Medicines Management in Older People: An Action Research Study in a Hospital Setting

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Abstract

A prescribed medicine is the most frequent treatment provided for patients in the NHS. The safe and effective management of medicines is therefore central to the quality of health care. In 2003, 21% of the population of England were aged 60 or more, and this will continue to increase. Increased morbidity in the elderly, coupled with the growing elderly population, has profound implications for the use of medicines. Almost 60% of prescriptions are for older people. Government objectives are to ensure that older people gain the maximum benefit from their medication to maintain or increase their quality and duration of life, and that they do not suffer unnecessarily from illness caused by excessive, inappropriate, or inadequate consumption of medicines. However, despite national guidance and standards, patients often do not get the best from their medicines, and may suffer avoidable adverse effects.

Using an action research approach, I therefore explored the use of medicines in older people in a hospital setting, elicited the views of patients and staff on the use of medicines and identified how the management of medicines, and hence patient care, can be improved. The research comprised four phases. Phase one aimed to establish an understanding of the health care environment within which the study would be conducted, in particular, the nature of patient care in different specialties and settings; the culture relating to therapeutics within the trust; current practice and standards of care relating to medicines; problems relating to medicines use; and attitudes to change in these areas. Phase two reflected on emerging themes and identified key issues in the use of medicines. In phase three I developed and implemented a new model of care in the study Trust, and in phase four I evaluated the model in the study setting and explored issues which would influence its adoption throughout the Trust. The methodologies used included ethnography, participant observation, case studies, an evaluative study and focus groups and interviews with patients and staff.

The study identified several serious issues concerning patient safety, the culture relating to medicines, inefficiency and competency of professionals. Medication errors occurred frequently and were rarely reported. Patients were frequently admitted to hospital because of medication problems and readmissions occurred because of problems with discharge medication. Drug therapy was poorly documented in patient notes and communication with GPs about medicines and treatment plans was rarely comprehensive. Inefficiencies in medicines management impaired patient care and caused waste. Delays in supplying medicines lead to patients missing doses, often for several days.

Medicines were not viewed as an important part of patient care and, while hospital staff acknowledged the shortcomings, these were often viewed as inevitable and not a priority for improvement. Staff, particularly junior doctors and nurses, sometimes lacked essential competencies in medicinal therapeutics.

I therefore implemented a model of pharmacy practice, fully integrated within the health care team, which included comprehensive drug histories on admission, systematic medication reviews throughout hospital stay, patient education and advice, advice to medical and nursing staff, enhanced communication with primary care teams and discharge planning. As a result, errors and omissions in patients' medication were significantly reduced. The quality of information provided to patients and general practitioners at discharge was enhanced. Adverse drug reactions were identified and avoided. Evidence-based, appropriate prescribing was ensured in study patients. Interviews with patients demonstrated increased satisfaction with their care.

This study was undertaken in a particular hospital setting and results cannot be generalised. The nature and level of medicines management in hospitals varies widely and many hospitals have successfully implemented elements of the model described here. Nevertheless, there is no reason to believe that the study Trust is unique. Many Trusts display similar shortcomings in their current approach to therapeutics, and in the apparent obstacles to achieving change. My findings, supported by the literature, indicate that these hospitals will find change difficult to achieve. The evidence suggests that pharmacy staff

themselves may represent the biggest obstacle (rather than lack of resources, frequently cited as a barrier to progress). Pharmacists need to have confidence in their clinical skills, to secure the support of other clinical staff, and to be committed to improving services to patients. Pharmacy managers must exercise clinical leadership and advocacy in articulating the need for change and the benefits for patients and the organisation. The evidence shows that resources will then invariably follow.

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1. CHAPTER 1 - INTRODUCTION

The safe and effective management of medicines is central to the quality of health care. A prescribed medicine is the most frequent treatment provided for patients in the NHS. Nearly all patients are given medication as a result of a visit to hospital, with 7,000 individual doses administered daily in a 'typical' hospital and up to 40% of nurses' time spent administering medicines (Audit Commission, 2001). An estimated 200 million prescriptions are issued in hospitals each year and General Practitioners (GPs) in England issued 650 million prescriptions in 2003 at a cost of £7.5 billion. The total cost of medicines in all sectors of the NHS is estimated to be £10 billion per annum.

In 2003, 21% of the population of England were aged 60 or more, and this will continue to increase (Department of Health, 2001a, Department of Health, 2004a). The increasing burden of illness among the elderly means older people have a much greater need for health and social services than the young, therefore the bulk of health and social care resources are directed at their needs. Almost two thirds of general and acute hospital beds are used by people over 65 years. There were 404 finished consultant episodes (FCEs) per 1000 population aged 60-74 in 2003-04, compared with 261 for all ages. This increased to 735 FCEs per 1000 in people aged 75-84 or more (Department of Health, 2004a).

Increased morbidity in the elderly, coupled with the growing elderly population, has profound implications for the use of medicines. In 2003 almost 60% of prescriptions were for older people (as defined by prescription charge exemption status: women aged 60 and men aged 65) who received on average 35 prescriptions per head compared with 13.1 for all ages and 7.7 for people aged 16-59 (Department of Health, 2004b). Four in five people over 75 years old take more than one medication, with 36% taking four or more (Health Survey for England 1998. Volume 1: Findings).

The Government is committed to raising the quality of service and reducing variations in delivery within the NHS and a policy framework is set out in the NHS Plan, National Service Frameworks and the Programme for Pharmacy in the NHS (Department of Health, 2001b, Department of Health, 2001a, Department of Health, 2001c, Department of Health, 2001d, Department of

Health, 2000b, Department of Health, 2000a, Department of Health, 1999a, Department of Health, 2000c). A statement of good practice is set out in the National Service Framework for older people. Its objectives are to ensure that older people gain the maximum benefit from their medication to maintain or increase their quality and duration of life, and that they do not suffer unnecessarily from illness caused by excessive, inappropriate, or inadequate consumption of medicines.

Despite guidance and standards set by the Government, often patients do not get the best from their medicines, and suffer unnecessarily. Within this study I attempt to identify how the management of medicines in hospitals, and hence patient care, can be improved.

In chapter 2, I give an overview of the literature relating to this research beginning, in section 2.1 with some background regarding myself and why I embarked on this research. In 2.2, I discuss literature regarding adverse drug events and I examine issues concerning the competencies of health care professionals in therapeutics in section 2.3. I then explore literature relating to communication between primary and secondary care in section 2.4 and in section 2.5 examine the literature relating to patient education about their medicines and compliance. In section 2.6, I discuss the way forward in enhancing patient care with respect to medicines, in particular the Government's position and the role pharmacists have in this. Finally in section 2.7, I present literature to provide a background and rationale to the methodologies employed in this study.

In chapter 3, I present the 'preliminary phase' of this project, methods 1 and results 1. This chapter describes the first two phases of the research, phase 1, an initial phase to gain an understanding of the problems relating to medicines in the study Trust. This involved gathering and analysis of preliminary data. Phase 2 of the project involved reflection on emerging themes and identification of key issues relating to the use of medicines. In section 3.2, I describe the overall approach used for this study then in 3.3 describe the setting. In 3.4, I describe the methods used for data collection in this preliminary investigation

and in section 3.6, I present the results, which include a selection of case summaries.

In chapter 4, I present the 'implementation and evaluative phase' of the project, methods 2 and results 2. This chapter describes the final two phases of the research phase 3, development and implementation of a new model of care providing a more patient focussed approach to pharmacy services and phase 4, evaluation of the model in the study setting and exploration of issues, which would influence adoption throughout the study Trust. In section 4.2, I describe the new model of care, how this was implemented in the study Trust, and the methods used for evaluation. Finally, in section 4.3, I present the results from the evaluative study.

Finally, in chapter 5, I summarise and discuss the main findings from this study. In section 5.2 the main findings are summarised then in section 5.3, I relate my findings to existing literature. In section 5.4, I explore the challenges, and limitations and strengths within the study and in section 5.5, I discuss the implications for future research. Finally in section 5.6, I talk about the implications my study has for future practice within the study Trust and beyond.

2. CHAPTER 2 – LITERATURE REVIEW

2.1. INTRODUCTION

Although considerable efforts have been made to improve quality of care within the NHS, failures to deliver safe and effective drug therapy often result in poor clinical outcomes and economic consequences.

In this literature review, I will outline some the issues relating to medicines use in the health care setting. Following on from this I will consider the role pharmacy staff have in the management of medicines and patient care, and will evaluate evidence relating to this. Finally I will give a theoretical discussion of the methods employed in this study and the rationale for them. I begin with my personal background and interest in the subject.

2.1.1. My background

I have been practising as a pharmacist since 1997, primarily working in hospitals in the North of England. I undertook my pre-registration training and worked as a basic grade pharmacist at a large teaching hospital, working here for a total of 21 months. As a basic grade pharmacist, my job involved participation in dispensary services, sterile and non-sterile manufacturing, cytotoxic and central intravenous antibiotics services, and drug information. I was also involved in co-ordination of clinical trials and provision of education and training for student technicians and pre-registration pharmacists. Whilst working at this hospital I gained some experience of working on wards through provision of clinical pharmacy service to neurology, general paediatric and paediatric oncology wards.

I then worked in another large teaching hospital as a C grade pharmacist for 3 years and my job was primarily clinical, providing ward based pharmacy services to neonatal and paediatric departments, and a neuro-rehabilitation department. This clinical pharmacy service included attendance at Consultant ward rounds, providing therapeutic advice for doctors, nurses and patients, monitoring prescribing and development of evidence-based treatment guidelines. Whilst working at this hospital I also provided anticoagulant management services, provided education and training for pharmacy, nursing,

and medical staff both in-house and externally, and provided support for drug information and manufacturing services.

As a practising pharmacist I thought that, sometimes people seemed to receive poor standards of care with respect to their medication, and medication related problems frequently occurred. For example I observed that patients sometimes didn't receive their usual medication in hospital for various reasons. I found that mistakes occur and the attitudes of doctors and nurse seemed to be blasé. I encountered people admitted to hospital because they appeared to be suffering adverse reactions from medication. In my experience patients often seemed not to be given sufficient information about their medication. Communication relating to drug therapy across the primary secondary care interface appeared to me to be poor and this led to problems in continuity of care. Problems relating to medication, in my experience, resulted in readmission of patients to hospital. These observations drew me to the research idea and my experience is mirrored in the literature, which I now discuss.

My strategy for the literature review encompassed searches of the Medline and Cochrane databases, together with specific searching in relevant journals, for example the British Medical Journal, Quality and Safety in Healthcare and Journal of Advanced Nursing through their websites. I searched under a number of relevant key words grouped within the broad headings of adverse events, learning from adverse events, health professionals' competency in therapeutics, communications, patient education and compliance and action research methodologies. I also undertook hand searching of relevant texts and government documents. I did not impose any date restrictions on the searches.

2.2. ADVERSE EVENTS RELATING TO MEDICINES

In this section I will talk about adverse drug events starting with a description of the concept of medication errors in 2.2.1 and adverse drug reactions in 2.2.2, then going on to discuss their incidence in 2.2.3. I will also in this section outline the human and financial implications, which include harm to patients and sometimes death, distress for relatives, expense and waste for the NHS and anguish for the health professionals involved. In section 2.2.4 I examine the causes of medication errors, discussing firstly in section 2.2.4.1 approaches to looking at errors and their causes for example, the person centred approach and the system approach to human error then moving on to talk about the 'Swiss cheese' model of accidents. Prescribing errors are the most frequent and probably the most serious form of medication error, which I discuss in section 2.2.4.2; dispensing errors occur less frequently which I talk about in section 2.2.4.3, but administration errors, described in section 2.2.4.4, occur more often and can be due to a number of causes which include poorly written prescriptions, inadequate labelling , transcriptions errors, drug name confusion, incorrect dose calculation and inadequately trained personnel. I then go on to consider medication errors in specific patient groups, particularly people with allergies, seriously ill people and children, in section 2.2.4.5. In section 2.2.5 I consider some of the factors which influence the ability of organisations to learn from failure discussing the cyclical process of learning in section 2.2.5.1, barriers to learning in section 2.2.5.2 and how these can be overcome in section 2.2.5.3. Finally, in section 2.2.6 I outline the Governments commitment to improve patient safety with particular reference to documents such as, *'An organisation with a memory', 'Building a Safer NHS for patients: implementing an organisation with a memory', 'Building a safer NHS for patients: improving medication safety'* and guidance issued for safe administration of intrathecal chemotherapy. I also outline the work of the recently established National Patient Safety Agency (NPSA).

Every day patients are being injured because of unwanted effects of medicines such as side effects or adverse drug reactions, or through medication errors. Such injuries occur relatively frequently and many are avoidable. Many adverse drug reactions are predictable and can be avoided or minimised; however,

some are unpredictable and therefore unavoidable. Medication errors, in contrast, can always be avoided.

2.2.1. Medication errors

Patient safety and medication errors have become a major concern for the public, government and for the professions concerned. Medication errors are probably the most prevalent form of medical error and there is evidence that they occur in all healthcare settings (Department of Health, 2000d, Leape *et al.*, 1991). In many countries of the world, medication errors account for about a quarter of all patient safety issues (Department of Health, 2001e).

A medication error has been defined as:

> *"Any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of health professional, patient or consumer"* (National Coordinating Council for Medication Error Reporting and Prevention.)

Medication errors may be related to professional practice, products, procedures, environments or systems including prescribing; ordering; dispensing and distribution; preparation and administration; labelling, packaging and nomenclature; education and communication; or use and monitoring of treatment.

2.2.2. Adverse drug reactions

An adverse drug reaction (ADR) has been defined by the World Health Organisation (WHO) as:

> *"Any response to a drug which is noxious, unintended and occurs at doses used for prophylaxis, diagnosis or therapy" (World Health Organisation, 1970).*

ADRs can be separated into two categories (Rawlins and Thompson, 1991). Type A reactions are usually predictable from the pharmacology of a drug and are augmented responses to drugs which tend to be dose dependent. Type B reactions are bizarre effects that are unpredictable on the basis of a drug's

pharmacology. Type B reactions are generally unrelated to dose and although comparatively rare, they often cause serious illness and death. They are generally due to hypersensitivity or an 'idiosyncratic' mechanism.

2.2.3. Medication error and adverse drug reactions: incidence, human and financial implications

Much of the academic literature comes from overseas and although it is accepted that these findings can be transferred to the UK, there is relatively little reliable information to quantify the problem of adverse events in the NHS.

Data from the Medicines Control Agency indicate nearly 10,000 hospital patients each year have serious adverse reactions to drugs (Department of Health, 2000d). ADRs cause significant morbidity and mortality and account for approximately 5% of all admissions to hospital (Einarson, 1993). ADRs are implicated in up to 17% of hospital admissions of older people (Cunningham *et al.*, 1997, Mannesse *et al.*, 2000), and whilst in hospital up to 17% of older in-patients experience ADRs (Mannesse *et al.*, 1997). Almost 7% of hospital patients suffer serious ADRs and 0.3% suffer fatal ADRs (Lazarou *et al.*, 1998). ADRs increase the length of hospital stay and costs, may result in increased frequency of GP consultations and delay the improvement of symptoms (Audit Commission, 2001).

Because of low reporting rates the incidence of medication errors in the NHS, however, is unknown. There are various reasons behind under reporting, for example, errors may be intercepted before reaching the patient and some errors may be unnoticed. Errors, which result in harm or injury to patients, are more likely to be reported than those where the patient has not come to any harm. Because of the fear of discipline, there may be a tendency not to report 'near misses' or potential errors and a failure to report errors which are considered to be 'minor'.

Retrospective studies of case records in the United States and Australia have revealed a substantial rate of adverse events in hospital practice.

Brennan *et al* reviewed the medical charts of 30,121 patients admitted to 51 acute care hospitals in New York state in 1984 and identified adverse events in 3.7% and, of these, 14% died (Brennan *et al.*, 1991, Leape *et al.*, 1991). Adverse events that were due to drugs were the commonest type (19% of all adverse events identified), occurring in 0.7% of *all* patients admitted.

In the Quality in Australian Healthcare Study, (Wilson *et al.*, 1995), a population based study modelled on the Harvard study, investigators reviewed the medical records of 14, 179 admissions to 28 hospitals in New South Wales and South Australia in 1995. An adverse event occurred in 16.6% of admissions, half of which were considered preventable. Of these adverse events 77% resulted in disability that resolved within 12 months, but in 14% the disability was permanent and in 5% the patient died; 51% of adverse events were considered to have been preventable. Adverse events were estimated to account for 8% of hospital bed-days and to cost the Australian healthcare system $4.7 billion a year. The proportion of adverse events due to drugs was not reported (Wilson *et al.*, 1999). In Australia the higher rate of adverse events was attributed in part to methodological differences between the two studies but a real difference in rates of injuries between the two populations could not be excluded (Weingart *et al.*, 2000).

Similar rates to the Harvard study were found in a more recent replication of the Harvard study in Colorado and Utah (Thomas *et al.*, 2000), with adverse events occurring in 3% of hospital admissions. Adverse drug events were the leading cause of non-operative adverse events accounting for 19% of all adverse events. Over one third of adverse drug events were preventable and 10% resulted in permanent disability. Preventable adverse events were more common among elderly patients and the authors suggest this is probably because of the complexity of their care (Thomas and Brennan, 2000).

The Harvard investigators defined adverse events stringently, using disability and injury as prerequisites. This underestimates the error rate as many errors don't produce injury because they are caught in time, the patient is resilient, or because of good fortune.

Moving beyond simply reviewing patients records, in comparison, Bates *et al* used both record review and prompted self-reports from clinicians, and found that adverse drug events occurred among 6.5% and potential adverse drug events occurred among 5.5% of 4031 adult patients admitted to two teaching hospitals in Boston over a 6 month period (Bates *et al.*, 1995b). Of the adverse drug events, 28% were due to errors, making the rate of serious medication errors (that is, preventable adverse drug events plus potential adverse drug events) 7.3%. This is a much higher rate than the 0.7% rate of the Harvard study's review of medical records.

In a prospective study in the United States, 256 elderly patients, aged 65 years or over, were interviewed one month after discharge, following a medical hospitalisation (Gray *et al.*, 1999), 20% were found to have suffered an adverse drug event within one month following discharge and individuals at particular risk were those with lower cognition who were discharged with several new medications.

A small-scale pilot study of hospital in-patients in London indicates a similar incidence of adverse events in the UK (Vincent *et al.*, 2001). In their study of over 1000 records in two acute hospitals, Vincent *et al* found that almost 11% of patients experienced an adverse event, over half of which were deemed preventable, adding a mean 8.5 days in hospital with additional costs of £290,000. More worryingly, at least a third of these events led to disability or death. 12% of adverse effects were related to medicines use. This was a pilot study but there is no reason to believe that the results are unrepresentative and if extrapolated to the NHS in England adverse event generate up £2 billion direct costs per year in additional bed days. This is in addition to the costs of litigation, staff time, impact on patients and staff, and the wider economic consequences.

Intravenous medication errors occur frequently and are associated with considerable harm. In a study on 10 wards in two UK hospitals, Taxis and Barber found that errors occurred in almost half the IV drug preparations and administrations, 1% of which were severe, 29% had potentially moderate consequences and 19% had potentially minor consequences (Taxis and Barber,

2003). Similar rates have been reported in other studies (O'Hare *et al.*, 1995, Hartley and Dhillon, 1998, Wirtz *et al.*, 2003).

In the US it is estimated that medication errors kill 7000 patients each year (an equivalent figure in the UK would be 1500 deaths), and the number of deaths because of medication errors and adverse effects of medicines used in hospitals increased from 2,876 in 1983 to 7,391 in 1993 (Phillips DP *et al.*, 1998). The Adverse Drug Event Prevention Study Group in the US reported that 1.8% of admissions result in harmful medication errors (Leape *et al.*, 1995).

It is claimed that there is also evidence of an upward trend in the UK and in 2000 there were nearly 1100 deaths in England and Wales due to medication errors or adverse reactions to medicines, 5 times more than in 1990, see figure 2.1 (Audit Commission, 2001). This data is based on an analysis of International Classification of Disease (ICD) codes. Previous reports of increases in medication related deaths using ICD codes have been criticised due to uncertainty of coding classification. In 1995 -1996 the ICD-9 coding system was changed to ICD-10, raising the possibility that coding changes have contributed to the observed increase in deaths (Cox and Marriott, 2002). The incidence of ADRs in the literature has remained fairly constant over the years which casts further doubt on the reported surge in medication related deaths. However, ICD codes poorly detect adverse drug events, as diagnoses may be inaccurate, and since physicians may consider they are used only for administrative purposes, they may be less concerned with accurate recording of ICD codes (Cox A R *et al.*, 2001). It is therefore uncertain whether there has been an upward trend in medication related deaths.

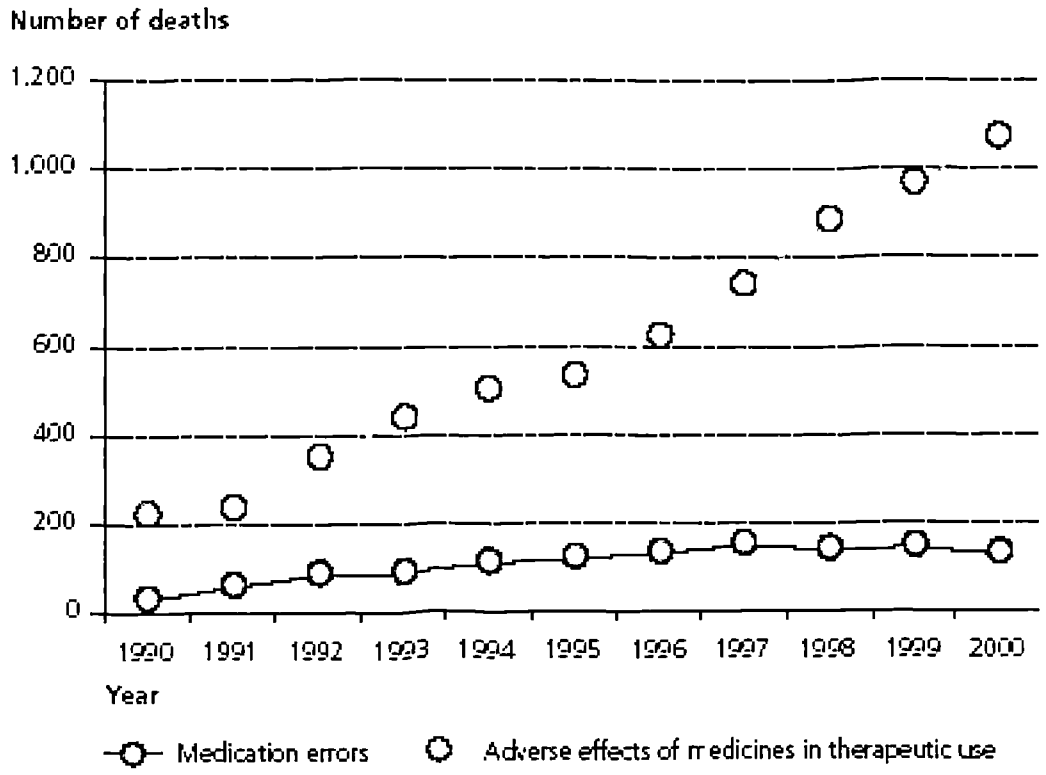
Despite the fact that ADRs account for up to 5% of hospital admissions, estimates indicate that only 6.3% of reportable ADRs are submitted to the Committee of Safety of Medicines (CSM) yellow card scheme (Smith *et al.*, 1996). The perceived seriousness of an ADR is one factor influencing the decision to report, but serious well known reactions are often not reported.

Therefore the incidence of medication related deaths in the Audit Commission report may be a severe underestimate. The true extent of medication errors

and adverse drug events is unknown because of inadequate definitions and different reporting arrangements. The Audit Commission reported that only one hospital from the 26 visited had a comprehensive error and near miss reporting system in place (Audit Commission, 2001).

The National Patient Safety Agency (NPSA), a special health authority, has been established to collect and analyse information from NHS organisations, assimilate data relating to patient safety from reporting systems and feedback lessons learned into service delivery (National Patient Safety Agency 2003. Business Plan 2003-2004.). By the end of March 2001, the Agency had completed a study, working with 28 pilot NHS Trusts and based on the Department of Health's guidance set out in *Doing Less Harm*, to test the feasibility of collecting, recording and analysing 'near miss' and adverse incident data that involved actual or potential harm to NHS patients. During this pilot study 9% of incidents reported involved medicines (National Patient Safety Agency 2003. Report of pilot data audit.).

Figure 2.1 The number of deaths in England and Wales from medication errors and the adverse effects of medicines, 1990 to 2000 (Source: ICD-9 and ICD-10 data) (Audit Commission, 2001).



Medication errors lead to great personal misery and injury, diminish public confidence, and are expensive and wasteful for the National Health Service. They are an important cause of morbidity and account for one-fifth of deaths due to all types of adverse event in hospital (Ferner and Whittington, 1994). If a doctor is grossly negligent and the patient dies as a result, the doctor can be charged with manslaughter. Ferner (2000) described 17 cases involving 21 doctors accused of manslaughter after deaths due to errors in drug treatment or anaesthesia in the UK between 1970 and 1999.

Whilst the primary concern must of course be the human cost, the financial costs of adverse events are alarming. Litigation claims cost the NHS £400 million in 1998/1999 in addition to an estimated £2.4 billion for existing and expected claims (Department of Health, 2000d). One-fifth of all clinical negligence litigation stems from hospital medication errors.

Medical Defence Union data show that one-quarter of all indemnity paid out following litigation claims after adverse events in general practice results from medication errors. Between 1995 and 2001 the Medical Defence Union handled 216 claims against GPs that were directly related to errors in prescribing, monitoring or administering medicines, (Medical Defence Union, 2001), and of 1000 claims to the Medical Protection Society, almost 20% arose from medication errors (Medical Protection Society, 2001). It is estimated that medication errors alone cost the NHS about £500 million a year in additional days spent in hospital (Department of Health, 2001e). To this must be added the unknown cost of errors in primary care and community care, along with indirect costs such as those arising from litigation. The potential savings from reducing serious medication errors are substantial (Department of Health, 2004c).

Data suggest that adverse drug events are a major international problem, with huge human and financial implications. It is therefore vital that health care organisations address these avoidable failures to maximise patient safety and minimise waste, and research such as this study is a prerequisite to this.

2.2.4. Causes of medication errors

Humans make mistakes in healthcare as in any other field, and individuals must sometimes be held accountable for their actions, in particular if there is evidence of gross negligence or recklessness. In the great majority of cases however, the causes of failures stretch far beyond the actions of individuals immediately involved. In the complex environment of healthcare, numerous factors contribute to failures in the service. Activity aimed at learning from and preventing failures to improve patient safety needs to address their wider causes.

2.2.4.1. Approaches to examining errors

In this section I look at some approaches to looking at the causes of errors and classification of errors in general, in particular human error which can be viewed using the person centred approach or the system approach, and then I discuss the 'Swiss cheese' model of examining accidents.

2.2.4.1.1. Human error

Human error may sometimes be the factor that immediately precipitates a serious failure, but there are usually deeper, systemic factors at work which if addressed would have prevented the error or acted as a safety-net to mitigate its consequences. There are two ways of viewing human error: the *person centred approach* and the *system approach* (Reason, 2000).

The *person centred approach* remains the dominant tradition within medicine, as elsewhere, and focuses on errors made by individuals. It centres on the psychological precursors to errors, such as forgetfulness, inattention, carelessness, poor motivation, negligence and recklessness. Counter-measures are aimed at individuals rather than situations and these invariably fall within the "control" paradigm of management. Reactions tend to be disciplinary measures, writing more procedures to guide individual behaviour or naming, blaming and shaming. Followers of this approach tend to treat errors as moral issues, assuming that bad things happen to bad people, what psychologists have called the just world hypothesis (Lerner, 1970). A serious weakness of the person approach is that by focusing on the individual origins of

error it isolates unsafe acts from their system context. As a result, two important features of human error tend to be overlooked. Firstly, the best people can make the worst mistakes - error is not the monopoly of an unfortunate few. Secondly, far from being random, errors tend to fall into recurrent patterns. The same set of circumstances can provoke similar errors, regardless of the people involved (Reason, 2000). The *systems approach* takes a holistic approach to failures, recognising that many of the problems facing organisations are complex, ill-defined and result from the interaction of a number of factors. It accepts that humans are fallible and therefore errors are inevitable, even in the best run organisations (Kohn *et al.*, 2000). Errors are seen as being shaped and 'provoked' by 'upstream' factors which include the organisation's strategy, its culture and the approach of management to risk and uncertainty. Countermeasures are based on the assumption that though we cannot change the human condition, we can change the conditions under which humans work to make them less error provoking. Rather than focusing on the individual it concentrates on how and why did the defences fail and what factors helped to create the conditions in which the errors occurred. Understanding the factors that contribute to errors enables system defences to be developed in order to prevent repeated failures. This is the approach to analysing adverse events that I will adopt in my research.

2.2.4.1.2. The Swiss cheese model of system accidents

NHS organisations have developed barriers, defences and safeguards to prevent medication errors such as procedures and protocols, but these have been shown to be inadequate at times. These defences form layers, some of which are engineered (physical barriers, automation and alarms) others rely on people, procedures and protocols.

In an ideal world, each defensive layer would be intact; but in reality, they are more like slices of Swiss cheese, having many holes — though unlike in the cheese, these holes are continually opening, shutting, and shifting their position (Reason, 1997). The presence of holes in any one "slice" does not normally cause a bad outcome. Usually, this can happen only when the holes in many

layers momentarily line up to permit a trajectory of accident opportunity—bringing hazards into damaging contact with victims, see figure 2.2.

The holes in the defences arise for two reasons: active failures and latent conditions (Reason, 1990). Nearly all adverse events involve a combination of these two sets of factors.

Active failures are the unsafe acts committed by people who are in direct contact with the patient or system. They take a variety of forms: errors (slips, lapses, fumbles and mistakes) and procedural violations, for example deviations from safe operating practices, procedures or standards. In contrast with errors, which arise primarily from informal problems (forgetting, inattention, etc), violations are more often associated with motivational problems such as low morale, poor examples from senior staff, and inadequate management generally (Vincent *et al.*, 1998). An error occurs when a planned action fails to achieve a desired outcome. Reason described two basic types of error (Reason, 1990).

- **Slips and lapses,** where the actions do not go according to plan, for example: omitting to administer a prescribed drug to a hospital patient, *intending* to write a prescription for 100mg of a drug but writing 300mg instead, picking up the wrong syringe. Slips and lapses are more likely in the presence of tiredness, interruptions, and distraction by competing tasks, all of which are inevitable in clinical practice.
- **Mistakes,** where the plan itself is inadequate to achieve its objectives, for example: failing to prescribe a drug that is indicated in a patient, writing a prescription for 300mg of a drug *not knowing* that the usual dose is 100mg (Department of Health, 2004c). Mistakes particularly arise when a task is unfamiliar or where there is insufficient information to formulate an analytical solution.

Active failures have an immediate and usually short-lived effect on the defensive layers.

