Total
	Health and science (n=11)	Middle class parents (n=14)	Young adults (n=15)	Others (n=5)	
Bacteria	11	5	0	2	18
Viruses	0	1	2	1	4
Bacteria and viruses	0	8	6	3	17
Don’t know	0	0	7	0	7

When asked if antibiotics were effective against bacteria, viruses, or both, many respondents gave responses that were inconsistent with scientific models.

Importantly, less than half of the respondents (30%) explicitly indicated that antibiotics are only effective in treating bacterial infection.

R6: I’ve heard that you can’t use antibiotics against a virus (33-year-old mother, low deprivation rural ward).

R33: I think that it was virus with antibiotics. I never thought about it, um bacteria. This is where I’m a bit too basic but I thought with viruses antibiotics only worked if it was a certain strain of a virus, that’s what I thought and that’s also what I have been told but I can’t remember any of the detail. If it like a viral virus or something and that’s what the doctor says anyway (21-year-old woman, deprived urban ward).

Only three respondents, all with either a health or science background, discussed how prescribers attempted to match antibiotics to the microbe most likely to be

causing the infection. In many cases antibiotics appeared to be seen as a generic cure for all infection.

R31: I usually think of penicillin, it's a medicine, which will kill bacteria, and there are sort of general ones for certain types of bacteria and some are more specific ones (56-year-old man, low deprivation urban ward).

When questioned about the efficacy of antibiotics within the context of URTIs, almost half of the respondents reported that antibiotics were not effective against 'colds' ($n=22$). A few respondents also reported that antibiotics could successfully treat throat infections ($n=2$).

Initial analysis of respondents' ideas about the links between the microbe causing the infection and the effectiveness of antibiotics suggested that those who believed that URTIs were viral in origin also recognised that antibiotics have limited effectiveness in such cases. A search for disconfirming evidence, however, revealed that some respondents denied any possible benefit from antibiotic because they had not been prescribed them following a consultation for URTI. Although these individuals could say that antibiotics were not always indicated, they were unable to say why.

R30: Colds are viruses so antibiotics aren't going to work (26-year old woman, average deprivation post-industrial ward).

NH: Do you expect to get antibiotics when you see your doctor?

R43: Well the last time I went to the doctors (whilst experiencing symptoms of URTI) she wouldn't give me any (antibiotics), so I wouldn't really go for them anymore (21-year-old man, average deprivation urban ward).

7.2.2 Disadvantages of Antibiotics

On initial questioning, respondents appeared unfamiliar with most of the potential adverse reactions and disadvantages of antibiotic consumption, although a few respondents reported personal experience of some side effects ($n=4$). However, following probing, a number of respondents were able to suggest some potential disadvantages which have been categorised as allergies, gastrointestinal disturbances, secondary infections, and ‘resistance.’ A number of allergic reactions were described: anaphylactic shock ($n=1$), swellings ($n=1$), and rash ($n=7$). Gastrointestinal disturbances included diarrhoea or ‘stomach upset’ ($n=11$), nausea or ‘sickness’ and vomiting ($n=2$). Antibiotics were also believed to lead to secondary infections such as cystitis and yeast infections or thrush ($n=4$). These side effects were generally perceived to be the result of the antibiotic ‘disagreeing with,’ ‘upsetting’ or ‘unbalancing’ the body in some way. Diarrhoea was particularly considered a significant indicator of a disruption to the body’s natural balance ($n=5$).

R15: There are lots of different side effects from headaches, to rashes, to stomach upsets. I know with erythromycin my children can't take it because it actually gives them diarrhoea, um I don't know I just presume that it disagrees with the body, it's not suitable for that person, don't really know why (29-year-old mother, deprived urban ward).

R14: Well particularly for women they (antibiotics) can lead to yeast infections and that sort of thing and upsetting the pH balance, so you need to be aware of that (38-year-old mother, low deprivation rural ward).

R22: Oh yes they do have some side effects, don't they? Some of them can upset your stomach or give you diarrhoea, that sort of thing, oh yes. Is it because they kill the bugs in your gut, they, you know it upsets the balance of bacteria in your stomach and guts (32-year-old mother, average deprivation rural ward).

Other adverse reactions cited included headaches ($n=1$), drowsiness ($n=1$), discoloration of teeth ($n=1$) (this is a known problem with tetracycline use in children), and interference with the effectiveness of other medication ($n=3$).

A quarter of respondents reported a belief that the frequent use of antibiotics was detrimental in some way. Clinicians were criticised for prescribing antibiotics too liberally. Members of the public were also criticised for consulting clinicians too frequently and for consuming repeated courses of antibiotics. Repeated use of antibiotics was believed to reduce their effectiveness ($n=12$), a process that was described as 'resistance.' Resistance in this sense was not, however, related to resistant infections, MRSA, superbugs or hospital-acquired infections, but to changes in the *body's* ability to deal with infection as a result of antibiotic use. Changes in the body were indicated in two ways. Firstly, the immune system became less effective if not stimulated to protect the body (beliefs about immunity have been previously discussed in chapter 5) and secondly, repeated antibiotics use caused the body to become tolerant to antibiotics and hence the body failed to respond to therapy. As a consequence, individuals who repeatedly used antibiotics were described as likely to need greater amounts or stronger antibiotics to combat infection. Here the respondents may have been drawing upon images of substance misuse (where repeated use of drugs can lead to psychological or physical dependence). One respondent specifically mentioned addiction as a potential consequence of antibiotic use. These perceptions may be reinforced by recent campaigns aimed at reducing the use of antibiotics, such as, the 'Andybiotic' campaign (DoH, 1999), which used posters displaying the message 'Antibiotics- don't wear me out' (Appendix 13). The ambiguity in the text of this media

campaign (Is it the antibiotic or the body that is being worn out?) may contribute to public misconceptions about the nature and causes of bacterial resistance.

R12: Well, I just worry that um. Because I've heard that the more you use them the less resistant you are to infection, you know they don't work as well, so I just think that if then they (talking about her children) get something very bad in the future the antibiotics might not work, so I tend not to have antibiotics just in case. It's like, my sister-in-law she takes them to the doctor at a drop of a hat and they are always on antibiotics. Doctors shouldn't give them out so easily, it's just a few weeks in between (courses) and then she'll go and get some more just for cough and things like that. I think it's terrible, it's a waste, and their immunity is never going to pick up if they keep doing it. And I've got a friend her daughter is like just always on them. She's like one of these sickly children and you know I'm sure it's because she can't fight it on her own (35-year-old mother, average deprivation rural ward).

Nine respondents, mostly young adults, indicated little or no awareness of the potential adverse reactions related to antibiotic use. The European Community Directive, (92/27/EEC) requires that all medicines supplied to patients are accompanied by written information (both prescription only medicines and those which can be purchased over the counter). This led to questions about the use of Patient Information Leaflet (PIL). In this study the use of PILs varied considerably. Some respondents, predominantly young adults, indicated limited use of PILs reporting that they 'rarely looked' at them, read leaflets quickly or briefly scanned them ($n=14$). Two respondents reported that after 'having a quick look' they threw the PIL away. This suggests that some respondents placed little importance on obtaining information from PILs. Others, many of whom were middle class parents or from the subgroup 'health and science background' indicated that they read PILs and wanted information about the antibiotics prescribed for them. Ironically, some of these more highly informed respondents reported that the information contained in PILs were insufficient to meet their needs.

R22: Oh, definitely. I want to know what it's going to do to me. Sometimes it's not sufficient information but it is helpful (32-year-old mother, average deprivation rural ward).

Although the desire for information about treatment may explain respondents' apparent motivation to read the Patient Information Leaflet it does not automatically follow that a lack of desire for information is associated with not reading the PIL. Other reasons, such as problems comprehending the information ($n=3$) have been previously reported (Ley, 1982), but patients in this sample also described how they would avoid reading the PIL so as not to increase anxiety about potential side effects ($n=7$). Some respondents felt that knowledge of adverse reactions was undesirable because it was likely to deter adherence to antibiotic therapy, and therefore, lead them to breach their perceived obligation to follow the clinician's instructions. Furthermore, studies have reported that some clinicians are reluctant to provide information about adverse reactions because this may deter adherence to therapy (Myer, 1995). In addition some respondents reported that having been instructed verbally to follow a course of action by clinicians, they felt that there was little need to read the PIL. This behaviour suggests that verbal instruction from clinicians was not only influential but were considered more important than written information, or perhaps of more personal relevance to the patient. It is also possible that verbal information may be easier for the patient to interpret or understand.

R45: No, I don't bother reading it. It probably tells you a little about what's in the medicine 'cause a lot of them got Latin names and that type of thing and for the ordinary person it's very difficult (19-year-old woman, deprived post-industrial ward).

R19: I try to avoid reading them if at all possible because it can be quite scary and the side effects and things like that. If they (doctors) tell me to use a medicine then I'll just go for it. If I started reading the information leaflet, the side effects, this

that, and the other, then it would probably put me off (38-year-old mother, low deprivation rural ward).

R40: I always do what the doctor says but I don't bother with it (PIL) but I do follow his instructions (18-year-old man, deprived post-industrial ward).

Confidence in the safety of antibiotics was also demonstrated in attitudes towards the disposal of unused or unwanted antibiotics. No respondent indicated an awareness of the disadvantages of disposing of antibiotics in household waste or sewage systems. Most disposed of unused antibiotics by discarding them in the bin ($n=19$). Others flushed them down the toilet or put them down the sink ($n=11$). If we accept the common lay belief that it is the body that becomes resistant to antibiotics, and not bacteria, then this behaviour represents a logical response - an antibiotic disposed of in the bin can do no harm because a person is not ingesting it. Two respondents felt that storing medicines in the home was unsafe. As a result, they threw antibiotics away considering this to be good practice, reducing the risk of others consuming them by accident and in one case, reducing the chance of self-medication.

R13: No but my husband is not very good at taking his antibiotics and I know that he's had a time when he had some left over, ummm

NH: What would he do with those left over ones?

R13: Just threw them in the bin (36-year-old mother, low deprivation rural ward).

NH: Why do you throw them away?

R41: To get rid of them really, don't want them lying around the house (22-year-old man, deprived post-industrial ward).

Very few respondents indicated an awareness of the recommendation for unused medicines, including antibiotics, to be returned to a pharmacist for safe disposal ($n=7$), and even fewer would actually consider returning unused antibiotics to the

dispensing chemist ($n=5$). Those who were aware of the recommendation to return antibiotics to the pharmacy for disposal but did not routinely do this were questioned about the rationales for their behaviour. The inconvenience of returning unused antibiotics to a pharmacy was cited a major determinant ($n=4$) but in addition the safe disposal of antibiotics appeared to have little importance. Respondents described how they ‘just didn’t bother’. One respondent gave unused antibiotics to a house mate (who was also a dispensing chemist) for disposal because she could ‘not be bothered’ to return them herself. Another respondent felt that returning unused antibiotics to a pharmacy would enable them to be reused. This, he perceived, as unacceptable for two reasons, it was ‘just a way of the NHS saving money’ and furthermore returning unused antibiotics to a pharmacy was of no personal benefit.

R14: I used to live with a pharmacist so I used to give them to her and she would make sure they were destroyed safely. I tried to make sure that I never hung on to them. Particularly at that point of my life I couldn't be bothered, when I was busy all the time it was the lowest priority (38-year-old mother, average deprivation rural ward).

7.3 Adherence Behaviour: The case of antibiotics

Respondents were specifically asked to reflect on whether or not they perceived themselves as adhering to the prescribed antibiotic regimes. They were also encouraged to report the ways in which antibiotic regimes were modified and to discuss their rationales for adherence behaviour. Adherence behaviours, both intentional and non-intentional, were classified into 6 categories. Many respondents reported a number of different behaviours and consequently were classified into more than one category. The data indicated that certain behaviours were more typical of certain types of respondent in terms of their socio-demographic

characteristics. The following section presents a typology of adherence behaviour in the community.

7.3.1 Doing 'What the Doctor Says'

Fewer than half of the sample self-reported fully adhering to antibiotic regimes ($n=17$). Actual adherence rates are, however, likely to be lower than reported adherence (Bergman and Werner, 1963; Hoppe et al, 1999). Most respondents who reported adhering to antibiotic regimes claimed to follow the clinicians' instructions, although some said they supplemented the doctor's instructions with instructions on medicine packaging. The label on the medicine packet is believed by some to be the most important source of information because verbal information may be forgotten and leaflets may be ignored, (Raynor and Stiletto, 1982). This study suggests that although package information may be instructive, verbal communication from clinicians was the key motivator for adherence.

NH: When do you stop taking the antibiotics?

R15: When they've all gone, even if you feel better, cause that's what it says on the packet. You mean when they've all gone? Because the doctor says take this course of antibiotics even if you feel better, please take whatever is left, so that's what I always do (29-year-old mother deprived urban ward).

The provision of explicit instruction is known to positively influence adherence behaviour (Scalar et al, 1994). Instruction can be defined as 'a spoken or written statement of what must be done delivered formally, with authority, as an order' (Collins Pocket Dictionary and Thesaurus, 1993). The medical profession, by virtue of their training and expertise, are endowed with authority. The social psychology

of conformity supports ideas that the authoritarian nature of instruction makes it a more powerful mediator of behaviour (obedience to the instructions given) than information alone (Hayes, 2000). The influence of instruction from an authority figure was also demonstrated by several young adults who said that they finished the full course of antibiotics because their parents 'told them to' ($n=5$). In these cases, parents appear to be acting as advocates for the clinicians' instruction.

R11: Yeah I do because my dad is always on to me to take the full course; it's normally my dad that gets on at me to take them (18-year-old woman, deprived urban ward).

Not all respondents, however, were motivated to adhere to treatment regimes because the clinician had told them to. This may reflect the changing nature of the relationship between the public and medical professionals. Recent accounts suggest that the public have begun to move from a state of dependence and acceptance of medical authority to one of greater scepticism. This may be a result of increased access to medical knowledge via the media and other routes, and a rise in consumerism within UK National Health Service (Nettleton, 2005).

In 'doing what the doctor says', most respondents referred to finishing the full course of treatment, which was widely considered to be an important aspect of antibiotic consumption. However, antibiotic regimes were commonly modified by respondents; doses were omitted ($n=24$) and timings between dosages were altered ($n=18$). Some respondents neither finished the full course of treatment nor consumed or administered antibiotics at the optimal dosing intervals ($n=5$). Whilst any modifications to antibiotic regimes may increase the likelihood of resistant

strains developing, genetic mutation is actually a rare event. Those patients who miss doses or whole days of therapy are at risk of treatment failure by contributing to the selection of resistant organisms (resistant organisms will survive and proliferate after treatment) (Epstein et al, 2004). It is, therefore, a concern that such high numbers of respondents omitted antibiotic doses. Although most respondents were aware of the importance of finishing the full course of treatment, many were unaware of the importance of taking antibiotics at prescribed intervals. The full implications of the importance of dosing interval and its role in the development of bacterial resistance has only recently been acknowledged by the scientific community, and as such it is possible that it has yet to be widely disseminated to the public. Data did not indicate whether respondents did not receive information on the importance of dosing intervals from the clinician or whether they did not recall it as important.

R7: Well no, it isn't easy but I just think that it is important to try to stick to it as much as possible and I do. I have. If I miss one then I would take the next one as soon as I can. Whatever happens I would take it. If I had missed a couple then I would take that couple at the end of the course. I would stick as near as possible to the regime (38-year-old woman, low deprivation urban ward).

R10: As far as the intervals are concerned I try and take them as frequently as indicated. Sometimes you can't do it precisely so miss a dose if I miss one but basically as long as you get the right dosage in the end its ok (36-year-old father, deprived urban ward).

Some respondents indicated that adhering to clinicians' advice and antibiotic regimes was important because they were perceived as ways of optimising the effectiveness of treatment and speeding recovery. Adherence was described as being particularly important and would take precedence over other day-to-day responsibilities when illness was considered serious or having the potential to

become serious if not treated. This finding is consistent with earlier studies reporting that adherence rates increase when the illness is perceived as serious (Charney et al, 1967; Cockburn et al, 1987). Parents perceived children as more vulnerable to serious infection than adults, and many made particular efforts to ensure their children adhered to treatment regimes as a result.

R11: I'm not really fussed at taking them. Again, if the cause is a bad situation like a bad chest or something then I take them whatever happens. But if it's just like for an earache then I might miss a few days and then maybe go back to it (18-year-old mother, deprived urban ward).

R2: Um, no not really, not regularly no (quiet voice, less assertive). I have to say that I very, I had a big period I had a difficult phase in my life when I did need to use a lot of antibiotics, when I was very ill. I had acute lymphatic leukaemia, so I had quite a long period of needing quite intensive drug treatment and at that time I was very careful with taking things on a regular basis and when they were, when I was told to take them, I didn't mess about with any of the prescriptions. Now I tend to be very much more laid back about the whole thing umm and err, I probably don't take them at the correct intervals. I take them roughly at the right time but probably not exactly.

NH: Is that difficult for any particular reason?

R2: No, just that busy lifestyle (30-year-old mother, average deprivation urban ward).

R24: I'd be lying if I said I always did because I have and do miss them but on the whole I try to do exactly what it says on the packet. No she's (talking about her daughter) very good at taking medicine, even if she hates it she will take it, be it with a bit of persuasion, so I have to say no (she does not miss doses), and also because I think because it's her that I am a bit more aware of the baby she has to have her medicine. I tend not to forget (the child's) medicine, but I forget mine, that's' bizarre really isn't it (29-year-old mother, low deprivation rural ward).

Some understanding of how antibiotics work influenced adherence decisions. Those who recognised that the completion of the full course of antibiotics would help eradicate any causative bacteria and maximise treatment effectiveness were much more motivated to take the full course of treatment ($n=13$). Some indicated that

taking the full course of antibiotics was a matter of personal responsibility and blamed individuals who failed to adhere to treatment regimes ($n=2$).

R15: You do really need to take the full course to make sure that you have got rid of the infection. That it does go, and doesn't come back again (29-year-old mother, deprived urban ward)

Many parents, but not all, described adherence as a moral prerequisite of good parenting. Parents wanted to do what was 'best' for their child and to be seen by others as being 'good parents.' Not following clinicians' advice was described as unacceptable and indicative of 'bad parenting.'

R19: Yes but I try to avoid taking anything but my husband is completely the other way but with the children we're always thinking what shall we do for the best, you know, to be good parents. We always do what the doctor says with (daughter) but I'd be lying if I said that I always take the full course (38-year-old mother, average deprivation rural ward).

Parents also described how the emotions they experienced when a child was ill influenced their motivation to ensure their child took medication as prescribed by the clinician. The distress of caring for an ill child was a potent motivator to 'do something' whether that be consulting a clinician or administering a medicine (reasons for, and expectations of, the consultation are discussed in chapter 6).

7.3.2 Challenges to Adherence: Work, child care and social constraints

Most respondents reported their intentions to adhere to antibiotic regimes but described how they failed to do so because of problems associated with employment commitments, daily routine, time constraints, difficulties in administering medicines

to children, and social priorities ($n=12$). Adherence behaviour appears to vary depending on contextual factors experienced at a particular time. Adhering to medication regimes at work could be made difficult by employers' regulations dictating when individuals would be able to access medicines, and problems in obtaining a drink at a specified time. This led to doses either being missed or dosing intervals adapted to accommodate the practicalities of work situations.

R13: I did actually, with work, yes, I teach sport. I did have a couple of days when it was difficult fitting in doses.

NH: Why was that difficult?

P13: Because of the job I do. If I am out on the water, because I teach canoeing and rowing. If I'm out on the water during the time when I should be taking a dose then I'll take a dose as soon as I can but it may be an hour late it might be a bit later (36-year-old mother, low deprivation rural ward).

The data also suggests that the responsibilities and practicalities inherent in individuals' daily lives took precedence over adherence to antibiotic regimes.

Respondents reported 'being busy', 'hectic', and having 'too much to do' as reasons for missing doses of antibiotics. This finding is similar to research in the field of chronic illness, where maintaining 'normal life' takes precedence over treatment regimes (McGavock et al, 1996).

R41: No, I just found it hard to remember really, just really busy (22-year-old man, deprived post-industrial ward).

R21: I would say probably but like if you were going to work or something then you would have to remember to take them with you, it becomes a little bit more difficult and you have to think a bit harder (57-year-old woman, low deprivation rural ward).

Although parents attempted to ensure children adhered to antibiotic regimes, adherence was often described as problematic, particularly in babies and young

children. Two key challenges faced parents administering antibiotics: firstly, low levels of co-operation from children to take the medicines; and secondly, difficulties in ensuring children received medication when the child was in a day care or educational setting.

Parents reported difficulties in administering antibiotics to children and babies, with the antibiotics being either refused or spat out, resulting in incomplete doses being administered. Intermittent refusal of antibiotics resulted in the antibiotic therapy lasting longer than prescribed. On occasions, parents stopped antibiotic therapy early because the child appeared to be recovering from the illness and the advantages of ensuring antibiotics were administered as prescribed were outweighed by the difficulties in administering them ($n=2$).

R13: Oh (laughs) it could be a day either side. It could be a longer period of time because of missed doses or shorter periods of time because you've split a dose (36-year-old mother, low deprivation urban ward).

R28: (when trying to administer antibiotic syrup) He (child) would say no way. He would say, I'm not, I don't like that, I mean even if I tried some Cleburne and um it was orange he was not going to take it at any cost. It can be difficult (30-year-old mother, average deprivation rural ward).

In school age children, adherence to antibiotic regimes was complicated by school attendance. Some parents modified antibiotic regimes by omitting doses or altering the dosing intervals because schools were either unwilling, or unable, to administer medicines to children. Two parents (neither of whom were in paid employment) overcame this complication by attending the school to administer antibiotics during the school lunch break, but for many parents delivering antibiotics in this way was not a feasible option.