Latent conditions are comparable to "resident pathogens" within the system. They arise from decisions made by designers, builders, procedure writers, and

top-level management. All such strategic decisions have the potential for introducing pathogens into the system. Latent conditions have two kinds of adverse effect: they can translate into error provoking conditions within the local workplace, (for example, time pressure, understaffing, inadequate equipment, fatigue, and inexperience) and they can create long lasting holes or weaknesses in the defences (for example, untrustworthy alarms and indicators, unworkable procedures, design and construction deficiencies, etc). Latent conditions may lie dormant within the system for many years before they combine with active failures and local triggers to create an accident opportunity. Unlike active failures whose precise forms are hard to predict, latent conditions are always present and they can be identified and remedied before an adverse event occurs.To use another analogy, active failures are like mosquitoes. They can be swatted one by one, but they still keep coming. The best remedies are to create more effective defences and to drain the swamps in which they breed. The swamps, in this case, are the ever present latent conditions (Reason, 2000). Figure 2.3 illustrates the anatomy of an organisational accident according to this scheme of active and latent failures. The accident sequence begins with the negative consequences of management decisions and organisational processes (Reason, 1995). The latent failures thus created are transmitted along various organisational and departmental pathways to the work place (operating theatre, ward) where they create the local conditions that precipitate errors and violations. The model represents the people who are directly involved as the inheritors rather than the instigators of an accident sequence, though this does not necessarily imply that blame is "upstream".

In health care there can be relatively few protective layers separating danger from harm, and human elements are often the last and most important defences.

Figure 2.2 The "Swiss cheese" model of accident causation (Reason, 1997)

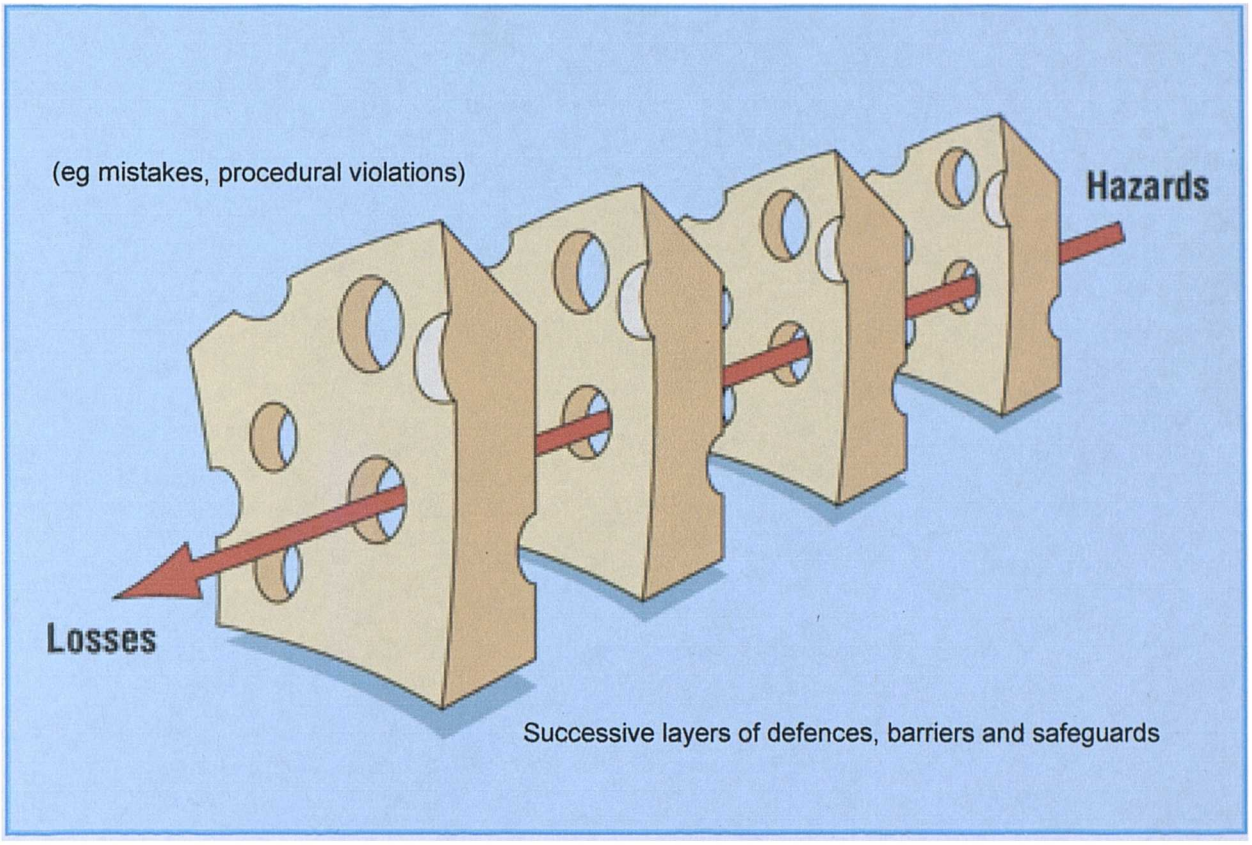
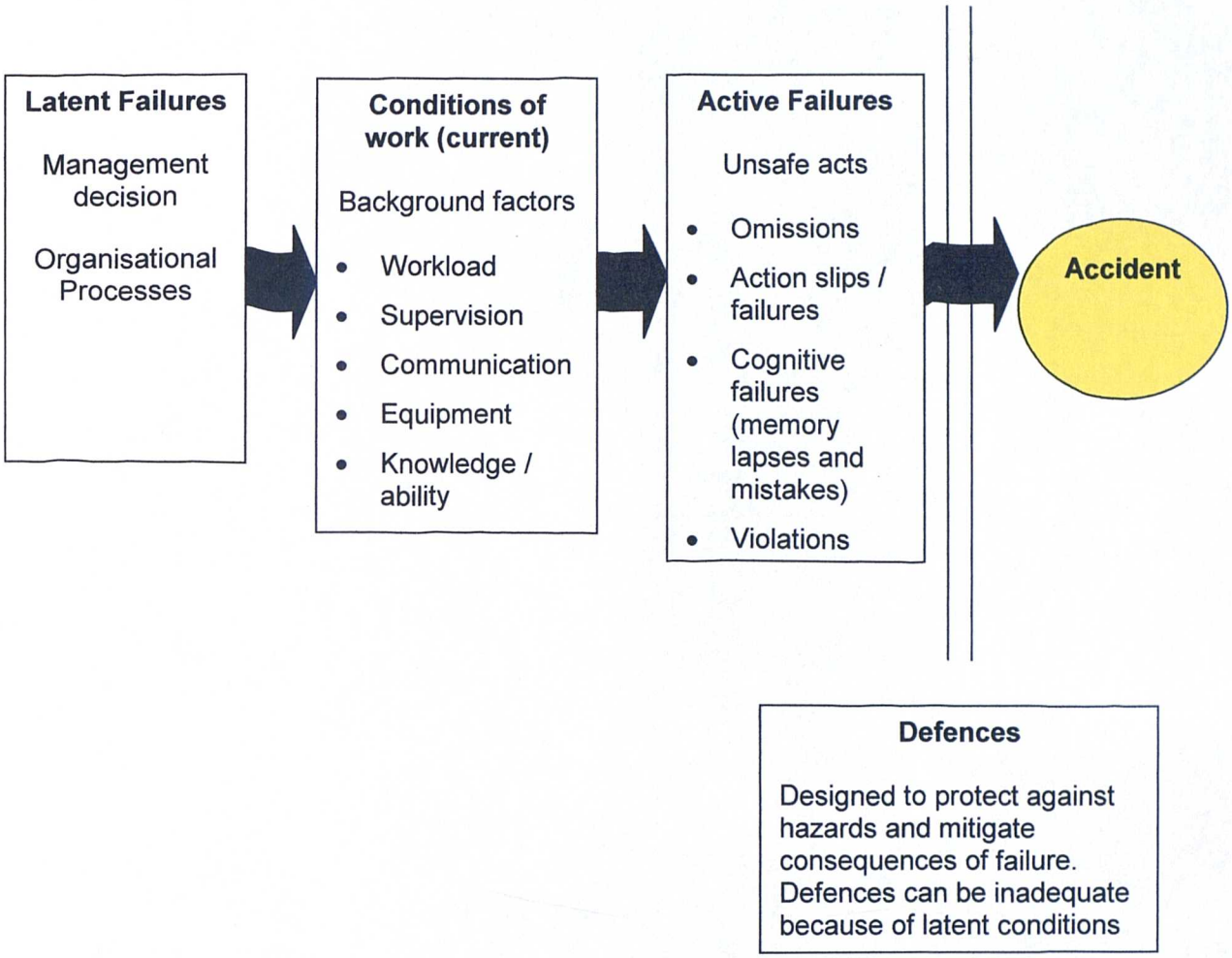


Figure 2.3 Organisational accident model based on work by reason (Reason, 1990).



Adverse medication events can occur at all stages of the medication process from prescribing, to dispensing and administration, and I review each of these three stages now, along with risks in specific patient groups.

2.2.4.2. Prescribing errors

The most frequent and probably the most serious medication errors occur in prescribing, (Bates *et al.*, 1995a), such as selecting the wrong drug, dose, route, form or frequency (Leape *et al.*, 1995, Leser *et al.*, 1990, Lesar *et al.*, 1997). Errors occur in up to 1.5% of hospital prescriptions, (Dean *et al.*, 2002), and in primary care errors occur in up to 11% of prescriptions (Sanders and

Esmail, 2003). If undetected, prescribing errors will be systematically applied and can result in significant harm or death.

The following definition of a prescribing error has been adopted by a recent UK report (Dean *et al.*, 2000):

> *"A clinically meaningful prescribing error occurs when, as a result of a prescribing decision or a prescription writing process, there is an unintentional significant reduction in the probability of treatment being timely and effective or increase in the risk of harm when compared with generally accepted practice."*

Prescribing errors occur for many reasons including inadequate knowledge of the patient and their clinical condition, inadequate knowledge of the drug, calculation errors, illegible handwriting, drug name confusion, use of abbreviations, dosage formulation, zeros and decimal points, unusual routes of administration, uncommon and/or complicated dosage regimens, repeat prescribing and poor history taking (Department of Health, 2004c).

In a study at a 550 bed teaching hospital within the UK, pharmacists prospectively identified 88 potentially serious prescribing errors in a 2 month period (Dean *et al.*, 2002a). The hospital operates a ward pharmacy service whereby pharmacists routinely examine drug charts to check that medication orders are clear, legal and clinically appropriate. Prescribers who made 44 of the mistakes were interviewed to assess reasons for the errors and a questionnaire was used to investigate the factors which may have contributed to the error. Human error theory was used to analyse the findings (Reason, 1990). Most mistakes were made because of slips in attention, or because prescribers did not apply relevant rules (the active failures). Risk factors or error-producing conditions include work environment, workload, whether or not doctors were prescribing for their own patient, communication with the team, physical and mental well-being and lack of knowledge. Organisational factors or the latent conditions which were also identified included inadequate training, low perceived importance of prescribing, a hierarchical medical team and an absence of self-awareness of errors.

The absolute frequency of prescribing errors leading to patient harm is not known. Almost all studies have involved detection of errors by pharmacists, and avoidance of harm to patients. In one UK hospital, potentially serious errors which were identified and averted by pharmacists, occurred in 0.4% of prescriptions. The majority of errors (54%) were associated with the choice of dose and most serious errors originated in the prescribing decision. This is an example of a 'mistake' type of active failure (Dean et al 2002b).

2.2.4.3. Dispensing errors

Data from hospitals suggest that dispensing errors occur less frequently than prescribing errors, but can cause serious harm to patients (Spencer and Smith, 1993). Predisposing factors for dispensing errors include: drug name confusion and transcription errors, 'mistake' types of active failure; and inexperienced staff, low staffing, and high workload which are latent conditions. Other causes include: failure to clarify an ambiguous or badly written prescription or applying an incorrect dispensing label, 'lapse' types of active failure; and similar packaging and lack of check by a second person which are latent conditions.

The ten drugs most commonly involved in dispensing errors from the UK Dispensing Error Analysis Scheme are prednisolone, MST, isosorbide mononitrate, warfarin, aspirin, lisinopril, carbamazepine, diclofenac, co-codamol and flucloxacillin (Department of Health, 2004c). Dispensing errors involving prednisolone, warfarin, lisinopril, morphine and carbamazepine are known to have caused serious harm to patients. Drugs less commonly involved in dispensing errors, but nevertheless occasionally causing serious patient harm include; ciclosporin, digoxin, methotrexate and tramadol.

Pharmacists sometimes need to compound medicines from a formula, and some serious errors have occurred in extemporaneous dispensing.

2.2.4.4. Administration errors

About 80% of medicines are prescribed and dispensed in primary care and are taken by patients in their own homes or care homes. In hospitals medicines are administered sometimes by doctors but more commonly by nurses. There is

also a growing trend for patients to self-administer medicines in hospital, if appropriate.

An administration error has been broadly defined as:

> *"any discrepancy between the intentions of the prescriber and the treatment actually received by the patient."*
>
> *(Department of Health, 2004c).*

A failure at any point in the medication process from prescribing to administration may cause a drug administration error. In UK hospitals administration errors occur in approximately 5% of medicine doses due, (Barber and Dean, 1998), however the majority of these are not harmful, typically involving missed or delayed doses. Most studies have been limited to oral drug administration and have used small sample sizes. Most research on drug administration errors has been carried out in secondary care. The rates of administration errors in primary care and community healthcare settings are not known.

Many types of administration error may occur (American Society of Health-System Pharmacists, 1982), for example: doses incorrectly omitted; incorrect drug, dose, dosage form given; drug given at the wrong time or by the wrong route; administration of drugs with compromised physical or chemical integrity; incorrect infusion rate; inappropriate technique of administration; incorrect reconstitution of drug prior to administration; and accidental duplication of dose administration.

Poorly handwritten prescriptions, verbal orders, transcription errors and inadequate labelling are frequent causes of drug administration errors (Department of Health, 2004c). Other common causes are drug name confusion, equipment failure or malfunction, inaccurate dose calculation, inadequately trained personnel and abbreviations (ASHP report, 1993). Personal factors such as lack of knowledge, fatigue, stress and distractions also contribute to administration errors.

Drugs given by the intravenous route have the greatest potential for harm if given incorrectly (Department of Health, 2004c). The Department of Health has made this type of error one of its prime targets in increasing patient safety. Preparation of injectable drugs is frequently associated with medication errors such as (Clinical Resource and Audit Group, 2002): incorrect dose calculation, selection of the wrong drug or diluent, mislabelling of syringes, incorrect method of preparation, incompatibility of constituents, instability of final product and microbial or particulate contamination. The risk of error may be increased when drugs are prepared in busy, cluttered clinical rooms.

For oral drug administration, the most common type of error is omission (Barber and Dean, 1998). High rates of dose omission may be due to hospital drug distribution systems being unresponsive to clinical demands. The time delay between a prescription being written and the medication arriving on the ward can lead to missed doses especially when drugs are prescribed outside pharmacy opening hours. Up to half of all inpatient prescriptions are written outside traditional weekday pharmacy opening hours (Audit Commission, 2001).

2.2.4.5. Specific patient groups

In this section I discuss the risks of adverse drug events in specific patient groups, specifically for patients with allergies, seriously ill patients and children and then relate this to my proposed study.

2.2.4.5.1. Medicines use in people with allergies

Serious harm has occurred when patients have been prescribed drugs to which they have a pre-existing allergy. Blood products, vaccines, antibiotics, aspirin, and other non-steroidal anti-inflammatory drugs (NSAIDs), heparin, muscle relaxants used in anaesthetics and many other drugs have the potential to cause anaphylaxis in susceptible individuals.

25 of 234 claims to the Medical Defence Union by hospital doctors, (Medical Defence Union, 2001), and 11 of 193 claims to the Medical Protection Society by General Practitioners (Medical Protection Society, 2001), involved allergic drug interactions.

Inadvertent prescribing and administration of medicines where the patient has a documented allergy may be a result of the allergy history of the patient not being available at the time of prescribing, or a lack of prominent information within the prescribing system. Even when the allergy status of a patient has been available, patients may be given a combination product containing a contraindicated medicine, where both the prescriber and the person administering the drug were unaware of the constituents of the product (Department of Health, 2004c). This occurred when a 63 year old woman recovering from a hysterectomy died after receiving a dose of intravenous penicillin. She was documented to have an allergy to penicillin on the front of her medical notes, although the prescribing doctor had not seen this warning when the prescription was signed. She was also wearing a red wrist-band labelled "penicillin sensitive". She was given Augmentin®, a proprietary product which contains amoxicillin (BBC news online, 2000).

2.2.4.5.2. Medicines use in seriously ill patients

Complex drug treatment regimens in the seriously ill patient greatly increases the risk of medication errors, especially drug administration by the wrong route. Giving a drug by the wrong route has been shown to be a frequent administration error in studies from America and Europe (Department of Health, 2004c).

The United States FDA reported that wrong route accidents caused 12% of fatal medication errors. A review of 469 medication error related deaths reported to the US FDA between 1993 and 1998 identified giving the drug by the incorrect route as the third most prevalent type of error, involving 57 patients. 14 patients died as a result of an intravenous drug being administered intrathecally, eight deaths were associated with an oral product being given intravenously, four patients die as a result of an intramuscular injection being given intravenously and one died as a result of an IV injection being given intramuscularly. 30 other wrong route incidents were not categorised further (Phillips *et al.*, 2001).

Intrathecal maladministration of drugs that should instead have been administered by the intravenous route is a rare, but always very serious,

medical accident. Since 1985, 13 such accidents have been reported in medical literature or to the Committee on Safety of Medicines, but it is not known whether there are any more than this because no comprehensive central record is kept of such adverse events (Department of Health, 2000d). Of the 13 documented accidents, 12 involved intrathecal injection of a vinca alkaloid (vinblastine, vincristine, and vindesine). These drugs are strongly neurotoxic and can kill if incorrectly administered. They can be administered by the intravenous route, but are fatal if injected into the spine.

2.2.4.5.3. Medicines use in children

A medication error in a child may be more serious than the same error in an adult. Drug dosing for children can be complex because of the need for additional calculations based on weight or surface area, and because of variations in metabolism. Errors in prescribing for children often occur because of poor handwriting, misplaced decimal points and calculation errors. Despite widespread awareness of the risk, decimal point errors involving potent drugs such as digoxin and opiates continue to occur and can be fatal.

2.2.4.5.4. Summary

As I have described, adverse drug events represent a particular challenge in specific patient groups. Patients are susceptible to serious harm if they are prescribed a drug to which they are allergic. Many commonly prescribed drugs can cause anaphylaxis in vulnerable people. In my research, I will examine recording of allergy status and the attitudes of medical staff towards this. Seriously ill patients are also at greater risk of medication errors and as these patients are often cared for on general medical wards, this is of particular relevance. Children are also particularly vulnerable to medication errors although I will not examine this. Older people tend to use more medicines (Department of Health, 2001a), and for this reason, they are clearly at an increased risk of adverse drug events. This, coupled with multiple pathologies and an age related altered capacity to handle medicines makes this patient group particularly susceptible. This is one of the reasons that older people were selected as the target population within this study.

2.2.5. Learning from failure

Human error may be the factor that immediately precipitates a serious failure but there are usually deeper, systemic factors at work which if addressed would have prevented the error or acted as a safety net to mitigate its consequences (Department of Health, 2000d). Activity to learn from and prevent failures must therefore address their wider causes. Changing behaviour towards safer care comes about through learning at the level of the individual health professional, at the organisational systems level, and at points in between (Firth-Cozens, 2001).

To ensure lessons are embedded in practice, activity must stretch beyond simply diagnosing and publicising lessons from incidents. Within the NHS learning from incidents is often passive, i.e. valid lessons have been drawn from experience, but they have not been fully implemented. It is only through active learning, where lessons are embedded into an organisation's culture and practices, that the benefits of experience are actually realised. For example when prescribing errors occur, the emphasis should not be on simply identifying and exposing, but the actual underlying factors, which precipitate such errors, should also be investigated. Once lessons have been drawn from errors, efforts to change culture must be made, rather than merely advertising the issues in the hope that individuals will alter their behaviour.

In this section I will discuss the actual process of organisational learning with reference to the learning cycle. I then go on to discuss barriers to learning from failure and ways in which these can be overcome.

2.2.5.1. The learning loop

Organisational learning is a cyclical process, the key components of which can be described with reference to an approach which has been adapted from a model used by British Petroleum (Department of Health, 2000d), (figure 2.4). The first half of the learning cycle is concerned with identification of learning opportunities and development of sound solutions. This involves monitoring of service delivery activity, including adverse events and the experience of others. Once potential and actual risks have been identified, they must be properly

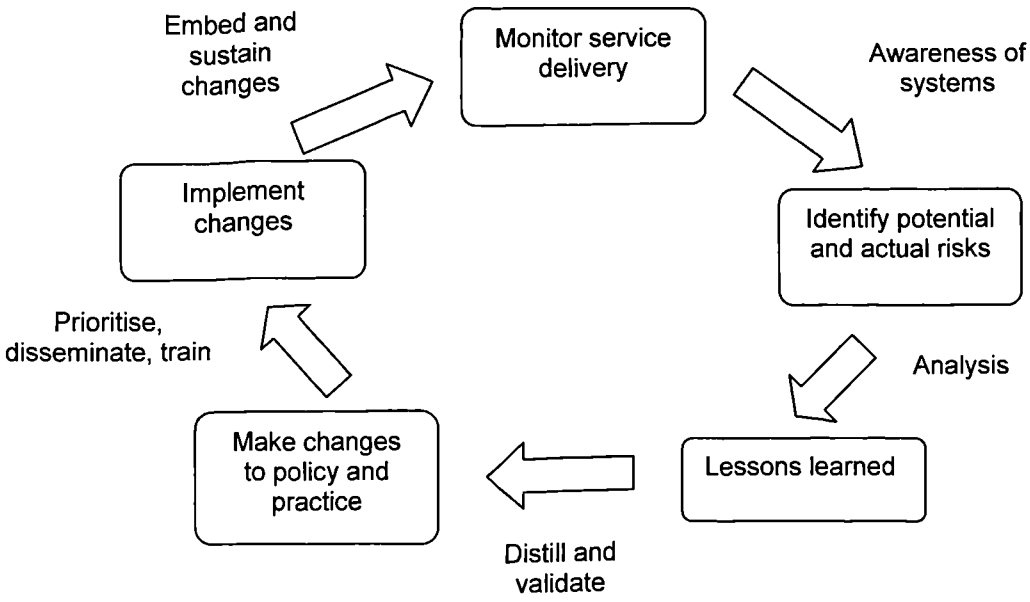
analysed to identify lessons for policy and practice. Lessons need to be distilled to make sure the essence of the learning points is properly captured, and their validity tested in theory or practice.

The second part of the learning process is to make sure that the sound solutions are put into practice. Learning points need to be translated into practical policies and actions that can be implemented at the appropriate level.

Action to implement and apply improvements on the ground is an essential part of the learning process. Lessons can be 'learned' on one level, in that there is a strong awareness of what needs to change and why, but if there are barriers in place to the application of that learning in practice the active learning process will fail. To sustain long-term change solutions also need to be firmly embedded into the culture and routine practice of the organisation. Finally, continuous monitoring of changes and improvements in practice is an essential part of ongoing learning and improvement.

It is at the stages of implementation and embedding that the learning loop often seems to fracture. There is much literature with examples from a range of different sectors where lessons had been clearly and correctly drawn from experience, but for one reason or another these lessons had not been translated into effective organisational learning.

Figure 2.4 The Learning Cycle



2.2.5.2. Barriers to learning

In general, individuals learn from their mistakes because they cause them emotional pain, but often those around them fail to do so . Even when individuals learn from mistakes, what they learn may not always be useful. Focussing on individuals makes it harder for systems to learn, to spread the impact of events or accidents beyond their immediate environment. A number of 'barriers to learning' have been identified (Smith and Elliot, 1999, Toft and Reynolds, 1997, Firth-Cozens, 2001).

An undue focus on the immediate event rather than on the root causes of problems, allocating responsibility at the sharp end of care where the health professional and patient interact often occurs. Organisations tend to latch onto one superficial cause or learning point to the exclusion of more fundamental but sometimes less obvious lessons. Core beliefs, values and assumptions often develop over time and any learning that contradicts these is restricted. Organisational learning often fails to occur because of bureaucracy, a lack of clear purpose or feedback mechanisms, ineffective communication and other information difficulties, cultural issues around a lack of openness, centralised authority and blame where errors are seen as indicating competence.

Pride in individual and organisational expertise can lead to denial and to a disregard of external sources of warning, particularly if a bearer of bad news lacks legitimacy in the eyes of the individuals, teams or organisations in question. Human alliances lead people to "forgive" other team members their mistakes and act defensively against ideas from outside the team. High stress and low job-satisfaction can have adverse effects on quality and can also engender a resistance to change. A failure to acknowledge the real emotional context of healthcare and high stress levels is likely to make any attempts at real cultural change impossible. The sheer size and complexity of healthcare organisations means they do not lend themselves well to attempts to intervene directly at the organisational level and often through the inability to recognise the financial costs of failure, a powerful incentive for organisations to change is lost. Overcoming barriers to learning and creating an informed culture

In her review of the literature on teams, culture and managing risk, Jenny Firth-Cozen suggests a number of ways in which the barriers to active learning can be overcome or minimised (Firth-Cozens, 2001). Raising awareness of the costs of not taking risk seriously with more routinely available data on the human and financial costs of adverse events encourages active learning. By focusing on "near misses" as well as actual incidents the emotion from an incident can be removed which allows learning to take place more effectively. It is also easier to keep near miss data anonymous, itself a factor in encouraging reporting. Bearers of bad news may fear that they will be ostracised or silenced, therefore ensuring that concerns can be reported without fear, with clear rules about what must be reported, and regarding reporting as good behaviour rather than as disloyalty will all help. A systems approach to risk is essential in terms of cultural change in that it has the effect of spreading responsibility throughout all levels of the organisation. So long as the acceptance of responsibility at managerial level is communicated and seen to be taken seriously, this will help negate an authoritarian top down culture. Just as importantly, this sharing of responsibility will reduce the level of emotional response that takes place at the sharp end, which should allow learning to take place more readily and more appropriately.

Effectively-led teams are effective mechanisms for culture change. Teams need to be firmly linked into the wider management structure to ensure that alliances within them do not hamper learning. Team-based training can also be a useful tool here and using external input to stimulate learning. External input can help teams to think outside established parameters and challenge assumptions about the way things are done and user involvement can be of particular value in encouraging learning. Team should ensure that they are able to hear the voices of those staff with the most experience of what can go or has gone wrong in patient care, whether or not they are of lower rank than their colleagues.

It is essential to give a high-profile lead on the issue and it should be made clear both nationally and locally that safety and quality are key goals. Staff concerns should also be recognised with emphasise placed on the personal and service benefits of change rather than just the threats.

2.2.5.3. Summary

In this section I have discussed the importance of actively learning from failures. The learning cycle begins with identification of risks and identifying lessons for practice, then making sure that the solutions are put into place, then continuous monitoring of changes. This can be applied directly to my research, as I intend to examine current services and then develop solutions to improve care. I have described barriers to learning, which include focussing on individual events rather than the problems within systems, lack of feedback systems, ineffective communication and defensive attitudes within teams. Knowledge of these barriers and how to overcome them will be of particular importance in attempting to change practice within and beyond this study setting. In particular, focussing on teams as effective change agents will be important.

2.2.6. Improving patient safety

The chief medical officer's report *An Organisation with a Memory* reviewed the scale and nature of serious failures in NHS health care and specifically how the NHS can learn from such failures to make patient care safer in the future (Department of Health, 2000d). The report stated that there has been no

reliable system for learning from adverse events and service failures and introducing change to prevent similar events recurring. As a result, patients suffer unnecessary and avoidable harm because lessons from past experience have not been learned and specific serious errors can be repeated a number of times over a period of years. The repeated erroneous spinal administration of vinca alkaloids (Department of Health, April 2001), is the most striking example although similar patterns are seen with other medicines such as overdoses of methotrexate (Cambridgeshire Health Authority, July 2000), and opiate analgesics. Other examples include children being given incorrect dosages due to calculation errors, administration errors and incidents following failures in communication (Department of Health, 2004c).

An organisation with a Memory identified various barriers to active learning within the NHS and made a number of recommendations (Department of Health, 2000d), in particular:

- introduction of unified mechanisms for reporting and analysis of adverse events and near misses
- encouraging a more open and questioning culture in which errors or service failures can be reported and discussed
- developing mechanisms for ensuring that lessons learned actually changes practice
- developing a wider appreciation of the value of the system approach to preventing errors.

In May 2001, *Building a Safer NHS for patients* took forward the Government's plans for improving patient safety, which included the specific commitment to reduce by 40% the number of serious errors in the use of prescribed drugs by 2005 (Department of Health, 2001e), and to reduce to zero the number of patients dying or being paralysed by maladministration of spinal injections. In November 2001, the Department of Health issued mandatory national guidance for safe administration of intrathecal chemotherapy and updated this in October 2003 (Department of Health, November 2001, Department of Health, October 2003).

Medication errors are an early priority of the NPSA and in early 2004 the Health Minister launched a national reporting and learning system (NRLS) to enable the NHS to report all types of adverse events and near misses, including medication errors. The core purpose is to improve patient safety and the NPSA has four major roles:

- collect and analyse information,
- assimilate other safety-related information from a variety of existing reporting systems,
- learn lessons and ensure they are fed back,
- where risks are identified, produce solutions, specify national goals and establish mechanisms to track progress.

By December 2004 the NPSA hit its deadline that 607 NHS organisations can report to the NRLS and 90% of organisations are reporting through this route.

From its pilot data audit, 33 adverse events involving intravenous potassium solution were reported and a Patient Safety Alert to raise awareness of risks and safety precautions associated with concentrated potassium solutions has subsequently been issued (National Patient Safety Agency 2003. Report of pilot data audit.).

The Government's overarching aim is to embed a culture of safety within the NHS and ensuring that drug treatment is safe is central to this. The recent report, *'Building a safer NHS for patients: improving medication safety'* (Department of Health, 2004c), addresses this aim, providing guidance for health professionals and NHS organisations. The report provides specific guidance to improve safety at all stages of the medication process, for example active management and review of long-term repeat prescribing; clear treatment plan; shared with all health professionals involved in the patient's care; appropriate training for all staff involved in the handling of medication; discussing medication with patients at the time of administration; and clear procedures for the documentation of allergies. The report also stresses the need for accurate information about current drug therapy on admission to

hospital and timely and reliable communication following discharge. Staff should ensure patients understand their discharge medicines and can take them properly. The report highlights that training of undergraduates in pharmacology and therapeutics should be strengthened where appropriate. Primary Care Trusts and NHS Trust boards are told they should ensure strategies are in place for reporting and learning from medication errors and building error traps into medication processes.

2.2.7. Summary

In this section I have discussed some of the problems that are encountered in the use of medicines, specifically medication errors and adverse drug reactions. In section 2.2.3 I talked about the scale of the problem of adverse events in the UK and overseas, and the consequences for individuals and organisations. This is very relevant, as I will be recording and analysing any adverse events I encounter throughout the course of my study and obtaining the views of health care workers and patients.

In section 2.2.4 I discussed the causes of adverse drug events, and different methods of examining errors, initially looking at human error using the *person centred approach*, which focuses on blaming individuals, and then the *systems approach,* which focuses on organisational factors shaping and provoking errors. This is particularly pertinent to my work facilitating my understanding of the factors that contribute to adverse events in order to suggest safer systems. I described the Swiss cheese model of accidents, whereby defence layers in organisations, such as procedures and protocols have many 'holes' which are continually shifting and only when the holes in many layers momentarily line up, can an accident occur. This will relate to my work as I will be investigating many aspects of medicines use within the study Trust, examining potential problem areas and 'holes', in order to minimise risk to patients. I talked about active failures and latent conditions causing 'holes' in defences and will find this helpful in identifying error-provoking conditions. I will concentrate more on examining latent conditions, rather than active failures which focus more on individual mistakes rather than the underlying problems.

I showed that prescribing errors are the most frequent and probably most serious type of error, with dispensing errors occurring less frequently, but administration errors can occur more often. My work will therefore concentrate on prescribing and administration of medication, and my attention has been drawn to how errors occur in these activities.

I then went on to discuss the challenge adverse drug events represent in specific patient groups, particularly patients with allergies, seriously ill patients, children and older people. My work is predominantly in a general medical setting, so I will encounter many of these high-risk patients.

In section 2.2.5 I considered some of the factors that influence the ability of organisations to learn from failure and talked about the learning loop, barriers to learning and how these may be overcome. This will be very relevant to my work, as it will allow me to suggest more successful strategies to learn from any issues identified in the project.

Finally, in section 2.2.6 I described what the Government are doing to improve patient safety, referring to several recent documents, and outlining the work of the NPSA. This is of course very relevant to my work as improving patient safety is a key objective of this study.

2.3. HEALTH CARE PROFESSIONALS' COMPETENCY IN THERAPEUTICS

In this section I discuss the challenges facing health care professionals in the management of therapeutics. I examine health care professionals' knowledge of and competency in therapeutics, focusing in section 2.3.1. on the training of doctors, specifically, undergraduate medical students in section 2.3.1.2, and postgraduate medical training in section 2.3.1.2. In section 2.3.3. I discuss the roles and responsibilities nurses have in therapeutics for example administration of medicines and more recently prescribing. I examine the pre and post-registration training of nurses and their competency to undertake these roles. I then consider and contrast the training pharmacists receive in therapeutics in section 2.3.4, and finally in section 2.3.5. I explore the concept

of a shared approach to learning between professionals as a more appropriate preparation for the teamwork that is required in the real world.

Prescribing, dispensing and administration of medicines are complex and skilled tasks. Health care professionals need to understand the actions, indications and contraindications, doses and adverse effects of drugs. In the UK, most of the initial assessment and treatment of acutely ill patients is provided by trainee doctors. However deficiencies in trainees' knowledge, skills and attitudes have been identified (Rolfe and Harper, 1995, Montgomery *et al.*, 1994, David and Prior-Willeard, 1993, Gould *et al.*, 1994, Teahon and Bateman, 1993, Smith and Poplett, 2002), and these have the potential to influence patient outcome and contribute to the high level of clinical error in the NHS. Undergraduate programmes do not always adequately develop the knowledge or skills needed for safe medicines practice (Department of Health, 2004c). Concerns have recently been expressed that the core curricula at medical schools do not provide a thorough knowledge of safe medicines prescribing and administration (Department of Health, April 2001). More recently, the Audit Commission report *"A Spoonful of Sugar"* highlighted concerns that most junior doctors working in NHS hospitals feel they do not receive adequate training and support to enable them to deal with medicines (Audit Commission, 2001). The report raised concern that current undergraduate medical courses *"do not provide a thorough knowledge of safe medicines prescribing and administration"* for junior doctors. A recent review (Barber *et al.*, 2003), highlighted the *"poverty of teaching medical students about therapeutics in general and prescribing in particular."*

Nurses perform many roles which require knowledge about medications. Deficiencies in pharmacology teaching in nurse education have also been highlighted and theory-practice gaps identified (King, 2004).

2.3.1. Training of doctors in therapeutics

In this section I discuss the training of undergraduate medical students, in particular the manner in which the undergraduate curriculum has developed with respect to therapeutics, and deficiencies that have been highlighted by doctors themselves. I then move on to discuss post-graduate training, in

particular outlining the three training grades in the UK: pre-registration house officer (PRHO), senior house officer (SHO) and specialist registrar grade (SpR).

2.3.1.1. Undergraduate medical training

It is essential for patient safety and to ensure high quality patient care that the undergraduate curriculum provides a good understanding of the clinical pharmacology of common drugs in therapeutic use, including contraindications, drug interactions and toxicities (Maxwell *et al.*, 2002). The current shortcomings in education for medical students about therapeutics and prescribing have been highlighted by health professionals themselves (Maxwell and Walley, 2003, Rawlins, 2003). *Tomorrow's Doctors* published in 1993 (General Medical Council, 1993), by the General Medical Council (GMC) outlined core recommendations for the undergraduate curriculum, emphasising closer integration between subjects, reduced factual burden, greater student choice and problem based learning. Whilst this changed undergraduate education for the better in many ways, individual disciplines were marginalised, such as clinical pharmacology and therapeutics that teach skills that all doctors require. These recommendations have recently been updated (General Medical Council, 2003), and although the council highlight the management of disease and use of drugs as key learning objectives, little specific guidance is offered. The GMC state that graduates must know about and understand the principles of treatment. This should include, for example, the effective and safe use of medicines as a basis for prescribing, including side effects, harmful interactions, antibiotic resistance and genetic indicators of the appropriateness of drugs, how to evaluate effectiveness against evidence, and how to take account of patients' own views and beliefs when suggesting treatment options. However, few courses ensure that undergraduates are taught and tested on how to prescribe and give drugs safely (Maxwell *et al.*, 2002).

Whilst drugs are prescribed predominantly by doctors in the UK, prescribing rights are now being extended to other health professionals. Current programmes for training nurse and pharmacist prescribers (35 days of theory, and two months' supervised prescribing) are a stark contrast to the training

doctors receive for prescribing, and might be looked upon enviously by medical students.

The study cited in section 2.2.4.3. in which doctors who had made serious prescribing errors (most of which were inappropriate choice of dose) were interviewed, lack of knowledge about prescribing was identified as a key factor (Dean *et al.*, 2002). Some doctors said that they don't learn about doses at medical school. Learning about how to choose the dose seems to fall into a chasm between medical school and employment.

Medical students also have expressed concerns about their training in therapeutics and competency to prescribe and administer drugs (Ellis, 2002). In a letter to the British Medical Journal a medical student expresses her worry at the prospect of prescribing. *"Where's my teaching on this (prescribing)? I had a series of lectures at the end of the second year that probably amounted to about eight hours."* She also expresses concern about the supervision she will receive as a pre-registration house officer (PRHO), *"From what I have seen, house officers are generally left to get on with it on their own."*

In a study utilizing ratings of graduates on how well prepared for the role they are carrying out, Clack identified deficiencies in aspects of training in medicine and concluded that undergraduate skills may not adequately prepare students for their PRHO year (Clack, 1994). Particular deficiencies highlighted included clinical pharmacology and medical ethics.

A study in Manchester used questionnaires to examine and compare the perceptions of graduates and educational supervisors concerning how well prepared graduates were for their first post (Jones *et al.*, 2001). Respondents were asked to rate how well prepared they were for a list of broad areas of competence, on a five point scale, with 'very well prepared/competent' and 'not very well prepared/competent' as the range; the mid-point label was 'quite well prepared/competent'. Of the 18 broad areas of competence listed, only four were rated more than 'quite well prepared' by at least 50% of the graduates. Rating was similar for the educational supervisors. Nearly one third of graduates rated themselves at less than the mid-point for diagnosis, decision

making and provision of treatment including prescribing and only one quarter felt their course had prepared them well in understanding the principles of evidence based medicine. In rating their competence for specific tasks, 58% rated themselves at less than the midpoint for writing a prescription, and 60% at less than the midpoint for calculating drug dosages. Amongst qualitative responses, several comments from graduates related specifically to preparation for administering drugs to patients:

> *"I was the last of the year that studies the old course and don't feel it provided adequate training of the essential, but perhaps mundane, duties that form the majority of a house officer's workload, e.g. fluid prescriptions and treating electrolyte levels/disturbances and pain control/managing nausea."*

A general comment from a supervisor was:

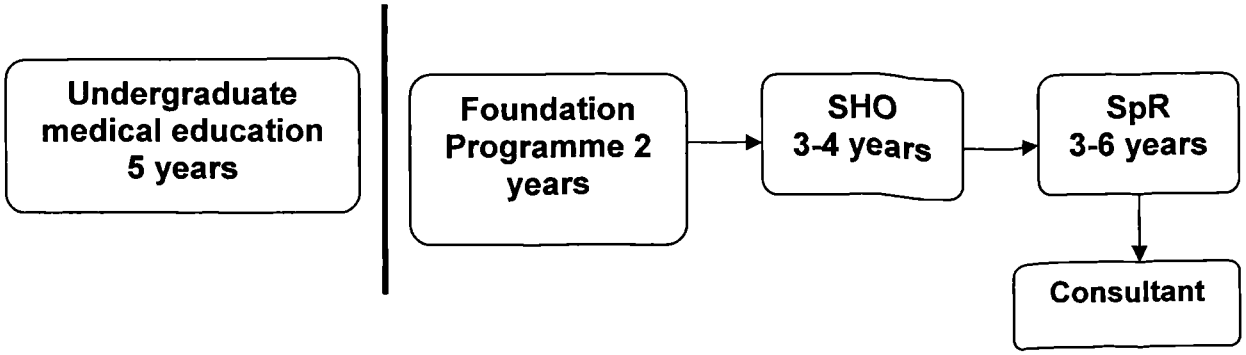
> *"The undergraduate course does not prepare one for the practical day-to-day aspects of the PRHO job, e.g. prescribing medications, commencing IV antibiotics, setting up a drip. The 'bread and butter' of the job!"*

Doctors should be competent to prescribe before they start doing so and their competence should be demonstrable (Barber *et al.*, 2003). Students should demonstrate their competence by being given the drug charts and medical records for several patients and checking the prescribing for appropriateness. Doctors should then be asked to prescribe new drugs for these patients.

2.3.1.2. Postgraduate medical training

In the UK, each stage of medical training is managed by a variety of professional, managerial and educational bodies, making it more difficult to improve clinical education. Postgraduate training involves a series of stand alone, or loosely linked appointments across three training grades (Parsell, 2001, Calman *et al.*, 1999), PRHO, SHO and a new specialist registrar grade (SpR) which has recently been introduced to higher specialist training, see figure 2.5.

Figure 2.5 Outline of postgraduate training in the UK



In 1997, the GMC outlined central requirements to improve PRHO training in its report *The New Doctor* (General Medical Council, 1997), and this was reviewed in 2002 (General Medical Council, 2002). The revised draft of *The New Doctor* is couched in terms of 'outcomes' rather than 'experience'. A two-year Foundation Programme has recently been introduced which encompasses the PRHO year and the first year of SHO training (Departments of Health in England *et al.*, 2003). At the end of the first year of the Foundation Programme PRHOs must demonstrate that they can achieve the outcomes set out in *The New Doctor* required for full registration. The second year will aim to instil doctors with basic practical skills and competencies in medicine.

The Academy of Medical Royal Colleges recommended improvements to the SHO grade (Academy of Medical Royal Colleges, 1996), and the GMC emphasised the need for structured training and supervision in its report *The Early Years* (General Medical Council, 1998). In both reports, the GMC stresses that good prescribing practice, acute and chronic pain relief, the principles of evidence based practice and assessing the quality of care should be covered through in-house service training and where appropriate educational sessions.

To comply with European law regarding specialist training and registration, the Joint Committees responsible for Higher Specialist Training in the UK have drawn up detailed curricula for specialist registrars training in each discipline (Mucklow, 1998). However, although prescribing will appear in the Training Record for trainees in medical specialties as a generic skill requiring endorsement from the educational supervisor, specific mention of the principles

and practice of drug therapy is not at all universal among the specialist curricula. Trained specialists will have fulfilled requirements for certification in their chosen field and training will include knowledge of how to use drugs in the management of conditions presenting to the specialist, but may not cover the many other drugs that patients are taking which are not related to the presenting complaint.

Research has suggested that junior doctors' 'on the job' education and training can vary in quality and quantity (Wilton, 1995, Wilson, 1993, Bogg *et al.*, 2001). The proportion of time spent in formal training is equally variable, and in some studies it was reported as less than 1 hour a week, (Wilton, 1995, Wilson, 1993), with teaching duties being delegated to junior or appropriate non-medical staff (Wilton, 1995).

A study in which PRHOs perceptions of work role, job requirements and mental health were explored by use of questionnaires (n = 56) including a diary of activities and interviews with randomly selected participants (n = 18), found that the average weekly proportion of time spent on organised continuing education was 5% (Bogg *et al.*, 2001). One-fifth of PRHO time was spent on routine administrative tasks, perceived as lacking in training or educational elements.

Problems relating to senior house officer (SHO) education and training, for example poor supervision, unstructured education, inadequate careers advice, minimal assessment, poor working conditions and difficulty obtaining study leave have also been documented over several years (Grant *et al.*, 1989, Standard Committee on Post-graduate Medical Education, 1991, COPMED and UK Conference of Deans, 1995).

In 1996 a survey of senior house officers and registrars about the educational and training components of their posts found that, over-all, one-third of doctors thought that their training was inadequate and three-quarters wanted a greater amount of formal education (Panayiotou and Fotherby, 1996). The majority of doctors time was spent on routine work and most considered that training constituted less than 10% of their working time.

2.3.1.3. Summary

In this section I have discussed the knowledge and skills that doctors require to manage therapeutics safe and effectively, and the training they receive from undergraduate, through to postgraduate level. Undergraduate training in therapeutics is clearly lacking and medical students and graduates have concerns about their competency to prescribe and administer drugs. Similarly, postgraduate training, despite recent reforms, remains variable. I will be exploring the competency in therapeutics of doctors in my study.

2.3.2. Nurse training in therapeutics

Nurses in the UK are accountable to the nursing and Midwifery Council, and are guided by government policies. The 'Code of Professional Conduct' (Nursing and Midwifery Council, 2002a), states that nurses should acknowledge any limitations, and if necessary improve levels of knowledge and competence, as they are accountable for their practice. In 'Guidelines for the Administration of Medicines' (Nursing and Midwifery Council, 2002b), it is emphasised that nurses administering medication must exercise professional judgement and apply knowledge and skill. They must know the therapeutic uses, normal dosage, side effects, precautions, and contraindications of the drug to be administered.

In 'Making a Difference' (Department of Health, 1999b), the government has highlighted changes in the context of nursing, including the extension of nurses' prescribing rights, and it has stated that by 2004 the majority of nurses should be able to prescribe. (Department of Health, 2001b).

The Government has moved rapidly to extend prescribing by nurses, pharmacists and other health professionals. The aim is to improve access to care, and make better use of the skills of health professionals.
Currently, nurses who are qualified to do so and registered by the Nursing and Midwifery Council (NMC) can prescribe from the nurse prescribers' formulary (NPF). Nurses who are qualified and registered to do so have been able, since April 2002 to prescribe from the nurse prescribers extended formulary (NPEF). This contains a much wider range of medicines including

about 180 prescription only medicines for the treatment of about 80 conditions. They can also prescribe any of the GSL or P medicines that GPs are able to prescribe. (Department of Health, 2002). The NPEF contains 6 controlled drugs including codeine and dihydrocodeine. The government took primary legislation in the Health and Social Care Act 2001 to enable prescribing by pharmacists and other health professionals (HMSO, 2004). Under regulations made under this Act, nurses and pharmacists may, if suitably qualified and registered, be supplementary prescribers, working within a clinical management plan agreed with a doctor. There is no formulary and any medicine may be prescribed provided the requirements of the clinical management plan are met (Department of Health, 2003a, HMSO., 2003). Controlled drugs are currently excluded from supplementary prescribing although the Home Office is proposing to amend the misuse of drugs regulations to permit their inclusion (Home Office Drug Legislation & Enforcement Unit, 2003). The Department of Health also undertook public consultation in 2004 on a further extension of nurse prescribing to include a range of drugs for emergency care, including thrombolytics (Medicines and Healthcare Products Regulatory Agency, 2004a). Under the new proposals, nurses could prescribe medicines used to treat life-threatening conditions such as blood clots, DVT and meningitis.

Knowledge of pharmacology and therapeutics is essential if nurses are to work within the limits of the Nursing and Midwifery Council Code of Conduct and undertake these new extended prescribing roles. However, concerns have been expressed relating to the scientific inadequacies of pre-registration nurse education and training. The introduction of a new curriculum in the late 1980s removed much of nurses' education about pharmacology and therapeutics and this sent an implicit message about the relative importance of medicines, which was reinforced on the wards. Current emphasis on behavioural sciences rather than bioscience has meant that nurses may be lacking in this important area of scientifically based patient care, and nursing may be facing a widening theory-practice gap (Thornton, 1997, Jordan, 1994).

Latter *et al* (2000), using a case study design, examined the pharmacology and therapeutics education of pre-registration nursing students. Multiple data collection methods were used and multiple perspectives were utilised. The 'unit of analysis' to serve as cases consisted of three educational institutions offering pre and post registration nurse education programmes. Multiple methods of data collection at each site involved focus group discussions with lecturers and practitioners, individual interviews with key personnel, non-participant observation at teaching sessions, post observation interviews with students and curriculum analysis. The researchers found that there was insufficient taught pharmacology, which was common to each institution. The perceived deficiency was related to both the potential amount of pharmacology knowledge that nurses need to know, and the knowledge required for their fitness to practice. For example, at one site students felt that pharmacology sessions were insufficient and they did not feel confident talking to patients about their medicines. Teaching strategies were found to be ineffective and material was not tailored to nurses' needs. Results were consistent across data sources and also across sites which, together with their similarity to results from a comprehensive literature review, further strengthened their findings. The multiple methods employed in this study allowed an in-depth examination of the therapeutics education of nurses. This study is very relevant to my research as I intend to use multiple methods, in particular observation, interviews and focus groups.

Since nurses are the principle health care professionals involved in the administration of medicines, it is worrying that much of the literature suggests that nurses do not always possess a knowledge base adequate to fulfil this role (Boggs *et al.*, 1988). A comparison of nurses', doctors, and pharmacists' knowledge of the hazards of medication found that nurses were significantly less knowledgeable than both pharmacists and physicians (Markowitz *et al.*, 1981). A more recent study also found that nurses were not adequately prepared for their responsibilities in administering drugs and that their self-rated knowledge was higher than their actual knowledge (Ives *et al.*, 1996).

King (2004) interviewed 10 qualified nurses from an emergency admissions unit in a city in the north of England to explore nurses' pharmacology needs. She found that the nurses had a limited understanding of the subject and were dissatisfied with the teaching of the subject, which resulted in anxiety on qualifying. This is consistent with Clancy *et al* (2000), who found that 98% of nurses and students surveyed expressed a wish for more education of the biological sciences in order to prepare them for practice. Similarly, Bullock and Manias (2002) suggest that nurses who have a stronger knowledge base in pharmacology would be better prepared to fulfil their roles in the management of patients' drug therapies and medication education. Using questionnaires they explore the perceptions and expectations of lecturers involved in teaching pharmacology about teaching and learning pharmacology in pre-registration nursing courses using questionnaires. The questionnaire was distributed to all university campuses in Victoria, Australia, that are involved in undergraduate nursing education. The questionnaire examined: the integration of pharmacology teaching into nursing, range and depth of classroom-based pharmacology teaching, approaches to teaching and learning, nursing practice in a clinical context, related importance of patient education and communication skills, and the appropriate professional background of academics teaching pharmacology to pre-registration nursing students. They found a great variation between institutions as to the number of hours devoted to pharmacology and when it was offered. A number of respondents indicated that they were dissatisfied with the preparation of graduates and their knowledge base in pharmacology. They conclude that a review of nursing curricula is required to improve the knowledge base of nurses in pharmacology and to facilitate their skills in life-long learning.

Courtney (1991) used questionnaires to establish the views of both students and teachers on the biological sciences in three schools of nursing. Nurse teachers ranked the behavioural sciences as more important than did the students. Most students ranked the level of pharmacology teaching as too low, and only one in 10 of students and staff felt they had adequate knowledge of pharmacology.

Morrison-Griffiths *et al* (2002) undertook a questionnaire survey of all nurse education institutions in England to identify current pharmacology education provided for pre-registration nurses. Teaching of pharmacology in pre-registration nurse education was found to vary greatly between the different universities. Pharmacology is usually integrated into the curriculum with very little time devoted solely to the subject. Almost a fifth of institutions did not formally assess pharmacology knowledge at all, which is worrying since a large part of hospital nursing involves the administration of drugs. Less emphasis is placed on the theoretical knowledge of pharmacology, with some aspects of pharmacotherapeutics considered unimportant or not taught. The study suggests that may nurses may be inadequately prepared for the role that they are expected to perform once qualified.

The lack of pharmacology and therapeutics in nurse training and education is reflected in the demands of nurses themselves for more scientific education. In particular, nurses have asked for more training in psychopharmacy, (Jordan *et al.*, 2002, Davis and Hemingway, 2003, Hemingway and Freeman, 2002, Hemingway, 2003), applied pharmacology, diagnostic skills and critical evaluation skills, (Otway, 2002), drug therapies for organ based conditions, the recognition of adverse drug reactions, and issues pertinent to drug management, (Sodha *et al.*, 2002), general pharmacology and nurse prescribing (Giles, 2001).

While and Rees' (1993) reported, in their study of health visitors and district nurses, that most participants did not feel competent in prescribing medications and had a poor understanding of the medicinal products in the nurse prescribing formulary.

The large amount of time nurses in clinical practice spend on the aspects of care related to medication is not reflected by the small amount of time devoted to pharmacology teaching (Ashurst, 1993). The possible consequence is many nurses experience difficulties managing patients medication (Jordan and Potter, 1999, While and Rees, 1993), or communicating knowledge of medication to patients and their carers (Latter *et al.*, 2000). However the reason nurses experience difficulty may be due to lack of time as they are too busy.

Although nurses undertake postgraduate education before they can prescribe, basic pharmacology should nevertheless be covered in pre-registration training as a firm base on which to build further teaching. Educational courses should provide students with the propositional and process knowledge forms that will promote capability as they become experienced nurses (Fraser and Greenhalgh, 2001). This theoretical foundation will provide the educational building block to support future clinical update and postgraduate study.

Additional education is required to maintain competence and ensure clinical practices are evidence based and up to date. The education of nurse prescribers should be continuous and not limited to an individual course.

Nurse employees and their employers have a responsibility to update themselves both in terms of product and clinical update. The breadth and depth of pharmacology, and continual developments necessitate self-directed, continuous life long learning in practice.

2.3.3. Pharmacist training

Pharmacists have now extended their training to 5 years. Until recently however they have been unable to prescribe, although they often intervene to prevent prescribing disasters, and increasingly, write discharge prescriptions for pre-registration officers to sign.

Pharmacists qualifying now have a strong knowledge base on which to build prescribing skills. Under European Union requirements, all undergraduate programmes must contain at least 1000 hours of directed learning on the actions and uses of drugs and medicines. The four year degree programme is followed by one year's approved postgraduate training and a further practice examination. Approved training programmes for supplementary prescribing by pharmacists (who must have at least 3 years' clinical experience) are now in place in 25 UK universities, focussing mainly on clinical prescribing skills. These lead to registration by the Royal Pharmaceutical Society of Great Britain as a supplementary prescriber. There is early anecdotal experience of successful supplementary prescribing by pharmacists (Lavendar, 2005). As at March 2005, 400 pharmacists had

successfully completed the training. In March 2005 the Department of Health published a formal consultation document on independent prescribing by pharmacists. One of the proposed options would enable suitably qualified pharmacists to prescribe from the entire British National Formulary (Medicines and Healthcare Products Regulatory Agency, 2005).

The Department is also developing proposals for supplementary prescribing by chiropodists, optometrists, physiotherapists and radiographers (Medicines and Healthcare Products Regulatory Agency, 2004b).

2.3.4. Multiprofessional learning

The Government is committed to a new approach to service delivery in which the old hierarchical ways of working are giving way to more flexible team working between different clinical professionals (Department of Health, 2001b). There is an increasing overlap of knowledge and skills between health care professionals and changes in health service delivery have blurred the boundaries which define the roles and responsibilities of the various health professions.

A key aim of the NHS Plan (Department of Health, 2001b), is to make better use of the skills and expertise of all NHS staff and nurses and other staff, such as pharmacists, physiotherapists, radiographers, and optometrists will have greater opportunity to extend their roles. By 2004 over half of them will be able to supply medicines.

At undergraduate or professional training levels, doctors, nurses, pharmacists, health care professionals and managers are educated separately, but in the real world have to work in teams. Workers from each healthcare discipline currently train in isolation from one another and as part of this process become 'professionally socialised' into ways of working which delineates them from other healthcare professionals. In addition to having its own training, each professional group is located within its own hierarchy, leading to the situation where each healthcare professional is part of a 'professional pyramid', and this has tended to compound professional isolation and tribalism. The existence of separate ideologies, hierarchies, professional bodies, training, experiences,

therapeutic focus, departments and uniforms will necessarily tend to create separate workforces within a total workforce.

Shared learning at relevant stages within schools of medicine, nursing and pharmacy would help to foster an understanding of the contributions different professions make to medication processes (Greene *et al.*, 1996). The emphasis should be on 'shared learning' as opposed to 'shared teaching'. Shared teaching refers to learners from different professions sitting side by side in lectures where the development is not supported be deliberate educational strategy or intended learning outcomes, for example, collaborative team workers (Horsburgh *et al.*, 2001). In shared teaching arrangements students are typically 'passive' *recipients and interactive learning may be minimal. There* is some evidence that this may actually reinforce stereotypes and foster resentment (Areskog, 1988).

In contrast, interprofessional learning is an educational process through which students are provided with structured learning opportunities for shared learning, to enable the acquisition of knowledge, skills and professional attitudes which could not be achieved effectively in any other way (Horsburgh *et al.*, 2001). Through this, health professional students can understand the complexities of working in a multiprofessional environment. Shared learning aims to develop adaptable, flexible, collaborative team workers with high level interpersonal skills, who understand the contribution each health profession makes to patient and health outcomes. It intends to reduce or limit prejudices which might exist between professionals and increase the mutual understanding of the professions. Introducing shared learning at the beginning of health professionals' careers may offer significant advantages as at this stage professional identities have not been formed.

Examples of interprofessional training within the United Kingdom can be found at Southampton University and St George's Hospital Medical School, London. (Department of Health, 2001f). The Faculty of Medicines, Health and Biological Sciences at Southampton has developed a common learning programme for interprofessional learning and teaching in healthcare education and practice. This will result in every student experiencing both inter-professional and

profession-specific learning and teaching in each year of their programme. The aim is to ensure that education and training is driven by the needs of the modern health service and patient-centred care. This type of programme is vital to illustrate relevance to practice and enable recognition of the role of colleagues in the service to underpin development of a multidisciplinary environment.

The Faculty of Health and Social Care Sciences at St George's have developed a Common Foundation Programme (CFP). The CFP is designed to meet the preparatory needs of this range of healthcare students within a multi-disciplinary environment. It offers the opportunity for each professional group to acquire certain generic abilities, knowledge and understanding from which to develop their discipline-specific skills and competencies. The multi-disciplinary context of the programme is designed to facilitate a collaborative inter-professional atmosphere where student groups can work together and begin to understand the different dimensions of other healthcare professional roles.

I feel this is particularly relevant to my study as I will be exploring the concept of pharmacists working as members of the medical team on the ward providing a multidisciplinary approach to patient care. My idea is that pharmacists would work alongside doctors and nurses and for this to be successful I believe it is essential that health care professionals have good interprofessional skills and understand each others roles and contributions to patient care. I suspect that a lack of understanding of responsibilities and competencies, along with interprofessional barriers may adversely effect truly successful team working and I will explore the views of health professionals themselves.

2.3.5. Summary

In this section I have discussed the knowledge of and competency in therapeutics of the different healthcare professionals who are involved in patient care with respect to medicines. In section 2.3.1 I examined the training of doctors at both the undergraduate and postgraduate levels and in section 2.3.2 I look at nurse training in therapeutics. I moved on to discuss and compare pharmacists' training and finally talked about multiprofessional approaches to

learning and how this could impact on team working and the management of therapeutics. This area of the literature is clearly very relevant to my research as my main objective is to improve patient care with respect to medicines and I will be examining, very closely, the competency the healthcare professionals demonstrate with respect to therapeutics and their own perceptions of their preparation and training for their roles. This will help me identify problem areas and suggest potential solutions.

2.4. COMMUNICATIONS BETWEEN HOSPITALS AND PRIMARY CARE

Effective communications are essential when patients are transferred between primary, secondary and tertiary care, however medication problems occur at such 'handover points'. Poor communication of key clinical information on both admission and discharge frequently compromises patient care and can lead to poor outcomes which I discuss in this section. In section 2.4.1 I examine the problems arising when an accurate record of the medication patients are taking prior to their admission is not obtained. I also discuss the scale of the problem, consider the reasons why accurate drug histories are often not obtained and the effect on patients care. I examine approaches that have been employed to study this area and consider these in my own study design.

In section 2.4.2 I discuss information transfer from secondary to primary care, when patients are discharge from hospital, and problems that arise. I discuss the methods of transferring information and problems in continuity of patient care.

2.4.1. Medication histories

Accurate information about current drug therapy is vital when patients are admitted to hospital to enable a correct clinical assessment and to plan future treatment. This is particularly important when patients are concurrently or sequentially treated by several physicians. Inaccurate drug histories taken on admission can lead to inappropriate drug therapy in hospital (Feely *et al.*, 1984), and referral letters from GPs do not always contain full information about drug therapy (Claoue and Elkington, 1986). Inaccuracies in the medication history may lead to duplication of drugs, unwanted drug interactions, discontinuation of medication use, missed diagnoses and failure to detect drug related problems.

Studies on the completeness of hospital medical records with respect to the drugs a patient uses directly prior to hospital admission are scarce and have several limitations. The completeness of hospital medical records have been evaluated by comparison with patient questionnaire information only, by comparison with records from the patient's GP, or by comparison with

computerized files of dispensed prescriptions in community pharmacies. Studies, however, tend to focus on one source of information for comparison.

A study in the Netherlands investigated the comprehensiveness of medication histories when patients are admitted to hospital (Lau *et al.*, 2000). This was a prospective study in which patients admitted to a general ward of two acute care hospitals, over a two year period, were included in the study. The researchers interviewed patients to solicit information about all medicines used before admission and extracted the medication history from hospital medical records. Pharmacy records over a 1 year period before the admission were collected from the community pharmacy where the patient was registered and this was compared with the registration of drugs in hospital medical records. Homeopathic drugs and 'over the counter' (OTC) drugs were excluded, and errors in dose and frequency were not considered in the analysis. The investigators found that the medication history in the hospital medical record is often incomplete. 61% of all patients had one or more omission errors, (drugs that were in use but not recorded in the hospital medical record), whilst 17% had three or more omission errors. 26% of the prescription drugs in use were not recorded. 11% and 1.6% of all patients had one and two commission errors respectively (drugs registered in the medical records but not being used by the patient at the time of admission). In total 67% of patients had one or more registration errors (the combination of omission and commission errors) and 18% had three or more. Registration errors covered a broad spectrum of drugs and included many drugs considered important such as cardiovascular and antidiabetic drugs, and NSAIDs. The researchers comment that their estimate of the completeness of the inpatient medical record was probably conservative as they took into account only errors of omission and commission and did not consider errors in dose or regimen.