Parents with children attending day care (nursery or child minder) did not report the same difficulties. Antibiotic adherence for young children was made easier by the fact that antibiotics could be administered either before or after the nursery session and this enabled adherence to the dosage intervals. The ease in which antibiotic adherence was accommodated by the sample in this study may not, however, represent the experiences of the wider population. Most mothers in this sample did not have employment commitments, and consequently children typically only spent 3-4 hours a day in care settings.

Some parents reported that nursery staff were willing to administer medicines to children on receipt of a signed letter. In comparison with teachers, the willingness of nursery staff to administer antibiotics may be associated with the nature of their role. Nursery staff routinely provide intimate care, for example, toileting and feeding, and administering medications may be a natural extension of this role.

Even when the school or nursery was reported as being willing to administer the child's antibiotics, this did not always ensure adherence to the dosing intervals. In a couple of cases, adherence to medication regimes was complicated by parents' lack of confidence in carers' or teachers' abilities to safely administer medicine to their children ($n=2$). This minority indicated that they preferred to alter the dosage intervals rather than allow someone else to administer medicines to their child. The reasons for this lack of confidence were not discussed.

R33: With the children at school, I may even have to send my dad to make sure they get it at lunchtime because you know, they won't give medicines to children any more. I know that antibiotics do not work if you don't complete the course. When

(son) was ill a fortnight ago um I gave him his medicine on the Monday, Tuesday and Wednesday and I gave it to him three times a day. Because it was orangey favoured Amoxicillin, he was ok, I made it more of a game, I gave him an empty syringe, and I let him hold it. A few times in the evening, when he got a bit too distraught, and he was just spitting it out a bit so I decided to give it to him 2 hours early and I gave it to him a little bit earlier. Then on the Thursday when he goes to the child minder, I gave it to him in the morning and they were to give it to him in the afternoon but I wouldn't give them it. I wanted to keep it for me to give it to him myself. So for two days he only had it twice rather than three times but then he finished it then. But I just wanted to know that he had had it tidy (correctly). I mean. I know that they would have given it to him, but I just wanted to know that he had the right amount and he was ok. And within two days (after the course was intended to have been completed) he had finished it all off then (21-year-old mother, deprived urban ward).

Interestingly, very few parents reported receiving advice about how to tackle the potential difficulties of antibiotic administration to babies and children. Although one parent described how she had been given a syringe to place medicine directly into the baby's mouth, the baby was able to spit out the medicine.

Social priorities and peer pressure also resulted in adaptation of antibiotic regimes in a very small number of cases ($n=3$). Social activities involving the consumption of alcohol (referred to by some as 'going out') reduced the likelihood of adherence to antibiotic regimes because these respondents believed that 'you cannot drink and take antibiotics.' Although it is possible that the type of antibiotic being used by respondents in these cases did necessarily make the consumption of alcohol inadvisable, none were able to remember the name of the antibiotic that should not be taken with alcohol. The belief that alcohol cannot, or should not, be consumed during antibiotic therapy is common misconception as very few antibiotics actually require abstinence from alcohol (Greenwood et al, 2003). This behaviour does, however, illustrate how individuals adapted treatment regimes based on

circumstances, context and a sense of priority. In these cases it appears that antibiotic consumption was less important than socialising.

7.3.3 Forgetting

Many respondents reported that, at times, they forgot to take antibiotics that had been prescribed for them ($n=19$). As a result they adapted treatment regimes either missing doses completely or by taking doses outside the optimal dosing schedule. Some of these respondents indicated that they 'simply forgot' and were unable to provide a rational for such behaviour ($n=8$). Others blamed memory lapses on being busy ($n=11$). Failure to adhere to medication regimes because of lapses in memory were reported as, and are likely to be, unintentional. Forgetting to take antibiotics, however, suggests that adherence was considered unimportant by some respondents in some situations. Research on the memory of everyday tasks indicates that perceptions of personal importance influence protective memory (protective memory-remembering something because its importance lies in its ability to prevent somebody or something from being harmed or damaged. Messages that are perceived as unimportant are particularly vulnerable to being forgotten when the period of time between receiving the message and remembering it is filled with activity (Raynor et al, 2007).

R28: When I had an infection in my sinuses and it hurt like hell and I couldn't wait to get to the doctors for him to help me and um for the first two days I took them (antibiotics) on time, like clockwork, because I knew at sometime these things were going to kick in or something was going to kick in and make it better for me, so for the first couple of days I take them on time regardless but when the pain starts to wear off and you are starting to feel a bit better then you do forget a little bit and I knew they say finish the course and everything but I may be an hour or so late in

taking a tablet. There has been times when I haven't finished the course either (30-year-old mother, average deprivation rural ward).

R14: No routines really, lack of routine, no structure. I mean straight out after work and back to sleep, too tired and just taxing yourself too much really. They'd be in your handbag and you'd just carry them around and then forget and end up more ill than you were in the first place. If I hadn't been out and stayed in then it wouldn't have been so bad (38-year-old mother, low deprivation rural ward).

It has been suggested that older adults have greater difficulty remembering to take medication than other adults because of a natural decline in the effectiveness of memory due to aging processes (Raynor et al, 2007). In this study, however, younger adults (aged 18-55 years) were more likely to report forgetting to take antibiotics than adults over 55. The data, therefore, refutes the rather stereotypical view that the elderly are forgetful. The increased reports of 'forgetting' in the younger age group could be a consequence of managing busier lives or could be explained by the younger ages attaching less importance to the value of medicine taking than older adults. Older adults were also more likely to have greater experience of illness and were, therefore, more likely to be accustomed to medicine taking. Most of the older adults interviewed in this study were taking some form of prescribed medication (other than antibiotics) at the time of the interview.

Several respondents reported that the longer the course of therapy, the more likely it became that doses were forgotten. Poor adherence is known to be influenced by the duration and complexity (number of doses each day) of the course of therapy.

Higher levels of adherence have been reported in short courses of therapy and when treatment regimes are simplified (single daily doses) (Bergman and Werner, 1963; Yoos, 1984; Greenberg, 1984; Cockburn et al, 1987; Hoppe et al, 1999, Claxton,

2001; Perrez-Gorricho and Ripoll, 2003). Only one respondent in this study had experience of a once daily antibiotic regime, all other respondents talked of therapy regimes that required them to take antibiotics three or four times a day. Simple treatment regimes are more easily accommodated within the daily activities and responsibilities of the individual.

R33: No, no, I am atrocious. If they are four a day you will get four a day. Day one or two, I am usually very good, on day three I usually forget lunch time, day four you might have them all at bed time, no, no not really. If you are really poorly then I will remember (21-year-old woman, deprived urban ward).

R27: Oh yes I am quite good at that (finishing he course). But sometimes the intervals between them will be much too short or much too long because inevitably if its four times a day I will forget when I go to work and then rush home take one straight away and then take another one, and then think crumbs, leave one on the bed side table because in the middle of the night I am bound to wake up at some point but it's still sitting there in the morning (54-year-old woman, average deprivation rural ward).

R19: I try because um you know sometimes particularly if they're a long course I just find it hard to remember but I have to remember to feed my children let alone take my antibiotics so you see what I mean. But I do try (38-year-old mother, average rural ward).

Conversely, other respondents reported that taking medicines three times a day was 'easy'. These were older adults who were retired who perhaps had less busy daily lives and were more familiar with routine medicine taking.

NH: Were there any difficulties in keeping to the regime?

R32: No, I always take my medicine at 9 o'clock, one o'clock, 9 o'clock, that was it.

NH: And did you manage to finish them and keep to the prescription?

R32: Oh yes, absolutely, if I am having any sort of treatment whether it's my optician, my dentist, my GP, cooperation and trust is essential between the two individuals and (name of clinician) said I want you to do this and stick to it and say

no more. I wasn't cavalier about it at all (72-year-old man, low deprivation urban ward).

This data supports the ideas of Raynor et al (2007) who suggest that the complexity of the medication regime alone does not drive modifications to treatment regimes but that adherence depends on how well the treatment fits the individual's daily routine.

7.3.4 'Feeling Better'

Decisions to stop antibiotic therapy before the full course had been taken were often described as a response to 'feeling better' and to declining symptoms, both of which were perceived as indicating that the infection had been successfully treated ($n=12$).

In these cases, respondents were not making a conscious attempt to limit antibiotic consumption motivated by a desire to prevent bacterial resistance, but simply stopped taking them because they felt that they no longer needed the treatment.

Early cessation of therapy has been associated with lay perceptions of recovery in other studies (Trostle, 1988; Yoos, 1984). These beliefs mark dissonance between the biomedical and lay models of infection. As most respondents demonstrated little understanding of the biological nature of microbes and antibiotic pharmacology (except members of the health or science background subgroup) early cessation of treatment based on subjective evaluation of the symptoms appears to represent a logical response to perceived treatment success.

R19: She was so much better and you think oh she's fine and you kind of give up (38-year-old mother, average deprivation rural ward).

7.3.5 'Leftover' Antibiotics and Self Medication

Many respondents indicated that they would store 'leftover' antibiotics (antibiotics that had been prescribed for them which had not been consumed at the time of illness) within the home typically in cupboards, boxes, draws, and bathroom cabinets ($n=22$). Most respondents were unable to provide a rationale for storing unused antibiotics but indicated that they had little intention of using 'left over' antibiotics at a later date or during subsequent illness. Dunnell and Cartwright (1972) recognised that patients with little intention of ever using them sometimes save medicines. However, recent studies focusing on antibiotic use in URTI have suggested that 18% of those who stored leftover antibiotics in the home subsequently self-medicated (McNulty et al 2006).

R13: No but my husband is not very good at taking his antibiotics and I know that he's had a time when he had some left over, ummm

NH: What would he do with those left over ones?

R13: Just throw them in the cupboard

NH: Would you use them for another illness, at a later date?

R13: No, no

NH: Why do you keep them?

R13: Don't know really; don't really think about it (36-year-old mother, low deprivation rural ward).

In this study, a few respondents indicated that they would keep unused antibiotics and may self-medicate with these during subsequent illnesses ($n=5$). Self-medication with antibiotics has been reported in Europe, particularly for colds and URTI (Grigoryan, 2006 Grigoryan et al, 2007). Self-medication is concerning because it can lead to the consumption of the wrong class of antibiotic, insufficient dosing and unnecessary antibiotic use, all of which can contribute to the emergence of resistant bacteria (Grigoryan et al, 2006). The retention and storing of unused

antibiotics in these cases was not, however, a deliberate decision aimed at retaining a supply for later use but appeared to be a matter of chance. Respondents described how if they, by chance, had a few antibiotics in the cupboard they might use them if they became ill. Having antibiotics stored in the home in these cases was a matter of convenience. The data also suggests that antibiotics were not seen as simply something to be taken as prescribed but a flexible commodity to be used as and when an individual deemed them as useful. Since April 2007, prescribed medication has been free to all NHS patients in Wales, but at the time of data collection, some of these respondents were likely to have incurred a fee for each prescribed item. Consequently, these respondents may have perceived the receipt of antibiotics as being similar to a purchase. It is, therefore, perhaps not surprising that antibiotics were retained for future use in the same way in which one might buy and use common analgesics, such as paracetamol.

R35: I don't know why. I think it's because they feel better, stop taking the pills and put them in the draw, don't feel well, think oh I've got antibiotics in the draw, easy enough. I'll take those (36-year-old mother, deprived post-industrial ward).

Respondents who self-medicated with antibiotics in this study appeared to have few concerns about their actions. Ideas that antibiotics can be safely administered without clinicians' supervision may be influenced by experiences of prescriptions for antibiotics being dispensed without direct consultation with a clinician, as well as limited awareness of potential side effects. Three respondents in this study reported receiving prescriptions for antibiotics by telephoning the surgery and asking for them.

In this study, only a small minority of respondents indicated that they deliberately did not complete the full course of therapy prescribed for them and kept the remaining antibiotics specifically for use during subsequent illness ($n=3$).

These respondents also described sharing antibiotics with other family members as normal, regular and reasonable behaviour.

R43: I keep them and use them now and again when I'm feeling ill (21-year-old man, average deprivation urban ward).

NH: Do you normally finish the full course of antibiotics?

R11: No I keep them in the house because my mother always takes them for her chest (18-year-old mother, deprived urban ward).

Difficulties in accessing primary care services may have been influential in the decision to self-medicate. Although many respondents' spontaneously described their frustrations in accessing primary care services, it was not explicitly stated that they self-medicated as a result.

R10: To get the antibiotics that may have stomped on the infection it would have meant camping outside his door or putting up with the delay and I still be none the better. It's the time delay that's why people end up going to casualty. That's the reason why A&Es are normally chock-a-block because people don't have the confidence with the GP system. Especially if the receptionist, even before you get to see the doctor, is a dragon, you have to get past her firstly of all. She can be quite off putting (36-year-old father, deprived urban ward).

R36: You know with the doctors, the system there, I find is so bogged down is so underfunded. You know she's (wife) in the doctors and she is in the waiting room for three hours. It's a joke, it's a joke! If you have got an appointment for 10 o'clock and its 10.30, then you have got to expect that really, but to go in at 12 o'clock is a joke, a total, total joke. I haven't got time for that you know and with myself I would never go to see the doctor unless I really had to. I bet we've got a cupboard full of them (medicines). I think there are some antibiotics in there. We

do keep them (antibiotics) sometimes just in case it comes back and then we got them if we need them (43-year-old father, average deprivation post-industrial ward).

All respondents reporting antibiotic self medication were from high deprivation communities, most were female and relatively young (18-43 years of age), and only one had entered post-compulsory education. Previous studies correlating self-medication with demographic characteristics report contradictory findings. Whilst Grigoryan et al (2007) found an association with low levels of education and self-medication across a number of European countries, McNulty et al (2006) reported that in the UK self-medication is more likely amongst better educated members of the public. Whilst Grigoryan blamed self-medication on a poor understanding of how antibiotics work, McNulty explained her findings on the basis that well educated individuals would be more confident to make their own decisions about self treatment.

Although a small number of respondents described self-medicating with antibiotics, most did not condone such behaviour. Most respondents said that they would not use antibiotics prescribed for someone else or that they would not allow antibiotics prescribed for them to be used by another individual ($n=30$). For these respondents, antibiotics were 'owned' by the person named on the packet and only clinicians have the authority to sanction antibiotic use through the act of prescribing.

NH: Have you ever shared antibiotics with someone else?

R18: No, no definitely not

NH: Why don't you do that?

P18: Well mainly, their doctors haven't given them to them and I don't think it's right even if its, it's just folic acid and it's not got their name on them (18-year-old mother, high deprivation urban ward).

R22: Oh yes I do know people who do that but they shouldn't because medicines are given for a specific ailment and that's it and they're yours and nobody else's and you shouldn't keep them or share them around or anything like that (32-year-old mother, average deprivation rural ward).

Some respondents were also concerned about the safety of antibiotics not specifically prescribed for them. These concerns were related to potential incompatibility between individuals and antibiotics. Respondents implied that the prescribers matched the antibiotics to the individual and in doing so were, in some way, able to reduce the risk of incompatibility. Taking antibiotics that had not been prescribed for them was perceived as incurring a greater risk of adverse reactions. Some respondents, mostly those with a science background, also considered sharing problematic from the position of reduced dosing leading to reduce effectiveness and to an increased risk of bacterial resistance ($n=10$).

R15: No we never do that (self-medicate). My son has food allergies and my husband and myself are allergic to penicillin and the kids have never actually had penicillin but we are both really worried that because we've got it that they will also be allergic to penicillin. And I think with that in mind I would never want to give them something that had not been prescribed for them by a doctor, just in case (29-year-old mother, high deprivation urban ward.).

Others reported that they would not use antibiotics 'left over' from a previous illness because of concerns about when they should or could be used. Some were concerned about the effectiveness of antibiotics being reduced if they were stored and that antibiotics could 'go past their sell day date' or 'expire.'

7.3.6 Avoiding Antibiotics

Some respondents, mostly middle class parents, had reservations about taking antibiotics. Antibiotics were perceived as unnatural, potentially harmful drugs and, as such, were best avoided. These respondents made intentional decisions to limit their consumption of antibiotics often by shortening the duration of a course of therapy ($n=11$). This adaptive behaviour was justified on the basis of being able to treat an infection whilst reducing the risk of harmful effects of drugs on the body.

R19: Everyone is getting anti-antibiotics and they are saying don't take them if you can help it (38-year-old mother, average deprivation rural ward).

R12: If they advise them (antibiotics) then I ask if they're absolutely necessary. A few times I have questioned it because you see my doctor poo poos (dismisses) homeopathic remedies. He's given me antibiotics, well he's prescribed them and he's asked the chemist to give me the powdered Amoxicillin. Give me the powder form and then he said if your homeopathic remedy doesn't work then you must use this and add so much water and use this, so for a few months I had the dried amoxicillin in the cupboard (35-year-old mother, average deprivation rural ward).

Most respondents provided rationales for avoiding antibiotics that were consistent with their reservations about other medicines, such as concern about the harmful effects of unnatural products previously discussed in Chapter 6. Middle class parents and respondents with a science background proposed very different rationales for their concerns about antibiotics. Rather than being simply adverse to pharmaceutical medicines, respondents from a science background reported awareness of the problems of antibiotic resistance. These respondents claimed to adhere to antibiotic regimes but aimed to limit their use of antibiotics to essential situations. Reservation about antibiotics may have also been driven by recent health

education campaigns aimed at reducing antibiotic use, such as the ‘Andybiotic’ campaign mentioned previously.

7.4 Changing Health Priorities

Health priorities and attitudes to antibiotics did not appear to be fixed.

Inconsistencies within individuals’ accounts (discussed in more detail in Chapter 4) may indicate that attitudes towards antibiotics altered depending on personal circumstances and evolved over time. Several middle class parents reflected upon how their attitudes were different when they were younger. Antibiotic adherence gained increasing importance as individuals aged and particularly when they became parents. The arrival of children marks a change in the social roles of adults: they became responsible for the welfare of their newly arrived baby. Interestingly it also appears to increase parents’ sense of responsibility for their own health; the well-being of a child is inextricably linked to the parents’ ability to care for the child. Becoming a parent is unlikely to influence perceptions of importance of adherence regimes in isolation. General health awareness also increased with age. Respondents described how as young adults they did not perceive themselves to be at risk from illness and that medicines were unimportant to them personally. With increasing age they developed a growing sense of health responsibility described as ‘looking after myself,’ ‘keeping fit’, and ‘following health advice’.

NH: What were the chances of you finishing a course of antibiotics when you were in your twenties?

R14: Fifty, fifty I should imagine. I wasn’t as vigilant as I am now I’m much more aware of my health and the fact that you need to be well fed and I take it a bit more seriously to make sure you get over things. Whereas then I would be thinking err did I finish those or, whereas then you would bounce back a lot quicker. I think you’re a

bit more bomb proof when you're younger and you'd just say things like oh I'm all right now (38-year-old-mother, low deprivation rural ward).

R17: I didn't take them properly, at the time, (antibiotics) I was often out socialising with friends and drinking. If I was going out, I won't take them. Back then I never really thought that I would ever be really ill. But you know back then I just didn't see it as important. However, since having (child's name), I feel differently about it and I do follow the doctors' instructions especially for her (34-year-old mother, low deprivation rural ward).

7.5 A Typology of Antibiotic Users Behaviour the Community

Data analysis demonstrated that respondents possessing particular demographic characteristics described similar adherence behaviours. Table 7.3 illustrates the typical adherence behaviours for various types of respondents. Previous studies have presented typologies of antibiotic adherence behaviour related to patients' attitudes to doctors and the characteristics of the patient-clinician consultation (Pechère et al, 2002). In this study, most respondents reported taking antibiotics as prescribed, but there is a range of unintentional and intentional sub-optimal adherence behaviours that are likely to require different solutions. A point to which I will return in Chapter 8.

The typology presented here, to some degree, reflects the findings of Pechère et al (2007). Pechère's category of 'deferent patient' (those who believe the doctors are the expert) reflects the category of respondents in this study who generally took antibiotics as prescribed. Similarly, 'ignored patient' (those who were least satisfied with their consultation and reported poor compliance) reflects the attitudes of respondents in this study who reported that they may self-medicate with antibiotics because of difficulties accessing services.

Table 7. 3: A Typology of Adult Antibiotic user Behaviour in the Community

Characteristic pattern of antibiotic use	Comment	Typical respondent
Generally use antibiotics as prescribed.	Belief in the efficacy of antibiotics and respect for medical authority	Older men and women.
Could not take all doses due to constraints of work, child care/school and social reasons.	Missed doses were often regretted.	Young adults and employed individuals with children in school or nursery.
Forgot doses	Often blamed on busy life-style. Associated with minor infections with limited symptoms.	Adults in employment.
Stopped taking antibiotics when symptoms improved.	Assumed there is no important benefit or harm from stopping antibiotics once feeling better.	Younger adults.
Actively sought to limit antibiotic use because of reservations about the nature and effects of antibiotics.	Common beliefs that one's body gets used to antibiotics, making them less effective and that antibiotics are unnatural and may harm the body.	Mostly parents of young children from wards with low levels of deprivation
Opportunist self-medicators	Using left-over antibiotics	Adults from wards with high levels of deprivation
Deliberate planned self-medication	Deliberately stops therapy early to retain antibiotics for later use	Adults from wards with high levels of deprivation

Health education campaigns aimed at reducing antibiotic consumption and adherence have, thus far, relied on simple messages such as ‘complete the full course’ (often found with the medication instruction) and ‘antibiotics are not needed for a cold.’ Behavioural interventions therefore appear to be focussed on improving public awareness. This study, however, suggests that although respondents did typically lack knowledge about antibiotics, knowledge was not the only factor

influencing adherence behaviour. Concerns about medicines, social constraints and influences, situational factors and human error are also important influencing factors. The success or otherwise of health education campaigns may be determined by how well these issues are addressed. The typology also suggests that specific interventions targeting sub-groups with particular socio-demographic characteristics would be valuable.