These results are comparable with those of Beers *et al* (1990). The study design was similar, however, instead of using pharmacy records, an extensive questionnaire with specific questions asked to patients to identify drugs not recorded in the medical record was used, thus introducing the possibility of recall errors by the patient. The investigators reviewed the written drug history

recorded upon admission of 122 patients age 65 and over, and compared it to a structured history they obtained from the patient two days later. Failure to record the use of a medication or the recording of a medication the patient denied using appeared at least once in the hospital records of 83% of patients studied. Three or more errors were found in 46% of patients records. After reviewing the data and excluding OTC, topical, and cold medications, the researchers still reported that, with regard to important drugs, 60% of patients had one error and 18% had three or more. In agreement with Lau *et al* they found omission errors were far more common than commission errors (Lau *et al.*, 2000). Estimation of commission errors could be too low though, as patients tend to deny their nonadherence to medical advice (Cramer and Spilker, 1991).

Van Hessen *et al.* (1990) studied the continuation of outpatient medication in 205 patients after admission to hospital by comparing community pharmacy records with hospital-pharmacy records. This study differs however, in that the actual completeness of medication histories is not assessed, rather the potential effects on the patient. Drugs that were in use according to the community pharmacy records, but were not retrievable in the hospital pharmacy records, were categorized by an expert panel as discontinuations that will not cause problems, as discontinuations that will probably not cause problems, or as discontinuations that should not have occurred, unless purposefully done on the advice of the attending physician. In the last, most serious category of discontinuations, 15 discontinuations in 12 patients (6%) were considered inadvertent as no information was found that could explain the discontinuation. The evidence for the conclusion of the authors, that information of drug histories obtained at the time of hospital admission is not always accurate is indirect, as the completeness of the medical records was not studied, and as other reasons such as an omission to record the reason for stopping a drug in the medical history might account for the lack of information.

Patients are often unable to report accurately the drugs they are taking (Schwarz *et al.*, 1984), and they often deem certain things not to be medications, such as things they put on their skin or in their eyes. Doctors also bear this responsibility, and do not always take the time to ask all the necessary

questions to obtain a complete history, and then don't double-check their information after the acute situation (Walker, 1991).

In an American study, Gleason *et al* (2004), conducted a study to identify the type, frequency and severity of medication discrepancies in admission orders and assess whether pharmacist-obtained and reconciled admission histories reduced the number of medication errors and the potential for harm. Reconciliation consisted of comparing the medicines listed in the admission orders to the documented medication information in the history obtained by the physician, the patient's admission profile (a form completed collaboratively by the nurse and patient) and information obtained during the pharmacist conducted interview. From August 2002 to July 2003 medication reconciliation was conducted with a convenience sample of patients directly admitted to a 725-bed tertiary care, academic medical centre. The researchers interviewed patients who were directly admitted within 24 to 48 hours of admission to obtain their allergy histories and medicines currently being taken, including all prescription and non-prescription medications, vitamins, herbal remedies, and any other products used to supplement the patient's health. This was then compared with allergy and medication histories documented in the patient's medical record. 204 out of 2046 patients (10%) admitted during the study period, were interviewed. The mean amount of time required to obtain a medication history was 11.4 minutes per patient (range 1 to 75 minutes) and the mean patient age was 58.6 (range 19 to 96). A mean of 1.2 discrepancies per patient was identified and the pharmacists made 97 interventions involving 55 patients. Using a validated rating scale, the research nurse and research pharmacist estimated that in the absence of pharmacist intervention, 22% of the discrepancies could have resulted in harm to the patient during hospitalisation, and 59% may have resulted in harm if continued beyond discharge. This is particularly noteworthy as their sample excluded patients who had difficulty communicating their medication histories and higher risk patients e.g. in intensive care, or patients transferred from other hospitals. A limitation of this study however, is the possibility of recall bias. Because of the stress of hospitalisation patients or their carers may not recall the complete medication regimen (Beers *et al.*, 1990). To overcome this in my research I intend to use

other sources such as the GP records, to validate the patient's account of their medication.

Several other solutions have been suggested (Walker, 1991). One is for patients to carry a list of the medications they are taking, but this presents problems if they are not kept up to date. Another answer is to have patients bring their medication into hospital with them but this isn't without problems as many elderly patients hoard medication or may take medication given to them by well-meaning friends.

A series of case studies from a large university hospital in America, demonstrated several near misses, identified by pharmacists, related to patient's self-reported medication histories (Jacobson, 2002). In each case the admitting doctor insisted that the patient's self report was reliable, when in fact, it was inaccurate. The report states that many physicians who were initially irritated with pharmacist's enquiries later acknowledged the diligence of pharmacists to be valuable. The author suggests using open-ended questions when interviewing patients to elicit more accurate information, which I will adopt in my study.

2.4.2. Discharge information

On discharge, patients' medication regimen and treatment plan need to be communicated in a timely and reliable manner to ensure safe and seamless transfer of care back to the primary care team. However, when patients are discharged communication is often slow and incomplete (Department of Health, 2004c). Delays in communicating information about the patient's hospital inpatient episode and discharge medication mean that this information is not available to the GP to enable continuation of care.

Drug therapy is often altered when patients are in hospital and if patients are unaware of the changes and the GP hasn't received the relevant information, they can be inadvertently prescribed drugs that are no longer indicated, duplicate drugs and drugs that interact or are contraindicated. Doctors may overestimate patients' understanding of the discharge treatment plan (Calkins *et al.*, 1997). Patients' misunderstanding of the discharge treatment plan can lead

to poor outcomes in the community. It has been reported that patients being discharged from hospital have a poor understanding of their medication (Cantrill and Clark, 1992, Dyson *et al.*, 1995). One study, for example, showed that 80% of elderly patients who had been prescribed a new drug whilst in hospital did not know what it was for (Cantrill and Clark, 1992). Patients had a poor understanding of side effects that might be expected and precautions they should take, and did not know for how long they should be taking the medication.

Discharged patients may continue to take drugs that are no longer indicated or necessary, or drugs prescribed at discharge may be inadvertently stopped after their return home. Cochrane *et al* (1992) followed up 50 elderly patients 6 to 14 days after discharge, when the drugs supplied by the hospital should have run out and a further supply obtained from the GP. A pharmacist visited each patient's home and used a structured verbal questionnaire to elicit information about the drugs, and where possible all drugs held by the patient at the time of the visit were inspected. The prescription issued on discharge and the drugs actually being taken by the patient at home after discharge were compared. Patients were also asked about information supplied to them by health care professionals during their hospital stay. After returning home the drug regimen of 45 patients differed from that prescribed on discharge, with 11 patients taking a different dose,10 having stopped drugs and 20 taking new drugs. Changes in drug name and strength also occurred. Most of the patients had not been reviewed by their GP and so these changes could not be attributed to clinical judgement. Possible influencing factors included an incomplete drug history, continuation of drugs taken before admission and changes in the prescription not attributable to a conscious clinical decision. After returning home, patients recalled little information being given about drugs in hospital. 46 patients could not remember being told when to take their medication, 41 patients could recall being told the purpose of their drugs, and 30 patients said that they weren't informed they must obtain further supplies of medication when they ran out. The authors conclude that closer communication is needed between hospital and community health care professionals to ensure that patients are informed about their discharge prescription and continuation of treatment.

Burns *et al* (1992) visited 56 elderly patients on or after the 5th day post discharge and assessed their medication. By the day of the visit 15 of the 56 patients had not had a new prescription issued (27%) and had exhausted the hospital supply and 27 patients (48%) had old prescribed medications available at home.

The problems arising from poor communication of prescription details at discharge were highlighted by the Department of Health in 1991(Department of Health, 1991), in an executive letter which stressed the need for "notification in adequate time of the patient's diagnosis and drug therapy so that any ongoing treatment may be maintained". One study showed that 10% of discharge summaries did not include a diagnosis, and up to 22% did not record treatment at discharge (Mottram *et al.*, 1994).

There are currently two methods of transferring discharge medication to general practice from hospital, the preliminary discharge letter (PDL) and the subsequent consultant discharge summary (CDS). As the two documents are written and sent to the GP separately, and more likely by two different people, this provides the potential for errors if they do not agree. A study conducted in Ashton-under-Lyne to determine the nature and extent of medication related problems post-discharge from hospital followed up 63 patients after their discharge (Gardiner, 1998). The investigators contacted the GP practices and discovered that for most patients there was a lack of continuity in one or more aspects between drugs given on discharge and those recorded in the GP computer. There were also very few PDLs which gave exactly the same information as the corresponding CDS. This led to many patients receiving prescriptions from their GP post-discharge, which differed in some aspect from their discharge prescription. The medication of patients readmitted to hospital within six months of discharge was also audited. Most patients had their drug therapy altered between discharge and readmission to hospital. Some changes could be attributed to clinical decisions made by the GP or at the hospital outpatient clinic but others could not.

Jones *et al* (1998) similarly found that errors occur in the prescribing of medicines following discharge and demonstrated that continuity of care is not

up to the standard which is required to deliver maximum benefit to patients. They state that issuing a discharge prescription is extremely valuable as it informs the GP of medication changes immediately, as oppose to waiting weeks for a full discharge letter, however their results indicate that often this does not happen effectively, resulting in patients receiving wrongly prescribed medicines. They found that prescriptions are sometimes issued to patients within a few weeks after hospital discharge, without reference to the discharge prescription, and anecdotal evidence suggests that mistakes also occur when medically unqualified staff update record systems without the intervention of a health care professional.

A study in Glasgow to ascertain whether GPs and community pharmacists wanted or received information on the reasons for drug therapy changes implemented in hospital found that 96% of GPs and 94% of pharmacists said they would like this information to ensure continuity of care (Munday *et al.*, 1997), 58% of GPs were not satisfied with the information they receive about their patients' discharge drug therapy. The preferred method of receiving the information was via a modified hospital discharge letter.

2.4.3. Summary

Communications across the interface must be improved to ensure the risks associated with drug therapy are minimised and that patients gain maximum benefit from their medicines. From this section it is clear that therapeutic problems often occur when patients are transferred between primary and secondary settings. Drug related problems can occur at the time of admission as a result of inaccurate drug histories and discharge back into the community because of unreliable, untimely communication of treatment plans and lack of patient understanding.

This section is particularly pertinent to my research and I have encountered the problems outlined frequently whilst working as a pharmacist in two acute NHS hospitals. Transfer of information about medicines is an area I intend to address in my study and this literature has helped me develop my research approach and attempts to develop and implement interventions aimed at improvement.

2.5. PATIENT EDUCATION AND COMPLIANCE

In this section I discuss patient involvement in their care with respect to drug therapy, in particular communications between health care professionals and patients and behaviour of patients with respect to their medication. In section 2.5.1 I begin by considering various terminologies encountered in this literature. I move on in section 2.5.2 to discuss why patients sometimes deviate, intentionally or unintentionally, from prescribers' instructions and consider this from both the health care professional view point and that of patients themselves. In section 2.5.3 I discuss the incidence of non-compliance medication regimens looking at specific patient groups, such as people with rheumatoid arthritis, cancer patients and people with CHD etc. Then in section 2.5.4 I discuss ways to promote patients' compliance with their medication in particular focussing on patient education.

2.5.1. Terminology and patient compliance

The terms used to describe medicines use which does not fully conform to professionals' recommendations include non-compliance, non-adherence and lack of concordance (Carter and Taylor, 2003). Compliance can be defined as 'the extent to which the patient's actual history of drug administration corresponds to the prescribed regimen' (Urquhart, 1994). This definition includes both quantity and timing of doses. For the purpose of this thesis the terms adherence and compliance have been accepted as synonymous.

Concepts of compliance or adherence have now been subsumed within the framework of concordance, which seeks to promote the taking of medicines through informed agreement between patient and professional. In 1997 the Royal Pharmaceutical Society of Great Britain published its report *"From compliance to concordance: achieving shared goals in medicine taking"*. This was the culmination of two years' work carried out by a multidisciplinary working group whose original brief was to examine the problem of patients' non-compliance with prescribed medication. The working group came to the conclusion that the model of compliance was unhelpful as it carried the assumption that patients should merely carry out doctors' orders, and gave no

value to patients' own ideas or experiences. The report introduced the concept of concordance, which was described as follows:

> *"The clinical encounter is concerned with two sets of contrasted but equally cogent health beliefs – that of the patient and that of the doctor. The task of the patient is to convey her or his health beliefs to the doctor; and of the doctor, to enable this to happen. The task of the doctor or other prescriber is to convey his or her (professionally informed) health beliefs to the patient; and of the patient, to entertain these. The intention is to assist the patient to make as informed a choice as possible about the diagnosis and treatment, about benefit and risk and to take full part in a therapeutic alliance. Although reciprocal, this is an alliance in which the most important determinations are agreed to be those that are made by the patient."*
>
> (Royal Pharmaceutical Society of Great Britain, 1997).

The emphasis of concordance is on communication about medicines, while the concept of compliance focuses on the behaviour of individual patients. Albeit controversial, compliance remains the most widely cited term in the national and international literature on this topic, and the term will continue to be used in this thesis.

Non-compliance with medicines is a widespread, intractable problem, and it significantly compromises the well being of patients (Raynor, 1992). Up to 80% of patients may be 'non-compliant' in their medication taking, (Dunbar-Jacob and Sclenk, 2001), although this varies between patient groups and types of illness.

2.5.2. Why are patients non-compliant?

Previously, it was felt that the patient alone was the cause of non-compliance and patients who refused to do as they were told, or took an irrational attitude to prescribed medicines that could be doing them good, had only themselves to blame. Patients who deviate from the prescribers' instructions can be intentional or unintentional non-compliers (Barber, 2002). Those who intentionally do not

comply have made the decision consciously; the others wish to comply but cannot for some reason and there is overlap between these groups. Some patients who forget to take their medicine (unintentional non-compliance) will do so because their view of the medicine, its importance and risks, may have made taking the medicine a low priority, and hence more easily driven out of mind by other matters.

Deliberate non-compliance can be in the patient's interest, for example, correct titration of the dose and frequency of analgesics, and taking hypnotics and laxatives only when required, even if the medicines are prescribed to be taken regularly.

Unintentional compliance can result from a number of factors, all of which are more likely to occur with more complex regimens (Cramer, 1991, Cramer *et al.*, 1989, Jacobs *et al.*, 1988, Eison *et al.*, 1990). Forgetfulness is the single most common problem with medication compliance, the result of which is partial compliance. Although patients have essentially accepted their diagnosis and need for treatment and are making an effort to participate, they neither achieve their intention nor receive maximum benefit.

Patients may not be given sufficient information to comply even with a simple regimen. Verbal information is largely forgotten (Ley 1973), and if written information is not given, patients' lack of understanding is likely to contribute to non-compliance (Ley 1982), and this must be regarded as non-intentional.

Factors that are predictive of non-compliance are (Carter and Taylor, 2003):

- demographic indicators, for example age, gender and socio-economic status
- medication characteristics, for example side effects, complexity of regimen
- psychosocial issues, for example social support, family functioning, self esteem

Patients' beliefs and perceptions about medication affects compliance, (Horne and Weinman, 1999), for example the extent to which they are perceived as harmful, whether a medicine is perceived as necessary to maintain health, and whether there might be adverse consequences such as side effects or

dependency.

2.5.3. Estimates of non-compliance

In a US study, one-third of patients with arthritis attending hospital rheumatology clinics had 'adjusted' their medication during the previous week (Chewning *et al.*, 2001). Of these, 61% intentionally added or missed doses; the rest forgot. About half were on eight or more different medicines at one time. As the number of drugs increased, patients became more likely to change their regimen without seeking professional advice.

In their review of compliance with oral antineoplastic agents, Partridge *et al* (2002) found that compliance rates are variable, and sometimes very poor. 'Non-compliance' appears to be higher in patients taking cancer medication regimens perceived to be for preventive rather than curative purposes.

Evidence shows that appropriate coronary heart disease (CHD) medication regimens can deliver major health gains cost effectively, but poor compliance reduces their benefits. Sung *et al* (1998) reported that only one-third of patients took at least 90% of their lipid-lowering treatment. Others have estimated discontinuation rates in this context to be 50% after one year and 85% after two years (Insull, 1997). A review by McDermott *et al* (1997) found that non-compliance with CHD treatment was associated with a lower survival rate. Patients with or at risk for coronary artery disease or congestive cardiac failure and who were classified as noncompliant with treatment, were twice as likely to die as those who were compliant. Non-compliance may also increase morbidity. One study in the McDermott *et al* review found that up to 43% of hospitalised cardiovascular disease patients were non-compliant, while another found that non-compliance was one of the two most common reasons for hospital admission.

A review of studies in the US showed that patients on antidepressants took an average of 65% of the prescribed amount, compared to an observed 76% compliance in physical disorders (Cramer and Rosenheck, 1998). Other research has claimed that depressed patients are three times more likely to be non-compliant with medical treatment recommendations in general, as

compared to non-depressed patients (Di Matteo *et al.*, 2000). A national clinical survey of suicide in psychiatric patients revealed non-compliance with treatment is common before suicide (Appleby and *et al*, 1999).

Recent research from Scotland revealed that, among 2920 people with type 2 diabetes, adequate compliance (defined as taking more than 90% of prescribed medication) was found in less than one-third of those prescribed sulphonylureas and/or metformin (Donnan *et al.*, 2002). Patients taking both drugs achieved only 13% compliance.

In a study of epileptic patients, 72% said they never miss taking their anti-epileptic drugs (AEDs), 15% reported missing a dose less than once a week, 9% missed more than once a month, and 4% said that, at least once a week they did not take their treatment as prescribed (Buck *et al.*, 1997).

Greenstein and Siegal (1998) found that one-fifth of patients who underwent a renal transplant were non-compliant (as measured by self-reporting, and defined as one or more medication doses missed within the previous four weeks). Despite the importance of taking immunosuppressive medication to ensure good organ function and avoid rejection, many post-transplant patients are reported to be non-compliant. A review of research on non-compliance rates with immunosuppressive therapy reported figures ranging from 2% to 68% (Chisholm, 2002). Post transplant patients tend to become less compliant over time. In one study of renal transplant patients, 95% were compliant five months after the operation, but only half continued to be so after 12 months (Chisholm *et al.*, 2000).

Non-compliance to antiviral therapy has been identified as a critical factor in HIV treatment failure (Markowitz, 2000).

Estimates of drug non-compliance in the elderly vary, ranging from 40% up to 75% (Salzman, 1995). If patients are not given enough information they may deviate from even simple regimens; written information is rarely given and verbal information is often forgotten. However, a recent study (Cline *et al.*, 1999), found that, despite receiving written and verbal information, 27% of older people discharged from hospital after heart failure were classed as

noncompliant 30 days later. The majority remembered receiving oral information, but less than one in four recalled any written information they were given. Nine percent did not remember receiving any information at all. Half the patients surveyed could not recall the dose of their medication and nearly two-thirds did not know what time of day to take them. In a Danish study, 40% of elderly patients did not know the purpose of their medication, only 20% knew of the consequences of non-compliance, and less than 6% knew about possible side effects of the drugs prescribed for them (Barat *et al.*, 2001).

Elderly patients are more likely than average members of the overall population to:

- be living alone
- be taking multiple medicines with high dose frequencies
- have decreased dexterity and/or cognitive functioning

Combined with lack of knowledge, these factors can lead to unintentional non-compliance. There is also evidence that older people are as likely as people in any other age group to make a rational and intentional decision to change or stop their medication without seeking professional advice. One study found that one-third of the older patients surveyed had altered their medication regimens, primarily because of experienced side effects, adjustments made in response to symptom changes and the perceived inefficacy of treatments prescribed (Lowe and Raynor, 2000).

2.5.4. Interventions to improve compliance

A review by Rotter *et al* (1998) found that interventions to improve compliance generally had a weak to moderate effect. However, even modest improvements could have beneficial effects, save lives and costs. Combined-focus interventions were more successful than single-focus ones, the most effective being a combination of educational, behavioural and effective communications. This educated patients about their illness and treatment, taught behavioural strategies to enable people to cope better with symptoms and medication taking and addressed emotions and moods.

More recently a Cochrane review of interventions (Haynes *et al.*, 2002) to improve compliance found that there had been few well conducted studies, and that many interventions failed. Nearly all the successful studies used complex mixtures of interventions.

Compliance-related interventions should be designed to help the patient make an informed choice about their medicine taking, rather than to 'improve compliance' *per se* (Horne, 2001).

To promote compliance with medication regimens, patients must be given sufficient, accurate information about their prescribed medicines, by professionals with the necessary skills and knowledge to deliver this. In this way patients will be empowered to take a more active role in managing their drug therapy

Tomorrow's doctors encouraged and emphasized improving communication between doctors and patients as a further important factor in decreasing the number of medical errors (General Medical Council, 2003).

2.5.5. Summary

In this section I have discussed the various terminologies used around this subject and moved on to discuss why patients may deviate from medication regimens. I talked about the scale of the problem then examined possible interventions to improve compliance. This literature is extremely relevant to my work as a large part of my study will be examining ways in which we can help patients manage their medicines and I see this as a particularly valuable role for pharmacists working on the wards. In particular I will explore interventions such as patient education to improve compliance and education for doctors and nurses, so they are better equipped to give patients the full support they need with their medication.

Clearly, there is a wide range of potential interventions to improve the use of medicines in older people. These include nursing and medical strategies, and also the use of information technology. However, for the purposes of this study I have focused on the contribution that pharmacists can make, for a number of

reasons: pharmacists receive extensive training in the actions, uses and adverse effects of drugs; these skills are generally acknowledged to be under utilised in the NHS; and developing the contribution of pharmacy is now an important element in Government policy.

2.6. WHAT CAN BE DONE?

In this section I explore the way forward in enhancing patient care with respect to medicines. In section 2.6.1 I discuss the Government's strategy for the NHS to improve quality of care and patient safety and their vision for hospital pharmacy. The Government is committed to raising the quality of service and reducing variations in delivery within the NHS and a policy framework is set out in the NHS Plan, National Service Frameworks and the Programme for Pharmacy in the NHS. I move on, in section 2.6.2 to examine the development of hospital pharmacy services and in section 2.6.3 discuss the progression of clinical pharmacy services. I then introduce the concept of pharmaceutical care in section 2.6.4, and the evolution of pharmacists into more patient focused health care providers. In section 2.6.5 I go on to examine the current realities in pharmacy services and research into pharmacy practice, and the practical reality is that pharmaceutical care is poorly developed in many hospitals. Within this section I discuss work that has been done to evaluate various elements of pharmaceutical care and explore the methods of assessing service provision. I begin with ward-based pharmacy services in section 2.6.5.1 which tend to be evaluated by measuring pharmacist interventions into patient care and recording advice given to medical staff. I examine pharmacists' involvement in patient counselling and the impact this can have on compliance in section 2.6.5.2 moving on in section 2.6.5.3 to discuss the impact of pharmaceutical services at the primary/secondary care interface, in particular admission medication history taking, and discharge planning. Finally I discuss the issues associated with changing practice within organisations and the implications for this research in section 2.6.6.

2.6.1. The Government's strategy

The NHS plan sets out radical proposals for reform in the NHS. The key aims are: to improve quality of care; to re-shape care around the patient, thus improving access to care; and to make better use of the skills and expertise of all NHS staff (Department of Health, 2001b). The Government's Programme for Pharmacy within the new NHS outlines the important role pharmacy has in delivering this plan (Department of Health, 2000c). The need to make the most of the medicines in hospitals, as the service delivery model for hospital care changes, is emphasised. Hospitals are called upon to review their systems regarding medicines, to make them more efficient, convenient and safe, and more patient focussed. The Government have stressed the need to make the most of pharmacists' clinical skills and have emphasised the important role that pharmacists have in establishing and underpinning clinical governance wherever medicines are used in hospitals.

National Service Frameworks (NSFs) set out national standards of care and define service models for specific service areas or care groups. NSFs have already been published for mental health (Department of Health, 1999a), coronary heart disease (Department of Health, 2000b), diabetes (Department of Health, 2001c), children's services (Department of Health, 2001d), renal services (Department of Health, 2004d), and for older people (Department of Health, 2001a). A national service framework for long-term conditions was launched in 2005. A National Cancer Plan has also been issued (Department of Health, 2000a).

Current NHS strategies therefore provide an excellent platform for developing the role of pharmacists. For example, the objectives of the National Service Framework for Older People include (Department of Health, 2001a):

- by 2002 all people over the age of 75 years should have their medicines reviewed at least annually and those taking four or more medicines should have a review every 6 months.

- all hospitals should have 'one stop dispensing/dispensing for discharge' schemes and, where appropriate, self-administration schemes for medicines for older people.
- by 2004 every primary care organisation will have schemes in place so that older people get more help from pharmacists in using their medicines.

As a qualified pharmacist, I see this as a unique opportunity to ensure the skills and expertise of pharmacists that have previously been under utilised, are used most appropriately. This prompted my desire to undertake research into a new model of practice, initially within a particular client group, for example the elderly.

Traditionally, the hospital pharmacist has worked behind the scenes, with little direct patient contact. However, I believe that patient care and outcomes would be improved if pharmacy services were restructured to allow pharmacy staff to assume shared responsibility for drug management, as part of the multidisciplinary team.

2.6.2. Development of hospital pharmacy services

The NHS act (1946) brought existing hospital pharmacy services into the newly formed NHS (Holloway, 1991). With the advent of a national hospital service, hospital pharmacists had high hopes of at last achieving the status and remuneration appropriate to their important work. Their hopes, however, were not realised and their battle for better pay and recognition continued.

In 1955 the first Linstead Report (Ministry of Health, 1955), reviewed hospital pharmacy services and found that there was a shortage of staff in hospital pharmacies due to low salaries, lack of definition of the function of the pharmacy in the hospital and ignorance among pharmacists of their potential role in hospitals. One of its recommendations was that all hospital pharmacies should be under the control of a pharmacist. The ministry of Health then surveyed functions and staffing and their report, which was unpublished, emphasised the need for organisation of hospital pharmacy services to ensure efficiency and economy (Ministry of Health, 1955). An MSc conducted at

Manchester found that few of its recommendations were implemented (Moss-Barclay, 1976).

After the Noel Hall report in 1970 (Department of Health and Social Security *et al.*, 1970), new grading and structures were created for pharmacists and technicians. In the context of clinical pharmacy, the report emphasised the hospital pharmacists' consultative role, recognising their knowledge of clinical pharmacology and their advisory role in prescribing. The report stated that pharmacists had a role in advising on formulation, stability, incompatibilities and conditions of storage, dosage and administration methods, quantitative and qualitative identification of drugs, drug interactions, contraindications and side effects, and costs and sources of drugs. Development of drug information services was suggested and the new ward pharmacy system highly praised.

2.6.3. Clinical Pharmacy

Since the Noel Hall report, in the UK, clinical pharmacy has developed and this was endorsed by the Department of Health in 1988 as a means of increasing cost-effective use of medicines and enhancing patient care (Department of Health, 1988b, Department of Health, 1988a, Department of Health and Social Services, 1989). It recommended the provision of clinical pharmacy services in hospitals, such as monitoring and modifying of drug therapy, discharge counselling and clinical trials support. Similar recommendations were made by pharmacy organisations (United Kingdom Clinical Pharmacy Association, Harrison *et al.*, 1988), and in the 1986 Nuffield report on pharmacy (Pharmacy, 1986).

In the earliest official UK document on clinical pharmacy, The United Kingdom Clinical Pharmacy Association (UKCPA) defined clinical pharmacy and states that it includes educating patients on drug use, educating health care staff, advice and information on drugs, provision of pharmaceutical expertise for clinical problems and surveillance of drug use (United Kingdom Clinical Pharmacy Association). The Nuffield Report (Pharmacy, 1986), described a clinical pharmacist as someone who would *"help particularise the medication to be used.....the pharmacist can contribute to the choice of drug regimen,*

particularly when more than one condition is being treated. The pharmacist should be in a position to supply the physician with evaluated information on pharmaceutical and therapeutic aspects of drug use as well as on the toxic profile of drugs. He can help decide which dosage form or formulation of an active principle should be used and the best route of administration of a medicine; he may be expected to undertake responsibility for deciding the formulation of a medicine or other treatment which the clinician has prescribed; and he may take responsibility for dosage calculations" but would not diagnose. *"The contribution of the pharmacist is additive to, and not a substitute for, that of the doctor"*. In 1988 the Regional Pharmaceutical Officers (RPhOs) Committee (Harrison *et al.*, 1988), said that clinical pharmacists *"should help individualise patients' medication, promote patient compliance and promote the safe, rational and economic use of medicines".*

The Department of Health has long recognised the importance of clinical pharmacy in minimising both clinical and financial risk (Department of Health, 1988b). Enabling pharmacists to contribute more fully to patient care reduces patient morbidity and saves money (Bond and *et al*, 1999).

The Department of Health described clinical pharmacy as a developing role *"in which pharmaceutical skills are systematically applied to medicine usage both at the policy-making level and in the treatment of individual patients"* but the role was limited to help at the request of the doctors (Department of Health, 1988b). The Department views the role of the hospital clinical pharmacist as assisting the doctor in prescribing decisions and monitoring and modifying drug therapy, independently counselling patients on the ward prior to discharge and having a function in clinical trials of medicines.

2.6.4. Pharmaceutical care

The role of the pharmacist is evolving from product orientated custodian to more patient focused health care providers and the term pharmaceutical care is more appropriate to this. The term clinical pharmacy has come to be used generally to describe the knowledge, skills and attitudes required by a pharmacist to contribute to patient care.

Hepler and Strand originally defined the concept of pharmaceutical care more than 10 years ago as:

> *"The responsible provision of drug therapy for the purpose of achieving definite outcomes that improve a patient's quality of life."*
>
> (Hepler and Strand, 1990)

They further refined the definition as:

> *"the process through which a pharmacist co-operates with a patient and other professionals in designing, implementing and monitoring a therapeutic plan that will produce specific therapeutic outcomes".*

This in turn involves three major functions:

- identifying potential and actual drug related problems
- resolving actual drug related problems
- preventing potential drug related problems.

These aims are central to a great deal of pharmacy is trying to achieve in the NHS. The Department of Health in England has adopted the term 'medicines management' rather than pharmaceutical care. Medicines management has been defined by Tweedie and Jones as:

> *"the systematic provision of medicines therapy through a partnership of effort between patients and professionals to deliver best patient outcomes at minimised cost."*
>
> (Tweedie and Jones, 2001)

Although the concepts are related, there has been extensive debate about the terminology and the two terms are not necessarily synonymous. However, for the purposes of this research, the two concepts have been accepted as being convergent.

The philosophy of pharmaceutical care has been given new emphasis by a range of measures recently introduced by Government and the profession. The

Government is committed to raising the quality of service and reducing variations in delivery within the NHS. There is a very strong underlying political drive to achieve this with a policy framework set out in the NHS Plan, National Service Frameworks and the Programme for Pharmacy in the NHS.

Furthermore, the Royal Pharmaceutical Society of Great Britain's *"Pharmacy in a New Age"* strategy, which outlines the profession's future aspirations, strongly promotes the developments in areas such as management of prescribed medicines, management of long-term conditions and advice and support for other healthcare professionals (The Royal Pharmaceutical Society of Great Britain, September 1997), that are central to the concept of pharmaceutical care.

2.6.5. Current realities in pharmacy service provision and research

There is broad agreement between Government and the profession about the development of pharmacy services and pharmaceutical care. In addition to this the Royal College of Physicians (RCP) has suggested that pharmacists could take on some of the work currently undertaken by doctors. A working report noted that pharmacists taking on some of the work of doctors "would be in keeping with their desire to take on an extended clinical role for which they are now being trained," and the aim was to remove the existing "tribal" boundaries (Royal College of Physicians, 2001).

A well-developed clinical pharmacy service has been identified by the Audit Commission as a crucial component of efforts to reduce the risk of medication errors and adverse effects of drugs in hospitals and the commission would like to see pharmacists working as full members of the clinical team (Audit Commission, 2001). In its report, the Commission questions whether NHS trusts throughout England and Wales possess adequate resources to provide all aspects of clinical pharmacy services and highlights the need to link medicines management to clinical governance.

However, although there is a growing literature on pharmaceutical care in UK hospitals, the practical reality is that pharmaceutical care is poorly developed in

many hospitals. Cotter, McKee and Barber, in a comprehensive review in 1995 said that:

> *"clinical pharmacy processes are diverse, ill-defined and sometimes difficult to measure ... the shortage of evaluative studies in clinical pharmacy reflects its ad hoc development in the UK and the failure of managers to fully and objectively assess new services."*
>
> (Cotter *et al.*, 1995)

Since then, there have been no substantive studies that suggest progression towards achieving widespread delivery of pharmaceutical care on any significant scale. There is wide variation in the amount of time pharmacists spend on clinical pharmacy activities (Audit Commission, 2001).

Moreover, because we have no holistic model of total pharmaceutical care in the UK, the term has come to mean almost anything that pharmacists do, over and above direct operational activities. As a result of this lack of an evidence base, the standard of pharmaceutical care varies enormously from patient to patient. Robust, rigorous research is therefore required to identify best practice in pharmaceutical care and to provide a reliable evidence base on which to develop future provision.

Research into pharmacy practice has been hampered by the profession's need to concentrate on issues such as overcoming inadequate facilities, staffing shortages, medication errors, formulary management and the increasing use of more potent and complex medicines (Child D *et al.*, December 2001). Although there is clearly a long way to go yet, the signs for pharmacy practice research are becoming more promising. 'Pharmacy in the Future – Implementing the NHS Plan' acknowledges that hospital pharmaceutical services have come a long way over the past 20 years (Department of Health, 2000c). Medication reviews, one-stop dispensing, use of patients' own drugs, concordance issues, links with primary care, increased roles for technicians and pharmacist prescribing are important roles for hospital pharmacy that have been highlighted, and these appear in the literature with increasing frequency to demonstrate the efficacy of hospital pharmacy. In 'A Vision for Pharmacy in the

New NHS', published in 2003, the Government reinforced its intention of developing wider clinical roles for pharmacists in all sectors (Department of Health, 2003b).

Although no cohesive model of pharmaceutical care has been evaluated in UK hospitals, there is a substantial body of work that has evaluated various elements of pharmaceutical care.

2.6.5.1. Ward-based pharmacy services

Clinical pharmacy services to wards have been evaluated by measuring processes, such as interventions into patient care through monitoring of prescriptions and provision of information and advice on therapeutics to medical staff. Published studies have often contained weaknesses in design and execution and are therefore subject to significant bias.

Nevertheless, the impact of pharmacist interventions on prescribing quality have been shown (Hawkey *et al.*, 1990, Eado, 1992). In addition, doctors almost always accept pharmacists' recommendations to alter drug therapy with over 95% of recommendations being accepted (Barber *et al.*, 1997, Batty and Barber, 1992, Wood and Bell, 1997).

An intervention into drug therapy is defined as 'interference or action taken by the pharmacist to improve drug therapy'. In pharmacy practice research, many studies have used monitoring interventions or contributions that pharmacists make, to provide quantitative and qualitative data on pharmacists' input into patient care (Hawkey *et al.*, 1990, Lannigan, 1994, Clark *et al.*, 1995, Hubbard and Alder, 1992, Glinn, 1993, Hatoum *et al.*, 1988, Bertch *et al.*, 1988, Eadon, 1992).

Wood and Bell conducted a study to implement a model of analysing the level of involvement of pharmacists in drug therapy decisions (Wood and Bell, 1997). Over a three month period events were recorded for one week of each month, by six ward-based and six dispensary-based pharmacists. Overall the pharmacist's advice was accepted by prescribers on 97% of occasions, resulting in a change to drug therapy in 82% of cases. They showed that ward-

based pharmacists were far more likely to influence the outcome of drug therapy decisions than those based in dispensaries. Their results showed that for ward-based pharmacists, their work location provides them with an increased opportunity to behave proactively and to be involved in the drug therapy decision-making process. In addition the perceived impact on patient care (significance of the intervention) was greater when pharmacists were ward-based, rather than simply providing traditional ward visits.

Barber *et al* conducted a study monitoring pharmacist interventions in which all pharmacists who visited patient wards in 27 acute care hospitals recorded their daily ward visits and their clinical interventions, during 5 consecutive days (Barber *et al.*, 1997), 248 pharmacists visited 10,478 beds and proposed 3,501 interventions. Of these 3371(96%) were accepted, 56 were rejected and 74 were unresolved. The most frequent reasons for the intervention involved the dose (29%), the need for therapy (21%), the choice of drug (14%), and the route (12%).

Batty and Barber carried out a survey in one English region (31 acute hospitals with 10,337 beds) over 7 days (Batty and Barber, 1992). Pharmacists advised doctors on 2095 occasions, most commonly relating to the dose and frequency of administration, and this was accepted in 96% of instances.

Some studies look at perceived contribution to patient care by assessing clinical significance of interventions. However, many fail to include an independent assessor, and are therefore subject to bias.

Hawkey *et al* (1990) analysed the interventions made by 35 pharmacists at 6 hospitals, over 28 days. These interventions were analysed for their potential for preventing harm by one doctor. 769 interventions were made (2.9% of all prescriptions); 7.8% of these were on prescriptions with major potential for harm and 22.8% had appreciable potential for harm. 86% of pharmacist-interventions were accepted, with wrong dose (280), dose not stated (50) and excessive duration of antibiotics being the commonest problems. Assessment by a juror of one doctor is open to potential invalidity and bias. Bias due to the collection of data by pharmacists is also a possibility.

Leach *et al* (1981) conducted a retrospective survey of a random sample of prescriptions form 6 wards in one general hospital for prescribing errors for three months before and after the introduction of a ward pharmacy service. A prospective study was performed of the contribution made by three ward pharmacists. Personal records were made of the activities carried out by three ward pharmacists on 13 medical and 5 surgical wards over three months. Pharmacists noted any drug related problem that they detected, their action, the result, and any questions asked by ward staff. Also a questionnaire survey of medical and nursing staffs' opinions on the value of the service was carried out. The results showed that a ward pharmacy service reduced errors and ambiguities of prescribing by 40-50%, assisted in the safe and more effective use of medicines in hospitals and was valued by medical and nursing staff. The main weaknesses of this study were potential bias due to pharmacists self-recording and assessing their activities with no independent assessment and confounding (possible non-comparability of time periods).

Dhillon *et al* (2000) showed that 467 interventions of major significance were identified in 33 Trusts over a one week period. The pharmacist's advice was accepted in 98% of cases. The data was further validated by a panel of clinical pharmacists and it showed that 325 patients had a major adverse drug event prevented. If these figures were extrapolated to provide annual rates in these 33 Trusts, approximately 17,000 patients had a major adverse drug prevented.

Stubbs *et al* (2004) studied the nature and effectiveness of pharmacists' interventions in correcting prescribing errors they detected during a one-month period in a psychiatric hospital. Pharmacists in the course of their work in pharmacy and on the wards, recorded on data entry forms, details of prescriptions they considered contained prescribing errors. They also recorded whether or not the drugs had been administered. Data were scrutinised by the two study pharmacists and a consultant psychiatrist involved in the study. 211 errors were detected in 188 prescribed items, with prescription writing errors (76%) more common than decision making ones (24%). Pharmacists corrected errors in 92% of instances, however the drug had already been administered in 65%. The potential severity of prescribing errors was rated by the investigators

and 11.4% were considered to have potential to cause harm for example prescribing ibuprofen with lithium, omitting antidepressant on discharge medication and incorrect high starting dose for quetiapine. Again, bias may have been introduced in this study due to a lack of independent assessment, as the 3 investigators rated all the pharmacist interventions.

Griffith *et al* demonstrated the beneficial effects of pharmacy services on hypnotic prescribing in a hospital setting (Griffith and Robinson, 1996). As part of an on-going pharmacy audit, a policy was implemented to try and improve prescribing habits resulting in the average monthly number of sleeping tablets prescribed falling from 2392 to 734.

Pharmacists have traditionally had an important quality control role in checking patients' medication. The Audit Commission reported that typically, pharmacists within six hospitals in the Oxford region, amend between one-fifth and one-quarter of inpatient prescription charts, for a variety of reasons that reflect shortcomings in the basic rules of prescribing (Audit Commission, 2001).

In a study detailed in section 2.2.4.2, pharmacists were the main source of defence, identifying and rectifying all the 88 serious prescribing errors reported in the study (Dean *et al.*, 2002). Prescribers who made 44 of the mistakes were interviewed and pharmacists were specifically mentioned in 16 interviews. Doctors welcomed help from pharmacists, since they not only identified mistakes, but also provided an educational role to the individuals in doing so. However, some junior doctors suggested that they trusted the pharmacists carry out this role so much so that they would sometimes not bother to look up doses.

The presence of pharmacists on ward rounds as a full member of the patient care team reduces prescribing errors significantly, (Leape *et al*, 1999), enhances patient care and reduces drug costs.

Cloete and Heath (1997) recorded and costed changes in drug therapy resulting from pharmacist interventions on psychiatric consultant ward rounds, over a 12 month period. There was a 29% reduction in the number of drugs prescribed per patient, the number of patients taking more than one antipsychotic dropped from 54% to 29% and those taking more than two antipsychotics from 2.5% to

zero. The number of patients on antipsychotics who were also taking an anticholinergic dropped from 62.5% to 43%. The calculated saving in the drugs bill over the 12 month period was £3212.

Although some studies have examined the economic benefits of particular aspects of pharmaceutical care, such as the impact on drug costs, there are no UK studies that address a full economic evaluation, taking into account factors such as potential cost minimisation through avoidance of medication errors and adverse reactions, reduced hospital re-admissions, reduced length of hospital stay and/or social costs.

In this section I have shown that ward-based pharmacists have an important role in improving patient care and advice is almost always accepted by prescribers. Inclusion of pharmacists in medical teams gives greater scope for them to contribute proactively rather than reactively. This literature is especially important for my study as it provides support for my hypothesis about the value of pharmacists working on wards and being more intimately involved with patient care. It also gives me guidance about how to design my study, particularly in attempting to strengthen my approach. Intervention monitoring is clearly a valuable method of assessing the impact ward-based pharmacists can have on patient care, although it has limitations, for example it is difficult to link their effect to patient outcomes, which I discuss in more detail in section 2.7, and different people assessing interventions may disagree on their clinical significance. In my study I intend to use two independent pharmacist assessors to measure the significance of any interventions into patient care in an attempt to avoid bias. The literature has helped me understand the limitations of intervention monitoring and I discuss this later in my thesis.

2.6.5.2. Compliance and patient education

Several, mainly small, studies have shown that verbal education improves patient knowledge and compliance in the short term and that, subjectively, patient responses are favourable (Cotter *et al.*, 1995).

MacDonald *et al* (1977) assessed the value of patient education by a pharmacist and memory aids in improving compliance in geriatric patients.

Patients were allocated to one of three groups. 60 patients were educated by a pharmacist for 15 minutes prior to discharge and their understanding was formally assessed. 45 patients were counselled in the above manner but were also issued a memory aid such as a daily calendar specifying the medication schedule. 60 patients acted as controls receiving no counselling from the pharmacist, receiving only the brief description of tablets from nursing staff. All patients completed a mental status questionnaire (MSQ) and all were able to take their tablets before leaving hospital. A week after discharge patients were asked to detail their dosing schedule and describe the purpose of their tablets. Compliance was checked using a tablet count. Patients in the three groups were similar in age, sex, MSQ score and number of tablets being taken. Improved compliance was seen in the educated groups at follow-up and this was statistically significant. The use of memory aids did not improve compliance. Multiple errors were more common in patients who had not received any education. The validity of this study however, is questionable as tablet count may not give a reliable indication of the number of tablets being taken and does not measure when tablets were taken. The examination of patients' knowledge of their dosage schedule reduced this potential problem but the assessment of patients' knowledge by the educating pharmacist may have biased the results.

Johnston *et al* conducted a randomised controlled trial in a single hospital (Johnston *et al.*, 1986). The control group received the usual nurse education on discharge whereas patients in the test group were given additional education by a clinical pharmacist. Later on the day of education, a psychologist blindly assessed the patients' knowledge using a standardised format. 13 controls and 14 test patients were recruited and those educated by the pharmacist were significantly better informed about their medicines than controls ($P<0.02$). The independent assessment helped reduce bias, but the lack of post discharge follow-up made it difficult to assess the true effects of pharmacist education.

Goodyer *et al* randomly allocated elderly patients with chronic stable heart failure to receive a 3 month pharmacist education programme, or no education (Goodyer *et al.*, 1995). Compliance improved for the pharmacist educated

group by 32% but remained unchanged for controls. Medication knowledge, 6 minute exercise test and peripheral and pulmonary oedema scores improved for the educated group only, remaining stable or worsening in the control group. Improved compliance due to intensive medication education by a pharmacist had a small but measurable beneficial effect on objective measures of heart failure.

Wandless and Whitmore, however, found that education by a pharmacist in elderly patients at a day hospital had no effect on compliance (Wandless and Whitmore, 1981). They randomly allocated patients with a mental test score (MTS) of 20 or more to a control or test group. A pharmacist educated the test patients and the control group had no education. Compliance was assessed by tablet count. Test patients' initial understanding of their medication regimen was assessed by the pharmacist by asking them to recall their dosage regimen. 23 patients were allocated to the control group and 30 patients to the test group. Patients were similar in age, MTS and number of prescribed medicines but their error rate in recalling their dosage regimens were significantly different. Before pharmacist education 13 test patients were non-compliant; after education 14 were non-compliant. Differences in patients at baseline, the use of tablet counts to assess compliance and the use of the pharmacist educator to assess knowledge and errors make the results subject to bias and confounding.

As already discussed, the concept of concordance is now promoted and research in this area is currently growing. For example, Blenkinsopp *et al* showed that a structured intervention significantly improved clinical outcomes in people with hypertension, albeit in a primary care setting (Blenkinsopp *et al.*, 2000). From previous research and interviews with 40 hypertensive patients they developed a questioning protocol for pharmacists to use with patients which contained questions about:

- whether the patient was having any difficulties with medication,
- how often the patient had forgotten to take the medicine, increased or reduced the dose, missed doses or stopped taking the medicine altogether,
- what side effects patients experienced,

- whether patients wanted more information about his/her condition or medication,
- if patients had any questions.

25 community pharmacists were randomised into intervention or control sites and were asked to recruit 20 patients receiving treatment for hypertension. The pharmacists in the intervention group delivered the intervention to a total of 117 patients on two or three occasions, two months apart, and on each occasion the pharmacists recorded the patients responses to the questions, the actions the pharmacists took and the length of the conversation. The pharmacists in the control group provided normal care to 115 patients. Data from the patients' medical records showed that those who had uncontrolled blood pressure before the study were significantly more likely to have controlled blood pressure after the study if they received the intervention than if they were in the control group. The patients in the intervention group also reported significantly increased adherence and greater satisfaction with several aspects of pharmacy services after the intervention.

In this section I have presented several studies which demonstrate the benefits on compliance that pharmacist counselling of patients can have. One study failed to demonstrate any effect. This literature has been especially helpful when considering how I will assess patient compliance and the best way to intervene to improve patients' understanding of their medication regimen, and therefore the opportunity for compliance at home. Clearly there are problems in assessing compliance and the effect that counselling has on this. I intend to use careful patient questioning to gain a measure of compliance rather than tablet count, as I feel that particularly in a hospital setting, where patients often do not bring all their tablets from home, this is more appropriate. The intervention in this study will involve two-way communication between patient and pharmacist, based on a patient centred approach in which the pharmacist assesses patients' experience of their condition and treatment, and a structured questioning protocol to identify patients' medication problems (Cox *et al.*,2004). Interventions such as this appear to have an impact on many outcomes

including patient medication knowledge, satisfaction, changes in health and adherence.

2.6.5.3. Evaluation of pharmaceutical care services at the primary/secondary care interface

In this section I present research into pharmacy input at the point of admission, undertaking drug histories, and at discharge, to facilitate continuity of care. I discuss various pharmacist interventions at the primary/secondary care interface and methods used to evaluate these.

Admission medication histories taken by pharmacists have consistently been shown to be more accurate and complete than those taken by junior medical staff, (Truitt *et al.*, 1982, Titcomb, 1989, Badowski *et al.*, 1984), although there is little information on the contribution this makes to patient outcomes.

Dodds (1982) compared the drug history taken by a pharmacist using a specifically designed questionnaire, to that of the doctor's normal history for 302 patients admitted to a gynaecological ward over 4 months. In the first month of comparison, the doctor omitted 41% of entries recorded by the pharmacist, and in the second month omitted 21%. Of ADRs detected by the pharmacist, the doctor missed 56% in the first month and 15% in the second month. The study was biased because the doctor was aware of more information at the time of drug history taking than the pharmacist. This study, although lacking data on outcome, showed that the process of care was enhanced.

As part of a five month study on three care of the elderly wards, to evaluate provision of a pharmaceutical care service, Binyon (1994) undertook a drug history procedure and pharmaceutical assessment for 38 patients. The results state 24 cases of treatment being adjusted and improved based on information obtained from the pharmacist drug history procedure, although the types of drugs or clinical significance of these are not assessed.

Badowski *et al* (1984), validated a questionnaire to be used by a pharmacist to obtain a drug history and determine the clinical importance of the extra information obtained by the pharmacist compared with that obtained by the

physician. Once the validity of the questionnaire was confirmed using six simulated patients, a pharmacist used the questionnaire to interview 80 newly diagnosed patients and was blinded to the physician's drug history, which served as a control. The additional drug history information was shared with the physician as soon as it was obtained as it was deemed unethical not to do so. The results were reviewed by a panel consisting a doctor and two clinical pharmacists, to determine if additional information had indeed been obtained, and the clinical importance of this. The pharmacist obtained at least one piece of additional information for 76 of the 80 patients. The expert panel concluded that 11% of drug histories obtained by the pharmacist contained clinically important information missed by the physician, for example, well-defined allergies to antibiotics, contraindications to drugs, and drug interactions. It is not stated whether the panel were independent to the study therefore potential bias could not be identified.

In a recent study, outlined in section 2.4.1, Gleason *et al* concluded that reconciliation by pharmacists of discrepancies in admission medication histories and orders decreased opportunities for medication errors and the potential for patient harm (Gleason *et al.*, 2004).

Pharmacist involvement in discharge also facilitates continuation of care and enhances patient outcomes. There is evidence that pharmacists are five times more accurate than doctors in writing discharge prescriptions (Stevenson, 1998). The studies examining the effectiveness of pharmacy input into discharge of patients are subject to the same biases as previously mentioned intervention studies i.e. the same pharmacists delivering and evaluating the intervention.

Shaw *et al* evaluated the effect of pharmacy discharge planning on the pharmaceutical care issues experienced by 97 discharged mental health patients (Shaw *et al.*, 2000). Patients recruited from three acute-admission psychiatric wards were randomly allocated to either an intervention group (receiving a baseline pharmaceutical needs assessment, information about medicines and then a pharmacy discharge plan sent to their community pharmacy) or a control group (no such additional pharmaceutical care).

Domiciliary visits were carried out at one, four and 12 weeks post-discharge and medicine knowledge and the number and types of medication problems experienced were assessed at each visit. Fewer medication problems were recorded for the intervention group and there was a trend for reduced readmissions, but this was not statistically significant.

Following a pilot phase on an acute admissions ward, Cattell *et al*, assigned 68 patients from one surgical and one medical ward, to have their discharge medication organised by either a pharmacist (intervention group) or using the existing system (control group) (Cattell *et al.*, 2001). Median discharge prescription processing time (time from discharge decision to patient discharge) was significantly less in the intervention group than in the control group (322 versus 460 minutes, P=0.0056). The median discharge prescription dispensing time was significantly greater with the existing system than when prescriptions were transcribed by the discharge pharmacist (240 versus 177 minutes, P=0.005). Integration of a pharmacist into the discharge system was found to improve the timeliness of discharge, benefiting hospital bed management. Significant reductions in wastage and release of medical time were also demonstrated.

Cromarty *et al* recruited 90 elderly patients to a test or control group on discharge (Cromarty *et al.*, 1998). A pharmacy information letter providing information on the discharge medication was given to the test group of patients only, at discharge and a copy was sent to the patient's GP, community pharmacist and community nurse. The provision of this letter was valued by patients and significantly decreased the incidence, once home, of medication related problems.

Patients whose medicines are assessed by pharmacists both before and four weeks after discharge from hospital require less long-term social support, are less likely to be readmitted or to suffer adverse effects from their medicines (Green, 2000). In a project at a UK general hospital lead by Green, patients considered suitable for early discharge were visited by a 'collaborative care' pharmacist 48 hours before being sent home. Patients' take home medicines were reviewed by the pharmacist and a care plan was drawn up identifying any

potential risks, for example continuation of drugs that had been intended for short courses, falls possibly due to medication and complicated drug regimens. Patients were pleased to be visited and the earlier discharge increased the number of beds available. The collaborative care pharmacist used a scoring system to assess the patient's level of risk from their medicines and their ability to cope with their dosing regimens and those with higher scores were most likely to need continued support. This project won the Shared Care Section of the Pharmaceutical Care Awards 1999.

Subsequently, a study has been undertaken to validate this scoring system (Ranson *et al.*, 2003). Over a four month period, 99 patients were referred by the Collaborative Care Service (a team made up of physiotherapists, occupational therapists, carers and a pharmacy team which aims to facilitate the transition of patients from hospital into the community). A pharmacist saw patients prior to discharge and scored them using the risk assessment tool (RAT). All patients were followed up 2 to 4 weeks after discharge by a second pharmacist, blind to the risk score, who carried out a semi-structured interview to identify medicine related problems (MRPs). 51 patients were given a high-risk score and 48 a low-risk score. 294 MRPs were identified on follow-up, of which 79% were from the high-risk group. There was a significant difference in the mean number of MRPs in the high-risk group compared to the low risk group. A strong correlation was found between the total risk score and MRPs and the authors concluded that the RAT was effective at highlighting patients who would most benefit from extra pharmaceutical input following discharge.

Despite evidence supporting pharmacist involvement to improve seamless pharmaceutical care at discharge, (Dobrzanski and Reidy, 1993, Coombes and Horne, 1994, Cantrill and Clark, 1992, Lord, 1999, Milliken and Rea, 1997), many of these schemes have been restricted to certain wards or selected patients or have formed part of a research project that has proved difficult to expand or continue because of staffing difficulties. In addition, bed pressures may lead to hasty discharges which preclude proper discharge planning even when resources are available. In 1987, 40% of nearly 200 patients discharged

from Welsh hospitals had less than 24 hour notice of their impending discharge (Victor and Vetter, 1987).

In 1999, Sexton *et al* sent a questionnaire to each NHS Trust providing acute hospital services in the UK, with a covering letter to the chief pharmacist requesting it be forwarded to the most appropriate pharmacist for completion (Sexton *et al.*, 2000). The response rate was 73.4%, and virtually all discharge prescriptions were hand written by junior doctors. The major contribution of pharmacists was screening the prescription against the ward prescription chart, but a quarter of Trusts replied that even this did not happen. Hospitals used a wide variety of methods to communicate information about medicine regimens to GPs and discharge counselling, telephone 'help-lines' and clear medication records to patients also varied widely. The authors conclude that there is still a wide variation within hospital pharmacy practice in meeting the medicines-related needs of patients at discharge.

In this section I have discussed the value of pharmacists working closely with patients at the time of admission and discharge from hospital to ensure optimum patient care with respect to medicines. It is clear that pharmacists have a particularly useful role in obtaining drug histories. This literature is particularly useful as I will be examining how doctors obtain drug histories and how accurate they are, and if there are similar problems, as I suspect, at the study trust, I will develop an intervention aimed at improvement. The studies have guided me in how I will conduct my work, especially how drug histories should be obtained and how to assess the benefit of this method. It is important not only to quantify the discrepancies between different methods of taking drug histories, but to look at the clinical significance.

It is also evident that pharmacists have an important role in coordinating discharge medication. The studies suggest that patients experience fewer MRPs when pharmacists are involved in assessing pharmaceutical needs, planning discharge medication and providing information to patients. There is also evidence that patients with more complicated medication regimens can be targeted as they have more MRPs following discharge. Patients were found to appreciate pharmacist involvement, time to discharge may be shortened and

possibly readmission rates reduced. This literature has again helped me plan how I will conduct my study in particular developing and assessing discharge interventions. Planning for discharge must start early in the patient's stay to enable patients needs with respect to their medicines to be met.

2.6.6. Changing practice

Achieving wholesale change in practice may be difficult. Recommendations made based my research will probably be insufficient to change practice. Professional behaviour is influenced by organisational and community environments of practice as well as beliefs, attitudes and knowledge (University of York. NHS Centre for Reviews and Dissemination, 1999).

Before attempting to implement a new approach to pharmacy practice it is essential that factors which are likely to influence the proposed change are identified. Organisations are thought to move through a series of stages in the process of change. For example an early model still in use today suggests three stages: **Unfreezing** of old behaviours or practices, i.e. a recognition that the old ways of doing things are no longer sustainable, **changing** to a new position, maybe through exposure to new information and **refreezing** of new attitudes, practices or policies through reinforcement and support (Lewin, 1951).

Barriers are factors which impede the implementation of change in professional practice. They have been classified as those related to the individual health care professional (knowledge, skills, attitudes, habits), to the social context of care provision (reactions of patients, colleagues, authorities) or to the organisational context (available resources, organisational climate, structures etc). To implement a new approach to pharmacy practice effectively the factors which may either enhance or inhibit the change of practice must be identified, and taken into account.

It is well established Government policy to break down professional barriers where they adversely affect patient care. The service developments and extension of the roles of pharmacy staff proposed from this research therefore fit in very well with Government's vision for the NHS. The old stereotypes of doctors, nurses and pharmacists must be broken down, with shifting of role

boundaries to reflect the needs of patients. Work organisations, however, try to define the various roles in their hierarchies as closely as possible so that there will be no conflict about different people's rights and responsibilities (Banton, 1965). In one sense it is in the interest of the patient to have subdivisions within the workforce as each professional group has its own body of knowledge and skills to offer the patient, for example a pharmacist has specialist knowledge relating to therapeutics. Whilst the separatist way of working, and professional isolation has this advantage for patients, it is vital for healthcare workers to work as a team, communicate well and share therapeutic aims to ensure optimum patient care.

This is very important within my study as it is essential that I identify how the barriers to implementation will be overcome and how it is possible for the pharmacist to be accepted into the multidisciplinary team. From my previous experience I feel that the most important obstacles are people, specifically different professional groups. The culture in the Trust and issues of professional autonomy and practice are also obstacles to implementing change. It is vital that I consider these issues throughout the course of this study.

2.6.7. Summary

In section 2.6 I have discussed strategies for improving medicines aspects of patient care. I have examined the Governments strategy and commitment to improving the quality of patient care, and their vision for pharmacy services to deliver this. I have discussed the development of hospital pharmacy services, the progression to clinical pharmacy and then the concept of pharmaceutical care. I then described the current realities in pharmacy services and research in this area. Finally I explored the difficulties which may be faced in attempting change within organisations, and issues which will need to be addressed. This literature is particularly relevant as it demonstrates that my research is in line with current Government policy and aspirations of the pharmacy profession. In addition it gives some background about the development of pharmacy services and the current position. This will assist in developing my interventions and give me studies in similar areas to which I can compare and contrast my data to help theorising and discussion of results.

2.7. ACTION RESEARCH

In this section I will discuss action research, starting with a brief overview of action research, then in section 2.7.1 I explain some of the problems researchers face when trying to develop methodologies to assess the impact of interventions. In section 2.7.2 I discuss the various typologies and distinguishing criteria that have been used to differentiate between different types of action research. Then in section 2.7.3 I explore the application of action research in health care, in particular in nursing in section 2.7.3.1, in medicine in section 2.7.3.2 and pharmacy and medicines management in section 2.7.2.3. In section 2.7.4 I discuss the value of qualitative methods in health care research. In section 2.7.4.1 I introduce ethnographic technique moving on to discuss its use specifically in health care research. In section 2.7.4.2 I describe participant observation, in section 2.7.4.3 I discuss interview techniques and in section 2.7.4.4 I describe the use of focus groups. I finally move on to talk about data analysis and theorizing using grounded theory in section 2.7.4.5 I describe method triangulation in section 2.7.4.6.

In this study, I have used action research methodology, as it is particularly suited to identifying problems and their solutions in clinical practice (Hart and Bond, 1995). Action research is a style of research rather than a specific method, and may employ a range of research methodologies. Adopting this approach does not constrain a study to particular qualitative or quantitative methods; a range of methods can be used, enabling triangulation of data which will help overcome the problems of any single approach. Because of the complexity of the study setting this was considered to be a particular advantage.

Kurt Lewin is recognised as the founder of action research, introducing the term as a way of generating knowledge about a system at the same time as trying to change it. Lewin was a social scientist, concerned with intergroup relations and minority problems in the United States. He placed much emphasis on the need for practical joint studies between social scientists and practitioners, aimed towards social change through a problem solving approach (Lewin, 1946).

Action research is particularly suited to identifying problems in clinical practice and helping develop potential solutions – serving to bridge the gap between theory and practice. Action research is powered by the processes of enquiry, intervention and evaluation, and it aims at both taking action and creating knowledge or theory about that action. It is cyclical in nature and underpinned by a collaborative and democratic philosophy – that is, it involves a supportive partnership of researchers and researched, being concerned with doing research with and for people, not on them. In this way action research empowers both researchers and participants (Hart and Bond, 1995, Webb, 1989, Meyer, 1993, Holter and Schwartz-Barcott, 1993). Similarly, Meyer's definition of action research, incorporates three important elements: its participatory character; its democratic impulse; and its simultaneous contribution to social science and social change (Meyer, 2000). These elements are reflected in the current study. Both patients and health care practitioners were active participants feeding their views and experiences into the research process and significantly influencing development of the model of care. The study has identified improvements in care and has added to the knowledge base underpinning the development of pharmaceutical care.