7.6 Summary

The respondents in this sample generally had confidence in the safety and efficacy of antibiotics but were unfamiliar with how antibiotics work, when they could be of use, potential adverse reactions or their role in bacterial resistance. Some were concerned that repeated use of antibiotics led to 'resistance', but resistance in this sense referred to changes in the individual's response to treatment and not to the mutation of microbes.

Lack of awareness of side effects was somewhat surprising, but may be explained by the fact that very few respondents read the patient information leaflet. Some respondents found the leaflet difficult to understand and felt that awareness of side effects could deter antibiotic use.

Rationales for adherence focused on following the doctor's instructions. Instructions from clinicians were powerful mediators of adherence because of their authoritative nature. Respondents were also motivated to adhere to antibiotic regimes because they wanted to maximise the effectiveness of the treatment and were concerned

about the potential seriousness of the illness. In particular, parents adhered to antibiotic regimes because they felt that they had a moral responsibility to ensure that the child received the medicines prescribed for them and they felt compelled by the emotional distress of having a sick child to 'do something.' Ensuring adherence in children was, however, problematic. Children, especially young babies would not necessarily cooperate with parents and may refuse medication. Few received advice from prescribers or dispensing chemists about how to deal with this. Difficulty in giving antibiotics to children in care and educational settings meant that parents used sub-optimal dosing intervals.

Attitudes toward adherence varied depending on life-stage as a consequence of an accumulation of experience and life events. Adherence gained importance as individuals grew older and when they became parents. More than half of the respondents reported that they failed to fully adhere to antibiotic regimes.

Respondents adapted their consumption of antibiotics in response to a number of influences. Firstly, constraints within work, school or other structural constraints led some to modify their treatment regimes. These challenges meant that individuals endeavoured to fit antibiotic doses around their existing home, work or school schedule. Others simply forgot to take antibiotics. Sub-optimal adherence in these cases was unintentional but suggests that adherence was not a high priority in their lives. Decisions to stop antibiotic therapy before the full course of treatment had been completed were often associated with subjective assessments of recovery.

Although many respondents kept unused antibiotics in the home, most respondents did not report the intention of using them during subsequent illness. A small number

of respondents self-medicated with 'left over' antibiotics but described having antibiotics in the home as a matter of chance and using them as a matter of convenience. Storing unused antibiotics in the home and self-medicating may have been adaptive responses driven by difficulties accessing primary care services, beliefs in the efficacy of antibiotics, and a desire to self-care. It enabled self-medication and rapid self-treatment with a medicine perceived as both needed and safe without individuals having to negotiate access to primary care. Other respondents adapted antibiotic regimes to limit their consumption of what they perceived as potentially harmful drugs.

The six main types of antibiotic adherence behaviour were considered in the light of the demographic characteristics of typical respondents and a typology of adherence behaviour was developed. Information provision alone may not effectively facilitate behavioural change if the underlining lay beliefs and rationales for modifying treatment regimes are not addressed. Interventions aimed at improving antibiotic adherence should be tailored towards groups with specific socio-demographic characteristics and rationales for sub-optimal adherence.

Chapter 8: Discussion and Recommendations

8.0 Introduction

Previous studies exploring lay understandings of resistant infections have been limited to patient populations within secondary care and to patients' basic understandings of MRSA. Public beliefs about bacterial resistance have been explored in only one other UK qualitative study (Brooks et al, 2008), which was published subsequent to findings from this thesis (Hawkings et al, 2007) and was limited to patients attending two general practices in Bristol. This thesis is therefore the first in-depth exploration of lay attitudes (non-help seeking individuals) to bacterial resistance using a general population sample, and one of the first qualitative studies to explore lay attitudes towards infection, antibiotics, and bacterial resistance.

The purpose of this concluding chapter is to summarise and synthesise the main findings from the preceding empirical chapters and highlight connections and patterns across the analytical themes. Firstly, the multidimensional meanings the public attach to the term 'resistance' are highlighted. Public lack of awareness of the problem of bacterial resistance is discussed, drawing on the theories of diffusion of responsibility and bystander apathy. Health professional and public beliefs are compared and contrasted. The role of the media in disseminating information about bacterial resistance is discussed. Lay attitudes to resistant infections are considered in the light of previous theories of infection and hygiene. The discussion then turns towards the reliance on medicines and introduces the concept of 'antibiotic attachment'. The meaning of medicines for patients beyond their therapeutic effect

is discussed. The discussion of the empirical findings is concluded by an examination of the ways in which adherence to antibiotic therapy may be optimised through an awareness of typology of adherence behaviours that was developed from the empirical findings. The potential of social marketing to improve antibiotic adherence is also explored. The policy implications of this thesis are discussed throughout this final chapter. Suggestions are made for further research. Finally, some of the issues relating to the study methods will be revisited along with an evaluation of the strengths and limitations of the overall study.

8.1 Public Indifference and Bacterial Resistance

8.1.1 The Meaning of 'Resistance'

Consistent with studies which have used patient samples from both primary and secondary care (Newton et al 2001; Hamour et al, 2003; Gill et al, 2005; Brooks et al, 2008), respondents in this study were largely uncertain of the causes and the consequences of bacterial resistance and how their personal antibiotic use (consumption and disposal) could have the potential to influence bacterial resistance within the community. However, this study also found clear differences in the lay meanings attached to terms used to describe bacterial resistance: MRSA and 'superbugs' were perceived as being caused by unhygienic hospitals and poor standards of health care. In contrast, when bacterial resistance was discussed within the context of antibiotic use, respondents believed that resistance was caused either by changes in the body's response to antibiotics (the body becomes more immune to antibiotics) or changes in the microbes' susceptibility to antibiotic therapy. The term 'resistance' therefore has different lay meanings, depending on context. These

multiple meanings are likely to contribute to public confusion, limiting understanding of microbes and infection. It is therefore unsurprising that respondents in this study were generally unconcerned about such an ambiguous threat.

Early campaigns aimed at promoting appropriate antibiotic use such as the 'Andybiotic' campaign (Appendix 13) may have contributed to public misconceptions of bacterial resistance. The message 'antibiotics, don't wear me out' could be interpreted either as failure in antibiotics to treat infections (the antibiotics are being worn out by repeated use) or a failure in the body to respond to treatment (the body is being worn out, or losing its immunity to infections, by repeated antibiotic use). Data from this study (discussed in Chapters 5 and 7) demonstrated both these beliefs. Early campaigns that aimed to reduce patient expectations for an antibiotic during URTI provided little information about the mechanisms of bacterial resistance. More recently, public information campaigns across the USA and Europe about when antibiotics can be of use, and the role of antibiotics in bacterial resistance, have been shown to improve lay knowledge and reduce patient expectations for antibiotics (Perz et al, 2002; Bauchner et al, 2001; Wheeler et al, 2001; Madle et al, 2004). The most recent UK public education campaign launched in April 2008 'Getting Better without Antibiotics' (DoH, 2008), provides more detailed information about the links between antibiotic use and bacterial resistance compared to the earlier Andybiotic campaign, but has yet to be evaluated.

8.1.2 *'It doesn't affect me'*

Chapter 5 demonstrates that respondents in this study were generally unaware and/or unconcerned about bacterial resistance in community settings, and had little sense of ownership for the cause or control of bacterial resistance. This may be associated with a lack of knowledge about the mechanisms contributing to bacterial resistance. Whilst the public's lack of concern about bacterial resistance in community settings demonstrated in this thesis is congruent with other studies (Brooks et al, 2008; Emslie and Bond, 2003), in contrast (and as discussed in the literature review), a recent UK survey of attitudes towards antibiotics reported high levels of public concern (McNulty et al, 2007a). These differences may be reconciled on the basis that the public's concerns appear to be confined to hospital settings. Within their homes, the public appear to feel impervious to the threat of bacterial resistance. This finding confirms the idea that, for the public at least, bacterial resistance is context dependent. Fear of MRSA and hospitalisation was consistent with respondents' strong beliefs about resistant infections being caused and contained within hospitals.

Respondents in this study did express concern in relation to their body developing immunity to antibiotics, and therefore limiting the body's ability to fight future infections. This was perceived as a personal rather than societal risk. However, these concerns appeared to be only moderate compared to the fear of contracting resistant infection whilst in hospital. The lack of public ownership for the cause and control of bacterial resistance is inextricably linked with public perceptions of bacterial resistance as a hospital problem. This public framing is likely to present health education campaigns with a considerable challenge: full public engagement in

the fight against bacterial resistance is unlikely unless the public perceive resistance as something that is likely to affect them personally.

Behavioural change models have been used to design interventions aimed at improving adherence to medication regimes in general (highlighted in Chapter 1) but also specifically to design interventions to improve adherence to antibiotics (Finch et al, 2004). One of the pioneers of behavioural change theory, Bandura (1977), proposed a model of behavioural change based on two concepts: self-efficacy and outcomes expectations. Self efficacy refers to the individual's confidence that they can achieve a specific change, and outcome expectations refers to a judgement about whether or not the change is valued, or, in other words, important. Other models such as the Theory of Reasoned Action and Health Belief Model, use different terms to describe similar concepts; how people make judgements about the value (importance) of a change in behaviour and their ability to successfully implement change (confidence in their ability to change) (Rollnick et al, 1999). Literature reviews of health psychology theory and behavioural change report that importance (perceived costs/ benefits) and confidence (perceived ability) are important precursors of readiness (motivation) to change. If one feels change is important, and one has confidence that the change can be achieved, one will be more motivated (i.e. 'ready') to making that change (Rollnick et al, 1999).

Models of behavioural change have already been used in other countries to guide campaigns aimed at engaging the public in the control of bacterial resistance. For example, The International Project on Antimicrobial Resistance and Therapy (IMPART) study used a transtheretical model of behavioural change which

postulates that during a process of change an individual experiences five stages; pre-contemplation, contemplation, preparation, action and maintenance (Prochaska and DiClement, 1992, cited in Finch et al, 2004). Alternative models of behavioural change have also been suggested. The International Forum on Antibiotic Resistance (IFAR) recommends the Predisposing, Reinforcing and Enabling Constructs in Educational Diagnosis and Evaluation (PRECEDE) model as useful in designing behavioural change programmes aimed at antibiotic use (Finch et al, 2004). The predisposing factors are knowledge and attitudes that inhibit or promote certain behaviours. Enabling factors are those, which facilitate actions (both at an individual and societal level). Reinforcing factors are considered rewards or punishment for certain behaviours. An evaluation of this model suggests that behavioural change is more likely to occur if these constructs are incorporated in behavioural change programmes (Davis et al, 1992). Although behaviour change models are recommended when designing strategies aimed at improving public engagement in the fight against bacterial resistance, the use of behavioural change models in this area requires further evaluation. However, evidence from this thesis suggests that the concepts of importance and confidence are central to understanding and addressing lay attitudes of bacterial resistance.

8.1.3 Diffusion of Responsibility and Bystander Apathy

Data from Chapter 5 of this thesis indicates that not only did most respondents believe that bacterial resistance was unlikely to affect them, but they also felt they were not responsible, or had no role in the cause of the problem. The predominant belief expressed was that the perceived hospital based problem required blame to be apportioned to the NHS, health care staff, and the government. The framing of

individual responsibility for health gained increasing importance during the 1970s when pressure to contain ever increasing health care costs grew, and as a result, health policy shifted emphasis from providing services to the sick to preventing ill health among the general population (Newman and Vidler, 2006). Despite the rise in consumerism in the NHS, respondents in this study felt that they were unable to personally influence the NHS or health care practices specifically around this issue, and they did not recognise the contribution to controlling resistance they could make by supporting clinicians in the judicious use of antibiotic, adhering to antibiotic regimes, and safely disposing of unused or unwanted antibiotics.

In my study, respondents with a health care or science background were more likely to report a belief that the control of bacterial resistance was everyone's problem (the public, scientists and health care providers). In contrast, young adults, few of whom had any post-compulsory education, placed the blame on the NHS. Pill and Stott (1985) recognised that educational level influences an individual's belief that their actions affect their health and the health of other people.

The Theory of Diffusion of Responsibility (Gross, 1996) is helpful in explaining why respondents lacked a sense of responsibility for the cause and control of resistant infection. The theory holds that people often deny personal responsibility because they believe that someone else will act. In this study, many individuals believed that it was the role of the government and the NHS to solve the problem. Related to the theory of diffusion of responsibility is the idea that individuals need to perceive themselves as competent to affect a situation. Chapter 5 demonstrates that many respondents believed that the responsibility for controlling resistant infections

resided with health care workers, the NHS, the government, and scientists because of their positions of power, access to resources, and scientific understanding.

Latané and Darley's (1968) decision model of bystander apathy is also useful in understanding respondents' lack of ownership for bacterial resistance. This psychosocial model has been successfully applied to many societal problems (Schroeder et al, 1995). It proposes that for action to be taken, 'bystanders' need to notice the event, interpret it as needing their help, assume personal responsibility, and choose a way to help and to implement their decision. Table 8.1 illustrates the application of the data from this study to the decision model of bystander apathy.

Table 8.1 Bystander Apathy for Resistant Infections

The decision model of bystander apathy	Application of data from this study
1. Notice the event	Awareness of MRSA in hospitals. Lack of awareness of MRSA as a community problem. Lack of awareness of the links between resistant bacteria and use of antibiotics.
2. Interpret it as needing help	It doesn't affect me. I'm not concerned.
3. Personal responsibility	It's a hospital problem. It's the government responsibility.
4. Choose a way to help	There's nothing I can do to help. I didn't cause the problem and I can't resolve it.
5. Action	None

Although data from my study, and others, such as Brooks et al (2008), suggest that the public has recognised the event to some degree, they have not perceived bacterial resistance as needing help from themselves, because it is caused by and occurs

outside of the home and community. Respondents assume no responsibility for its resolution because hospitals are outside their individual field of influence. The public, therefore, do not choose to act. They do not recognise the problem as also being a community one over which they have some influence.

Interestingly, respondents with a health or science background did not share the same lack of awareness towards the cause and control of bacterial residence. This may be explained by their increased sense of responsibility for health (previously discussed), but also that they were likely to perceive health care professionals and the NHS as having similar knowledge and ability to effect change as themselves, and were therefore, (according the model of bystander apathy), less likely to pass responsibility to others.

Latané and Darley's model (1968) suggests that in order to overcome bystander apathy, the public will need a greater awareness of the problem of bacterial resistance, and a greater sense of responsibility and ownership. This point has also been expressed by other researchers: "*the success of health promotion campaigns will depend on how far the notion of individual responsibility for one's own health is accepted by the public*" (Pill and Stott, 1982; p43).

Encouraging individuals to take responsibility for health is not without its challenges. Responsibility for health may not be welcome (Pill and Stott, 1982), and for some individuals, there is a sense of comfort knowing that a health care professional will take charge (Blumhagen, 1980). A greater sense of individual responsibility can lead to victimisation and blaming – indeed, in the present study,

some respondents expressed hostility towards those frequent users of antibiotics. Furthermore, socially deprived populations may not have the resources to undertake the responsibilities asked of them (Minkler, 1999). Health education campaigns emphasising individual responsibility for health have also been criticised for failing to acknowledge individual and group differences in how people respond to their environments (Minkler, 1999). Minkler (1999) recommends an ecological approach to health education as opposed to a social responsibility model. A key aspect of an ecological approach is “*an appreciation of the human agency perspectives that changes at the individual level can in turn influence the broader systems of which individuals are part*” (Minkler 1999; p131). Ecological models of health promotion tend to emphasise environmental rather than individual factors influencing health, which could serve to reinforce the public’s belief that environmental hygiene rather than personal use of antibiotics are the main causes of bacterial resistance. However, an ecological approach may help to focus public awareness on a reciprocal relationship between people and their environment, and could therefore help promote attitudes that acknowledge the interplay between antibiotics, the environment, and resistant infections.

8.1.4. Lay versus Professional Knowledge

There are fundamental differences between professional and lay understandings of health and illness (Freidson, 1970). However, it is now widely accepted that lay beliefs are actually a synthesis of lay and expert knowledge (Blumhagen, 1980). DeSwaan (1990) describes the process of lay internalisation of professional ideas as ‘proto-professionalization’. Health information that the public receives – both

informally and formally - becomes “*a bridge between medical and public understandings*” (Washer and Joffe, 2006; p214).

Despite national initiatives aimed at improving health care professionals’ knowledge of bacterial resistance and adherence to infection control policy, UK studies have reported poor levels of knowledge amongst some doctors and nurses within both primary and secondary care (Easton et al, 2007). Clinicians in the USA were reported to express a lack of personal concern about bacterial resistance despite awareness of the problem (Wester et al, 2002). Likewise, recent studies in the UK have demonstrated that although GPs acknowledge that bacterial resistance was a national problem, two thirds did not feel that microbial resistance was an important issue relevant to their practice (Simpson et al, 2007). Resistance was only one of a number of pressing concerns influencing GPs’ prescribing decisions. Similarly, concerns about bacterial resistance may not be at the forefront of patients’ minds when they are unwell. Patients suffering from URTI felt the need to continue with daily activities and the desire to feel better may be prioritised over more long-term social concerns.

8.1.5 The Influence of the Media on Public Attitudes towards Bacterial Resistance

It has long been acknowledged that the media has a huge influence on public attitudes (Washer and Joffe, 2006). In my study, and in others (Hamour et al, 2003; Duncan and Dealy, 2007; Gill et al, 2006), the media was central in the processes of conveying scientific information about bacterial resistance to the lay public. The public belief that bacterial resistance is a hospital problem is in harmony with the media's portrayal of resistant infections as hospital-acquired and caused by poor

hospital hygiene. Furthermore, the media has been influential in framing the ‘hospital hygiene problem’ as a political issue with blame frequently apportioned to NHS managers and health care professionals (Washer and Joffe, 2006; Slayers and Whitt, 2005). Most respondents in the present study appeared to uncritically accept such messages, although several did accuse the media of ‘scare mongering’ and deliberately sensationalising the topic of bacterial resistance in order to catch the attention of their readership and viewers.

A popular theme of media stories is to portray a ‘modern plague’ and a return to a ‘pre-antibiotic era’. Fear of bacterial resistance and hospital admission expressed by respondents in this study may be the result of such stories and appears to resemble the anxieties reported during the 18th and 19th centuries when hospitals were associated with death (Brunton, 2003). Fear maybe an understandable response to resistant infection, but heightened anxiety leading to refusal of hospital admission has potentially negative effects on the wellbeing of individuals. This is perhaps an issue that warrants further investigation. Although some respondents blamed the media for misrepresenting the problem of bacterial resistance; or at least failing to present the full complexity of the problem (Washer and Joffe, 2006), the media may actually be a valuable source of health information dissemination. Mass media campaigns aimed at reducing the inappropriate use of antibiotics and promoting adherence in other countries have reported positive effects (Finch et al, 2004). An evaluation of a public health education campaign in Belgium showed television to be the most well remembered source of information and significantly fewer respondents expected antibiotics for sore throats and flu symptoms following a television campaign (Bauraind et al, 2003).

8.2 Prototypes of Infection and the Hygiene Panacea: The omission of hand washing

Chapter 5 provides data demonstrating that the lay public associate dirt with germs and sees this association as causal. The association between dirt and germs was transposed in beliefs about resistant infections in that dirty hospitals were believed to be the cause of resistant infections and improving hospital hygiene is the solution. Whilst these beliefs are consistent with prevailing scientific knowledge about cross contamination and the importance of hygiene in reducing infection risk, poor hygiene does not cause the emergence of resistant strains of bacteria. Antibiotic use selects out resistant strains. What is perhaps more concerning is that the public preoccupation with hospital hygiene causing resistant infections is likely to contribute to the public ignoring other factors contributing to bacterial resistance, or at least to contribute to a lack of perceived significance of the role of antibiotic consumption in the community.

The public preoccupation with dirt and germs, and a deep-rooted fear of infection, appear to act as prototypes for beliefs about resistant infections. Prototype beliefs have been reported in other studies. For example, children tend to think of illness as a process of contamination and contagion, with infection considered to be the most likely cause of any illness (Kalish, 1999). In later life these perceptions may alter, perhaps as the result of experience and education. Stefan and McManus (1989) argue that students attending medical school learn to move away from their cognitive bias of thinking about disease in terms of infection towards accepting wider scientific principles. Whilst it is obviously problematic to extrapolate studies of childhood beliefs to explanatory models held by adults, there is some evidence that adults retain their childhood representations of disease as caused by infection

(Bishop and Converse, 1986). Campaigns aimed at improving public understanding of resistant infections should therefore target all ages. Indeed, national initiatives targeting secondary school children currently include the provision of teaching material about infection, its prevention, and bacterial resistance, for example, 'The Bug Investigators: A resource for science teachers'. This resource pack is currently being updated using electronic learning materials (e-Bug) (http://www.dh.gov.uk/en/Publichealth/Patientsafety/Antibioticresistance/Antibioticresistancegeneralinformation/DH_4002219).

The populations of hygiene orientated cultures, such as those of the UK and USA, make ardent efforts to rid their environments of dirt and germs by washing and chemical decontamination through the use of disinfectants (Tomes, 1998).

Undoubtedly, attention to hygiene does reduce infection risk in both community and health care settings. Nevertheless, the benefits of our hygiene-oriented culture may be lost within a belief system that negates a more balanced appraisal of the positive attributes of microbes and understandings of our own innate immunity. Bacteria are essential to the ecosystem, economy (in many of our food manufacturing processes) and they play a role in the healthy functioning of the body. Lederberg (2000) argues that the polarised view of microbes as bad and humans as good needs to be replaced by one which promotes an understanding of microbes and susceptibility to illness.

Replacing the war metaphor with an ecological one, according to Lederberg, is a fundamental step in promoting a more balanced attitude to microbes. Evidence from this thesis suggests that the potential for bacteria to be 'good' is starting to be acknowledged. However, the concept of 'good bacteria' was poorly understood by respondents and, at present, amounts to no more than a well-known marketing

strategy associated with pro-biotic drinks. There is also the question of whether attitudes towards microbes can or should be rebalanced, as the moral value of hygiene and public fear of infectious illness may be immensely difficult to replace. For generations, humans have demonised dirt and germs (Curtis and Biran, 2001) and mysophobia (the fear of dirt and germs) appears to be entrenched within lay beliefs systems for good reasons.

Respondents' beliefs in the importance of environmental cleanliness in reducing infection risk were at odds with the very limited recognition of the importance of hand washing. Semmelweis first recognised the vital role of hand disinfection in reducing the spread of infection within maternity units during the 1800s. Yet, as highlighted in Chapter 5, promoting effective hand washing practices is known to be only partially effective in both health care and community settings. Few studies have explored hand-washing behaviours within the general population of developed countries and little is known about lay perceptions of the role of soap, water and washing in removing microbes. Considering the close association between dirt and germs, it might be that people do not regard hand washing as important when visible dirt is not present. Exploring this hypothesis further could generate new understandings of public hand-washing behaviour. Studying hand washing, however, presents considerable methodological challenges. Self-reports may not reflect actual behaviour, and observational studies may be influenced by the researcher's presence. Interestingly, although members of the public in this study appear to pay little attention to their own hand washing, literature suggest that the public are prepared to, some extent, to ask health care professionals to wash their hands in health care delivery (Duncan and Dealey, 2007), perhaps because the public

perceive health care professionals as a source of infection but do not perceive their own hands as harbouring the same infection risk. Alternative explanations for the indifference to the practice of personal hand washing have been proposed by Tomes (1998) who suggested that relative indifference to this source of infection is linked to the developments of modern medicine and changing patterns of disease associated with the development of antibiotics, and improvements in diet, sanitation and housing.

“The gospel of germs declined in importance, largely due to the strengthening of collective protections against germs, such as water filtration and food regulation. By the later 1920s, heart disease, kidney disease and cancer had replaced respiratory and gastrointestinal infections as the leading cause of death.....Germ consciousness remained strong until 1950s.....Not until World War II did the gospel of germs truly fade into insignificance as a road map for avoiding deadly disease.”

(Tomes, 1998, p12-13)

As populations began to enjoy better living conditions and longer life, concerns about chronic disease escalated and personal and household hygiene practices were no longer given the same degree of importance (in terms of controlling infectious illness) as they once were. Although Tomes offers a unique way of speculating about changes in hygiene practices, her theories have not been empirically tested. Also, the rise of epidemic infection, such as, Human Immuno Deficiency Virus (HIV), which may not be associated with hygiene within lay schema, may have alerted perceptions. This thesis was unable to provide any reliable data on why the public do not prioritise hand-washing as a means of preventing infection, but the findings do suggest that campaigns aimed at controlling resistant infection should emphasise the importance of hand washing using soap in community settings.

8.3 Reliance on Medicines and Medicine

Data from my study demonstrate that respondents strongly relied upon both medicines (OTCMs and antibiotics) and contact with primary care practitioners when dealing with URTI. Despite a number of empirical studies exploring antibiotic use during URTI, most of which are quantitative (discussed in the literature review), previous studies have not explored beliefs about antibiotics within the wider context of medicine use. The following section explores how the reliance on medicines (pharmaceutical remedies) and medicine (professional health care services, e.g. doctors) were central to both beliefs and illness behaviour.

8.3.1 Public Reliance on Medicines: Is antibiotic attachment a consequence?

Medicines have been widely used within our society for generations. Historians have reported that following the Second World War, ‘the great drug era began’, when both the public and clinicians became increasingly reliant upon medicines to treat illness (Crelin, 2004). Receiving or taking medicines has become normalised within society, but it is also almost instinctive and habitual (Ackernecht 1946, cited in Van der Geest and Whyte, 2002; p34). It is, therefore, not surprising that respondents from this study also reported a heavy reliance on medicines.

The ethnomodel of URTI described in this thesis supports the idea that the use of OTCMs was not dependent on beliefs about aetiology alone, nor on perceptions of medicines as cures. In my study, OTCMs were widely used for URTI, sometimes without a conscious rationale and despite variations in beliefs about causation. Although the efficacy of medicines is likely to be related to their pharmacological effects, this may fail to fully explain the reason for the overwhelming reliance on

medicines in situations where respondents were unable to express a reason for their use. Previous studies have identified that medicines are perceived as effective even when they have been shown to have few or no active pharmacological ingredients (Helman, 1984), otherwise known as the ‘total drug effect’ (Van der Geest and Hardon, 2006). The non-pharmacological value of medicines lies in their ability to address the social and cultural dimension of illness. According to Appadurai (1986)

“Things acquire meaning when they enter into the life of people.... Every ‘thing’ transcends its natural form and assumes a social, cultural and psychological role”

(cited in Van der Geest and Hardon, 2006, p213).

Medicines and medicine taking is, therefore, likely to be symbolic of many different aspects of the illness experience. Nichter and Vuckovic, (1994) explain that:

“Taking medication involves more than the embodiment of substances. Embodied also are subtle ideas about self, illness causality, and responsibility: the meaning of sickness, and perceptions of entitlement. Also embedded are assumptions about what is normal and desired, which link with the physical body to the social body and the body politic”

(Nichter and Vuckovic, 1994, p 288).

In my study, not only did medicines serve a pharmacological purpose, they also appeared to take on a social role i.e. they possessed ‘social efficacy’, that is, they were perceived to have the ability to ‘do things’ that were socially valued (Van der Geest and Hardon, 2006). Medicines (particularly OTCMs) were used for their perceived ability to enable individuals to comply with societal pressures to continue with normal responsibilities. Medicines enabled adults to go to work, mothers to care for their children, and children to attend school or nursery. My study has confirmed ideas that medicine consumption is a means of coping with illness

(primarily through symptom control) when the social context does not allow rest (see also; Bradley et al, 1998; Vuckovic, 1999). In addition (as discussed in chapter 6), perceptions of URTIs as 'normal' and not 'real illnesses' also influence decisions to continue with normal activity.

Medicine and medicine use also has symbolic meanings. Consistent with previous studies of a range of illnesses (Van der Guest and Whyte, 2002), parents felt the need to act when their children were ill. In my study, 'doing something' was considered a moral obligation of good parenting, but was also a result of the distress experienced by parents caring for sick children. Administering medication or consulting a clinician appeared to be symbolic of care, affection, and concern.

The reliance on medicines demonstrated by respondents was not restricted to OTCMs. For some respondents it also included antibiotics. The term 'antibiotic attachment' is used here to describe respondents' desire and expectations for antibiotics, as well as a confidence in their efficacy and safety. Antibiotic attachment appeared to be the product of two key factors. Firstly, there was a reliance on medicines in general. This was coupled with positive perceptions of antibiotics and ignorance of their disadvantages (Blaxter, 1990; Branthwaite and Pechère, 1996; Pechère, 2001). 'Antibiotic attachment' may also have been driven by a fear of infection and a desire to rid the body and environment of microbes. As with other medicines, antibiotics were seen as symbols of healing, and eulogies of modern drugs were common amongst respondents. Most respondents had positive experiences of using antibiotics; few had experienced side effects, and most were unaware of the association between antibiotic use and resistant infections.

Consequently, antibiotics were perceived as an essential and safe resource for dealing with infection.

The practice of storing unused antibiotics in the home also demonstrates ‘antibiotic attachment’. Of course, the public propensity to hoard medicines is not restricted just to antibiotics and retaining unused prescribed medicines in the home has been recognised since the 1970s (Dunnell and Cartwright, 1972). Many respondents in this study reported storing unused antibiotics, but most without the intention of using them later. However a minority of respondents did report that they would self-medicate with ‘left-over’ antibiotics, which they had stored in the home. Self-medicating with antibiotics is likely to be influenced by antibiotic attachment, but it is also possibly a consequence of national health campaigns, which promote self-care (a point which is discussed in chapter 7).

Antibiotic use and attitudes towards antibiotics are also likely to be influenced by the broader meaning of the prescription. Previous research has shown high levels of patient expectations for antibiotics when consulting a clinician for URTI (Holmes et al, 1997; Baer et al, 1999; Vingilis et al, 1999a; Hamm et al, 1996; Haltiwanger et al, 2001; Linder et al, 2003; Altiner et al, 2004; Welschen et al, 2004). Patient expectations for a prescription is not confined to antibiotics but has also been observed in other medical conditions (Van der Geest and Hardon, 2006). The writing of a prescription is an embedded ritual within the patient-clinician consultation signifying the clinician’s expertise and authority and the patient’s illness as legitimate (Blaxter and Britten, 1999). Balian et al (1970) went as far as to propose that the clinician ‘is the medicine’, and that the act of receiving a

prescription reassures patients that their illness can be treated and they will recover. Parents of young children in my study clearly expressed the need for reassurance as a primary reason for their consultation, and by comparison few actually reported a desire for an antibiotic. It is not only the antibiotic itself that has a beneficial effect, but the sense of reassurance and legitimisation of illness which accompany the act of prescribing.

8.3.2 Reliance on Medicine: Medicalisation, antibiotic use and public engagement in the fight against bacterial resistance

Chapter 6 presents data on parents' lack of confidence in their own ability to assess the severity of their child's illness and to make decisions about the appropriate course of action. Respondents' reliance on health care professionals for guidance and their scepticism about lay advice could be indicative of a process of medicalisation and a subordination of lay knowledge, and is referred to here as a reliance on medicine. Although definitions of medicalisation have varied, three ideas are considered central to the concept (Ballard and Elston, 2005). Firstly, medicalisation involves 'medical dominance', whereby medicine's jurisdiction is extended to life events previously considered to be part of normal experience (for example, child birth and death). Secondly, medicalisation requires that individuals seek a course of treatment or care in order to relieve or cure the problem. Thirdly, medicalisation requires that treatment decisions are made by health care professions who are seen as authoritative experts by virtue of their training (Lowenberg and Davies, 1994). Medicalisation can also be seen as a process through which traditional beliefs are replaced by scientific ones, and during this process individuals may lose faith in their own knowledge and judgement (Cornwell, 1984). Findings

from my study suggest that many respondents questioned their own ability to deal with illness without professional guidance. Furthermore, respondents' reluctance to accept that their bodies, in many situations, have the ability to resolve infection unaided through processes of innate and acquired immunity may have contributed to their reliance on both medicines and medicine to treat URTI. Previous research has only touched on the topic of lay beliefs surrounding innate and acquired immunity (Johnson and Helman, 2004). Only a few respondents in my study understood that the body's own immune system has the potential to deal with most infections, regardless of whether these are bacterial or viral. Further research in this area would be valuable in informing future antibiotic campaigns as lay beliefs of infection and antibiotics appear to be inter-twined with beliefs about the body's ability to fight infection.

The process of medicalisation is also believed to influence perceptions of responsibility for health and illness. Lowenberg and Davies (1994) have suggested that medicalisation has led to an 'absolvement' of personal responsibility for illness: a point that is also pertinent to ownership of the problem of bacterial resistance discussed in section 8.1.3

Thus far, I have argued that the medicalisation of society has led to a dependency on health professionals and this has negatively influenced self-efficacy in dealing with illness. However, recent studies of illness behaviour and antibiotic use have suggested that RTIs are being 'de-medicalised' within society (Ashworth et al, 2004). Indeed, self-care and self-medication were the predominant illness behaviours reported by respondents in my study for most cases of URTI. In my

study, and others, one of the main advantages of OTCMs is their ability to enable individuals to actively self-treat without seeking advice from clinicians (Van der Geest and Whyte, 2002; Vingilis, 1999a). Self-medication was the most favoured option in adults.

The propensity to self-medicate during URTIs may be a consequence of national initiatives aimed at reducing consultations for minor illness. Self-care has been promoted by successive governments on the basis that it encourages self-reliance and can reduce the financial burden on the National Health Service. Anthropologists also argue that medicines purchased without the need of a prescription, have a democratic character and have been described as “*vehicles of empowerment*” (Nichter and Vuckovic, 1994; p299), breaking the hegemony of clinicians by enabling individuals to self diagnose and self treat (Van der Geest and Whyte, 2002). Indeed, respondents in my study reported how the ease of access to OTCMs facilitated rapid and convenient symptom treatment without the need to consult a clinician. Other evidence of the challenge to medicalisation lies in the reports of CAM use, which are alleged to empower individuals (Lowenberg and Davis, 1994). In my study, middle class parents reported a greater use of CAM and a greater sense of responsibility for their health than other groups of respondents. Respondents’ efforts to self-care could, therefore, be indicative of de-medicalisation.

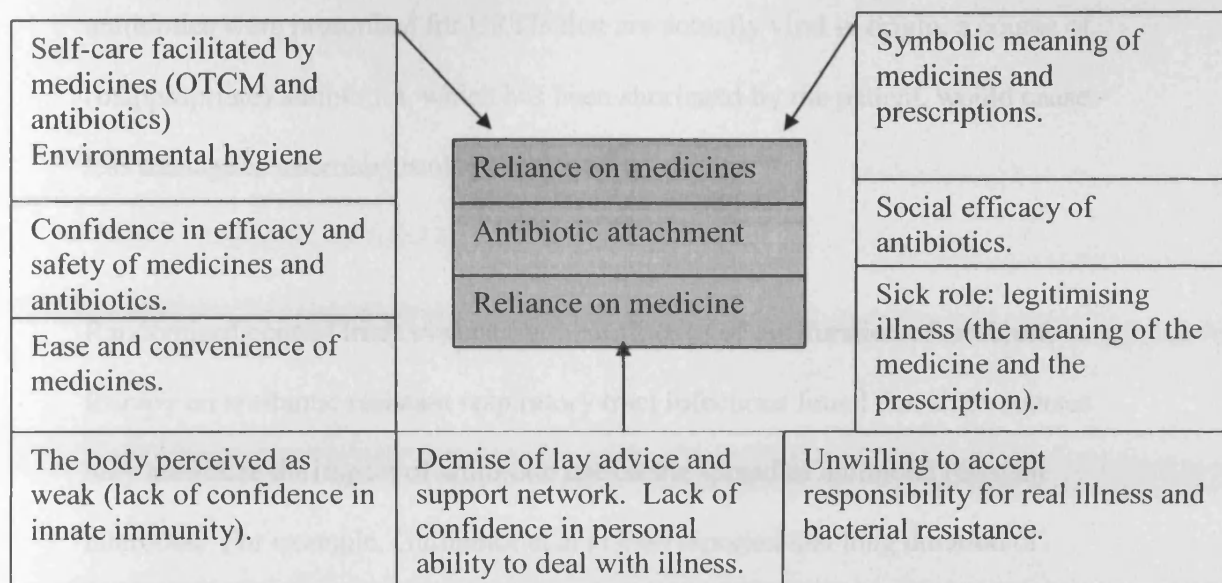
As data from my study indicate, elements of both a medicalised and de-medicalised society. One could conclude that respondents had mixed feelings about who has ultimate responsibility for health and illness and were uncertain of when they should consult a clinician. Indeed, the public are confronted with a number of mixed

messages about how individuals should react to common infections. For example, the directions provided with OTCM typically suggest that ‘if symptoms persist, consult a physician’; yet natural history data for common infections indicate that symptoms may persist for a number of weeks without that being an indication of a serious infection (Hay et al, 2002).

8.3.3 Towards a Unified Theory of Lay Attitudes towards Antibiotics and Infection

Traditional grounded theory espouses drawing out a central category (Glaser and Strauss, 1967), sometimes called the core category, which reports the main theme of the findings. As I had adopted a more contemporary approach to grounded theory - based on the work of Charmaz (2006) – I did not aim to formulate one central category. Indeed, my study, exploring three different (although interconnected) areas of lay beliefs, did not expose any clear central category uniting all three conceptual areas. However, the reliance on medicines and medicine appeared central to lay beliefs related to infection (URTI) and antibiotics. Figure 8.1 summarises the relationship between the conceptual themes and demonstrates that reliance on medicines (pharmaceutical remedies) and medicine (professional health care services) are key drivers for both antibiotic use/misuse and consultation for URTI.

Figure 8.1: The Reliance on Medicines and Medicine



8.4 Improving Antibiotic use in the Community

Adherence to antibiotic treatment regimes has been widely promoted as a way of engaging the public in the fight against resistant bacteria. Chapter 7 describes how most respondents in this study were aware that they should finish the full course of therapy, but were nevertheless unaware of how stopping a course of therapy early could contribute to resistant infections. Although widely promoted as a key way of reducing the risk of bacterial resistance from antibiotic use, the importance of finishing some courses of therapy is scientifically controversial. For example, two Cochrane Reviews of antibiotic use in urinary tract infection suggest that short courses of therapy (typically 3 days in duration) were as effective at relieving symptoms as courses lasting over 5 days (Lutter and Vogt-Ferner, 2002; Katchman et al, 2005). Longer courses of antibiotics were associated with an increase in adverse reactions. These studies suggest that if patients stop taking a long course of antibiotics once they feel better, rather than finishing the full, long course, the

therapeutic effect of the antibiotic may not be diminished. Furthermore, if many antibiotics were prescribed for URIs that are actually viral in origin, a course of (inappropriate) antibiotics, which has been shortened by the patient, would cause less damage to microbial ecology in the body.

Randomised control trials evaluating the influence of the duration of antibiotic therapy on antibiotic resistant respiratory tract infections found that short courses may minimize the impact of antibiotic use on the spread of antibiotic resistant microbes. For example, Guillemot et al (1998) reported that long duration of treatment with an oral β -lactam contributes to the selective pressure in promoting pharyngeal carriage of penicillin-resistant *S. pneumonia*.

Very few respondents recognised the importance of adhering to the optimal intervals between doses. However, as discussed in chapter 7, the importance of dosing intervals has only recently been recognised as a potentially important factor influencing the emergence of bacterial resistance, and has yet to be emphasised in public education campaigns. In addition, the public are also largely unaware of the negative consequences of disposing unused antibiotics in household waste and sewage systems, again partly because campaigns have not stressed the importance of doing so. Further research quantifying how the public dispose of unwanted and unused antibiotics is required. Operational definitions of adherence to antibiotic regimes should perhaps include three components: finishing the full course, taking dosing at the optimal time intervals, and (in the event that some antibiotics are unused or unwanted) returning them to a pharmacy for safe disposal. Health

information campaigns should perhaps take the same three-pronged approach to promoting appropriate use of antibiotics in the home.

Chapter 7 shows that respondents in my study reported both intentional and non-intentional suboptimal adherence. Furthermore, variations in behaviours were reported by respondents with different demographic characteristics. This supports the idea that different ways of promoting adherence are required for different sectors of society and for different types of suboptimal adherence behaviours.

The literature review has established that adherence to antibiotic therapy is dependent on individual and clinician characteristics as well as the nature of the patient-clinician consultation and the prescribed treatment. Interventions aimed at improving adherence are therefore likely to require behaviour change from both the public and health care professionals (Finch et al, 2004), although the focus here is public behaviour. Simple reminders such as a clock printed on the prescription label, stickers to be pasted at home (Lima et al, 1976), perhaps because reminders do not address the reasons for intentional modification to antibiotic therapy (Jackson et al, 2006). Putman et al (1994) explored a number of approaches to improve patient adherence to treatment regimes. Improving awareness of the value of antibiotics (when they are likely to effectively treat infection), stressing the importance of adherence, providing patients with a plan to improve adherence, and asking patients to make a verbal and written commitment to adhere, all had a positive effect on patient adherence. Verbal advice from clinicians or pharmacists is reported to have limited effect on adherence, but has been shown to be effective in combination with written information (Kardas, 2005). Simplifying treatment regimes, using short

course of therapy and minimising the number of daily doses required positively influence antibiotic adherence (Bergman and Werner, 1963; Yoos, 1984; Cockburn et al, 1987; Hoppe et al, 1999; Claxton, 2001; Perrez-Gorricho, 2003; Carey and Cryan, 2003; DeBellis et al, 2004).

Studies have suggested a number of ways of reducing self-medication with antibiotics, for example reducing the chance of consumers having any leftover antibiotics in the home by dispensing only the exact amount of antibiotics required (Grigoryan et al, 2007; McNaulty et al, 2006 and 2007). While reducing the amount of stored antibiotics in the home may reduce self-medication in opportunistic self-medicators, it may not effectively influence those who deliberately alter medication regimes to enable them to keep antibiotics for subsequent self-medication. Whilst data from my study suggest that this behaviour may reflect antibiotic attachment, it was also associated with difficulties in accessing health services, particularly in areas of high deprivation.

Table 8.3 summarises the typology of antibiotic adherence in the community presented in Chapter 7 and suggests strategies for improving adherence. Facilitating behavioural change is likely to be a complex undertaking requiring concurrent multiple interventions (Finch et al, 2004; Elder et al, 1999). Different interventions need to be tailored to specific groups within the community and addressing the attitudes, motivations, and psychosocial influences of the target group (Finch et al, 2004). It is not only educational interventions that could be more effectively tailored to different sectors of the community. My typology also suggests that other practical interventions such as improving/easing access to primary care, and prescribing

antibiotic regimes which facilitate completion of the course, could be targeted to certain population groups in order to maximise antibiotic adherence.

Table 8.2: Antibiotic user Behaviour and Suggested Intervention

Characteristic pattern of antibiotic use	Intervention response
Generally use antibiotics as prescribed.	None required.
Could not take all doses due to constraints of work, child care/school and social reasons.	Focus on making it easier for people to use antibiotics as prescribed.
Frequently forgot doses.	Need to address beliefs about antibiotics, and practical adherence issues such as reminders.
Stops taking antibiotics when symptoms improve.	Intervention should address the issue that completing the full course is necessary even if symptoms decline.
Actively sought to limit antibiotic use because of reservations about the nature and effects of antibiotics.	Need to address reservations about antibiotics.
Opportunist self-medicators.	Need to reduce unused antibiotic storage in the home.
Deliberately stops taking antibiotics and self-medicates.	Need to address structural problems in primary care as well as reliance of medicine and medicines.