It has been suggested that professional practitioners often engage in practice at less than effective levels because they follow routines, and furthermore, their actual practice does not necessarily coincide with their 'better knowledge', or espoused theories about good practice (Kim, 1999). Practitioners may not even be aware of this divergence. Action research that includes reflective practice is a way of determining why professional practice diverges from the ideal.

In essence, action research involves a cyclical process which identifies a problem in practice, reflection and analysis to assess the problem and develop a plan for improvement, action to implement change and evaluating and learning from the change process. The cycle continues, with findings fed back into practice with the aim of continuous improvement (figure 2.6).

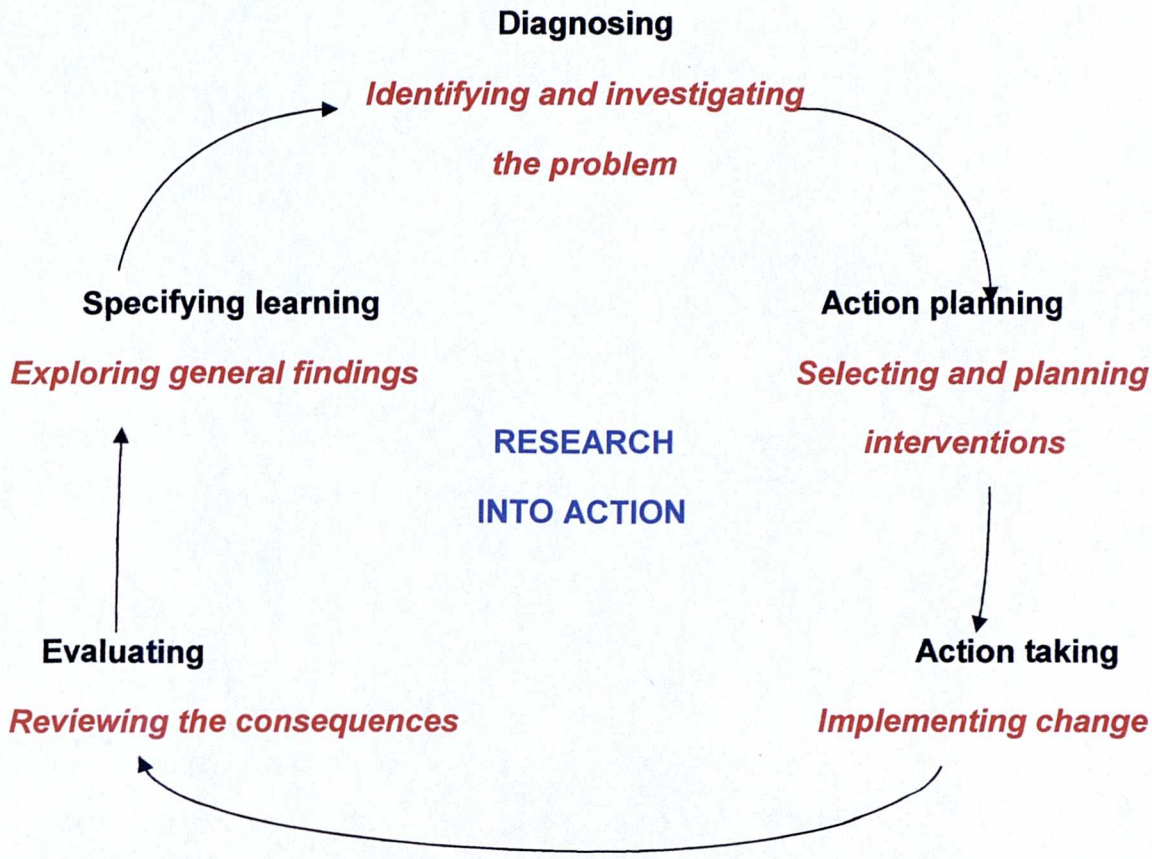


Figure 2.6 The cyclical process of action research

Lewin described the process as a spiral of steps, initiated by a general idea and general objective (Hart and Bond, 1995). The first step is fact-finding about the original idea; planning and further fact-finding; taking action, which may involve modification of the original idea; evaluating the action; and on the basis of this further planning and modification takes place and a decision is made about the next step. The next step then proceeds in the same way as the first, so that, "…..rational social management, therefore proceeds in a spiral of steps each of which is composed of a circle of planning, action and fact-finding about the result of the action."(Lewin, 1946)

2.7.1. Methodological difficulties

In this section, I give a brief explanation of the problems researchers face when trying to develop methodologies to assess the impact of interventions into patient care.

The major difficulty in evaluating the efficacy of patient centred pharmacy services is the problem of linking their effect to patient outcomes. The impact of a pharmacist's contribution to patient outcome is difficult to measure as it is only one part of the total patient care package provided by health care professionals. Even a specific indicator like the use and choice of drugs is influenced by several factors such as: patients themselves, doctors and other members of the healthcare team, hospital policies and the wider prescribing policy environment, e.g. NICE. Furthermore, even obtaining consensus of what constitutes a reliable or acceptable outcome measure of clinical pharmacy performance can be problematic (Fowler and Campbell, 2001).

Although outcome measurement is considered to be the ultimate test of effectiveness of a service, difficulties in measurement mean that research into pharmaceutical care has tended to focus on structure and process. There is a tacit assumption that if these are improved, then patient outcomes will similarly benefit. These studies are only reliable if we can be certain of the relationship between process and structure variables and true clinical outcomes. A further difficulty is that, although hospital pharmacists frequently influence therapeutic decisions, their input is rarely recorded in the medical record.

The Medical Research Council has defined the concept of a 'complex intervention' as comprising a number of separate elements, which seem essential to the proper functioning of the intervention, although the "active ingredients" of the intervention (that are effective) are difficult to specify (Medical Research Council, April 2000).

Clearly, pharmaceutical care is a complex intervention. It is multi-factorial with patients receiving a range of services. The "active ingredients" of pharmaceutical care are not easily defined, and there are many intangible

elements such as the pharmacist's personality, expertise, skill mix, patient characteristics, inter-professional relationships and organisational culture.

Even if all other influences on patient outcomes were absent or could be controlled, pharmaceutical care itself would remain intrinsically difficult to evaluate because of this complexity. This explains the attraction of methodologies that seek to reduce the complexity by focussing on discrete segments of care such as medication histories – they can yield valuable results but fail to capture the real impact on patient experience.

Direct measurement of patient outcomes is often not possible for ethical reasons, for example studies estimating the potential impact of pharmacist identification and correction of prescribing errors, on patient and economic outcomes. These studies can only "estimate" the expected impact rather than "measure" the observed impact that prescribing errors would have in the absence of pharmacists' interventions. This represents the only practical method of evaluating the impact of some pharmaceutical care interventions.

The alternative is to knowingly allow prescribing errors and medication errors to occur so it is possible to observe and measure their impact on patient outcomes. This is obviously unethical. There may indeed be some important aspects of pharmaceutical care for which true patient outcomes may never be available.

Similarly, problems arise in attempting to use comparisons in evaluating pharmaceutical care. Now it is unethical to compare pharmaceutical care services with a "no service scenario".

Most published studies have used quantitative methodologies. However, qualitative studies can yield valuable insights into patient experience and are widely used in other areas of health services research. Combining both methodologies can provide a powerful tool to research complex interventions such as pharmaceutical care.

In summary, designing studies such as my own is very difficult and careful consideration must be given to methods used. I should therefore pay particular

attention to my methods when presenting and discussing the results. I will now give a brief rationale and background for the methodologies employed in this study.

2.7.2. Action research in process: typologies

Various typologies and distinguishing criteria have been put forward to differentiate between different types and models of action research. Hart and Bond (1995) suggested seven criteria which identify different types of action research, and which together differentiate action research from other methododologies. In their typology, action research:

- is educative for those involved,
- deals with individuals as co-workers of social groups,
- is problem-focussed, context specific and future orientated,
- involves a change intervention,
- aims at improvement and involvement,
- involves a cyclical process in which research, action and evaluation are interlinked and
- is founded on a research relationship in which those involved are participants in the change process.

Using these criteria, Hart and Bond identify four basic types of action research:

- the **'experimental type'** which is most closely associated with the early days of action research and the scientific approach to social problems,
- the **'organisational type'** which represents the application of action research to organisational problem solving, including problems such as restriction of absenteeism, and has its core concern to overcome resistance to change and create more productive working relationships,
- the **'professionalising type'** which is informed by an agenda grounded in practice which also reflects the aspirations of the new professions, such as nursing, teaching and social work to enhance their status on a par with the

established professions such as law and medicine, and to develop a research-based practice and

- the **'empowering type'** which is most closely associated with community development approaches and is characterised by an explicit anti-oppressive stance to working with vulnerable groups in society.

Moving across the typology from the 'experimental' to the 'empowering' type, can be interpreted as a developmental process as action research has shifted from a scientific approach to social change to a more qualitative approach involving negotiated solutions.

Against a nursing background, Holter and Schwartz-Barcott (1993) have identified an alternative framework which has three approaches:

- the **'technical collaborative approach'** which aims to test a particular intervention based on a pre-specified theoretical framework, with the researchers having greater control. This approach is deductive and predictive and would be encompassed within Hart and Bond's 'experimental action research',
- the **'mutual collaboration approach'** which brings researcher and practitioner together to identify problems and seek possible causes and ways of intervening to change them. This approach is deductive and descriptive and is comparable to Hart and Bond's 'organisational type' of action research and
- the **'enhancement approach'** which attempts to align theory and practice, to resolve problems, and develop practitioners' skills in identifying and solving problems by raising their collective consciousness. This broadly corresponds with Hart and Bond's 'professionalising type' of action research but also overlaps with their 'organisational type'. The main aim is the improvement of professional practice at the level of organisational and cultural change.

Whilst these typologies are useful in understanding the wide range of action research, its inherent flexibility means that it is not always possible to delineate action research into specific categories or types. In practice the typology are not

distinct: they overlap and in the course of a project the style and strategies adopted may shift from one type to another as it moves through the spiral of cycles (Hart and Bond, 1995).

2.7.3. Action research: application in health care

The original application of action research was to problems in American industry in the 1940s (Lewin, 1948). More recently, this approach has been adopted successfully in education (Carr and Kemmis, 1986, McNiff, 1988, Whyte, 1991), and in health care, which I now discuss

2.7.3.1. Nursing

Action research is increasingly used to improve nursing practice, education and management, and professional development. Towell and Harries (1979) adopted action research to facilitate change in a psychiatric hospital, which involved them acting as facilitators of change, giving advice and emotional support to participants. They saw it as a means whereby staff could "take back the authority for clarifying their own roles and establishing conditions under which they could organise their work most effectively." Meyer (1993) reviewed studies in nursing and some of the methodological issues that arose, particularly the nature of the collaborative nature of the relationship between researcher and participants. Tichen and Binnie (1993) used action research to address problems of developing new nursing roles and shifts in power relationships within the ward team.

East and Robinson (1994) applied an action research approach to facilitate the transition from the traditional ward sister nurse role, to the new 'ward managers' in a district general hospital. Hospital managers and senior ward nurses had divergent views concerning the source of challenges and problems within the hospital. The researchers explored both sides of the story, and identified possibilities for opening up common ground to facilitate change. Stark (1994) describes how the action research process, which is underpinned by self reflection, has the potential to develop practitioners both professionally and personally.

Action research has been used to explore ways of improving stroke care and rehabilitation (Gibbon and Little, 1995), and more recently Kilgour undertook an action research enquiry into a health visitor programme for parents of school children with behavioural problems (Kilgour and Flemming, 2000).

Taken together, these and many other studies show that action research is a valuable approach to problems in nursing care, through analysis and reflection, development of action plans for improving care, and implementation and evaluation of those plans.

2.7.3.2. Medicine

In contrast, action research has been used much less in studies in medicine, where experimental or structured survey methodologies have been predominant. However, some studies using this approach are now beginning to appear. Murray *et al* used action research to define the health and social needs of a community in Edinburgh, identified priorities for change and formulate joint action plans between the residents and the extended primary care team (Murray *et al.*, 1994). Robinson and Stacey developed guidelines on palliative care in the community for primary care teams (Robinson and Stacey, 1994). The Royal College of Physicians in England has mounted an action research study to explore the roles of clinicians and managers in overcoming barriers to implementing clinical audit (Berger, 1998). Hampshire *et al*, noting that there were few examples of the use of action research in general practice, used this approach in 14 practices to improve child health surveillance. They concluded that this was a successful method for promoting change in primary care but that measuring the impact of change was difficult (Hampshire *et al.*, 1999).

2.7.3.3. Pharmacy and medicines management

Despite the increasing use of action research in health care settings, most notably in nursing, and its evident relevance to the complexities of current issues in pharmacy practice and the use of medicines, researchers in these fields have been slow to adopt this methodology and there are very few published studies. One reason might be that, like medical researchers, pharmacists have been more comfortable with traditional approaches such as

randomised controlled trials or structured surveys. Gilbert *et al* (2002) used a participatory action research approach to design and evaluate a model for implementing home medication reviews. A collaborative approach involving general practitioners, pharmacists and patients, was adopted to solve problems as the research process progressed. A participatory action research approach has also been used in Denmark to improve the quality of patient counselling in community pharmacies, by comparing the staff's views on, knowledge of and behaviour towards patients, with the views, perceptions and medicines use of those same patients (Haugbølle *et al.*, 2002).

In summary, action research has been demonstrated to be a valuable tool for improving quality in health care, albeit primarily in a nursing setting. It has wider applications in health services research. It lends itself particularly well to the current research, which aims to address complex issues of the use and safety of medicines, professional practice and culture, new roles for pharmacists and facilitation of change.

2.7.4. Qualitative methods in action research

Because the issue of quality in health care is complex and often ill-defined, it is intrinsically difficult to evaluate. The assessment of quality of services cannot only be confined to measurement by the objective, value free, systematic processes of quantitative methods, such as measuring waiting times. Rather, it requires an understanding of processes, and individuals' experiences and perspectives of what constitutes high or poor quality care. Experimental and quantitative methods are less well suited to answer these questions.

Qualitative approaches are an essential part of health services research, as they enable access to areas not amenable to quantitative research. The emphasis in qualitative research on meanings and experiences make this approach particularly useful for quality assessment and improvement.

Most qualitative research is inductive in nature, moving from observation to hypothesis rather than hypothesis testing or deductive. For example, within the qualitative tradition it is emphasised that in order to get behind respondents' formal public statements and behaviour to uncover their personal perceptions

and actual day to day actions, it is important not to impose prior categories and concepts from the researcher's own professional knowledge on to the process of data collection (Bryman and Burgess, 1993).

2.7.4.1. Ethnographic technique

Ethnography has its origins in cultural anthropology and sociology, although now it is being increasingly used in other fields of enquiry such as health care research. Ethnography is a descriptive account where people's behaviour is studied in everyday contexts, rather than under experimental conditions created by the researcher (Hammersley, 1990). Data are gathered from a range of sources, for example, detailed observations, informal or overheard conversations, unstructured interviews and analysis of documents. The approach to data collection is 'unstructured' in the sense that it does not involve following through a rigid plan set up at the beginning and the categories used for interpreting what people say and do are not pre-given or fixed. The does not mean that the research is unsystematic but simply that initially the data are gathered in as raw a form, and as wide a front, as possible. Ethnography can be considered similar to the sort of approach we all use in everyday life to make sense of our surroundings. The primary concern is discovering the nature of the social world through intense study of particular settings or people. In essence, ethnography involves the researcher spending some time in the company of those being studied. Hammersley and Atkinson (1983) gave the following explanation:

> "The ethnographer participates, overtly or covertly, in people's lives for an extended period of time, watching what happens, listening to what is said, asking questions; in fact collecting whatever data are available to throw light on the issues with which he or she is concerned."
>
> (Hammersley and Atkinson, 1983)

The purpose of participating is to obtain a holistic view of how people live and work within their own context. Ethnography is usually focused on a single setting or group, of relatively small scale, carried out in everyday settings. Analysis of data focuses on the meanings and functions of individuals' actions

and mainly takes the form of verbal descriptions and explanations, with quantification and statistical analysis playing a subordinate role at most (Hammersley, 1990).

2.7.4.1.1. Ethnography: application in healthcare

In health care, ethnography has been seen as a useful way of accessing beliefs and practices, allowing these to be viewed in the context in which they occur and thereby aiding understanding of behaviour surrounding health and illness (Morse and Field, 1996). Coombs (2003) used ethnography to explore decision making between doctors and nurses in the intensive care environment in order to examine contemporary clinical roles in this setting. She found that whilst the nursing role in intensive care has developed, this has had little impact on how clinical decisions are made and both medical and nursing staff identify conflict during patient management discussions.

Through an ethnographic case study approach of a critical care unit, Manias and Street (2001) explored how nurses and doctors constructed their practices through knowledge to inform their decision-making. Ethnography has also been used to understand the illness experience of patients with congestive heart failure (Mahoney, 2001).

Within pharmacy practice, an ethnographic approach has shown that there are differences in the nature and quality of advice and services provided by community pharmacies depending on their location (Rogers *et al.*, 1998).

Ethnography is particularly useful in understanding the organisation of health care (Morse and Field, 1996). Understanding why organisations operate the way they do and how they can be improved is seen to demand methods that go beyond questionnaires and surveys. Since my research depends on an understanding of phenomena in the natural setting, i.e. the study trust, an ethnographic approach was considered appropriate. Within my study ethnographic technique will enable an understanding of practice and behaviour relating to medicines within the trust studied and inform service developments. Ethnography can provide a nuanced understanding of the organisation and allow comparison between what people say and what they do.

2.7.4.2. Participant observation

The systematic observation of organisational settings, team behaviour and interactions is especially useful in studying quality issues as it allows the researcher to uncover everyday behaviour and discover what really happens in particular health care settings (Pope *et al.*, 2002). An important advantage of observation is that it can help to overcome the discrepancy between what people say and what they actually do. Observations can be participative or non-participative according to the degree to which the researcher is involved with the group of study. Participant observation has been described as an attempt to understand the phenomenon by observing from inside a group, to understand how people, including the researcher, interpret various situations (Bowling, 1997). In contrast, a non-participant observer maintains distance from the phenomenon under study and does not interact in everyday activity of the group under study, but instead tries to blend into the background in an attempt to reduce any effect their presence may have on the groups' behaviour (Pretzlik, 1994). Attempts to define the role of an observer may not always fit neatly into the two categories of participant and non-participant observation, and elements of the two may be combined. The extent of participation varies according to the nature and setting of the research and Gold (1958) identified four categories:

- **Complete participant,** participates in a group's activities whilst concealing their role from the group.
- **The participant as observer** spends most of the time participating in the groups' activities whilst undertaking observation, with the group's knowledge.
- **The observer as participant** spends most of the time observing and only a small proportion of time participating in normal group activity.
- **Complete observer,** does not participate in group activities, but is only concerned with observing behaviour.

One of the main problems with observation is the effect of the observer on the 'observed', which may lead people to be self-conscious and cause modifications

in actions or behaviours. This is known as the 'Hawthorne effect' (Mays and Pope, 1995).

There are however important issues to consider when using this type of observation. There are ethical considerations, and covert participant observation is rarely justified (Mays and Pope, 1995).

2.7.4.3. Interviews

There are three main types of interview: structured, semi-structured and in-depth interviews (Arksey and Knight, 1999, Britten, 1995). Structured interviews consist of administering structured questionnaires, and interviewers must ask questions in a standardised manner, sticking rigidly to the script. This type of interview is used only for collecting standard information from informants, and as each person is asked the same questions, answers are more comparable, allowing for robust testing of the hypothesis.

In-depth interviews are less structured than this. The researcher suggests the subject for discussion but has few specific questions in mind and uses probes as a stimulus to obtain more detailed information about what the interviewee said. The direction is largely set by the informant and the interviewer adopts a more passive, less directive role.

Where more specific information is required a semi-structured format is used. Semi structured interviews are conducted based on a loose structure consisting of open-ended questions that define the area to be explored, at least initially, and from which the interviewer may diverge in order to pursue an idea in more detail. This the most common and most diverse of the three formats. Interviewers are free to follow up ideas, probe responses and ask for clarification or further elaboration. Informants can answer questions in terms of what they see as important and there is scope for them to choose what and how much to say about a particular topic.

2.7.4.4. Focus groups

Focus groups are a form of group interview that capitalises on communication between participants in order to generate data (Kitzinger, 1995). The idea

behind focus group method is that the group processes can help people explore and clarify their views in ways that would be less easily accessible in a one to one interview. The method is particularly useful for allowing participants to generate their own questions, frames and concepts and to pursue their own priorities on their own terms, in their own vocabulary. Focus groups have been defined by Kitzinger and Barbour as:

> "Group discussions exploring a specific set of issues that are focussed because the process involves some kind of collective activity" (Kitzinger and Barbour, 1999).

Interaction is key to the method, giving a high level of face validity, because what participants say can be confirmed, reinforced or contraindicated within the group discussion.

Tapping into interpersonal communication is also important because this can highlight (sub) cultural values or group norms (Kitzinger, 1995). By analysing the operation of humour, consensus and dissent, and the narrative used within the group, common and shared knowledge can be identified. For this reason focus groups are particularly useful for examining work place cultures, for example that in an acute NHS Trust. Focus groups have the added advantage within this study, following an action research approach, of making participants feel that they are an active part of the research process.

Combining focus groups with other qualitative methods such as ethnography (Baker and Hinton, 1999), and individual interviews (Michell, 1999), as in my study, can be very valuable.

2.7.4.5. Data analysis and theorizing using grounded theory

A grounded theory approach to data analysis was adopted in this study. Grounded theory follows an inductive approach whereby theories emerge out of, or are grounded in, data (Glauser and Strauss, 1967). A grounded theory approach involves the following stages (Silverman, 2001):

i) an initial attempt to develop categories which illuminate the data

ii) an attempt to 'saturate' these categories with many appropriate cases in order to demonstrate their relevance

iii) developing these categories into more general analytical frameworks with relevance outside the setting

Grounded theorising has two components: theoretical sampling and the constant comparative method (Hammersley, 1981). Theoretical sampling involves selection of cases based on emergent concepts to further develop those concepts, as a way of developing a theory. The analysis relies on systematic and rigorous searching of text for categories and themes. Initially data are read and reread to identify and index themes and categories: these may centre on particular phrases, incidents or types of behaviour. Once a few analytical categories have been generated, the constant comparative method can be used to further develop the model. Each segment of data is taken in turn and its relevance to one or more categories having been noted, it is compared with other segments of data similarly categorised.

2.7.4.6. Method triangulation

In its broadest sense, method triangulation involves using a combination of methods to explore the same topic (Kimchi and Polivka, 1991). Each method can look at the topic from a different perspective and these perspectives can be used as a means of comparison and contrast. Using multiple methods produces different kinds of data on the same topic.

Triangulation derives from navigation and involves locating a position by referring to two or more coordinates. Sailors could identify their true position at sea with reference to known fixed points, such as stars. The direct application of this to the social world would suggest that if you measure the same phenomenon from different angles or positions, you will get an accurate reading or measurement of it (Mason, 1996). However, different methods and data sources are likely to throw light onto different social phenomena or research questions and therefore may not be directly comparable. The results, therefore, from each method cannot be used straightforwardly to corroborate (or otherwise) each other.

Furthermore, triangulation implies that there is one, objective and social reality or location which can be discovered using appropriate triangulation points. Using several approaches in the study of one phenomenon does not necessarily mean that each provide data to complete the whole picture or that a single consistent picture will be obtained. Some findings may indeed be contradictory, but rather than considering these incorrect, such findings can enhance understanding of the phenomenon and the research methodology.

Myers and Haase (1989), emphasising the importance of different data sources, suggest that in studies of bonding between mother and infant, 'the subjective descriptions of mothers' progressive ability to anticipate their infants' needs' can be contrasted with the objective observations of mother-infant interaction'.

2.7.5. Summary

In this section I have given an overview of and rationale to the action research approach used in this study and I considered the methodological difficulties associated assessing the impact of interventions into patient care. I discussed the various typologies used to differentiate between different types of action research. I then explored the application of action research in health care, in particular in nursing, medicine, and pharmacy and medicines management. I discussed qualitative methods in health care research in particular ethnographic technique, participant observation, interview techniques and focus groups. Finally, I talked about data analysis and theorizing using grounded theory and method triangulation. This literature is very important for my research as I will be adopting an action research approach in this study and will use the qualitative methods described in this section. It gives some background to these methods, helps to rationalise their appropriateness for my research and guides me in their use.

3. CHAPTER 3 – PRELIMINARY PHASE: PHASE ONE AND PHASE TWO

3.1. INTRODUCTION

As I have shown in chapter 2, despite the efforts made to improve the quality of care in the NHS, failure to deliver safe and effective drug therapy often results in poor clinical outcomes and waste. This can be a particular problem in the care of older people. I therefore designed this study to investigate the extent of such failures, the views and attitudes of health professionals and patients, and the impact of pharmacy-led interventions. These issues are highly relevant to current drives to improve care of older people, and County Durham Health Authority therefore agreed to provide financial support for this project.

In this chapter I will describe the preliminary phase of the project. In section 3.2 I will describe the overall approach used for this study, which, as detailed in section 2.8, is action research. I move on to introduce the study setting and methods and finally I present the results from this preliminary phase.

There is a recurrent broad theme throughout the literature that pharmacists' skills and expertise could be better used to improve the use of medicines in hospitals (Hawkey *et al.*, 1990, Griffith and Robinson, 1996, Barber *et al.*, 1997, Batty and Barber, 1992). This has been reflected in Government health policy for many years (Department of Health, 1988, Department of Health, 2000). Moreover my personal experience in several acute hospitals in the North of England confirms this picture of underutilisation of pharmacists and the consequent suboptimal use of medicines. However, the literature also shows that clinical pharmacy processes are diverse, ill-defined and sometimes difficult to measure, and that there is a shortage of evaluative studies (Cotter *et al.*, 1995). The service model that will best deploy pharmacists' skills to produce maximum benefits for patients therefore remains unclear.

Having not worked in the trust prior to the start of the project, I was not familiar with the health care environment within which the study would be conducted, in particular, the nature of patient care in different specialities and settings; the culture relating to therapeutics within the trust; current practice and standards of care relating to medicines; problems relating to medicines use; and attitudes to change in these areas. The research therefore comprises four phases:

Phase one - a preliminary phase to gain an understanding of these factors – methods one, to gather and analyse preliminary data

Phase two - reflection on emerging themes and identification of key issues relating to the use of medicines – results one, of preliminary analysis

Phase three - development and implementation of a new model of care – methods two, and

Phase four - evaluation of the model in the study setting and exploration of issues which would influence adoption throughout the trust – results two.

This chapter therefore encompasses phase one and phase two of the research

3.2. DESIGN OF STUDY: AN ACTION RESEARCH APPROACH

As outlined in 3.1 above, for a number of reasons the precise nature of the research problem was unclear at the start of the project. Moreover the research was conducted in a dynamic and politically sensitive health care setting which required considerable flexibility. Action research was therefore adopted, as it is focuses on problem solving and improvement, and allows the approach to be adapted and refined as the research process unfolds (East and Robinson, 1994).

Before adopting an action research approach, a number of alternative methodologies were considered but felt to be inappropriate. Quantitative surveys of patients and health care staff may identify some issues but could not be relied to capture all the problems in medicines use; and they would not allow for testing of new models of care. Consensus methods such as the Delphi technique are founded on opinion rather than observation (Bowling, 1997); they are unlikely to identify the specifics of care at patient level in this clinical setting; and, again, they would not test new models of care. On the other hand, an experimental intervention study, while enabling a new model to be tested, would need to be narrow and specific to identify differences between the groups; and it would be difficult, if not impossible to control the many confounding variables

that influence patient care. An experimental approach would raise ethical issues. It would involve assumptions about the model to be tested and it would not readily identify issues arising from the broad culture and practice of medicines use in the hospital.

In applying for ethical approval, the purpose of the research was clearly explained, and the individuals which might be interested in or affected by the work were identified. It was implicitly stated within the application that where possible fully informed consent would be obtained from participants at each stage of the project, for example patients and health care staff to be observed in particular settings, patients to included in the evaluative study, health care staff to be interviewed. Ethical approval from County Durham Health Authority Ethics Committee was granted (see appendix 6.1).

3.2.1. Action research in the current study

Applying Hart and Bond's criteria described in section 2.9.2 to the current research, the primary focus is professionalising as it involves change and reform in pharmacy practice and the wider use of medicines. It has a strong educative base in that it involves reflective practice in which professionals develop by embedding new knowledge and actions in the everyday experience of delivering care. The project has a strong practitioner focus, primarily involving doctors, pharmacists and nurses. The problem focus is defined by issues identified by these professional groups, with important input from users i.e. the patients. The problems emerge from the professional/practical experience of working within an acute hospital. The change intervention is professionally led and its resolution is in the interest of research based practice and professionalisation. It proceeds in a spiral of cycles and, importantly, there is a collaborative relationship between the practitioners and the researcher. The roles were on many occasions merged, as I was also actively delivering care.

3.3. SETTING

The research was conducted in an acute university hospital trust in the North of England. At the time of the study, the trust comprised:

- a main general hospital with 665 beds,
- three community hospitals with inpatient beds for rehabilitation and care of elderly people who require intermediate care, together with a range of out patient services and
- two day hospitals.

The preliminary phase of the study encompassed several areas of the trust, including the admissions unit, community and day hospitals and out patient clinics. The main study (phases three and four), discussed in chapter 4, was conducted on two acute medical wards within the main hospital, ward A and ward B. Patients admitted to these wards were usually under the care of one of four consultants in general medicine who were fully supportive of the project. Ward A had 30 beds, with patients generally under the care of two of the consultants. Ward B had 28 beds, with patients generally under the care of the other two consultants. Occasionally, because of bed shortages elsewhere in the hospital, patients under the care of other consultants were accommodated in these wards, but were not included in the study.

The patients studied were elderly people (over 60 years) with a range of diagnoses. Recruitment to the study was opportunistic (convenience sampling), with patients being included in the study as they were admitted to the wards.

3.4. DATA COLLECTION

As outlined in 3.1 above the study comprised four phases: a preliminary phase to gain an understanding of the issues; a reflective phase to identify key problems relating to the use of medicines; development and implementation of a new model of care and evaluation of the model and exploration of issues which would influence adoption throughout the trust.

A range of data collection techniques were used in the various phases of the study. In the preliminary phase, I collected data using ethnographic techniques with participant and non-participant observation; document analysis and informal discussions with patients and staff. In the reflective phase, further literature searches were conducted to identify relevant findings and compare them with data emerging from the study setting and also to develop research instruments for use in the third phase. In the implementation and evaluation phases, data were collected from interviews and informal discussions with patients, hospital and primary care staff; document analysis; and participant observation. In addition, in the evaluation phase, focus groups were conducted with pharmacy staff and interviews were conducted with doctors and nurses.

In this chapter I will describe the methods used in the preliminary phase of my study, which I refer to as 'phase one'. I will then move on to describe and reflect on the findings from the preliminary phase, which I refer to as 'phase two'.

3.5. PHASE ONE: METHODS ONE – ASSESSMENT OF THE PROBLEM

As stated in the introduction, this study began in a context of concern relating to quality of care relating to medicines use, although the exact nature of the problems were unclear. The first phase, in this project, following an action research approach, was to confirm the existence of problems relating to the use of medicines in the study setting, and to assess the nature of the problems identified. I describe this approach in detail in section 2.7.