Given that antibiotic adherence behaviours can be typified on the basis of socio-demographic variables, social marketing may be an appropriate public educational approach to bacterial resistance. Social marketing endorses a consumer-focussed approach to health education using strategies of targeting specific populations through ‘segmenting’ and ‘profiling’, followed by designing, testing and refining services (Kotler and Lee, 2008). The value of a social marketing to health education lies in the design of programmes of education that are targeted to discrete populations (here segmenting and profiling come into play) and particular educational needs. For example, health education campaigns may target communities with the most under-developed understanding of infections (in this

study these were young adults from areas of high deprivation). This sector of the population will require a basic understanding of microbes before knowledge of bacterial resistance can be meaningfully conveyed to them. Social marketing is also useful tool for facilitating behaviour change in the context of a valued outcome (e.g. us having effective antibiotics for the long term).

8.5 The Way Forward

This study has highlighted the importance of studying beliefs about antibiotics within the wider context of medicine taking and non-pharmacological use of medicines in the community. Anthropologists Van der Geest and Hardon (2006) support the need for research in this field.

“We should pay more attention to the non-medical meanings and effects of medicines. Even if we are ultimately concerned about a just provision and good use of medicines in health care, we should study how social and other meanings of medicines impinge on the quality of provision and use. Medicines mean different things and serve different interests to different people in different situations. No prescriber or policymaker can afford to overlook the complexity of medicines. We do not ignore or overlook their therapeutic function, but want to draw attention to aspects that usually are overlooked: their social, cultural, economic, religious and emotional effects”

(Van der Geest and Hardon, 2006, p51)

The findings of this study have already generated interest from colleagues. For example, the findings around the problems facing parents of pre-school children who attend day-care when their child is suffering from a common infection has been raised as an issue worthy of further exploration.

8.5.1 Implications for Practice

Reducing intentional modifications to antibiotic therapy will require a different approach to behaviour change than non-intentional sub-optimal adherence.

Unintentional sub-optimal adherence may be improved through interventions aimed at making it easier for patients to use antibiotics as prescribed and by focusing on developing realistic expectations for antibiotics through education.

Campaigns aimed at reducing intentional sub-optimal adherence need to address reliance on antibiotics and to focus on better information provision by clinicians and pharmacists which addresses lay beliefs about how antibiotics work. Developments in the organisation and delivery of care should evaluate supporting self-care whilst simultaneously ensuring the safe and appropriate use of antibiotics in community settings.

Public health campaigns should take into account the lack of awareness of antibiotic resistance as a community problem over which the public has little control. Although simple advice may influence knowledge, behavioural change is unlikely unless people have a clear sense of the importance of change, value it, and believe that they can make a positive contribution to resolving the problem. Campaigns aimed to engage the public in the fight against bacterial resistance should focus on three key elements: improving public understanding of the causes and consequences of resistant infections; raising the importance of bacterial resistance as a community issue and convincing individuals, with specific messages, that they can feasibly make a valuable positive contribution.

8.6 Methodological Issues: strengths and limitations of the study

8.6.1 Strengths

Most previous studies exploring attitudes towards antibiotics and beliefs about MRSA have sampled patient (help seeking or treatment) populations and used quantitative techniques. Studies sampling patient/treatment populations represent the views and beliefs of those with existing infection, and these patients may have been influenced by their immediate experiences and what health professionals have recently told them. General population samples have the potential to provide alternative accounts of illness, as respondents in this study were all 'well' adults, but discussions of illness behaviour were retrospective, open to recall bias and social desirability bias. In addition, previous quantitative studies have inherent limitations in that fixed responses do not elicit complex beliefs. Consequently, interesting theories that are based on the respondents' explanatory models that had not previously been recognised by the researcher may not be expressed.

This study adds a new dimension to understanding lay attitudes towards infection, antibiotics, and bacterial resistance. Sampling the general population and the use of grounded theory methods has enabled a thick description of lay beliefs and attitudes. Using the context of respiratory tract infection, self reported illness behaviour was explored for its potential to illuminate underpinning belief systems and influences on behaviour. Whilst the small sample of a qualitative study reduces its generalisability to the wider population, qualitative studies are able to provide conceptual data that can then inform a larger survey and are a useful first stage of the process of intervention development. The recently updated Medical Research Council (MRC) guidelines for developing and evaluating complex interventions (Craig et al, 2008)

states that "*a good theoretical understanding is needed of how the intervention causes change, so that weak links in the causal chain can be identified and strengthened*" (p 980). The findings of this study could, therefore, act as a useful catalyst to develop behaviour change interventions that could be evaluated in a trial, or inform public health campaigns.

This study also benefited from a staged sampling strategy. The initial purposive sample described in Chapter 3 improves the generalisability of the study, as the respondents were representative of a range of age groups, sex, and communities. The theoretical sampling that followed enabled interesting theories to be explored and developed, consistent with a grounded theory approach. The response rate for the study was also good. Personal introductions to respondents by community group leaders (gatekeepers) appeared to positively influence the receptiveness of respondents to the research. On the one occasion when I was not introduced before I approached potential respondents, the reception was comparatively negative, although recruitment was still partly successful.

8.6.2 Limitations

This study does, however, have a number of limitations. Firstly, the findings are the product of an active process between myself (the researcher), and the respondents. Taking a relativist perspective, the findings therefore can only represent one version of the world - another researcher could conceivably have produced an alternative version. This does not limit the value of this study, as Nettleton (1995) maintains that "*the argument that all knowledge is socially contingent is not the same as the*

statement that all knowledge is worthless; rather it attempts to gain an alternative understanding as to how knowledge is created” (Nettleton, 1995; p30).

The potential of the interviewer’s demographic characteristics to effect interview data has long been recognised. Race, age, sex, social class, educational background, religion, and even accent are all believed to have the capacity to affect participants’ responses (Fielding and Thomas, 2001). Although I am not able to alter my personal biography, I did attempt to minimise its effect by presenting as neutral a persona as possible. I only informed respondents of my nursing background if they explicitly asked me about my professional experience.

An interviewer’s behaviour can also produce bias, as can their willingness to probe the respondent’s depth of response (Fielding, 1993). Pilot interviews and feedback from colleagues helped me to develop my interviewing skills.

There are some limitations with the sample. Firstly, respondents were volunteers and, as such, were self-selected. The views of members of the public who did not respond to the study invitation may differ from those who did. This problem, however, applies to all research that relies on participant consent. The sample was also predominantly female. Attitudinal variations between men and women relating to illness behaviour are known to occur. For example, Macintyre (1993) reports gender differences in perceptions of common cold symptoms and women are known to be higher users of OTCMs and CAMs than men (Fleming et al, 1984). Although data from this study suggest that there were variations in attitudes between men and women, this theory could not be fully explored due to recruitment problems amongst

men. Great efforts were made to recruit under-represented sub-groups by theoretical sampling but, despite this, certain groups were under-represented (most notably younger men, women from affluent areas, and adults from all areas over the age of 65). Due to time and travel expense of fieldwork there was a need to limit the geographical area to south east Wales.

Educational attainment also appears to be associated with health beliefs. However, a rigorous assessment of educational attainment was not made in this study.

Respondents were only briefly asked whether or not they had experience of post-compulsory education. On reflection, a more fine-grained approach to measuring educational attainment would have been advisable.

8.7 Conclusion

No previous qualitative study has explored public beliefs in a non health care related sample about the causes and consequences of bacterial resistance beyond hospital acquired MRSA, nor have studies explored the meaning of antibiotics outside their pharmacological properties, how perceptions of URTI influence illness behaviour, and use of antibiotics in the home. This thesis aimed to address these gaps in empirical knowledge.

Data from this study demonstrate a lack of public awareness of the causes of bacterial resistance and how members of the public can personally contribute to its control. Furthermore, respondents in this study received little practical information from official health education sources. Media reporting appears to have contributed to misunderstandings around bacterial resistance and created a fear of

hospitalisation. The mass media does, however, have a valuable role to play in disseminating information to the public (providing the information is factual and accurate), and has been used successfully in information campaigns. Although the financial costs of mass media campaigns are an obvious challenge, using the media to disseminate information within a social marketing framework for health education has potential benefits, particularly in the way social marketing processes of segmenting and profiling can enable materials and approaches to be tailored to the needs of particular groups.

Behavioural interventions based solely on improving knowledge assume that the only barrier to change is ignorance. This thesis suggests that respondents did typically lack knowledge of microbes, infection control measures, antibiotics, and bacterial resistance, but in addition, their behaviour was influenced by deep rooted historical antecedents: our hygiene oriented culture, a reliance on medicines (in particular antibiotic attachment), and a medicalised society. The lack of public ownership for the cause and consequences of bacterial resistance is likely to be influenced by these factors along with a culture of ‘bystander apathy’ and diffusion of individual responsibility. Therefore, although providing information may be the first and a vital step toward engaging the public in the fight against bacterial resistance, information campaigns alone are unlikely to facilitate behavioural change. Utilising models of behavioural change may act as a useful framework for promoting the public’s contribution to the control of bacterial resistance.

Despite living within hygiene-oriented culture, the importance of hand washing in reducing infection risk is poorly acknowledged by the public and little is currently

known about lay beliefs of innate immunity. Public engagement in the fight against resistance could be improved through the promotion of simple hand washing with soap and warm water, as well as having obvious beneficial effects on the reduction of infection in general.

Multimodal campaigns attempting to encourage antibiotic adherence are needed to address the different influences on adherence behaviours. Generic messages are likely to have limited effect. The consumers' contribution to controlling resistance could be enhanced by advice on optimal dosing intervals and the safe disposal of unused antibiotics, messages that have thus far been widely omitted. The findings of this study suggest that information campaigns should emphasise the role of antibiotics in bacterial resistance and not just suggest that antibiotics are not needed for viral illness, colds or influenza.

Table 8.3 Summary of Main Recommendations

1. Efforts to support the judicious use of antibiotics in the home need to address the reliance on medicines and medicine.
2. Models of behavioural change should be used in information campaigns
3. A social marketing approach could assist with interventions - making use of mass media
4. Hand washing should be promoted as a valued way of reducing infection and resistant infection
5. Further research is needed into lay beliefs of innate and acquired immunity.

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Appendix 1: The Minimal Standards for Grounded Theory Studies

- The structure of the study will be fundamentally shaped by the aim to discover social and psychological processes
- The data collected and analysis phases of the project will proceed simultaneously
- The analytic processes employed will be promoted theory discovery and development rather than the verification of pre-existing theories.
- Theoretical sampling will refine, elaborate and exhaust conceptual categories
- Systematic application of grounded theory analytic methods will progressively lead to more abstract analytical levels

(Murphy et al, 1998; p143)

Appendix 2 List of Community Groups and the Nature of Approaches

Community Group	Letter	Follow up letter	Telephone call/email	Appointment with gatekeeper	Access granted
Abergavenny Family Church	x		x	x	x
Gabalfa Community Education Centre	x		x		x
Gabalfa Community Work Shop	x		x		x
St Marks Church (play group)	x		x	x	x
Cardiff Draconians	x	x	x		
Bute Angling Society	x	x	x		
Cliff Richard Fan Club (Cardiff)	x				
Welsh Crafts Association	x	x			
Tiger Bay Ramblers	x	x	x		x
The Avenue Day Centre	x		x		x
Tredegar Community Resource Unit	x		x		x
A4e Training	x	x	x		x
Hilltop Play Group	x		x	x	x
Ebbwvale Youth Centre	x	x	x		x
Radyr Community Centre	x		x	x	x
Ebbwvale Community Education Centre	x	x	x		x
Bethel Baptist Church (play group)	x		x		x
Methrin Welsh Play Group	x		x		x
Tredegar local History Society	x		x		x
Usk Friendship Club	x	x	x	x	x
Michel Troy Play Group	x		x		x
The Teddy Bear Club	x		x		x
Hatha Yoga	x		x		x
Puddle Ducks Nursery	x		x	x	x
Llanedryn Community Centre	x			x	x
Llanedryn Nursery and Play Group	x			x	x
Monmouthshire Young Framers	x	x	x	x	
Castle Street Play group	x			x	x
The Community University of the Valleys	x	x			
Cardiff Quins	x	x	x		x
Celtic Wrestling	x				
Ebbwvale RFC	x	x	x		
Ebbwvale Mountain Bike Club	x	x	x		
Provincial Grand Lodge Monmouthshire	x	x			
Monmouth Community Centre	x	x	x		
Monmouth Golf Club	x	x		x	x
Gabalfa Parent and Toddler Group	x			x	x

Appendix 3: Letter of Invitation and Participant Information

Department of General Practice
Head of Department Professor Helen Houston
Adran Meddygaeth Teulu
Pennaeth Adran Yr Athro Helen Houston



Title of the Study: Attitudes to Common Respiratory Infections, Antibiotics and Antibiotic Resistance.

Cardiff University
Department of General Practice
Health Centre
Maelfa
Llanedeyrn
Cardiff CF23 9PN
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Fax Ffacs +44(0)29 2054 0129
E-mail E-bost genpract@cf.ac.uk

Prifysgol Caerdydd
Adran Meddygaeth Teulu
Canolfan Iechyd
Maelfa
Llanedeyrn
Caerdydd CF23 9PN

Information Sheet for Participants

This leaflet has been prepared to give you some more details about the research and answer some questions you may have.

You are being invited to take part in research study. Before you decide, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Please ask if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

Professor/Yr Athro
Clare Wilkinson
Professor/Yr Athro
Christopher Butler
Professor/Yr Athro
Stephen Rollnick

Background to the research.

For many years we have relied on antibiotics to help us recover from both major and minor infections. But bacteria have adapted over time and now some bacteria are no longer killed by antibiotics. This is called bacteria resistance. Some illnesses that were once easy to treat are now causing great distress. There are many different reasons why this has occurred. One reason for the growth in resistant bacteria is the incorrect use of antibiotics. As most antibiotics are consumed outside of hospitals, members of the public have an important role to play in fighting this problem.

What am I trying to find out?

This study attempts to understand individuals knowledge, beliefs and experience of antibiotics. This will enable the development of strategies to promote their safe and appropriate use.

Why is the study being undertaken?

Awareness campaigns highlighting the need to reduce the use of antibiotics have already been launched by the government. But there is a need to develop other ways to promote the appropriate use of antibiotics. Talking to members of the general population, including those who feel they have no special knowledge in this area, is important to this research.

What do I have to do?

If you express a willingness to participate the researcher will contact you and arrange a convenient time and place to meet you. It is expected that most participants will prefer to be interviewed at home as this may cause less inconvenience but alternative arrangements can be made.

During the interview you will be asked to talk about the topic of the study and to describe your knowledge and experience. Interviews will be audio recorded and transcribed (typed up), so the researcher can analyse what is said. The transcripts will not have your name on them, so you will not be identifiable. Audio tapes and transcribed data will be kept in a locked cupboard and will not be seen by anyone outside the research team.

How long will it take?

How long it will take partly depends on how much time you are able to give. Even short interviews are very valuable to the study but on average the interviews last between 45-60 minutes.

Why have I been selected?

In order to find suitable members of the general public who are willing to participate in the study. I have contacted a number of community groups. These include different types of clubs, associations and activities within community centres.

Do I have to take part?

It is up to you whether or not you take part. If you decide to take part you will be asked to give your permission to participate by signing a consent form and you should keep this information sheet. If you decide to take part you are free to withdraw at any time without giving a reason.

What are the potential disadvantages and risks of taking part?

There are no obvious disadvantages to taking part in the study apart from the fact that you are being asked to give up some of your time.

What are the possible benefits of taking part?

There are no immediate benefits to you as individuals, although I hope you enjoy talking to me and have an opportunity to share your knowledge and experience. Your opinions will be help full in maintaining the effectiveness of commonly used antibiotics. This study could also lead to improvements in the way doctors and nurses manage common infections.

What is something goes wrong?

If you feel you are treated unfairly or have any reason to complain about any aspects of the study, please advise the researcher conducting the interview. You may also wish to contact the researcher's supervisor, Dr Fiona Wood (tel: 02920541133)

Who is undertaking the research and why?

The main researcher is a PhD student with the Department of General Practice of the Wales College of Medicine, Biology, Life and Health Sciences, Cardiff University. The study is funded by the Department of General Practice, Cardiff University.

What will happen to the results of the study?

The results of the study will be disseminated through the publication of research papers and at academic conferences. However, no individuals will be identified in any of the study reports.

Who has reviewed the study?

The researcher will be supervised by Professor C Butler and Dr F Wood both of the Department of General Practice, Cardiff University. Ethical approval has been granted by the Medical /Dental School Ethics Committee, Cardiff University.

What do I have to do if I would like to participate?

If you would like to participate then please complete your contact information on the attached reply slip and post to the Department of General Practice in the self addressed envelope provided.

Contact for Further Information

I will be happy to answer any questions that you may have.

Nancy Hawkings
Department of General Practice
Health Centre
Maelfa
Llanedeyrn
Cardiff
CF23 9PN

Tel. 02920 541133 ext.240
Email HAWKINSNJ@cardiff.ac.uk

Thank you for interest in this study

Appendix 4: Potential Participants Reply Slip

Study title: Attitudes to Common Respiratory Infections, Antibiotics and Antibiotic Resistance:

Contact Details

If you are willing to consider participation on the above named study please complete your details below and return in the envelope provided, thank you.

Title: Mr/Mrs/Miss/other

Full Name

Address.....

.....

.....Postcode.....

Telephone number:Mobile:.....Email.....

Please state the most convenient time or day to contact

you.....

Where did you meet me or receive your information pack

from?.....

Please tell me a little about yourself.

How old are you?

How would you describe your current or most recent

occupation?.....

Are you a parent yes/no * (* please delete as appropriate)

If you have children, how old are they?

.....

Are you a lone parent? Yes/no

Thank you very much for expressing a wish to participate in this study. I will contact you shortly to discuss arrangements.

Nancy Hawkings

Appendix 5: Version 1 of the Interview Guide

Can you remember a time when you (or your child) had a cough, cold, sore throat, runny nose, ear ache, chest infection or flu? What did you do when you began to feel unwell?

Probes: Did you seek advice from anybody?

Who did you ask? Why did you choose to go to them? Which medicines do you use and why do you choose them?

What did they advise you to do?

What remedies did you try?

Where any medicines prescribed by the doctor? What were these and why did you need them?

Prompts: Do you use home remedies, or medicines that are available in shops?

Did you go to see the doctor or the pharmacist or ask anyone else's advice?

What do you think are the causes of these symptoms? (A cue card with a list of symptoms or the symptoms will be read out)

Probes: What do you believe is happening inside your body when you have an infection?

Why do you become ill?

Why do you become unwell and get these symptoms?

What type of germs do you know about?

Prompts: Are colds caused by bacteria or virus?

Do you have any ideas about what infections are?

Probes: What causes infection? What are bacteria?

What are viruses?

What role does lifestyle have in your potential for you to catch an infection?

What can make you more likely to catch an infection?

How do you avoid infection?

What can make you less likely to catch an infection?

How can you prevent or reduce the risk of picking up an infection?

Are there any positive aspects of having an infection?

Prompts: What are the differences between bacteria and viruses?

Do you have any ideas about when antibiotics are useful?

Probes: Why would you take antibiotics?

When are antibiotics helpful? Which types of illness?

How do they work?

What do they do?

What different types of antibiotics are you aware of?

Does the type of antibiotic matter?

Prompts: Do you think that they can kill the cause of the infection, aid immunity or get rid of the infection in some other way?

Can antibiotics work against bacteria or viruses or both?

If you are prescribed antibiotics what do you do with them when you get home?

Probes: How/when do you take them?

How many tablets to you take and why?

When do you stop taking them? Why?
Do you manage to finish the full course? Why?
Do you/have you ever shared them?
Do you read the information leaflet?
Do you keep some for another time/ why/ how/ when?
Prompts: Do you take more, less or all the antibiotics instructed?

Are you aware of any disadvantages/side effects of taking antibiotics?

Probes: Have you had any adverse reactions to antibiotics?

Do you have any ideas about how or why these may occur?

Prompts: Have you heard of antibiotics leading to diarrhoea, sickness or rashes?

Can you tell me what antibiotic resistance means to you?

Probes: How do bacteria become resistant?

What do you know about Super bugs? Why are super bugs such a problem?

Do you have any ideas why these infections are such a problem to use?

How are they caused?

How do you contract one?

Why are some infections' such as Super bugs, not easy to destroy with antibiotics?

Where do you find resistant bacteria/ Super bugs?

Prompts: Have you heard of bacterial resistance, MRSA or super bugs?

How did you find out and learn about antibiotic resistance/super bugs?

Probes: Have you seen any posters or information about antibiotic and infection when and where?

Did this information make sense to you?

Prompts: Family, friends, GP, nurse, newspaper, TV, media, poster

Have you seen programmes on TV, talks on the radio, articles in news papers or magazines?

Whose responsibility is it to tackle these problems?

Appendix 6: Interview Summary Sheet

Date:

Participant number:

Age:

Male/Female

Number and age of age of children:

Utility Authority of residence: Blaenau Gwent/ Monmouthshire/ Cardiff/ Caerphilly

Townsend Score for electoral ward: deprived/ average/ affluent.

Occupation: Social Class classification:

Personal Circumstances/ back ground of participant.

The main issue that struck me;

Summary of information obtained or failed to get for each target question.

Other salient, interesting or important issues arising.

Appendix 7: Example Showing the Development of the Node Tree

QSR N6 Full version, revision 6.0.
Licensee: Unregistered.

PROJECT: Attitudes Infection, Resistance and Antibiotics, User N
Hawkings, 12:38 pm, Apr 5, 2007.