3.5.1. An ethnographic approach

Since the research depends on an understanding of phenomena in the natural setting, i.e. the study trust, an ethnographic approach was considered appropriate, as discussed in section 2.7.4.1. Within the current study ethnographic technique enables an understanding of practice and behaviour relating to medicines within the trust studied and inform service development. Through the nature of methods which can be adopted, ethnography can provide a nuanced understanding of an organisation and allow comparison between what people say and what they do.

3.5.1.1. Data analysis and theorizing using grounded theory

In keeping with a grounded theory approach, as I discussed in section 2.7.4.5, my study initial conceptual categories were derived from the data and more fieldwork was undertaken to further elaborate on these using theoretical sampling. A diverse range of individuals and settings were included and using the constant comparative method the emerging themes were developed. All the data relevant to each category were identified and examined and each item was checked and compared with the rest of the data to establish and validate analytical categories. Overlapping and interconnecting themes were merged under broader headings where appropriate.

3.5.1.2. Participant observation

I describe the rationale to this method in section 2.7.4.2. In this project most of the observations were participative, and my role was known to patients and health care staff, and I was involved in the everyday activities within the study settings. Observations of clerking patients following admission, consultant clinics and observation on the pharmacy department were non-participant. Participant observation was considered to be an appropriate method for understanding the experiences of doctors, nurses and patients with respect to the management of medicines. I worked along side doctors and nurses to observe events, together with their interpretation and explanation of them, whilst also using my pharmacy expertise to contribute to patient care, where appropriate. This allowed me to appreciate what happens on the wards with respect to medicines, and what the strengths and weaknesses of the present ways of working are. Non-participant observation in ward activities was deemed inappropriate, as it would be unethical for me to ignore a situation where patient safety is compromised. Gold's 'participant as observer' typology most suitably describes the researchers approach in this study (see section 2.7.4.2)

Through participant observation, I attempted to minimise the impact I had on the areas studies, and after a while I became accepted by the various groups observed, as natural. 'Participant as observer' as adopted in this study, poses fewer ethical dilemmas than covert participant observation.

Approval within the study hospital was obtained through negotiation with four general medicine consultants, and appropriate health care staff such as junior doctors and nurses. Informed consent was obtained from individual participants wherever possible, and they were informed that I would be observing particular activities relating to medicines. I explained to patients that I was undertaking research to try and improve the way medicines are managed and used in hospitals and asked if they minded me having a conversation with them about their feelings and experiences.

It was important that I struck up sufficient rapport and understanding with the groups to conduct the research. I had to integrate quickly into the hospital environments, and mix with the various health care staff. I explained my purpose to all staff and engaged them in discussions about what they are doing and why. The main study environment was two acute medical wards within the study hospital, although other areas within the Trust were also investigated. An observation schedule for each setting was used to prompt me to record the information required for the research and this ensured important data was not missed. The schedule used on the wards and in clinics included prompts to record: time spent talking about medicines; dialogue with patients about medication; errors relating to medicines; doctors knowledge and attitudes of therapeutics; patients' experience and attitudes; documentation relating to medicines and discharge planning and arrangements. The observation schedule used in the pharmacy included prompts to record: how prescriptions and drug orders from wards are processed and returned to the wards; interruptions by phone calls from wards enquiring about the progress of orders; and the attitudes of pharmacy staff.

Various activities in a variety of settings were studied:

- Patients' admission to hospital, and the process of clerking patients in by junior doctors was observed on six occasions. This was undertaken in the accident and emergency department and the admissions ward. I sat with the junior doctor and patient and recorded my observations.

- I participated in and observed 16 wards rounds, on the two main wards studied, and one ward round on the admissions ward.
- Two hour observations were undertaken at three day hospitals where I helped out where I could, helping the nurses and chatting to patients. I also undertook two hour non-participant observations at three consultant outpatient clinics. I sat in with the consultants at the clinics and took notes as they saw patients.
- Activities on the two main wards studied during a three month period from May to July 2000 were observed. During this time, I worked fulltime on the wards and contributed to patient care when appropriate. I recorded my observations relating to: prescribing behaviours; ordering, supply and administration of medicines; interaction between medical staff and patients and between the various staff on the wards; and patient involvement in their own care.
- Activities within the pharmacy department were recorded, using non-participant observation, on three occasions for two hour periods, and included: dispensing of prescriptions; supply of medicines to wards; communication with wards; and overall involvement of pharmacy staff in patient care.

Recording data in the field is difficult in participant observation and where detailed field notes could not be made immediately, I often had to take discreet notes, or make mental notes and transcribe these at a later time, usually within 24 to 48 hours.

3.5.1.3. Method triangulation

In order to gain a detailed and broad insight into the practices and behaviours relating to medicines, method triangulation was used to explore the research issues from different angles, in a rounded, multi-faceted way. This is described in detail in section 2.7.4.6. Ethnographic technique, using observations, analysis of patients' records and informal discussions allowed an in-depth, detailed picture of the subject under study across various dimensions.

3.5.1.4. Analysis of patients' records

The notes for 40 patients admitted to the two acute medical wards being studied within the three month period, May to July 2000, were thoroughly examined. The intention of this was to gain insight into: the actual documentation of medicines use; communication between primary and secondary care; and the accuracy of drug histories taken following admission and subsequent medication prescribed.

Detailed field notes were taken. In particular, data were recorded relating to:

- notes recorded at the time of admission, including drug histories.
- diagnoses.
- GP referral letters.
- records relating to drug therapy throughout the current and previous admissions.
- discharge information supplied to GPs, including the immediate discharge notification letters and the discharge summary written by the consultant.

3.5.1.5. Informal discussions and interviews

Within the study hospital I had informal interviews and discussions with:

- the four general medicine consultants who were supportive of the project
- six house officers, four senior house officers and two registrars
- six nurses and two ward clerks
- six patients
- various pharmacy staff.

Informal interviews and discussions were generally undertaken opportunistically within the course of my work on the wards. They varied in length from 5 minutes to 30 minutes. I arranged times to chat with the nurses as they were extremely busy and I talked to the doctors when they had a spare moment, usually in the afternoon.

Topics discussed with the doctors included: work patterns; processes within the hospital relating to medicines; problems they encounter with medicines; knowledge of therapeutics; and communication between primary and secondary care.

Discussions with the nurses covered: drug rounds; staff, shifts and handing over; ordering and supply, storage and administration of medicines; prescribing practice; information given to patients about medicines; the involvement of patients in their care; discharge of patients and problems with medicines.

The ward clerks were asked about: systems and procedures on the wards; admission and discharge of patients; processing information to GPs, and practice or community nurses; transferring patients to other wards or hospitals; and discharge to residential or nursing homes.

Informal discussions with patients focussed on: what they know, or would like to know about their medicines; their satisfaction with current standards of care; experiences with their drug therapy; and compliance with medication regimens and whether prescribing was concordant.

None of the dialogues were tape recorded as specific arrangements for these were not planned in advance, although field notes were made immediately afterwards.

3.6. PHASE TWO: RESULTS ONE - REFLECTION AND IDENTIFICATION OF ISSUES

During the ethnographic study I gained insight into the health care environment within which the study would be conducted, in particular the nature of patient care in different specialities and settings; the culture relating to therapeutics within the trust; current practice and standards of care relating to medicines; problems relating to medicines use; and attitudes to change in these areas.

I became familiar with ward processes regarding medicines, such as ordering, storage, prescribing and administration. I became known amongst staff and became accepted as more a part of the team rather than an outsider who had

come to do research on them. This also facilitated phase three of the project, which would involve actually implementing a change of practice.

Several problems were identified that could be detrimental to patients and their well-being, and involve or have the potential to involve significant risk. A selection of cases highlighting problems relating to medication are summarised in section 3.6.11.

3.6.1. Drug histories

From my observations, analysis of patients' records and informal discussions with doctors and nurses, it was apparent that accurate and complete drug histories were frequently not obtained when patients were admitted to the study hospital. Very little time was spent inquiring about medicines, and doctors did not thoroughly probe patients about their medicines. The process of history taking was compromised by frequent interruptions, which lead to information being missed. Sometimes patients were very ill and taking a drug history was therefore not the first priority. It appeared that lack of therapeutic knowledge sometimes resulted in inaccurate drug histories.

The admitting doctor rarely checked the list of medicines taken in the drug history with the General Practitioner (GP), and when it was not possible to obtain a complete drug history, this was rarely followed up. When it was not possible to obtain a complete drug history at the time of admission, and this was ascertained later, the complete list of medicines was rarely then recorded in the patient's notes. The doctors simply prescribed them on the prescription chart. Often doctors prescribed medicines without being aware of a clear indication.

Doctors never asked about 'over the counter' medicines, herbal or homeopathic medicines and didn't always ask about allergies. When allergies were recorded, the nature of the reaction was frequently not ascertained. None of the patients were asked about current or previous side effects of their medicines. Patients' understanding of and compliance with medication was not ascertained and the prescribing process was far from concordant.

Patients sometimes brought their repeat prescription lists with them, and when this was available, doctors frequently just used that for the drug history. These lists were often incomplete, inaccurate or out of date.

Not all patients referred by a GP had a referral letter, and the information relating to medicines varied when letters were provided. Even when a comprehensive list of medication was available from the GP letter, recorded drug histories still sometimes differed.

Inaccurate drug histories are not necessarily detrimental to patient care. Often, despite the inaccurate or incomplete drug history, patient's usual medicines were prescribed, but the drug history recorded in the notes did not reflect this.

3.6.2. Inappropriate prescribing

My observations revealed that inappropriate prescribing sometimes occurred and this included: over-treatment, increasing the risk of adverse drug reactions; under-treatment; and prescribing contraindicated drugs, leading to drug-disease interactions; continuing drugs with no clear indication and without appropriate review; prescribing drugs where there is no evidence base or drugs of limited clinical value; and prescribing drugs which are not included in the hospital formulary.

Doctors appeared unwilling to stop medication if they did not initiate the treatment and the patient did not appear to be suffering any adverse effects from it, whilst sometimes patients were not receiving drugs from which they would benefit. On occasions, drugs were prescribed to treat the side effects of other drugs. Sub therapeutic doses were sometimes prescribed although excessive dosing also occurred, which increases the risk of adverse effects. Intravenous (IV) antibiotics were often continued longer than necessary in some patients. Non-formulary drugs were frequently prescribed. The potential for adverse drug reactions and drug interactions was often not considered. When patients were discharged, doctors were rarely selective in the medications they prescribe on the discharge prescription, as it is quicker and easier to transcribe everything from the kardex, rather than consider what the patient actually needs to go home with.

3.6.3. Involvement of patients in their care

Some patients felt that doctors were not very understanding and most wanted to be told more about their medicines. Some patients felt that doctors don't have time or are reluctant to explain their medicines. These following extracts from informal interviews with patients illustrate these aspects:

> *"I told my Dr that the dipyridamole was making me feel a bit funny, but she just said 'there's nothing that can be done about that, you have to take either that or the aspirin to stop you having a stroke' but I can't take aspirin she knows that, they're not very understanding there."*
>
> Patient DW

> *"It would be nice to be told more about your medicines, as then you'd know why you are taking them and what they do, then you wouldn't mind taking them so much."*
>
> Patient MT

> *"You are scared to take medicines if you don't know anything about them, when you're told information you're more likely to take them."*
>
> Patient HD

> *"Some authorities assume you know everything, well we don't. We know nothing about our tablets. We need it to be explained."*
>
> Patient FG

Patients want written and verbal information about their medicines.

> *"People don't realise that when you're at home often you can't remember what you were told in hospital.....older people have a tendency to forget"*
>
> Patient CD

Some patients told me that they receive repeat prescriptions from their GPs but often see them infrequently, therefore don't have the opportunity to ask about

their tablets. Observation of doctors and discussions with patients revealed patients were rarely given comprehensive information about their medicines. For example, a patient had never been given vital information about how to take his medication, which resulted it him not benefiting from the treatment, see case 1. Another patient was not informed of the consequences of consuming certain food and drinks whist taking a monoamine oxidase inhibitor, see case 2. Drugs were started and this was often not explained to the patient. During my observation of an outpatient clinic, a patient was commenced on fludrocortisone for neuropathic postural hypotension. The consultant said to the patient, "here, take these", but gave no explanation as to why they had been started or instructions about taking them.

My observations and discussions with doctors and nurses revealed that warfarin counselling was rarely undertaken by doctors, and the responsibility for this fell with the nurses. However, nurses said they were not trained to do this and there was no protocol for exactly what patients need to be told. The level of information given to patients therefore varied greatly. Some nurses omitted vital information, which has the potential for significant risk to the patient.

Some patients, despite receiving information, ignored it. For example a patient was taking isosorbide mononitrate three times daily (9am, 2pm and 11pm), without a nitrate free period. The consultant explained to him that he must take his last dose no later than 5pm so he has a nitrate free period, to prevent nitrate tolerance developing. The patient said that he had a 'crushing' angina attack that morning but he would not accept that he must have a nitrate free period. He said his GP told him it was fine for him to have his last dose at 11pm and that some patients needed a late night dose to prevent early morning angina. The consultant said this was absolute rubbish, but the patient would not be convinced.

There were occasions where doctors did inform patients about their therapy, for example, a patient was unhappy about being commenced on digoxin as he had been admitted previously with digoxin toxicity. He told the doctors that those tablets make him really ill. The junior doctor explained to him about the

therapeutic range of digoxin and that they would be monitoring his blood levels very carefully.

3.6.4. Admissions related to drug therapy

It is clear from the literature that medication is frequently implicated in admissions and I observed frequent instances of medication problems resulting in admission. During the ethnographic study I encountered 145 patients and 31 of these admissions were directly related to drug therapy (21.4% of the admissions recorded). Eight patients were admitted because of problems which were highly likely due to non steroidal anti-inflammatory drugs (NSAID), see case 3. One patient had been admitted to the hospital in 1999 with gastritis. She was taking Naprotec (a NSAID - naproxen and misoprostol) for arthritis, and aspirin for transient ischemic attacks and this was thought to be responsible for her gastritis. The consultant had recommended to the GP that her analgesia be revised altogether and the Naprotec be stopped, and gastro-protection added to her regimen. This had not been done, and she was re-admitted on this occasion, six months later, with a gastro-intestinal (GI) bleed. This case also highlighted that even when hospital doctors supply clear information to GPs this is not always acted upon. This iatrogenic admission could have been avoided.

Other examples of drugs associated morbidity I observed, included: A patient taking warfarin, with an INR of 10 (target 2.5) suffered a gastro-intestinal bleed; several patients admitted with drug induced postural hypotension, for example a patient already on frusemide and dothiepin, which can cause a postural drop in blood pressure, who was recently commenced on an ACEI, see case 1 ; a patient admitted having had a fall, which was thought to be due to a hypoglycaemic episode as she was taking a high dose of a sulphonylurea see case 4; an admission due to a carbamazepine overdose; increasing heart failure with atenolol; several patients with diuretic induced low sodium and potassium; a patient with lithium toxicity; a patient in hyperosmolar non-ketotic acidosis coma, with steroid-induced diabetes; patients with confusion due to excessive use of hypnotics and anxiolytics; a patient with renal failure taking Volsaid® (diclofenac) and a patient with chronic renal failure thought to have been worsened by Ponstan® (mefanamic acid).

3.6.5. Communications across the interface

I observed that communications both from the hospital to GPs, following discharge and from GPs to hospitals when patients are admitted were often poor. When patients are referred by GPs to hospital as an acute admission, sometimes there was no referral letter at all. Even when a referral letter is provided, there may be no information relating to medicines, or if it was present, was sometimes incomplete or inaccurate. This could lead to patients' therapy being incorrect following admission, as admitting doctors rarely questioned the accuracy of this information on the GP referral letter, and many used this as the main source of their drug history.

Of the 40 patients' notes analysed, 33 were referred by the GP, and seven were emergency admissions and therefore would not have a GP referral letter. Of the 33 referred by a GP, the GP provided a referral letter for 24 patients, nine had no letter. Three of the 24 GP referral letters did not contain any information about medicines. Of 21 letters that did refer to the patient's medicines, the information in 15 of these was incomplete or inaccurate. Complete and accurate information relating to drug therapy was provided by GPs for only six out of the 33 patients referred by their GP.

Some GPs stated in the referral letter that the patient will bring along a list of their medicines, or that the medicines are 'as enclosed', however frequently patients do not have a list of their medicines and there is no 'enclosed' list. When GPs did provide a list of drugs sometimes doses or frequencies were omitted. For example, the referral for a patient stated that they took Adalat®, atenolol, aspirin, and frusemide, but gave no doses. Another referral letter stated the patient's sodium valproate dose as a single daily dose, but did not indicate how this was split throughout the day. The information given by the GP can conflict with that given by the patient, for example a patient claimed they were taking prednisolone 17.5mg daily, whereas the GP stated they were taking 35mg daily.

When patients were discharged, GPs were rarely given explicit information about changes to patients' medication, during the admission, on the preliminary

discharge letter (PDL). Of the 40 patients notes analysed only two of the PDLs referred to changes to drug therapy, and only one gave a complete and accurate account of all alterations. Examples of omitted dose changes were an increase in digoxin dose, and decrease in clobazam dose.

Decisions to discontinue medicines were often not communicated to GPs, for example, lisinopril stopped because a patient had postural hypotension, long-term prednisolone stopped in a patient with rheumatoid arthritis, and naproxen stopped as the patient no longer needed it.

Information about new medication commenced was often not communicated to GPs such as: amlodipine for high blood pressure; warfarin for atrial fibrillation; Didronel PMO for osteoporosis prophylaxis; metoprolol and lisinopril following a myocardial infarction; and lansoprazole for gastritis. It was just assumed GPs would continue prescribing these, following discharge.

Information given to GPs from the hospital, relating to follow-up of patients with respect to their drug therapy was poor. For example GPs were rarely instructed to take follow-up blood tests that were required, such as urea and electrolytes when an ACEI has been commenced or the dose changed, haemoglobin levels in anaemic patients discharged on iron therapy, potassium levels in a patient discharged on high dose bronchodilators, corticosteroids and frusemide (CSM advice), or sodium levels in a patient who presented with drug induced syndrome of inappropriate antiduiretic hormone (SIADH). It could be argued, however, that GPs should undertake this follow-up as a matter of course, and therefore instruction from the hospital is not necessary. I felt however, that it could only be of benefit to include such information on discharge letters.

Details about anticoagulant management initiated in hospital and subsequent follow-up were frequently omitted. Treatment plans following discharge were often not communicated to GPs, for example dose reductions. I encountered four patients who were discharged on a treatment dose of lansoprazole of 30mg and the intention was that this should be reduced to maintenance dose of 15mg after four weeks (National Institute of Clinical Excellence, 2000). None of the

discharge letters contained this information. The cost implications are significant.

One patient had been previously admitted with digoxin toxicity and the digoxin had been stopped. The GP was not instructed to restart the digoxin however, and the patient was later readmitted with recurrence of atrial fibrillation.

I often observed incomplete PDLs in terms of key information, such as the patient's name, date of birth, address, date of admission and discharge, whether the patient has allergies, identity of the consultant, and the name of the patient's GP. This wasted time as pharmacy had to contact the ward to obtain this information to ensure that the prescriptions were complete.

Key clinical information was also sometimes omitted from PDLs such as: anticoagulant control during admission; most recent blood pressures prior to discharge for a patient admitted with uncontrolled hypertension; details of a CT scan for a patient admitted having had a fall; and a diagnosis of pernicious anaemia along with instructions to continue hydroxocobalamin injections. Even when clear information was given to GPs about patients' medicines this is not always acted upon, see case 3.

Consultants also write a discharge letter following the preliminary discharge letter (PDL). From analysis of patients notes, I found that these consultant discharge summaries (CDS) did usually contain information about medication, and listed the patient's medicines on discharge. The CDLs, however, were also often incomplete with respect to medicines and on occasions did not match the information relating to medicines in the PDL. This is also reported in the literature (Gardiner, 1998). In addition, the CDS was usually written more than a month after the PDL.

3.6.6. Errors

I observed that prescribing and administration errors sometimes occurred but were rarely recorded. Errors were rarely recorded in patients' notes, and although there were systems within the study Trust for reporting incidents these were often not followed for errors involving medication, especially near misses

and errors that were considered to be of little harm to patients. For example, a patient was prescribed captopril (ACEI), and the doctors decided to change this to lisinopril, the hospital formulary preference for an ACEI, and as it is given once daily it may improve compliance. The captopril however was not crossed off the drug chart when the lisinopril was commenced and for one day the patient received both captopril and lisinopril. The same patient was commenced on warfarin, and her aspirin was stopped. The same day however aspirin was restarted, with no explanation given in the notes, and she received three days of both, increasing her risk of haemorrhage.

The dose of frusemide was to be reduced from 40mg to 20mg for a patient as he was found to have a postural drop in his blood pressure. The 20mg dose was prescribed, but the 40mg dose was not discontinued for a further two days. This resulted in the accidental administration of 60mg (both the 40mg and 20mg dose) of frusemide for two days. This may have delayed his discharge. A similar mistake occurred when a patient's thiazide diuretic was changed from Dyazide® to bendrofuazide. Although the bendrofluazide was started, the Dyazide® was not stopped until four days later. The patient was given both for four days.

On occasions, errors occurred when doctors wrote discharge notification letters, some of which had the potential for considerable risk, see case 5. Drugs were sometimes unintentionally omitted, for example ferrous sulphate was missing from the discharge prescription for a man with anaemia. Doctors made mistakes such as prescribing frusemide 8mg daily, instead of 80mg daily. Although this did not harm the patient I observed that nursing and pharmacy time was wasted finding out the correct dose. A patient was prescribed prochlorperazine 50mg three times daily on his discharge prescription, a ten fold overdose. Again I observed this wasted time as pharmacy had to contact the ward, and it had the potential for significant clinical risk, had the mistake not been noticed. Junior doctors were under time pressures and discharge prescriptions were written in haste which can only contribute to errors occurring, a problem also observed by this staff nurse in an interview:

"It's not just the time aspect of writing discharge prescriptions at the last minute, it's also the safety aspect of it as well, especially with the newer house officers....lots of errors do occur"

Staff nurse RM

Sometimes nurses transcribed the drugs from the drug chart to the discharge prescription, and filled in the patient's details to speed the process up. I observed that often junior doctors would sign these without checking them, especially if they were under time pressures.

Dosing errors were sometimes made, for example the admitting doctor recorded a patient as taking clonazepam 125mg at night, and this was then prescribed. The recommended maintenance dose in the BNF is 4 to 8 mg daily (BNF, 2002). The nurses had spotted the mistake, as that dose would have to have given with 62 tablets of 2mg. The error, however, was not highlighted to the doctors until day three of his admission. Tinzaparin was prescribed for a patient as the volume, without the strength. As two strengths are available, 10,000 unit/ml and 20,000 units/ml, there was considerable potential for error.

Nurses filled out reminder charts for patients which are given to patients without being checked and these were sometimes incorrect. This might be potentially confusing for patients and may result in medicines being taken incorrectly. There are checking procedures throughout processing discharge prescriptions which are undermined by this practice.

3.6.7. Poor documentation of therapy

From analysis of 40 patients' notes it appeared that drug therapy is often poorly documented, for example information about initiation and discontinuation of drugs, or dose changes. Examples include not documenting information about initiation of anticoagulation, or why antibiotics have been started. A patient was taking nifedipine prior to admission but it was not prescribed following admission. It was likely that this was because she had increasing heart failure, but this was not documented. A patient was given a test dose of an ACEI but it was not continued and there was no record in the notes about this. Drugs were

frequently stopped with no recorded reason. A patient usually took atenolol but this was changed to metoprolol with no explanation in the notes. Hydroxocobalamin was started with no reason recorded, see case 6.

There were, however, examples of good practice, for example doctors would sometimes write a treatment plan in the notes of the consultant ward round recording which drugs were to be started or stopped. This varied between junior doctors and consultants. Other examples of good practice were observed when specialists were asked to review patients, for example a consultant cardiologist wrote the following detailed treatment plan about a man suffering from confusion thought to be caused by amiodarone:

> *"that the amiodarone may well have caused his confusion I therefore recommend it be stopped and replaced with a beta-blocker for rate control. However this patient has COPD, and as beta-blockers are contra-indicated in COPD, nothing should be prescribed as he is not symptomatic."*

3.6.8. Supply and administration of medicines

I observed problems around the supply and administration of drugs. This often delayed patients receiving their prescribed medicines. Ordering of medicines not stocked on wards was sometimes erratic and untimely, see case 1. A further example concerned a patient not receiving a dose of her antidepressant until day four of her admission because the nurses did not order it immediately. Another patient who was fitted with a PEG did not receive her usual prednisolone or Didronel PMO® even though these could have been administered via the PEG.

I observed that patients with inhalers and eye drops tended to keep them in their bedside lockers. Nurses frequently signed the drug chart as the patient having 'self administered', but they did not supervise this and this was not in line with the hospital policy on the prescription, supply and administration of drugs. From my observations, it was apparent that many patients weren't taking/using the medication, however some patients did do this themselves.

When nurses administered drugs they initial the appropriate box on the drug chart, which corresponds to the time of dose given, and the date. This indicates only whether the dose has been given or not, but the chart does not enable an explanation to be recorded if doses are omitted. The nurses on the wards studied circled their initials if a dose was not given as prescribed. On the chart, at the bottom of each date column, there is a small space, entitled 'comments'. In theory the nurses fill this in to explain a 'circled initial'. This however did not always happen, and was often left blank. Only the nurse who did not give the dose knew the reason for this and if they were not available, other nurses and doctors could not easily ascertain why a drug had not been administered. In addition, if more than one drug was omitted on the same day (i.e. you would have to use the same small space at the end of the column for comments) it was very difficult to distinguish which drug any comments related to. I observed that important information regarding drug administration was often not communicated to doctors on the ward rounds.

From observations and discussions with nurses I discovered that patients' own medicines were sometimes mislaid when they were transferred between wards. One patient did not receive her usual hormone replacement therapy (HRT) throughout her entire admission, as all her medicines were 'lost' on her transfer from the admissions ward and the nurses did not order a new supply of HRT for the patient.

When discharge medication arrived back on the ward from pharmacy the porters often leave it in the nurses office on the ward. This office was never locked and often bags of medication are left unattended, which has risk implications.

I observed the pharmacy department was extremely busy processing prescriptions and wards frequently phoned to enquire about the progress of prescriptions and drug orders. This held work up in the pharmacy and resulted in further delays in prescriptions being processed and returned to the wards. All pharmacy staff expressed frustration about this and felt that the nurses do not realise exactly what is entailed in processing prescriptions and drug orders.

They criticised the wards for lack of organisation and forward planning with respect to discharge prescriptions.

3.6.9. Competency of doctors and nurses relating to therapeutics

Some doctors and nurses appeared to have insufficient knowledge of therapeutics. Doctors were sometimes unaware of treatment guidelines for certain conditions, such as initiation of anticoagulation in patients with atrial fibrillation. Often therapy with a low molecular weight heparin was commenced with warfarin, when there is no evidence base for prescribing low molecular weight heparin in newly diagnosed AF and warfarin alone is sufficient.

Some doctors and nurses did not know the purpose of some drugs, for example a patient was admitted with renal failure, and the doctor wrote the following in her discharge letter:

> *"Admitted with high potassium of 6.9. Acute renal failure, probably due to urinary tract obstruction/infection. Ultrasound of kidneys was normal. Ultrasound of bladder showed it had thickened walls and had a post-micturation residue of 120ml. Renal function improved with calcium resonium."*

The discharging doctor is incorrect in writing that the patient's renal function improved with calcium resonium. Calcium resonium is an ion exchange resin, which binds to potassium in the gut, releasing calcium in exchange. It lowers potassium over a period of hours or days; it does not improve kidney function. This may have been a slip by the doctor or it may reflect a lack of therapeutics knowledge. In a further example, whilst I was observing a junior doctor taking a drug history, she asked me what lamotrigine was and what the dose should be.

Of course, doctors and nurses do have training in therapeutics and therefore possess a certain amount of information relating to drugs. However, from my discussions with them and observations, it appeared that sometimes this is lacking and a particular concern was that doctors and nurses do not always take action to address this.

It seemed that knowledge of adverse drug reactions was lacking. A patient was seen in an outpatient clinic who was suffering numbness around his waist. He was taking simvastatin which can cause peripheral neuropathy and paraesthesia. This was not considered by the consultant who referred the patient for X-rays and a magnetic resonance imaging (MRI).

I observed that doctors sometimes spelt drugs incorrectly, for example mitazolin instead of mirtazipine see case 2. On occasions incorrect doses were prescribed, for example a patient who had a very low calcium blood level and which was believed to be due to hypoparathyroidism was being treated with alfacalcidol 250 nanograms daily. The hypocalcaemia was persisting and the consultant decided she needed more alfacalcidol, and to increase it to 500 nanograms daily. The BNF states that the starting dose of alfacalcidiol in the elderly is 500 nanograms, which should be adjusted to avoid hypercalcaemia, with a maintenance dose of 0.25mcg - 1mcg daily. The dose she was started on was too low; this may have prolonged her symptoms and possibly the length of her admission.

In another example, a patient with continuous fitting was prescribed a sub-therapeutic dose of diazepam. The doctors were unaware that the dose was sub-therapeutic and only when I pointed this out was the dose increased. The intention was to commence intravenous (IV) phenytoin as the fitting did not stop. Electrocardiogram monitoring is required when phenytoin is administered intravenously and only one nurse on the ward was able to do this. She was due to finish her shift so there was no nurse available to monitor the patient and the coronary care unit would not take the patient. The decision was made that the phenytoin therefore could not be prescribed, and the dose of diazepam was increased again. Eventually the fitting stopped. This patient's care was compromised as fully competent staff were unavailable.

A patient with atrial fibrillation was commenced on an inadequate dose of digoxin, which resulted in a delay in controlling his heart rate, and alleviating his symptoms.

Doctors were not always aware patients were actually taking certain drugs, for example a patient was administering his own sleeping tablets which he had in his bedside locker. Another patient was taking simvastatin which he kept in his locker. The medical staff did not know about this, and it was not prescribed on his drug chart. I observed that nurses allowed some patients to administer their own medicines, but at the time of the study hospital policy did not allow this as there was nowhere secure to store the drugs next to the patient's bed and anyone had access to them. No formal assessment was undertaken to assess whether patients were capable of administering their own medication, this was purely subjective depending on the opinion of individual nurses. When patients brought in their own medicines nurses did not assess whether the medicines were suitable for use. If patients were not deemed capable of managing their own medicines, any that are brought into hospital were taken from the patient and stored in a locked cupboard in the treatment room. There were no records of these medicines and the cupboard was always full and messy. Nurses often forgot to give medicines back to patients. When medicines were returned to patients whose drugs regimen had not changed, however there was significant potential for error because of the system.

Doctors sometimes lacked knowledge of therapeutic drug monitoring, for example a digoxin level was requested by a doctor four days after it had been started. Approximately five half lives should elapse before sampling after initiation of digoxin. With a half life of about 36 hours sampling should not be carried out until seven days after starting digoxin. Measurement of heart rate is the primary method of monitoring clinical effect, and maintenance doses are generally determined according to renal function and heart rate response. Monitoring of digoxin blood levels was often unnecessarily undertaken, wasting time and money. On the other hand, sometimes therapeutic drug monitoring wasn't undertaken although appropriate, see case 1. Another patient taking theophylline was started on ciprofloxacin which causes an increase in theophylline blood levels. Theophylline blood levels must be monitored but the junior doctors were not aware of this.