REPORT ON NODES FROM Tree Nodes
Depth: ALL
Restriction on coding data: NONE

```
(1) /CRI
(1 1) /CRI/Knowledge
(1 1 1) /CRI/Knowledge/causes
(1 1 1 1) /CRI/Knowledge/causes/colds and flu
(1 1 1 2) /CRI/Knowledge/causes/war metaphors
(1 1 1 4) /CRI/Knowledge/causes/other
(1 1 2) /CRI/Knowledge/beliefs about symptoms
(1 1 3) /CRI/Knowledge/risk
(1 1 3 1) /CRI/Knowledge/risk/diet/vitamins
(1 1 3 2) /CRI/Knowledge/risk/HLS
(1 1 3 2 1) /CRI/Knowledge/risk/HLS/work/rest
(1 1 3 2 2) /CRI/Knowledge/risk/HLS/Exercise
(1 1 3 3) /CRI/Knowledge/risk/contagion
(1 1 3 4) /CRI/Knowledge/risk/cleanliness
(1 1 3 5) /CRI/Knowledge/risk/other
(1 1 4) /CRI/Knowledge/changing beliefs
(1 2) /CRI/Responses
(1 2 1) /CRI/Responses/remedies
(1 2 1 1) /CRI/Responses/remedies/OTCM
(1 2 1 2) /CRI/Responses/remedies/CAM
(1 2 1 3) /CRI/Responses/remedies/home & traditional
(1 2 1 4) /CRI/Responses/remedies/prescribed drugs
(1 2 1 5) /CRI/Responses/remedies/combinations
(1 2 1 7) /CRI/Responses/remedies/other
(1 2 1 7 1) /CRI/Responses/remedies/other/Rest
(1 2 1 7 2) /CRI/Responses/remedies/other/working through
(1 2 1 7 3) /CRI/Responses/remedies/other/keeping warm
(1 2 1 7 4) /CRI/Responses/remedies/other actions/other
(1 2 2) /CRI/Responses/advice
(1 2 2 1) /CRI/Responses/advice/family
(1 2 2 2) /CRI/Responses/advice/friends
(1 2 2 3) /CRI/Responses/advice/media
(1 2 2 4) /CRI/Responses/advice/HCP
(1 2 2 5) /CRI/Responses/advice/other
(1 2 3) /CRI/Responses/consultation
(1 2 3 1) /CRI/Responses/consultation/waiting
(1 2 3 2) /CRI/Responses/consultation/drivers
(1 2 3 3) /CRI/Responses/consultation/expectations

(1 2 3 3 1) /CRI/Responses/consultation/expectation/antibiotic
(1 2 3 3 2) /CRI/Responses/consultation/expectation/advice
(1 2 3 3 3) /CRI/Responses/consultation/expectation/other
```


(2) /Antibiotics
 (2 1) /Antibiotics/Knowledge
 (2 1 1) /Antibiotics/Knowledge/side effects
 (2 1 2) /Antibiotics/Knowledge/types of antibiotics
 (2 2) /Antibiotics/Feelings
 (2 3) /Antibiotics/used in the home
 (2 3 1) /Antibiotics/used in the home/adherence
 (2 3 2) /Antibiotics/used in the home/decision making
 (2 3 3) /Antibiotics/used in the home/modification
 (2 3 4) /Antibiotics/used in the home/info leaflet
 (2 4) /Antibiotics/delayed prescribing

 (3) /Parenthood & children (PT)
 (3 1) /PT/remedies
 (3 2) /PT/parenting experience
 (3 3) /PT/challenges
 (3 3 1) /PT challenges/Emotional labour
 (3 3 1 2) /PT/challenges/Emotional labour/Professional
 opinions
 (3 3 1 3) /PT/Challenges/emotional labour/ priorities
 (3 3 2) /PT/Challenges/communication
 (3 4) /PT/medicine taking
 (3 5) /PT/other
 (4) /Illness (general)
 (4 1) /Illness (general)/medicines
 (4 2) /Illness (general)/benefits of being unwell
 (4 3) /Illness (general)/social issues
 (4 4) /Illness (general)/other

 (5) /Primary Care
 (5 1) /Primary Care/positives
 (5 2) /Primary Care/negatives
 (5 2 1) /Primary Care/negatives/access
 (5 2 2) /Primary Care/negatives/expectations
 (5 2 3) /Primary Care/negatives/other

 (6) /Bacterial Resistance (BR)
 (6 1) /BR/awareness
 (6 1 1) /BR/awareness/sources
 (6 1 1 1) /BR/awareness/sources/word of mouth
 (6 1 1 2) /BR/awareness/sources/Media
 (6 1 1 3) /BR/awareness/sources/training
 (6 1 2) /BR/awareness/causes
 (6 1 2 1) /BR/awareness/causes/cleanliness
 (6 1 2 2) /BR/awareness/causes/antibiotics
 (6 1 2 3) /BR/awareness/causes/Don't know
 (6 1 2 4) /BR/awareness/causes/other
 (6 2) /BR/Feelings
 (6 3) /BR/reducing resistance
 (6 3 1) /BR/reducing resistance/responsibility
 (6 3 2) /BR/reducing resistance/media
 (6 3 3) /BR/reducing resistance/NHS
 (6 3 4) /BR/reducing resistance/other
 (6 4) /BR/source/knowledge
 (6 4 1) /BR/source/knowledge/campaigns
 (6 4 2) /BR/source/knowledge/verbal advice
 (6 4 2 1) /BR/source/knowledge/verbal advice/HCP
 (6 4 2 2) /BR/source/knowledge/verbal advice/other
 (6 4 3) /BR/source/knowledge/media

(6 4 4) /BR/source/knowledge/other

(7) /characteristics of respondents

(7 1) /characteristics/sex

(7 1 1) /characteristics/sex/M

(7 1 2) /characteristics/sex/F

(7 2) /characteristics/OCS

(7 2 1) /characteristics/OCS/1

(7 2 2) /characteristics/OCS/2

(7 2 3) /characteristics/OCS/3

(7 2 4) /characteristics/OCS/4

(7 2 5) /characteristics/OCS/5

(7 2 6) /characteristics/OCS/6

(7 3) /characteristics/asthma

(7 4) /characteristics/Age

(7 4 1) /characteristics/Age/under 25

(7 4 2) /characteristics/Age/26-40

(7 4 3) /characteristics/Age/41-60

(7 4 4) /characteristics/Age/over 60

(7 5) /characteristics/Area

(7 5 1) /characteristics/Area/Cardiff

(7 5 2) /characteristics/Area/Blaenau Gwent

(7 5 3) /characteristics/Area/Monmouthshire

(7 5 4) /characteristics/Area/Caerphilly

(7 6) /characteristics/Ward

(7 6 1) /characteristics/Ward/deprived

(7 6 2) /characteristics/Ward/average

(7 6 3) /characteristics/Ward/affluent

(7 7) /characteristics/Parental status

(7 7 1) /characteristics/Parental status/other

(7 7 2) /characteristics/Parental status/children/under 5

(7 7 3) /characteristics/Parental status/children 5-18

(8) /Infection

(8 1) /Infection/definitions

(8 2) /Infection/immunity

(8 3) /Infection/prevention

(9) /Type of RTI /bad chest

(9 1) /Type of RTI/ The common cold

(9 2) /Type of RTI/ Undefined symptoms

(9 3) /Type of RTI/ Tonsillitis

(9 4) /Type of RTI/ Ear ache

(9 5) /Type of RTI/ Flu

(9 3) /Type of RTI/ Sore throat

(9 4) /Type of RTI/ Sinusitis

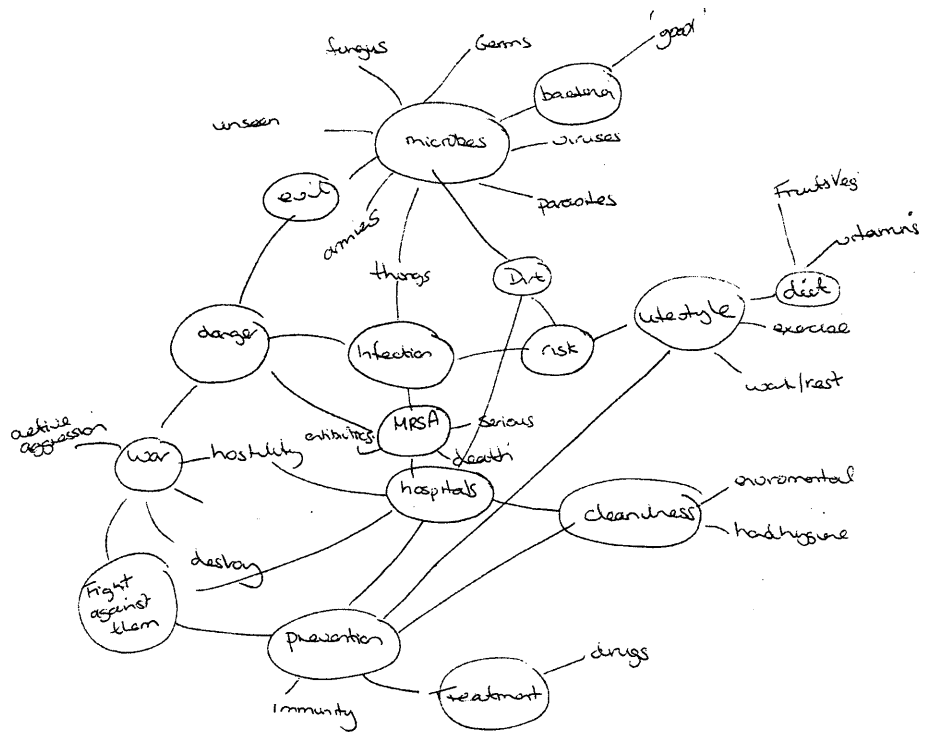
(9 5) /Type of RTI/ LRTI

(9 5.1) /Type of RTI/ LRTI/ Bronchiolitis

(9 5.2) /Type of RTI/ LRTI/ Bronchitis

(9 5.3) /Type of RTI/ LRTI/ Pneumonia

Appendix 8: Example of a Mind Map



Attitudes towards
infection and
Resistance

~lm

Appendix 9: Response from the Local Research Ethics Committee



**Canolfan Gwasanaethau Busnes
Business Services Centre**

**South East Wales Local Research Ethics Committees
Direct Line: (02920) 402309/402420**

Our ref: JS/db

02 February 2005

Ms Nancy Hawkings
Dept of General Practice
Cardiff University
Health Centre
Maelfa
Llanedeyrn
Cardiff CF23

Dear Ms Hawkings

Re: Attitudes to common respiratory infections, antibiotics & antibiotic resistance

Thank you for your letter and enclosures of the 28 January 2005 enquiring whether the above proposal requires ethical approval.

The Chairman of the South East Wales Research Ethics Committee, Dr D E B Powell, has considered your letter and confirmed that your proposal constitutes a public survey and therefore falls outside the remit of the Ethics Committee, and does not require ethical approval. The Chairman asked that any references to the South East Wales Research Ethics Committee be removed from your documentation.

I trust this is satisfactory, however, if you require any further information please do not hesitate to contact me.

Yours sincerely

**Mrs Jagjit Sidhu
Deputy Executive Officer
Research Ethics Committee**
✉ jagit.sidhu@bsccardiff.wales.nhs.uk



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Ffôn: 029 20 402402 WHTN: 1809
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Churchill House
17 Churchill Way
Cardiff, CF10 2TW
Telephone: 029 20 402402 WHTN: 1809
Fax: 029 20 402403
DX 121720, Cardiff 9

Canolfan Gwasanaethau Busnes ydy'n rhan o Powys a phart o Powys Lloegr Health Board

Appendix 10: Ethical Approval: Cardiff University

Dental School
Dean Professor Malcolm Jones
Vice Dean Professor Jonathan P Shepherd
Ysgol Deintyddol
Deon Yr Athro Malcolm Jones
Is Deon Yr Athro Jonathan P Shepherd

Our ref 05/01

13th May 2005

Mrs Nancy Hawkins
Department of General Practice
Health Centre
Maelfa
Llanedeyrn
CARDIFF
CF23 9PN

Dear Mrs Hawkins

Re: Attitudes to Common Respiratory Infections, Antibiotics and Antibiotic Resistance: Managing Common Respiratory Infections

Your application in relation to the above project was considered by the Medical/Dental School Research Ethics Committee on Monday 9th May 2005.

The Committee is happy to grant ethical approval for this project.

It was noted that the information sheet was rather long and you may wish to consider reducing the information sheet somewhat.

The Committee is happy for the project to proceed without further formal review.

With best wishes for the success of your study.

Yours sincerely



Dr I.G. Chestnutt
Chair
Medical/Dental School Research Ethics Committee

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CAERDYDD
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Appendix 11: Consent Form

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Professor / Yr Athro
Clare Wilkinson
Professor / Yr Athro
Christopher Butler
Professor / Yr Athro
Stephen Rollnick

Participant Identification Number for this study:

CONSENT FORM

Title of Study: Attitudes to Common Respiratory Infections, Antibiotics and Antibiotic Resistance:
managing common respiratory infections and prompting the appropriate use of antibiotics by the
general population

Name of Researcher: Nancy Hawkings.

Please initial box

1. I confirm that I have read and understand the information sheet dated
(version) for the above study and have had the opportunity to ask questions.

2. I understand that my participation is voluntary and that I am free to withdraw at any time,
without giving any reason

3. I agree to take part in the above study.

Name of Participant

Date

Signature

Researcher

Date

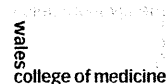
Signature

Copies: 1 for participant
1 for researcher



wgpnjh1

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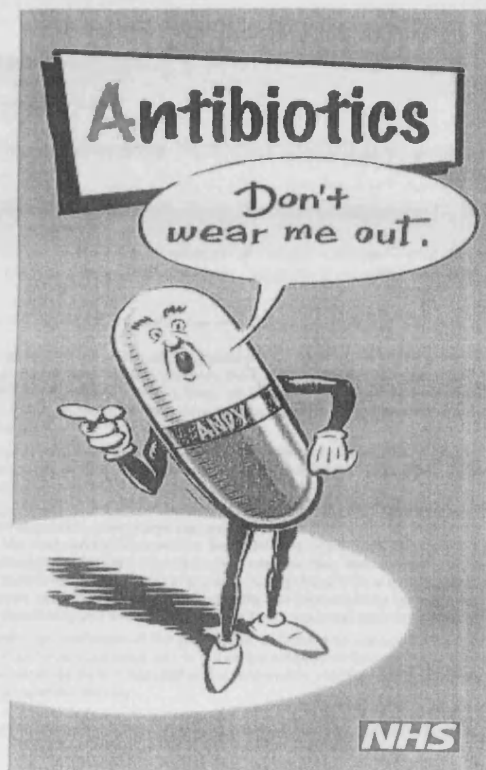


**Appendix 12: Registrar General's Occupational Social Classes and
Coding Scheme Used in This Study**

Category/code	Occupational Social Classes
1	I Professional occupations
2	II Managerial and technical occupations
3	III N (non-manual) Skilled occupations
4	III M (manual) Skilled occupations,
5	IV Partly-skilled occupations
6	V Unskilled occupations

(Registrar General's Occupational Social Classes, 1980)

Appendix 13: Example of a Poster from the 'Andybiotic' Campaign



(http://www.dh.gov.uk/en/Policyandguidance/Healthandsocialcaretopics/Antibioticresistance/Antibioticresistancegeneralinformation/DH_4001750, last accessed 15/08/07)

Appendix 14: Published Articles Generated by this Thesis

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JAC

Public attitudes towards bacterial resistance: a qualitative study

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Objectives: Behaviour of members of the public contributes to bacterial resistance. For behavioural change to occur, individuals need to perceive the issue as important to them and feel able to make a valuable contribution. Public campaigns have, so far, not been informed by detailed understanding of public attitudes to the problem. We therefore set out to explore the attitudes of members of the public to bacterial resistance.

Methods: A qualitative grounded theory interview study was undertaken. A purposive maximum variation sample included 32 (70%) women and 14 (30%) men, aged from 18 to 89 years, from areas of high, average and low deprivation.

Results: Participants were uncertain about bacterial resistance and their explanations were generally incongruent with prevailing biomedical concepts. Perceived importance and personal threat were low. The media was the main information source and it left the impression that dirty hospitals are the main cause. Some participants dreaded hospitalization because they feared resistant infections. Few recognized resistant infections as a problem in the community. Less than a quarter indicated that they could positively influence the situation by expecting antibiotic prescriptions less often, or taking antibiotics according to instructions, and even fewer through their own hand washing behaviour.

Conclusions: Although members of the public can contribute to containing bacterial resistance, most do not feel that they have a personal role in either the problem or its solution. Campaigns should identify bacterial resistance as both a hospital and a community problem that individuals have the power to influence through specific actions.

Keywords: qualitative research, grounded theory, public, attitudes, antimicrobial resistance

Introduction

The public are being increasingly engaged in efforts to contain bacterial resistance. They can positively contribute to controlling bacterial resistance by lowering their expectation for antibiotics for common infections,¹ by adhering to antibiotic regimes² and by helping reduce the spread of resistant organisms through behaviour such as hand washing.³ Public campaigns have had a mixed response,^{4,5} perhaps because they are often based on broad non-specific messages, for example, 'Antibiotics: don't wear me out';⁶ and are not adequately developed from an appraisal of the public's attitudes towards bacterial resistance. Behavioural change is unlikely unless people have a clear sense of its importance, value the change and believe in their ability to make a positive contribution through feasible action.^{7–9}

Although previous studies have explored lay perceptions of common infections and antibiotic treatment,¹⁰ public attitudes to bacterial resistance are under-researched. Understanding the

attitudes of the public may be vital in enabling health professionals and health education programmes to develop and frame messages in specific and meaningful ways.

Methods

We defined attitudes as having three aspects: affective (evaluative feelings), cognitive (opinions and beliefs) and behavioural (overt actions).¹¹ Qualitative methods were chosen because they enable in-depth exploration of perceptions while avoiding researchers merely quantifying responses to pre-conceived notions. Grounded theory methods were chosen as a way of revealing participants' views, feelings, intentions and actions within the context and structures of their lives.²

Subjects

We initially selected a purposive sample aimed to capture maximum variation in views and hypothesized that these would vary according

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to age, level of social deprivation and geographical context. We therefore recruited participants from three unitary authorities: Cardiff (urban), Blaenau Gwent (post-industrial, former coal mining area) and Monmouthshire (rural). We identified one deprived, one average and one ward of low deprivation, based on the Townsend scores of the census data, in each of these three areas.¹³ We aimed to recruit participants with a range of ages and to include a meaningful gender balance. One additional electoral ward with high levels of deprivation within Caerphilly was also targeted because of recruitment difficulties in Blaenau Gwent. The characteristics of the sample are described in Table 1.

Participants were recruited through community groups. A study team member visited a meeting of each group, following initial discussion with community group leaders. Verbal explanations of the study were given and all attendees were provided with an information pack. Those willing to participate returned a signed reply form using a self-addressed envelope.

N. J. H. conducted in-depth interviews with participants in their own homes or at local community centres. Interviews were semi-structured using an interview guide (see Table 2 for questions relevant to this report). Open questions were used, followed by prompts when there was no response to initial questions. For example, when participants indicated that they had not heard of bacterial resistance, they were asked whether they had any ideas about methicillin-resistant *Staphylococcus aureus* (MRSA) or 'super bugs'. The data generated during interviews were, thus, either spontaneous, the result of open questioning, or prompted and were coded as one of these three possibilities. Different ways of data generation were taken into account in our analyses.

Written consent was obtained prior to all interviews. All interviews were audio-recorded, apart from two where the recording device failed. In these two cases, additional detailed field notes were made immediately following the interviews. All data were anonymized on transcription.

After 21 interviews, category development left us convinced that we had insufficient data from young men from areas of high deprivation. We therefore made particular efforts to recruit from this group. We considered this theoretical sampling because the cases were selected on the basis of their potential to facilitate the

Table 1. Participants' characteristics

Area	Deprivation	Female	Male	PCE
Urban	High	6	1	1
	Average	4	1	4
	Low	4	3	7
	Total	14	5	12
Rural	High	0	0	0
	Average	7	1	4
	Low	6	0	5
	Total	13	1	9
Post-industrial	High	5	5	0
	Average	2	3	3
	Low	0	0	0
	Total	7	8	3
Age	18–25 years	8	5	2
	26–59 years	19	6	22
	>60 years	5	3	0
	Total	32	14	24

PCE, post-compulsory education.

Table 2. Interview guide: questions relevant to bacterial resistance

What does the word infection mean to you?
Prompts:
Do you have any ideas about how you contract an infection?
Do you have any ideas about how your body reacts to infection?
Why do symptoms occur?
How can you reduce your risk of infection?
Have you heard of bacterial resistance?
Prompts:
What do you understand by the term antibiotic resistance/MRSA/super bugs?
Do you have any ideas about where these MRSA/super bugs are found?
Do you have any ideas about how or why bacterial resistance occurs?
Why are some infections such as super bugs, not easy to destroy with antibiotics?
Why are resistant infections/super bugs/MRSA such as a problem?
Are you aware of any consequences of resistant bacterial infections?
How did you learn/hear about antibiotic resistance?
Prompts:
Have you heard about or gained information about MRSA/super bugs from TV programmes, radio or posters?
Has it ever been the topic of conversation with family, friends and work colleagues?
Do you have any ideas about how resistant infections can be controlled?
Prompts:
Do you think there is any connection between how you take antibiotics and the occurrence of resistant bacteria?
Whose responsibility is it to resolve the problem?

development of categories.¹² Consistent with a grounded theory approach, data collection stopped when 'theoretical saturation' was reached in that no new properties emerged from the data.¹²

Data were analysed using techniques of open, axial and theoretical coding, constant comparison and searching for deviant/unusual cases. Data collection and analysis proceeded in tandem using a cyclical process whereby analysis informed further data collection.¹² Codes, categories and themes were developed. Emerging theoretical hypotheses were repeatedly re-evaluated through subsequent interviewing. During open coding, concepts were named and their properties and dimensions identified. Axial coding related categories to subcategories and linked properties with dimensions. As initial hypotheses were formed, data were searched for disconfirming evidence falsifying initial hypotheses. Unusual (deviant/negative) cases were identified and early theoretical conclusions modified in the light of such evidence. Finally, during theoretical coding, concepts were integrated and the theory refined.¹²

The organization and retrieval of data were supported by qualitative data analysis software (NUD-IST). Reliability was explored through dual coding of 20% of the data by two researchers (N. J. H. and F. W.). Lack of concordance was resolved through discussion.

Results

We approached 37 community groups and gave out 283 information packs. Interviews were conducted between March 2005

Public attitudes towards bacterial resistance

and March 2006. Although we aimed to achieve a balance of men and women across locations and socio-economic groups, women were over-represented in the sample, and we were not able to interview people from rural areas of high deprivation or post-industrial areas of low deprivation. Twenty-four participants had undergone post-compulsory education (Table 1). Most of the data were the result of direct questioning and the use of prompts. Prompts were used more often when interviewing those who did not have a science background (professional training/qualifications within the fields of either biomedicine or health science). Analysis of data revealed two key themes:

(i) Uncertainty about the causes and consequences of bacterial resistance

'I really don't know the cause of them'

Data from our initial interviews led us to hypothesize that many members of the public shared ideas about bacterial resistance, which are broadly congruent with current biomedical thinking. Eleven (24%) participants with a science background, four middle class mothers and an unusual case of a father from a deprived urban area described the adaptation and mutation of bacteria in association with antibiotic use. Some of these participants also blamed general practitioners for over prescribing antibiotics ($n = 10$, 22%). However, following theoretical sampling, our early hypotheses were modified. Most participants, in fact, had little awareness of the causes and consequences of bacterial resistance (Table 3). Most were unable to respond to questions about the nature of bacterial/antibiotic resistance. Following prompts, however, most did acknowledge that they had heard of MRSA and/or super bugs.

P34: I really don't know the origin of them; they talk about cleaning hospitals better. I do not have a clue, whether it's airborne or whatever. I'm not sure. I just know it's severe (60 year old man, rural area).

P21: I don't actually know very much about it. But having been into hospital and everyone was talking about it and there

Table 3. Number of participants who mentioned specific causes of bacterial resistance

Specific causes	Participants' background	
	Science (including health science) ($n = 11$, 24%)	Other ($n = 35$, 76%)
Poor hospital hygiene	11 (24%)	29 (63%)
Suboptimal adherence to antibiotics	11 (24%)	4 (9%)
Over prescribing of antibiotics	8 (17%)	6 (13%)
Poor standards of healthcare	3 (7%)	7 (15%)
Lack of hand washing	3 (7%)	2 (4%)
Use of antibiotics in animals	1 (2%)	1 (2%)
Being too clean	0	1 (2%)
Antibiotic use in other countries	2 (4%)	1 (2%)
Flowers in hospitals	1 (2%)	0

must be something in place to prevent it, perhaps? It can be carried by people. I know that because some hospitals actually test you for it. But I don't know what it is. I just know that it is serious (57 year old woman, rural area).

None of the participants had personal experience of resistant infection, but several knew of others who had suffered from resistant infections while in hospital. Young adults (18–26 years of age) from areas of high deprivation expressed most uncertainty about the causes and consequences of the problem. Most participants associated resistant infection only with severe life-threatening infection and death.

Source of beliefs

Most respondents reported that their main source of information about bacterial resistance was television and to a lesser extent, newspapers and radio reports.

P44: Nothing, I don't know nothing but what I hear on the telly and they say that people go into hospital and end up worse than they did when they went in there but other than that I don't know a lot really (46 year old man, post-industrial area).

'It's a hospital problem'

The majority of participants believed that bacterial resistance was a problem within hospitals caused by poor environmental hygiene (Table 3). Dirt and germs were closely associated as were dirty hospitals and resistant infections. No participants expressed a belief that bacterial resistance was a common community problem or that resistant infections could affect those who were not in hospital. Few talked about the important role of hand washing in response to questions about how resistant infections could be controlled, although they were not specifically probed about hand washing *per se*.

P33: I thought that was just to do with the basic hygiene because um, people aren't being cared for properly like they used to be in hospitals. I mean wards aren't clean, you know, floors aren't washed, toilets aren't cleaned (34 year old woman, urban area).

P14: I think it was obvious in a place like that (hospitals) with all the dirt around that it was going to cause a problem (36 year old woman, rural area).

P37: The standards of hygiene and I'm not just blaming cleaning staff. I am blaming nurses as well because the standards of nursing these days I think is absolutely outrageous. I mean years ago wards were scrubbed from head to foot. Now what do they do? Give the bed a quick wipe over and shove the next body in it, its disgusting (63 year old woman, post-industrial area).

Consequences of resistant infections

Six (13%) connected bacterial resistance with potential treatment failure. However, these participants generally related treatment failure to the body's response to repeated antibiotic use and not to changes in resistance characteristics of bacterial populations. They believed that antibiotics become less effective with repeated use because the body (and not bacteria) becomes 'used to' or 'immune' to them.

P24: I think that if you take too many antibiotics that they are not going to do the job they are supposed to do when you really need them because your body does build up an immunity to them, doesn't it? (29 year old woman, rural area).

Not receiving antibiotics for long enough or antibiotics that were not strong enough, or of the wrong type, were also cited as reasons for treatment failure. Beliefs about the role of the immune system in combating infection were underdeveloped. Most participants overestimated the effect of antibiotics, independent of their own immune system.

(ii) Lack of individual ownership for the control of resistant infections and fear of hospital admission

'I don't worry about it'

Participants initially appeared to have few concerns about resistant infections. They did not feel that they had a role in either the cause or the control of bacterial resistance.

P31: Um worries me in terms of um, am I anxious about it? No, but only because I don't think there is very much I can do about it. I do think it's um, compared to global warming, its concerning, definitely, and it should be acted on and researched (36 year old man, urban area).

Dual coding, however, highlighted an initial discrepancy between coders. Following further scrutiny of data and discussion among the coders, the code 'lack of concern' was renamed and redefined as two separated but inter-related issues, 'perceptions of importance' and 'personal risk'. Participants' lack of concern was then coded as a low sense of importance for some and/or as low personal risk of contracting resistant infections for others.

P10: I can't say that I lose, I haven't lost any sleep over it. In general, terms, yes, you're aware of the problem; you know that the problem exists but its generally vague and not a cause for immediate concern (37 year old man, urban area).

However, following examination of an unusual case, it became clear that perceptions of risk were related to the likelihood of the participant needing hospitalization. When hospitalization was considered likely or possible, the perceptions of risk increased. This is not surprising as most respondents believe that resistant infections were caused by and contained within hospitals.

P26: I would worry about going into hospital but I don't worry about it every day but I would if I had to go into hospital for an operation, I would be very scared of getting MRSA (33 year old woman, rural area).

P17: Don't think it affects us on a day-to-day basis so we don't think about it. Well not a lot really. It's quite a scary one isn't it? But superbugs, I'm not quite sure about that. I've heard things on the news and in the newspaper and things like that but MRSA, I'm quite concerned about that myself because of having the baby soon and possibly going to have a caesarean. Is it like the wound stays; is it like the wound stays infected? (34 year old woman, urban area).

Fear of resistant infections was consistent with respondents' attitudes to germs as hostile invaders. Anxiety about hospitalization led some to refuse admission.

P30: I begged them last time that they wanted to take me into hospital not for me to go because I am afraid of going into hospital now. I am terrified of it (talking about MRSA) and everyone feels the same (58 year old woman, post-industrial area).

'There's nothing I can do'

Few participants talked about the individual's potential contribution to controlling bacterial resistance through adherence to medication regimes or by working with clinicians to limit

antibiotics to essential indications. Most of those who mentioned the importance of finishing a course of antibiotics in relation to bacterial resistance had a science background. Interestingly, few participants acknowledged the importance of taking antibiotic doses at the correct intervals.

'It's not my responsibility'

Attitudes towards infections influenced attitudes towards bacterial resistance. 'Germs' were perceived as something one caught from someone or something else, outside the individual's ability to control and closely associated with dirt. Participants perceived themselves as having little individual responsibility for the control of bacterial resistance, not only because they considered germs as being outside their control, but also because the standards of hygiene and resources within healthcare services were outside their field of influence. The majority of participants believed that the responsibility for tackling issues relating to bacterial resistance rested with the government and/or National Health Service (NHS) managers ($n = 33, 72\%$). Blame was often placed with the NHS at policy and institutional levels, as cuts in funding and resources were believed to be responsible for poor hospital hygiene.

P37: I blame the government for cutting back. I can think of a number of people who have gone into hospital and they got MRSA. Where did they get it from? They didn't take it in with them (63 year old woman, post-industrial area).

P39: it's very common in hospitals at the moment, um, it's down to lack of cleaning and what have you, isn't it a lack of staffing, that's what I would put it down to (21 year old man, post-industrial area).

N. J. H.: Who has responsibility for sorting these 'superbugs' out?

P35: Well I would say the government first and foremost. They have got the power to enforce legislation on the rest of us and they've got money and resources to do things about it, whereas no one else in the country really has. So the responsibility, kind of, lands on their table (43 year old man, post-industrial area).

In contrast, participants with science backgrounds described responsibility for controlling resistant infections as residing not just with governmental authorities but also with society as a whole; i.e. among the general public, health service providers and the scientific community. However, five middle class mothers and a father from a deprived urban area (all of whom had completed post-compulsory education), despite expressing some uncertainty, also felt that responsibility for resolving the problem rested with members of the public, albeit led by government agencies.

P10: Well I think that there is personal responsibility but I also think that governments have responsibility as well; they have to lead the way (37 year old man, urban area).

Discussion

To the best of our knowledge, this is the first in-depth qualitative exploration of members of the public's attitudes towards bacterial resistance. We developed a grounded theory of attitudes to bacterial resistance through interviews with participants from a range of ages, gender and living in a wide range of

Public attitudes towards bacterial resistance

geographical settings with a spread of deprivation. Most participants were uncertain about what bacterial resistance was and their explanations were generally incongruent with prevailing biomedical concepts. There was a low sense of perceived importance and personal threat. Bacterial resistance was not identified as a community problem. Rather, it was considered an issue of poor hospital hygiene. The media was the main source of information; its portrayal of resistant infections contributed to participants' fears of hospitalization. Participants generally felt that they had no role to play either in the cause or in the solution of the problem. Less than a quarter indicated that they could influence the situation through their own use of antibiotics and even less volunteered the importance of reducing the spread of resistant infections through their own hand washing behaviour.

Our findings are consistent with quantitative surveys reporting hospital patients' awareness of MRSA.¹⁴⁻¹⁶ Previous studies, however, have not explored the nature of informants' understandings of bacterial resistance including beliefs about aetiology and responsibility. Our participants demonstrated limited understanding of biomedical concepts, with the exception of those with a science background.

The media acts as a conduit between medical and lay knowledge and, consistent with other studies, is the main source of public information about resistant infections.¹⁶ It was not surprising, therefore, that participants' attitudes were consistent with the social representations recently presented by the media. Such representations portray MRSA as a potentially lethal infection contained within hospitals and caused by poor hygiene, the responsibility for which lay with the NHS and politicians.¹⁷

National strategies to contain bacterial resistance have focused mainly on reducing community antibiotic prescribing and improving infection control within hospitals.¹⁸ Indeed, some participants blamed general practitioners for over prescribing, but most described dirty hospitals as the primary cause of the problem.

Our data indicate that there was a low sense of personal ability to help contain the problem, because infections were perceived as outside the influence of individuals. Such beliefs are not new. Helman's seminal study in suburban London found that fevers were perceived to be caused by microbes and as such were outside individuals' control. The individual could not be proportioned with any blame or responsibility for these illnesses.¹⁹ Few participants expressed ideas that responsibility for resistant infections lies with society more broadly. Ideas about individual and social responsibilities were largely confined to participants with similar occupations and social class. Middle class parents and those with a science background were more likely to express beliefs that the control of bacterial resistance was an issue not just for government agencies. This finding is consistent with studies of health beliefs in the UK, which reported that working class mothers' hold more fatalistic views of ill health and lower levels of perceived personal responsibility when compared with middle class mothers, i.e. middle classes felt responsible.²⁰

Some believed that the repeated use of antibiotics has a negative impact, because of changes in the individuals' response to the antibiotic (their bodies 'got used to' antibiotics). Some informants of a quantitative pan-European survey indicated similar beliefs.¹⁰

Few participants in our study were aware of the importance of adherence to the optimal timing between doses as a way of reducing the risk of bacterial resistance. Adherence to the optimal intervals between doses has, however, only relatively recently been emphasized and depends on the nature of the infective microorganisms and the class of antibiotic.²

The ease with which resistant organisms are transmitted has made a major contribution to the problem of bacterial resistance. Hands are the primary mode for the transmission of some infections. The actual mutation of microbes, in comparison, is rare.² Reducing the spread of resistant infections is a national objective.¹⁸ However, very few participants volunteered the importance of simple hand washing in reducing the spread of infection, either in the home or while admitted to, or visiting, hospitals.

Participants did not perceive themselves at risk of contracting resistant infections in the community, despite emerging evidence that resistant infection in the community is common and increases morbidity. For example, antibiotic-resistant *Escherichia coli* urinary tract infections are common in the community and are associated with increased duration of symptoms and increased workload of general practitioners.²¹

Despite expressing few concerns about bacterial-resistance in general, some participants anticipated hospitalization with intense fear because of the threat of antibiotic-resistant infection while admitted. Public fear of hospitalization may now resemble anxieties during the 18th and 19th centuries, when hospitals were associated with death.²² Social historians tracing the development of modern medicine described how public views on hospitals were transformed through generations from suspicion to general acceptance, but recently, reports have indicated a growth in dissatisfaction with healthcare services in the UK.²³

Studies sampling people admitted to hospitals, however, have demonstrated relatively low levels of perceived vulnerability to resistant infections. A small quantitative survey of patients and visitors of a single hospital in the north of England reported that about a third felt that they might contract MRSA if admitted.¹⁶ Levels of perceived vulnerability are important as they influence health action and may motivate behavioural change and adherence.⁸⁻¹⁰ Realistic and appropriately channelled public concerns may have the potential to act as a powerful motivating force for engaging the public in the fight against resistant infections.

Health promotion campaigns focusing on other public health issues have found that simple practical advice influences public attitudes.^{24,25} Recent campaigns have aimed to reduce the use of antibiotics in minor respiratory tract infections by using simple messages.⁶

Conclusions and implications

Many participants in this study demonstrated misconceptions about resistant infections and a lack of individual ownership both of the cause and of the control of bacterial resistance. Although simple advice may influence knowledge, behavioural change is unlikely unless people have a clear sense of the importance of the change, value it and believe that they can make feasible, positive contributions. Campaigns aiming to engage the public in the fight against bacterial resistance could focus on three key elements: improving public understanding of the causes and consequences of resistance infections; raising the importance of bacterial resistance as a community issue and

convincing individuals, with specific messages, that they can feasibly make a valuable positive contribution.

Acknowledgements

We wish to thank the members of the public who participated in the study.

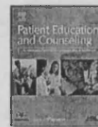
Professor R. Pill provided additional methodological guidance. Research costs were met by the Department of General Practice, Cardiff University. Contributors: C. C. B. conceived of the study and led the study team. All authors contributed to the study design, analysis and report writing. N. J. H. led the data collection and acts as guarantor. The South East Wales LREC confirmed that the study raised no ethical concerns and that a full ethical application was not required for this study.

Transparency declarations

None to declare.

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Antibiotics in the community: A typology of user behaviours

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Containing antibiotic resistance

ABSTRACT

Objectives: To contribute to achieving a deep understanding of lay beliefs about antibiotics and develop a typology of antibiotic user behaviours in the community.

Method: Qualitative semi-structured interview study with 32 women and 14 men, selected by both purposive and theoretical sampling, from areas of high, average and low deprivation.

Results: Respondents were highly confident about the efficacy and safety of antibiotics. Reported respondent antibiotic user behaviours fell into six types, those that: (1) always took antibiotics as prescribed; (2) could not take doses because of work, child care, or social constraints; (3) frequently forgot doses; (4) believed it made sense to stop taking antibiotics as they started to get better; (5) actively sought to limit antibiotic use because they believed their own bodies became used to them or because antibiotics are 'unnatural'; and (6) deliberately planned to stop early so as to have an antibiotic supply for self use in the future to avoid the challenges of consulting and obtaining antibiotics in primary care.

Conclusion: Members of the public are confident about the safety and efficacy of antibiotics. Most report taking antibiotics as prescribed, but there is a range of other unintentional and intentional characteristic non-adherent behaviours that require different solutions.

Practice implications: Promoting public engagement in the control of bacterial resistance through adherence to antibiotic regimes requires some interventions that address beliefs, others addressing forgetfulness, and others addressing practical barriers to adherence.

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1. Introduction

Bacterial resistance is a global problem affecting health care environments, communities, and the entire ecosystem [1]. Although mutation is a rare event, antibiotic use increases prevalence of resistant strains of bacteria, which can be aggravated by suboptimal dosing [2]. Initial efforts to control antibiotic use have focused on surveillance, reducing prescribing rates, and limiting the use of antibiotics in agriculture. Attention is now turning to promoting appropriate and safe consumption of antibiotics in the community [3].

There is a vast research literature on medicine taking and adherence, yet the majority of research has been conducted in relation to medicines for chronic medical conditions. Around one third to one half of all patients with a chronic condition fail to take their medications as directed by the prescribing clinician [4]. Non-compliance with medicine for chronic illnesses has been mostly

explained by theories of doctor–patient interaction, and patients' knowledge or beliefs about the treatment and the illness [5]. A meta-analysis has found non-adherence to antibiotic regimens to be 38% [6], similar to chronic illness medication non-adherence [4]. Direct comparisons between studies is, however, difficult because of varying definitions and ways of measuring adherence. Non-adherence to antibiotic regimes reduces the potential effectiveness of treatment, increases associated health care costs, and results in suboptimal drug concentrations [7]. Much of the research in medicine adherence has been conducted using quantitative methods. A meta-synthesis of qualitative research on medicine which focused mainly on chronic medication concluded that the main reason why people do not take their medication as prescribed is because of concerns over the medicine itself rather than due to failings in patients, health professionals or the system [8].

Suboptimal adherence to antibiotic therapy occurs in several ways: not starting a course of therapy, complete omission of doses, early cessation of therapy, errors in dose quantity, and inappropriate intervals between doses [3]. Self-medicating with antibiotics not prescribed by a clinician for that illness or individual can lead to the inappropriate antibiotic use and insufficient dosing or duration of therapy [9].

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The public, as the consumers of antibiotics, can contribute to the control of bacterial resistance by limiting their antibiotic use to situations where there is clear benefit, and by adhering to treatment regimes. Quantitative studies have investigated the extent of this problem and have correlated population characteristics with the use of antibiotics in communities [10,11]. A better understanding of factors influencing adherence decisions and reasons for modifying antibiotic regimes is needed in order to maximise the effectiveness of interventions aimed at optimising adherence with antibiotic regimes. This qualitative study aims to build on previous quantitative work to achieve a deeper understanding of the use of antibiotics in the community. We hoped that constructing a typology of characteristic antibiotic user behaviours in the community would inform the development of better targeted and more flexible interventions to promote appropriate antibiotic use in the community.

2. Methods

2.1. Study setting and sampling

We initially recruited a purposive sample of members of the community, aimed to capture maximum variation in views on antibiotics and their use. We hypothesized that these views would vary according to age, level of social deprivation and geographical context. Capturing variation in this way is important because it is likely that different generations have varying attitudes and experiences of antibiotics. In addition, socio-economic differences are known to influence beliefs and behaviour [12]. Based on the Townsend Scores of census data [13], we selected one deprived ward, one ward of average deprivation and one ward of low deprivation in each of these three areas. 46 respondents were recruited through community groups (such as adult education groups and parent and toddler groups) across three unitary authorities (one urban, one rural and one post-industrial) within South Wales. Following initial discussion with community group leaders, the interviewer (NH) attended group meetings and provided attendees with an information pack about the study. Those willing to participate were encouraged to return a signed reply form that provided their telephone contact details in the post to the research team. The interviewer subsequently phoned those returning an acceptance form to arrange a mutually convenient time for the interview. All respondents were aged over 18 years, and needed to be able to converse with the interviewer in English. There were no other inclusion or exclusion criteria.

After 21 interviews, category development convinced us that we had insufficient data from men and from areas of high deprivation. We therefore made particular efforts to recruit from these groups and widened recruitment areas to include an additional electoral ward with high deprivation. We considered this delayed theoretical sampling because the cases were selected according to their potential to facilitate the development of categories following initial purposive sampling [14]. This overall sample was also used to explore public views of bacterial resistance [15], but here we report on the development of a typology of antibiotic user behaviours.

2.2. Data collection

Semi-structured interviews lasting between 30 and 120 min were conducted in respondents' homes and one at a local community centre by the first author. All interviews were audio recorded and anonymised on transcription. The interview schedule is provided in Table 1. The interview was not based on a specific consultation for a respiratory tract infection, but

Table 1
Interview guide: questions exploring to attitudes to antibiotics

Do you have any ideas about when antibiotics are useful?	
Probes	Why would you take antibiotics? When are antibiotics helpful? Which types of illness? How do they work? What do they do?
Prompts	What different types of antibiotics are you aware of? Does the type of antibiotic matter? Do you think that they can kill the cause of the infection, aid immunity or get rid of the infection in some other way? Can antibiotics work against bacteria or viruses or both?
If you are prescribed antibiotics what do you do with them when you get home?	
Probes	How/when do you take them? How many tablets to you take and why? When do you stop taking them? Why? Do you manage to finish the full course? Why? Do you/have you ever shared them? Do you read the information leaflet? Do you keep some for another time/why/how/when?
Prompts	Do you take more, less or all the antibiotics instructed?
Are you aware of any disadvantages/side effects of taking antibiotics?	
Probes	Have you had any adverse reactions to antibiotics? Do you have any ideas about how or why these may occur?
Prompts	Have you heard of antibiotics leading to diarrhoea, sickness or rashes?
Definitions of probes and prompts	
Probes are open questions that enable further and deeper exploration of a concept or idea. They were used to rephrase questions in situations where the participant was unable to offer a response and/or to enable further exploration of something the participant had mentioned during the course of the interview	
Prompts provided participants with several response options following a question. They were used to enable participants to respond to questions they had been previously unable to answer. The aim being to trigger memory and to draw out ideas which participants may have been initially reluctant to share with the interviewer	

rather respondents drew on their experiences of a number of previous infections. Fully informed written consent was obtained prior to the interviews.

2.3. Analysis

Data transcripts were imported into a qualitative analysis software package which aids the management and indexing of qualitative data [16]. Transcripts were coded into categories and themes to develop a conceptual framework and typology of antibiotic adherence behaviour. We developed a typology by grouping together characteristic behaviours relating to antibiotic use. We refined the features of these types by comparing and developing their features. Reliability was explored through dual coding of 20% of the data. Coding discrepancies were resolved through discussion, and previously coded transcripts were reviewed iteratively as typologies developed. Data collection and analysis were conducted in parallel so that emerging hypotheses were repeatedly re-evaluated through subsequent interviewing and theoretical sampling. Unusual cases were identified and typologies were modified in light of such evidence. In order to support the representativeness of our results, this paper presents data using both data extracts (quotes) and data 'counts' of the number of respondents who provided similar responses [17]. We aimed to develop a typology where the categories were as mutually exclusive as possible. However, respondents were often allocated to more than one type as their reported adherence behaviour varied depending on factors such as the severity of the illness and whether they were giving antibiotics to a child or to themselves. Consequently the sum of the number of respondents in each category ($n = 74$) is greater than the number of respondents in the total sample ($n = 46$).

3. Results

3.1. Characteristics of respondents

We approached 37 community groups, were invited to attend 16, and handed out 283 information packs to adult attendees. Forty-six individuals agreed to participate, resulting in a response rate of 16%. Respondents were between 18–89 years and 70% were female. 63% were not employed at the time of the interviews, of whom 32% were mothers whose main occupation was to care for their children in the home and 3% were retired (Table 2).

3.2. Attitudes towards antibiotics

All respondents had used antibiotics and were generally confident in the efficacy and safety of antibiotics and unfamiliar with potential disadvantages or side effects. Antibiotics were described being able to promote rapid recovery from infection. Adjectives typically used to describe antibiotics were 'quick,' 'effective,' 'strong,' 'safe,' and 'life savers'. Analysis revealed six main types of antibiotic adherence behaviour, those that: (1) always took antibiotics as prescribed; (2) could not take doses because of work, child care, and social constraints; (3) frequently forgot doses; (4) believed it made sense to stop taking antibiotics as they started to get better; (5) actively sought to limit antibiotic use because they believed their own bodies became used to them or because antibiotics are 'unnatural'; and (6) deliberately planned to stop early so as to have an antibiotic supply for self use in the future to avoid the challenges of consulting in primary care. Table 3 summarises the typology of antibiotic user behaviour and typical groups describing the behaviour.

3.2.1. Taking antibiotics as prescribed

Fewer than half of the respondents reported always adhering to antibiotic regimes ($n = 17$). Respondents who fell into this group were generally confident in the efficacy and safety of antibiotics and unfamiliar with potential disadvantages or side effects. They were mostly older men and women. Antibiotics were described being able to promote rapid recovery from infection. Adjectives typically used to describe antibiotics were 'quick,' 'effective,' 'strong,' 'safe,' and 'life savers'. A few respondents did, however, suggest a lack of efficacy of antibiotics by reporting that they were sometimes 'not strong enough' or of the 'wrong' type ($n = 3$).

Table 2
Participants' characteristics

Area	Deprivation	Female	Male
Urban	High	6	1
	Average	4	0
	Low	3	4
	Total	13	5
Rural	High	0	0
	Average	8	1
	Low	4	0
	Total	12	1
Post-industrial	High	5	5
	Average	2	3
	Low	0	0
	Total	7	8
Age in years	18–25	8	5
	26–59	19	6
	≥60	5	3
	Total	32	14

P1: They get rid of what ever you have got, quickly and easily, and then you're better and they're marvellous things (64-year-old woman).

Clinicians' instructions were reported to positively influence adherence to antibiotic regimes. This was associated with a respect for medical authority, and perceptions of adherence as a moral prerequisite of good parenting.

P1: Because the doctor says take this course of antibiotics even if you feel better, please take whatever is left, so that what I always do (64-year-old woman).

P19: ... with the children we both make sure that they get their medicine we're always thinking what we shall do for the best, you know, to be a good parent (38-year-old woman).

Adhering to antibiotic regimes was also considered important because it was a way of optimising the effectiveness of treatment, particularly when the illness was perceived as severe. Individuals wanted to get well as quickly as possible. Following the expert's (clinician's) advice was seen as the best way to achieve this.

3.2.2. Unable to take doses because of work, child care, and social constraints

Some respondents indicated that, in principle, they wanted to adhere to treatment regimes but were unable to do so due to practical constraints ($n = 12$). Typical respondents describing this behaviour were young adults and individuals in paid employment. Some respondents discussed how work environments influenced adherence behaviour, remarking that it was not always possible to take antibiotics when at work due to, for example, the unavailability of a drink or not having access to the medication.

P13: I did have a couple of days when it was difficult fitting in doses because of the job I do (36-year-old woman).

Parents reported modifying children's antibiotic regimes because schools would not supervise their child's medication, and because they did not have confidence in child care workers' ability to safely administer medication to their child.

P33: When (name of child) was ill, a fortnight ago, I gave him his medicine on the Monday, Tuesday and Wednesday and I gave it to him three times a day. Then on the Thursday, when he goes to the child minder, I gave it to him in the morning and they were to give it to him in the afternoon but I wouldn't give them it. I wanted to keep it for me to give it to him myself. So for two days he only had it twice rather than three times but then he finished it then. But I just wanted to know that he had had it tidy (correctly). I mean I know that they would have given it to him but I just wanted to know that he had the right amount and he was ok, and within 2 days (after the course was intended to have been completed) he had finished it all off then (21-year-old mother).

Adherence behaviour was also occasionally influenced by the competing priority of their social life. A very small number of respondents adapted antibiotic regimes to enable them to participate in social activities, especially events involving alcohol consumption.

P17: When I was taking them, I was out all the time and drunk quite a lot so I never really could take them (34-year-old woman).

3.2.3. Frequently forgetting doses

Closely linked to work and social priorities was forgetting to take antibiotics. Many respondents aimed to follow instruction but forgot

Table 3
A typology of antibiotic user behaviour in the community

Characteristic pattern of antibiotic use	Comment	Number of respondents	Typical respondent
Generally use antibiotics as prescribed	Belief in the efficacy of antibiotics and respect for medical authority	17	Older men and women Age range 36–89 years Mean age = 56 years Median age = 56 years Recently employed 53%
Could not take all doses due to constraints of work, child care/school and social reasons	Missed doses were often regretted	12	Young adults and employed individuals with children in school or nursery Age range 21–38 years Mean age = 32 years Median age = 33 years Recently employed 58% Child in school/nursery 75%
Frequently forgot doses	Often blamed on busy life-style. Associated with minor infections with limited symptoms	19	Adults in employment Age range 21–56 years Mean age = 37 years Median age = 35 years Recently employed 79%
Stops taking antibiotics when symptoms improve	Assume there is no important benefit or harm from stopping antibiotics once feeling better	12	Younger adults Age range 18–34 years Mean age = 28 years Median age = 29 years Recently employed 58%
Actively sought to limit antibiotic use because of reservations about the nature and effects of antibiotics	Common beliefs that one's body gets used to antibiotics, making them less effective and that antibiotics are unnatural and may harm the body	11	Mostly parents of young children from affluent areas Age range 21–40 years Mean age = 33 years Median age = 33 years Recently employed 45% Child in school/nursery 55%
Deliberately stops taking antibiotics so to have a supply for self-initiated future use	Achieves a home supply to avoid the challenges of consulting in primary care	3	Young adults particularly from deprived areas Age range 18–21 years Mean age = 19 years Median age = 19 years Recently employed 33%

to take antibiotics because they were 'busy' ($n = 19$). In these cases, modifications to antibiotic regimes were unintentional. Typical respondents describing this behaviour were adults in employment.

P14: No routine really, lack of routine, no structure. I mean straight out after work and back to sleep, too tired and just taxing yourself too much really. They'd (antibiotics) be in your handbag and you'd just carry them around and then forget (38-year-old woman).

3.2.4. Feeling better

Decisions to stop antibiotic therapy early were often described as a response to 'feeling better' and a belief that the illness had been successfully treated ($n = 12$). In these cases respondents were not making a conscious attempt to reduce the amount of antibiotics consumed, but simply stopped taking them because they thought that they had recovered from the infection. Typical respondents describing this behaviour were younger adults.

NH: Did you manage to finish the course and take all the tablets?

P18: No (shaking head) half the time I don't.

NH: Why don't you manage to take those medicines?

P18: Well I don't know. I think I get better before they're finished. So it does help you. But they do say just to keep taking them, but I think what's the point of that? I'm feeling ok (18-year-old woman).

When asked what happen to the left-over antibiotics, the vast majority reported that they remained in a draw or cabinet until a later clear-out. The majority of people who stopped taking antibiotics early because they felt better had no intention of using 'leftover' antibiotics at a later date. Some, however, stated that they did self medicate with 'leftover' antibiotics (see Section 3.2.6).

P2: I've got several different ones in the cupboard, can't remember what they are.

NH: Do you keep them to use next time you are ill?

P2: No, not really, I just chuck them in there [cupboard] and eventually I'll throw them out. (30-year-old woman).

NH: Would you normally manage to finish the course of antibiotics?

P11: No

NH: And is there any reason why you wouldn't get to the end of the tablets?

P11: Well I suppose because I would be beginning to start to feel better, its like oh, don't bother now.

NH: What would you do then with the leftover ones?

P11: Keep them in the house because my mother would always take them for her chest. I'd just keep them and then if she needed them they would be there (18-year-old woman).

with antibiotics. For these individuals, self-medicating with antibiotics was dependent on having a supply of antibiotics in the home. Many respondents who had left-over antibiotics often had no intention of self-medicating at a later date (see Section 3.2.4), but a small minority of respondents reported that they deliberately stopped taking the course to 'save' antibiotics for future use ($n = 3$). When questioned about the reasons, they stated that having a supply of antibiotics in the home was advantageous because it meant that they would not need to consult a clinician in order to obtain antibiotics the next time they became unwell and felt they needed them. Typical respondents describing this behaviour were young adults, particularly from deprived areas.

P43: I keep them and use them now and again when I'm feeling ill (21 year old man).

Many respondents described problems with using health services ($n = 17$): long waits for appointments and long waits to be seen once they had arrived at surgeries, disappointment in the outcome of consultation (not receiving antibiotic medication), and a lack of confidence in clinicians. While these concerns were not always linked to intentional modification they were cited as relevant in a small minority of cases ($n = 3$).

3.2.5. Limiting antibiotic use because of concerns about the antibiotic

A few respondents, mostly parents of young children from affluent areas, expressed reservations about both medicines in general, and antibiotics in particular ($n = 11$). These respondents generally considered antibiotics as 'unnatural' and potentially harmful drugs and were to be avoided if at all possible. Two key beliefs emerged about how antibiotics help individuals recover from infections. These were either the antibiotics either killed or removed the cause of infection, and/or the antibiotic aided the body's immune response. Some respondents believed that if they were regularly exposed to antibiotics, their bodies might become used to antibiotics, consequently rendering antibiotics less effective. These respondents made intentional decisions to limit their consumption of antibiotics by shortening courses of therapy ($n = 9$) or not starting a course of antibiotics dispensed to them ($n = 2$). Shortening the duration of antibiotic therapy was perceived by respondents as enabling infection to be treated whilst simultaneously reducing potential risks to the body.

(Why would you stop antibiotics once the children appeared to be better?)

P33: I don't know really, because they all have their vaccinations. They have all been vaccinated; in fact I am very much for that. In fact I just don't like them having any (medicines) really. I do give them Calpol. I don't know I just don't like, it's a very personal thought of, well I don't like medicines anyway... I very rarely finish a course of antibiotics because I just think well I feel better so it must be all right, slightly more from that, I don't like them (21-year-old woman).

P12: If they advise them (antibiotics) then I ask if they're absolutely necessary. A few times I have questioned it because you see my doctor poo poos [dismisses] homeopathic remedies. He's given me antibiotics, well he's prescribed them and he's asked the chemist to give me the powdered amoxicillin, so for a few months I had the dried amoxicillin in the cupboard (35-year-old woman).

3.2.6. Deliberately stopping antibiotics early so as to have a supply for self use in the future

Accounts of illness behaviour indicated an overwhelming reliance on medicines. Most respondents self-medicated with over the counter medicines, but some reported self-medicating

4. Discussion and conclusion

4.1. Discussion

This in-depth qualitative exploration of public adherence to antibiotics identified six main types of antibiotic adherence behaviour and characteristics of respondents that typically mention each behaviour, those that: (1) always took antibiotics as prescribed (older adults); (2) missed some doses because of work, child care, social constraints (adults in employment and parents of children in childcare or school); (3) frequently forgot doses (adults in employment); (4) believed it made sense to stop taking antibiotics as they started to get better (younger adults); (5) actively sought to limit antibiotic use because they believed their own bodies became used to them or because antibiotics are 'unnatural' (parents of children mostly from affluent areas); and (6) deliberately planned to stop early so as to have an antibiotic supply for self use in the future to avoid the challenges of consulting in primary care (adults, particularly from deprived areas). Over a third of respondents reported that they always took antibiotics as directed by the clinician or pharmacist. The majority of respondents were positive about antibiotics, despite expressing uncertainty about when antibiotics are generally indicated and limited knowledge about potential side effects. Instruction from clinicians was the greatest reported positive influence on adherence. There were two types of non-adherence: intentional and unintentional. Unintentional non-adherence was influenced by constraints of work, child-care, school, and simply forgetting. Intentional non-adherence included early cessation of therapy, although the patient might not be conscious of the consequences of being non-adherent and/or the consequences of early quitting. Although we have classified these patients as intentionally non-adherent we acknowledge that the patients themselves may not see their behaviour as intentionally non-adherent. These patients assume there is no important benefit or harm from stopping antibiotics once feeling better. Some respondents made deliberate efforts to limit their antibiotic use because they believed antibiotics to be personally harmful. Shortening the duration of therapy was a fairly common strategy to reap the benefits of antibiotic therapy while minimising the harm. A small but important minority deliberately altered their treatment course

to enable them to self-medicate with 'saved' antibiotics at a later date. In three cases dissatisfaction and difficulties accessing health services influenced intentional modifications to antibiotics regimes.

The provision of explicit instruction positively influences antibiotic adherence in acute illness [18], and our findings confirmed that clinicians' instructions positively influence adherence behaviour. The social psychology of conformity supports ideas that the authoritarian nature of instruction makes it a more powerful mediator of behaviour than information alone [19]. Although clinicians' instructions were a key influence on adherence, not all respondents were encouraged to adhere to antibiotics regimes simply because the clinician told them to do so. This may reflect the changing nature of the relationship between the public and medical professional. Recent accounts suggest that the public have begun to move from a state of dependence and acceptance of medical authority to one of scepticism, perhaps as a result of increased access to medical knowledge via other routes and a rise in consumerism within the United Kingdom (UK) National Health Service [20].

However, there are other factors that affected unintentional antibiotic non-adherence. Working environments influence adherence as do restrictions placed on medicine consumption within schools. Ways of supporting adherence to antibiotic regimes, especially in day care and educational institutions need developing. The influence of daily responsibilities and demands made on individuals (including social activities) suggests that maintaining a 'normal life' takes precedence over treatment regimes in acute illness just as it does in chronic illness [4]. Treatment may be abandoned completely, or in part, if it cannot be accommodated within an individual's daily life. Prioritising the needs of social situations above adherence also suggest that adherence was not perceived as particularly important, perhaps because respondents did not believe that antibiotics were going to work or that individuals did not consider the illness severe enough to prioritise antibiotic consumption.

Forgetfulness may be an unavoidable aspect of human nature, but messages perceived as unimportant are less likely to be recalled [4]. Forgetting to take antibiotics may suggest that patients have also forgotten that they are, or were, acutely ill, an indication that perhaps their illness might not have been serious enough to warrant antibiotics, or that their condition had improved to the point that antibiotics therapy was no longer necessary.

Early cessation of therapy has been associated with lay perceptions of recovery from illness in other studies [4]. There is some evidence that shorter antibiotic courses can reduce antibiotic resistance [21], but the current advice to patients is to complete the course, regardless of recovery.

Reservations about antibiotics led to modification in treatment regimes as individuals attempted to limit their antibiotic consumption. This may be explained by two factors. Firstly, there has been a general growth in the popularity of complementary and alternative medicines and growing scepticism in modern medicines [22]. Reservations about antibiotics may have also been driven by recent health education campaigns aimed at reducing antibiotic use. The 'Andybiotic' campaign used phrases such as 'Antibiotics-Don't wear me out' [23]. These messages may have been misinterpreted by the public, with people coming to believe that taking antibiotics causes their own bodies to become 'used to antibiotics' and so making antibiotics ineffective (wearing the individual out, as opposed to wearing the effectiveness of the antibiotic out). Such messages may therefore contribute to concerns about personal overuse of antibiotics and ultimately to low adherence to antibiotic regimes.

Self-care is an integral part of society's response to ill health and self-medication is central to the self-care of minor illness [24]. UK national health policy has recently promoted the general principle of self-care with over the counter medicines in order to reduce consultations in primary care for minor illness [25]. Self-medication with antibiotics is, however, a particular concern because it is likely to result in suboptimal dosing and duration of treatment which can contribute to selection of resistant strains of bacteria [1]. This study has shown that self-medication with antibiotics is driven by beliefs in the safety and efficacy of antibiotics and a reliance on medicines. In a small number of cases self-medication with antibiotics was also influenced by difficulties in accessing health care and associated with efforts to avoid consulting a clinician. Encouraging self-care and discouraging consultation for acute infections, alongside difficulties accessing health care may have some unanticipated disadvantages in relation to antibiotic use.

Although the study was conducted in South East Wales, respondents' beliefs and experiences are unlikely to be significantly different to other parts of the UK. Variation in beliefs and knowledge between countries is an important topic that is being addressed by the authors in a current cross-national study of antibiotic use in the community [26]. Our sample included a high proportion of unemployed individuals, although over half of these respondents were either parents who work in the home or are retired. The relatively high proportion of unemployed respondents in the sample is likely to be due to both the recruitment method (via day-time community groups), and response bias as unemployed people are perhaps more willing to give their time to research. A further limitation is that, as with all interview studies, participants may have chosen to present a 'public account' [27] of their views and opinions which would reflect them in a favourable light. For example, non-adherence and self-medication with antibiotics may be under-reported.

4.2. Conclusion

Members of the public are confident about the safety and efficacy of antibiotics. Most report taking antibiotics as prescribed, but there is a range of other unintentional and intentional characteristic non-adherent behaviours that require different solutions. Previous surveys have reported public uncertainty and confusion about when antibiotics can be effective [6,10]. In the study reported here many respondents were uncertain about how antibiotics work, yet most felt confident about the efficacy and safety of antibiotics. Our results contrast with a recent meta-analysis of primarily chronic medications where concern about the medication itself was the main reason for non-adherence [8]. For acute medications, factors such as forgetfulness, constraints of work, school, child day care, and social priorities, as well as a belief that antibiotics were simply no longer required, appeared to be more salient reasons for non-adherence than concerns over the medicine itself.

4.3. Practice implications

Reducing intentional modifications to antibiotic treatment regimes will require a different approach to behaviour change than unintentional non-adherence. There seems to be little value in providing additional reminders for patients to take medication at specific times if they omit doses because they actively plan to limit antibiotic use. Unintentional non-adherence may be improved through interventions that focus on lay beliefs about antibiotics and making it easier for people to use antibiotics as prescribed. There may also be scope to develop the use of

reminders (for example, electronic text based, or fridge magnet) to address problems of forgetfulness particularly for patients who are easily distracted by their busy lives. Campaigns aiming to reduce intentional non-adherence need to address reliance on antibiotics and focus on better information provision by clinicians and pharmacists which addresses lay beliefs about how antibiotics work. Developments in the organisation and delivery of care should evaluate supporting self-care whilst simultaneously ensuring the safe and appropriate use of antibiotics in the community.

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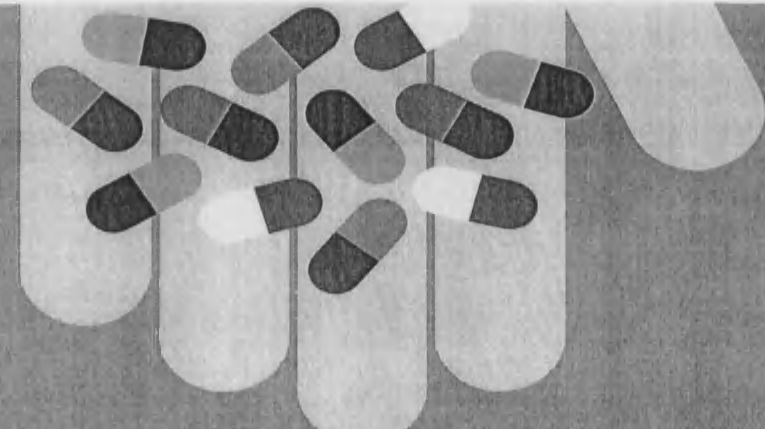
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Appendix 15:A poster from the : ‘Getting Better without antibiotics’ campaign



**UNFORTUNATELY,
NO AMOUNT
OF ANTIBIOTICS
WILL GET RID
OF YOUR COLD.**

Antibiotics don't work on colds, most coughs or sore throats. The best way to treat them is plenty of fluids and rest. Taking antibiotics kills your good bacteria and can lead to antibiotic resistance. For more information talk to your pharmacist or go to www.nhs.uk/antibiotics



(DoH, 2008)