I observed that doctors and nurses were often unfamiliar with different formulations of drugs such as modified release preparations, see case 4. Nurses were administering nifedipine LA 30mg daily as three nifedipine MR 10mg tablets, as they were unaware of the difference between the two formulations. The brand of mesalazine was not indicated on the drug kardex for a patient. This is very important as there are three different slow release formulations, with different release profiles and the brand should always be stated.

From my observations, doctors did not always follow hospital policy with respect to controlled drugs (CDs), see case 5. This may have been because they were not always fully aware of hospital policy or because of time pressures or because they simply couldn't be bothered. However, CD prescriptions are complicated to write and there is a lot for doctors to remember when writing them. If they are unsure doctors should enquire about the correct procedures when handling CDs.

Patients were sometimes given medicines to take home from ward stock without the appropriate labels and instructions such as inhalers and glyceryl trinitrate sprays. Alternatively, patients were sometimes given medicines to take home, that had been ordered by the ward to be administered during a patient's admission, for example Didronel PMO®, but again the appropriate label and instructions were missing.

3.6.10. Delays in discharge

From observations, and discussions with nurses it appeared that delays in discharge sometimes occur because the discharge notification letters are not written in adequate time therefore discharge medicines are not available in a timely fashion. Patients are often told on the morning ward round that they can go home, but the discharge prescriptions are not written until after the ward round has finished at midday, or even afternoon after the junior doctors have had lunch. Ambulances cannot be booked until the discharge medication is on the ward, and if prescriptions don't get to pharmacy until the afternoon, they

often don't arrive back on the ward until after 5pm. Then it is too late to book an ambulance, and the patient's discharge can be delayed until the next day.

It is reasonable that discharge prescriptions should not be written in haste during the ward round, as this may result in errors. However, some prescriptions could be written in advance, as medication would not change before discharge, but this is rarely done. The decision of a discharge date was made in advance for several patients, but the doctors frequently left it until the actual day of discharge to write the prescription. Even when the prescription was written in advance often it was not sent to pharmacy until the actual day of discharge. There are however limitations in pre-empting discharge prescriptions in this manner, which I will consider in the discussion.

I observed that on occasions nursing and pharmacy time was wasted chasing up discharge prescriptions. There was no method of recording if a discharge prescription had been written, if it had been sent down to pharmacy, or whether it had arrived back on the ward. This resulted in nurses phoning up pharmacy to check whether a prescription was ready, when they didn't even know whether it had been written and sent down to pharmacy. My observations and discussions with pharmacy staff revealed that time was often wasted looking for the prescription, when it may not even exist.

3.6.11. Case summaries highlighting issues identified

The following are a selection of case summaries which highlight some of the problems I have discussed.

Case 1 – Patient RS

This patient was admitted with dizziness and falls, which were thought to be due to postural hypotension caused by frusemide, dothiepin and lisinopril. The lisinopril was stopped. He was also taking carbamazepine, which can cause dizziness, drowsiness and ataxia, particularly in the elderly. The doctors did not mention this, and did not check his carbamazepine blood levels, which would have been appropriate, as the side effects are dose related and correlate to serum concentration.

He was also taking Didronel PMO® prior to admission for osteoporosis and this was prescribed on his drug chart. No doses however were given and the chart was annotated 'no stock' by the nurses. On day five of his admission it was discontinued. The family of this patient could have been asked to bring in this man's own Didronel PMO® pack from home. This avoids additional costs for the hospital and interrupting his cycle (Didronel, one tablet daily for 14 days and Cacit®, one tablet daily for 76 days).

If this was not possible it would have been better if ward staff ordered it from pharmacy immediately. As it is on the formulary, it would have arrived on the ward the same day. It should not have been discontinued, as he had a diagnosis of osteoporosis and needed treatment. However, it is probable that missing a few days during this admission would have little effect on his condition.

He was prescribed codeine phosphate for pain. Two days later he became constipated because of the codeine, so three different laxatives were prescribed. He then developed diarrhoea.

On day six of his admission Didronel PMO ® was again prescribed, and ordered from pharmacy. The patient had a week without his Didronel PMO ®. A discussion with the patient revealed that he had been taking his Didronel with his breakfast for the last 14 years. Food should be avoided for at least two hours before, and after a dose, if not it is passed out without being absorbed. He may therefore have not fully benefited from the treatment. According to the patient he had never received the appropriate counselling either from his GP or his pharmacist. The patient said, "Well nobody told me any different."

On day 11 he was discharged. The doctor prescribed Didronel PMO ® on the discharge prescription but did not mark that the patient had a pack on the ward. Fortunately, someone in pharmacy remembered that a pack had been sent up to the ward, for that particular patient, so phoned the ward to check. If that person in pharmacy had not done this another pack would have been supplied, which would have potentially been a waste of money if the pack he was using on the ward was thrown away. It also would duplicate work in pharmacy. This

also wasted time as pharmacy had to contact the ward, and the nurses then had to find out if there was a pack on the ward. The pack however, should have been returned to pharmacy so a new label with instructions could be placed on, but it was not. The patient was also discharged with senna, despite suffering from diarrhoea.

Case 2 – Patient FG

A patient had been taking Nardil® (phenelzine), a monoamine oxidase inhibitor (MAOI), for a considerable time, and had been admitted several times suffering postural hypotension. The patient had been seen in outpatient clinics several times also. Following a recent outpatient appointment the consultant highlighted that she was taking a MAOI for depression, which interacts with her antihypertensive medication, enhancing the antihypertensive effect and can cause postural hypotension. The consultant wrote to the GP, stating,

> *"This lady clearly needs antihypertensive medication.....In light of the side effects profile and potential for interactions, do you think a MAOI is appropriate for this patient?"*

Phenelzine was however continued, and the patient was readmitted on this occasion with postural hypotension. Various doses of phenelzine had been recorded throughout the notes, ranging from 15 to 50mg three times daily. 50mg three times daily is three times the recommended daily dose and it was unclear what dose she had actually been taking prior to this admission. During this admission, it was decided that this should be changed to a more appropriate antidepressant, which would not have a hypotensive effect. The psychiatrist advised mirtazipine 15mg daily. The withdrawal schedule for phenelzine, before mirtazipine can be commenced should be over four weeks, (BNF, 2002), but in this patient was over one week. This was more rapid than recommended and with the potential risk of withdrawal symptoms. She did not appear to suffer any however.

Confusing and incorrect information was given to the GP about changing this patient's medication. The house officer had written a separate summary letter

regarding the change from Nardil to Mirtazipine, and no information was included about this in the main PDL. The HO wrote:

"Notes for GP", Phenelzine 15mg bd until 2/7, then 15md od from the 2/7 – 5/7. Stop phenelzine, allow 2 wk period between, stopping phenelzine and starting 'mitazolin' 15mg on. Thanks.

Mitozolin is not the correct name for the drug that is to be started. Mirtazipine is a drug which is infrequently used, and this may have been confusing for the GP. In addition, her GP name and her allergy to penicillin was not recorded on the discharge prescription.

The patient should have been advised that the rules about which foods and drinks to avoid whilst taking phenelzine, must also be followed for the two weeks after stopping the drug. The patient told me that no one had given this information.

Case 3 - Patient WW

This patient was admitted with rectal bleeding. He had been using indomethacin suppositories, prescribed by his GP prior to this admission. During the admission the decision was made to stop the suppositories as they can irritate the rectal mucosa and inhibit prostaglandin synthesis which can cause rectal bleeding. The patient also had been taking long term antibiotic therapy with trimethoprim, for a chest infection. The consultant suggested that the rectal bleeding may possibly have been caused by a super infection due to the antibiotic therapy, and it was stopped. However, this information was not communicated to the GP in the PDL, there were no instructions not to restart these drugs. No information regarding this was included in the CDS written 3 weeks following his discharge. When I contacted the GP one month following the patients' discharge the patient was still receiving indomethacin, although the trimethoprim had not been restarted. During the patients admission the dose of his clobazam dose had been reduced. The GP was not informed of this either. Ferrous sulphate had been started as the patient was anaemic, but no information was given in the discharge notification letter as to how long this should be continued for.

Case 4 – Patient BH

This patient was referred to accident and emergency by her GP following a fall. She was taking the maximum dose of glipizide, 20mg daily, in four divided doses. The dose should have been prescribed as two divided doses. Glipizide was not on the hospital formulary, therefore not stocked by pharmacy and should have been changed to gliclazide, a cheaper drug which can be given once daily. The ward, however, used a supply brought in by the patient, which could be argued as reasonable, so long as sufficient for the admission and when the patient goes home. The patient was also prescribed isosorbide mononitrate 60mg SR, which is non-formulary.

She was also taking diltiazem MR 120mg daily for angina, and the GP had specified the brand as Adizem®, as recommended by the BNF. On the ward however, the nurses were giving the diltiazem dose as two 60mg Tildiem® (diltiazem standard formulation with a duration of action that requires administration three times daily). This was hazardous for the patient as diltiazem blood levels may be too high in the morning following a dose, which may result in toxic levels and side effects, and blood levels later in the day will be too low and she may have an angina attack. This standard formulation is required to be given three times daily. The nursing staff were not aware of the differences between the preparations, and the doctors weren't aware this was happening. The drug chart should have been endorsed with the brand of diltiazem which is the preferred hospital formulary brand, Angitil SR® (this is equivalent to Adizem SR®).

It was clear from my observations and discussions with staff that the discharge of this patient was delayed 24 hours and nursing and pharmacy time was wasted sorting out problems with the discharge medication. The discharge medication could not be supplied on the day the prescription arrived in pharmacy, as the prescribing doctor could not be contacted until the following day and there were various problems on the prescription. When pharmacy staff contacted this doctor the following day the prescription had to be re-written because of all the problems:

- 'Isosorbide mononitrate 60mg daily' was prescribed. The patient was actually taking the modified release (MR) preparation, Imdur®. When contacted, the house officer did not know the difference between the MR and instant release preparations. I advised the house officer to prescribe isosorbide mononitrate 20mg bd, in accordance with hospital policy. This should have been done when the patient was admitted.
- 'Diltiazem 120mg om' was prescribed, without specifying the formulation. When pharmacy staff phoned the ward to find out what she had been getting on the ward, the nurses explained what they had been giving (two 60mg standard Tildiem®). The house officer was then contacted to check this, but did not know the difference between the different diltiazem brands and preparations. I was on the ward at the time and explained she had been taking Adizem® MR 120mg daily prior to admission. Although usually given twice daily the patient had been stable on this dose for several years so the house officer was advised to prescribe the equivalent preparation of Angitil® SR (the hospital formulary preference) 120mg od.
- The HO had prescribed glipizide 5mg qds on the discharge Rx. The ward had been using the patient's own, and pharmacy does not stock glipizide. Had pharmacy been informed they could have ordered it in advance ready for the discharge prescription. The patient was changed to gliclazide.

Case 5 – Patient MS

This patient was referred by her GP with collapse and agitation. The GP suspected she had taken an overdose of carbamazepine, and that she was addicted to Diconal®, which she takes for osteoporosis. The admitting doctor recorded her drug history as only carbamazepine 200mg, but gave no frequency and the GP gave no information about her medication. The only medication she was prescribed following admission was a course of trimethoprim for a urinary tract infection, and co-codamol.

Despite the suspected overdose, a blood carbamazepine level was not checked. This could be considered reasonable as a CT scan revealed she had suffered an intracranial bleed so she was transferred to another hospital for

neurosurgical assessment. There was no communication about her medication from the study Trust to the second hospital, and when she returned two days later there was no information from the second hospital to the study Trust.

Six days following admission the doctors still did not know what her usual medication was, and this is stated in her notes, but the GP still was not contacted. On day seven she was prescribed carbamazepine 200mg daily, although it was not clear why this dose was started as there was no dose documented in her notes. On day eight she was prescribed codeine for pain and in her notes recorded ' the patient is very, very distressed as she is not receiving her usual Diconal®, when the nurses attempted to give her codeine phosphate, she spat it back out at them.'

On day eight, codeine was stopped and she was prescribed diamorphine and paracetamol, to be given when she requires them for pain. The GP was contacted on day eight and gave a list of her usual medicines: Carbamazepine, Diconal®, trifluoperazine, ranitidine, Calcichew D3® and dothiepin. The GP explained that the Diconal® was supplied on a daily basis as she was known to take more than the prescribed daily dose. She was then prescribed all her medicines, although Calcichew D3® was mistakenly not re-commenced until day 15 of admission.

19 days following admission, she was discharged. There were numerous problems with the discharge notification letter. It did not state the GP name, consultant name, date of birth, date of admission, or whether the patient had any allergies. She had been commenced on antihypertensive therapy and this was not communicated to the GP. Diconal® is a controlled drug (CD), and therefore must be written on a separate CD prescription form according to hospital policy. Initially the doctor had written it on the main prescription, and was instructed by pharmacy to write a separate CD prescription.

The house officer rewrote it on a CD prescription but prescribed seven days, and the consultant had instructed that patient was only to receive one day of everything as she may take more than the prescribed dose. I highlighted this and house officer rewrote the prescription for the third time for one day only.

This patient could have been sent home with seven days of Diconal®, which she is known to be addicted to. This wasted nursing and pharmacy time and delayed the patient's discharge.

Case 6 - Patient CB

The continuing care of this elderly patient following discharge was compromised by the incomplete and inadequate information supplied by the hospital to the primary care team. He was admitted with general deterioration and social problems. During the admission he received antibiotics for a chest infection and was given an injection of hydroxocobalamin 1 mg. Hydroxocobalamin is given for vitamin B12 deficiency such as pernicious anaemia and the recommended dose in the absence of neurological complications is 1mg on alternate days for one to two weeks, then 250mcg thereafter until the blood count returns to the normal range, then 1mg every two to three months (BNF, 2002). This patient's therapy was inappropriate as he received only one dose during his admission. There was no documentation of why this had been started in his notes. He was also commenced on ferrous sulphate as he had a low haemoglobin and folic acid. Although no diagnosis was recorded in the notes from his blood count it was clear he had pernicious and iron deficiency anaemia. When he was discharged, the information provided was very confusing. The GP was not informed of the patient's anaemia in the discharge notification letter, nor were any instructions relating to future therapy communicated i.e. two to three monthly hydroxocobalamin injections. Without these his condition may deteriorate significantly. Neither folic acid nor ferrous sulphate were included in his discharge medication and no reference was made to these in the discharge letter. He had received only eight days treatment in hospital. It appeared, however, that this omission was a mistake as there was no record in his notes that either had been stopped and both drugs were continued on his hospital drug chart. In addition to this the nurses discharge summary stated that the patient's medication included ferrous sulphate and folic acid. This would have been very confusing for the primary care team.

Case 7 - Patient MW

This patient had been attending the outpatient clinic for some time prior to this admission. She had initially been referred because of vertigo and falls. Her medication was thyroxine, bendrofluazide and co-proxamol. Following one appointment the consultant stopped the bendrofluazide, which she took for hypertension, and changed this to amlodipine, as she had low sodium and potassium. She was also suffering from palpitations and ectopics which he believed to be due to hypokalaemia, secondary to bendrofluazide. This was communicated to the GP. Despite this, however, the GP later restarted her bendrofluazide and she was readmitted on this occasion, with low sodium and potassium. I was however, unaware of the GPs reasons for restarting the bendrofluazide, which may have been reasonable.

3.7. SUMMARY

This chapter describes the preliminary, investigative phase of the study which aimed to examine the nature of patient care in different specialities and settings within the study Trust; the culture relating to therapeutics within the Trust; current practice and standards of care relating to medicines; problems relating to medicines use; and attitudes to change in these areas.

The main issues identified were:

- accurate and complete drug histories are frequently not obtained when patients were admitted
- sometimes prescribing is inappropriate
- patients are often not given sufficient information about their medicines and do not feel involved in their own care
- medication is frequently implicated in admission
- communications both from the hospital to GPs, following discharge and from GPs to hospitals when patients are admitted are poor
- prescribing and administration errors occurred and are rarely recorded
- drug therapy is poorly documented in patients' notes

- there are problems around the supply and administration of drugs
- some doctors and nurses have insufficient knowledge of therapeutics
- delays in discharge often occur because of problems with discharge medication

The following chapter describes how, based on the findings from this preliminary phase, a new model of care is developed, implemented and evaluated, aimed at improving care with respect to medication.

4. CHAPTER 4 – IMPLEMENTATION AND EVALUATIVE PHASE: PHASE THREE AND PHASE FOUR

4.1. INTRODUCTION

In section 3.1, I explained this research comprises four phases:

Phase one - a preliminary phase to gain an understanding of the study environment – methods one, to gather and analyse preliminary data

Phase two - reflection on emerging themes and identification of key issues relating to the use of medicines – results one, of preliminary analysis

Phase three - development and implementation of a new model of care – methods two, and

Phase four - evaluation of the model in the study setting and exploration of issues which would influence adoption throughout the trust – results two.

As detailed in section 3.2 the research was conducted in an acute university hospital trust in the North of England. The main implementation and evaluative phase of the study (phases three and four) was conducted on two acute medical wards within the main hospital, ward A and ward B. Patients admitted to these wards were usually under the care of one of four consultants in general medicine who were fully supportive of the project. Ward A had 30 beds, with patients generally under the care of two of the consultants. Ward B had 28 beds, with patients generally under the care of the other two consultants. Occasionally, because of bed shortages elsewhere in the hospital, patients under the care of other consultants were accommodated in these wards, but were not included in the study.

The patients studied were elderly people (over 60 years) with a range of diagnoses. Recruitment to the study was opportunistic (convenience sampling), with patients being included in the study as they were admitted to the wards.

As outlined in section 3.2, the design of the research followed an action research approach. In chapter 3, section 3.5, I described the methods used in the preliminary phase of my study, 'phase one' and then described and reflected on the findings from the preliminary phase, 'phase two'.

In this chapter I will describe how I developed and implemented a new model of care based on the findings from the preliminary phase, which I refer to as 'phase three'. I will then move on to describe the evaluation and reflection of the findings from this phase, which I refer to as 'phase four'.

4.2. PHASE THREE: METHODS TWO – DEVELOPMENT, IMPLEMENTATION AND EVALUATION OF A NEW MODEL OF CARE

In Chapter 3 I presented data from the preliminary phase showing the nature and impact of medication problems in the care of older people in the study Trust. In the third phase of the project, following the principles of action research, I developed and implemented a series of interventions aimed at avoiding or minimising these problems.

I prioritised interventions that were deliverable within the study setting and for which there was some evidence (summarised in Chapter 2) that they might be effective in improving care. These were:

- obtaining accurate and complete drug histories
- ensuring appropriate prescribing
- educating patients and improving concordance
- identifying iatrogenic factors in admissions
- improving communications with GPs
- avoiding errors, and, when they do occur, ensuring appropriate reporting
- ensuring complete and accurate recording of treatment in the clinical record
- optimising supply and administration of medicines to ensure timely treatment on the wards and efficient provision of discharge medicines
- educating other health professionals in medicinal therapeutics.

As I set out in section 2.5.5, pharmacists are well placed to deliver these interventions and developing their role is a feature of current health policy. In

this phase of the study, I therefore focussed on the contribution that a pharmacist could make to improving care.

4.2.1. Interventions

A new approach to professional practice of pharmacists was developed, based on these priority areas. Interventions were selected and planned, and comprised the following. The pharmacist:

- is based on the ward full time, available for all patients and ward staff for consultation
- attends the ward rounds, monitoring and advising on the prescribing and administration of drugs
- takes a second medication history following admission to the wards studied, using a structured proforma (see appendix 6.2)
- assess patients' knowledge about their medicines and compliance (see appendix 6.3)
- undertakes a formal medication review using indicators of appropriate prescribing
- plans and co-ordinates medicines aspects of discharge
- educate patients about their medicines
- provides information to GPs about patients' drug therapy during admission and following discharge

4.2.2. Aims

The main aims of this new approach to pharmacy practice were:

1. To provide a source of expertise about therapeutics to a team of health care professionals.
2. As a result of being involved with that team, change prescribing behaviour.
3. As a result of changing prescribing behaviour, reduce the risks associated with drug therapy to which patients are exposed and improve patient care.

4.2.3. Intervention instruments

In this section I describe the instruments developed to implement the intervention. Instruments were developed based on my experience in the preliminary phase of the project, from instruments already in use at the study trust and from appropriate literature. Instruments facilitated implementation of the intervention and also assisted in data collection for evaluation.

4.2.3.1. Drug history

I developed and piloted a structured proforma for drug history taking (see appendix 6.2). This was used to guide the author to obtain information about: prescribed medicines, including dose, frequency and indication; medicines bought by patients, including herbal and homeopathic; allergies; side effects of medicines; and social drugs such as smoking and drinking. On this proforma I could make a note of the differences between my drug history and that of the admitting doctor, and record any changes to therapy following the second drug history. The second drug history was taken within two days of admission when the patient arrived on the wards studied.

4.2.3.2. Medication review

The medication review was developed from the literature (Cantrill *et al.*, 1998, Department of Health, 2001a), and my own professional experience, and included:

1. Assessment of patients' knowledge

Patients' knowledge about their medication was assessed based on 6 criteria: the number of drugs the patient recalls they take, the number they know or partially know the name of, the number they know the purpose of, the number they can recall the overall dose for, the number they know the daily frequency of and where appropriate, the number they know the strength of. A score for each criterion was calculated as a proportion of the total number of drugs the patient was taking at the time of admission, determined following the second drug history. For example if a patient was taking 4 drugs and recalls:

- that they take 4, score = 1

- the name of 3, score = 0.75
- the purpose of 2, score = 0.5
- the dose of 3, score =0.75
- the daily frequency of 3, score = 0.75
- the strength of 1, score = 0.25

This allowed a more detailed analysis of particular aspects about patients' knowledge their medication regimen, for example, patients may be more likely to recall the overall dose rather than the strength of their medication. On the other hand, they may be less likely to know the actual names of their medication, but can recall that they take something, for example a patient may say, 'I take one for my heart'. The 'proportionate' scores for each criterion were grouped into the following percentage ranges: 100%, 75-99%, 50-74%, 25-49% and less than 25%. For example, a patient with a score of '1' for knowledge of all their medicines names would be classed as having 100% knowledge for this. A patient with a score of 0.63 would be classed as having between 50 – 74% of knowledge of their medicines names.

A standardised total score out of 10, for patients' overall knowledge of their medication, was calculated as the mean of all six proportionate scores multiplied by 10. This was also was grouped into the percentage ranges listed above.

2. Patient compliance instrument

Medication compliance is difficult to assess. Drug levels or pharmacological markers are sometimes available, but interpretation as a measure of compliance is complicated by potential pharmacokinetic differences between drugs and patients (Eraker *et al.*, 1984). This approach was considered inappropriate for this study as patients would be taking a wide range of drugs, and technical measures such as those would not be practical. Pill counts are a widely used compliance measure used in research but tend to be inaccurate (Raynor, 1992). Interviews may not accurately detect non-compliance as patients tend to overestimate adherence because of embarrassment,

forgetfulness or fear (Eraker *et al.*, 1984). How the question is asked is significant and careful phrasing may lead to more honest reports. Questions should not be being threatening, accusative or embarrassing. Not all patients brought their medication into hospital with them and even for those who did, it was not possible to ascertain whether that was all their medicine or whether they had supplies also at home. A pill count was therefore considered inappropriate.

It was decided the most practical method was to use a questionnaire administered by myself (see appendix 6.3). The questionnaire for patients was based on Goldberg *et al's* (1998) method of assessing patient compliance with medical treatment. Goldberg *et al's* questions constructed for patients were influenced by the distinction between forgetfulness and the decision not to comply used by Morisky *et al* (Morisky *et al.*, 1986). An item was added to ascertain if the patient took the medication late rather than at the prescribed time. Goldberg *et al's* (1998) final compliance index was based on four items, asking patients whether they:

1) Forgot to take medicines

2) Took medicines late (more than 2 hours)

3) Decided to take less medicine

4) Decided not to take at least one medicine

Instead of a dichotomous reply into 'yes' and 'no', as used by Morisky *et al* (1986), Goldberg *et al's* (1998) respondents were asked to answer with one of four different degrees of non-compliance:

a) Once a month or less

b) A number of times a month

c) A number of times a week

d) At least once a day

When patients said that they did not take their medicines as prescribed, I questioned them to ascertain reasons why, for example, they forget to take their medication, they sometimes take medicines late, and medicines are sometimes deliberately omitted or doses altered. I also asked patients whether anyone helped them with their medicines and if they had any routines to help them remember to take their medicines. If patients deliberately altered their own medication regimens, they were questioned as to the reasons for this. These were all open-ended questions and categories were developed depending on patients' responses.

3. Assessment of appropriateness of prescribing

I reviewed patients medicines according to the following criteria (Cantrill *et al.*, 1998, Department of Health, 2001a):

- the indication for the drug is recorded and valid according to the BNF
- untreated indications which may require therapy are reviewed
- the reason for prescribing a drug of limited value is recorded and valid
- there is evidence of efficacy
- the drug prescribed is the cheapest in its therapeutic class, providing it is just as safe and effective, unless a valid reason is given
- a generic product is prescribed if one is available, unless the BNF recommends otherwise
- the dose and dosing schedule are appropriate based on current evidence, unless a valid reason is given
- the duration is within the ranges in the BNF, unless a valid reason is given
- the formulation is suitable
- the drug is not contra-indicated in that patient
- the patient is not suffering any hazardous or unpleasant adverse drug reactions

- if there are any potentially hazardous drug-drug interactions, the prescriber is aware.

4.2.3.3. Patient reminder chart

A patient reminder chart was developed (see appendix 6.4), which gave patients written information about the name of their tablets, the dose and frequency, the purpose of their medicines, and any special instructions.

4.2.3.4. Discharge information for GP

A form was developed (see appendix 6.5), to give GPs additional information about drug therapy during admission, and following discharge, along with any monitoring that was required.

4.2.3.5. Piloting research instruments

All the instruments were piloted and refined prior to implementation of the next phase of the project. I used a sample of 20 patients, aged 60 years or over, to improve the instruments and become familiar with the techniques involved. These patients were recruited opportunistically as they were admitted to the study wards, during a two week period in October 2000. Patients were excluded if they were too ill, or if they had an abbreviated mental test score (AMTS) of less than five (see appendix 6.6) (Hodkinson, 1972). The nurses helped me in recruiting patients by suggesting patients they considered appropriate.

4.2.4. Implementation of interventions

From November 2000 to March 2001 this new approach to practice was implemented on two acute medical wards within the study Trust, ward A and ward B. Following the ethnographic work, I decided that it would not be possible to work simultaneously on the two wards therefore, for the first two months I worked on ward A and for the second two months I worked on ward B. I worked, as a pharmacist, on the wards along side the doctors and nurses, providing 'patient centred' pharmacy services as outlined above. I spent my whole working day on the wards, and was contactable via a pager at all times.

The preliminary ethnographic findings identified the therapeutic problems that were occurring and interventions that might be effective in addressing them. It

also provided a valuable insight into the workings of the wards and the prevailing clinical and management culture (which was itself a contributor to some of the problems). Clearly, it was important to embed the interventions within the ward culture while, at the same time, acting to change that culture where appropriate. Interventions that were explicitly in conflict with working practices and ethos would be unlikely to succeed. The ethnographic findings helped me to develop ways of working and relationships which were a good fit with existing practice and which enabled me successfully to integrate changes in practice.

As discussed previously, the patients involved in the study were elderly, as they have more medication related problems than younger people, and most of the patients on the wards studied fell into this age category. Convenience sampling was used, as patients were admitted to the wards studied. Each ward had an admissions book, in which the nurses entered the patient's name, details and diagnosis. Each morning I checked the admissions book and noted the names of potential participants. I then spoke to the nurses, who were aware of the inclusion and exclusion criteria, and asked which patients they considered potentially appropriate for inclusion in my study. They were very helpful in guiding me as to which patients were too ill or too confused to take part and this meant I did not have to assess all patients admitted to the ward.

Patients included in the study were over 60 years of age, under the care of one of the four specified consultants, and had an abbreviated mental test score (AMTS) of greater than or equal to five out of ten. It was felt inappropriate to include patients with an AMTS of less than five as they would not be able to consent. Patients whom I considered too ill to participate were excluded.

Patients admitted to the wards on Friday evening or Saturday were excluded as I intended to take the drug history no later than 24 hours after arrival on the study ward.

I gave patients an information sheet and explained about the study (see appendix 6.7). I explained that the study aimed to improve the use and management of medicines within the Trust and when patients are discharged.

Patients were asked if they were agreeable to taking part and so they signed a formal consent form, (see appendix 6.8).

4.2.5. Evaluation of interventions

As detailed in section 2.7, health care is complex, and patient outcomes are influenced by a range of factors. As it was deemed most appropriate for this research, an evaluative study was undertaken. Evaluation research is used to find out if, how and to what extent the objectives of particular activities, such as provision of service, have been or are being met. This type of research addresses the question, "Did it work?" So did the new approach to pharmacy practice work?

4.2.5.1. Case study approach

A case study approach was used for the evaluative study. A case study focuses on specific situations, which may be a single case, a number of cases, or an organisation. In this study 'the case' comprised the two wards studied, patients enrolled into the study and the various health care professionals. Case study evaluations are valuable for the study of complex circumstances and social settings (Bowling, 1997). Case studies typically use multiple methods and sources of evidence to establish construct validity (Yin, 1994), and as a design lend themselves well to both qualitative and quantitative approaches.

To evaluate the new approach to pharmacy practice implemented in this project, detailed information were collected using a variety of data collection procedures.

Differences between the admitting doctor's drug history and that obtained by myself were recorded and compared. I recorded any subsequent changes to therapy following my drug history. I also recorded all changes to medication following the structured review.

Patients abbreviated mental test score (AMTS) results were recorded, and their knowledge of their medication regimen was assessed. Patients' knowledge and understanding about their medication was assessed and scored using the

system described in section 4.2.3.2. Results from the compliance assessment were recorded, scored and categorised as outlined in section 4.2.3.2.

I recorded all my activities on the ward and all interventions into drug therapy were recorded and categorised, using a form which had been validated by pharmacists from the study Trust (see appendix 6.9) and was already used by pharmacists. Interventions were categorised according to the main people involved, the primary reason for the intervention, and the clinical significance of my action. Significance ratings were assigned retrospectively to each intervention by two separate hospital pharmacists, independent to the study and a measure of agreement between the two assessors was obtained using Cohen's Kappa. A value of 1 indicates perfect agreement, whilst a value of 0 indicates that agreement is no better than chance. The significance ratings were as follows:

1. Intervention detrimental to the patient
2. Information only
3. Minor benefit e.g. administration of intravenous cefuroxime and metronidazole in the same bag
4. Moderate benefit e.g. a recommendation which would bring care to a more acceptable and appropriate level (i.e. standard of practice)
5. Significant benefit e.g. changed sub-therapeutic dose, optimised therapy, changed inappropriate therapy
6. Very significant benefit e.g. prevented serious toxicity or discomfort
7. Potentially life saving

I recorded all instances where I intercepted errors, along with all impact on prescribing practice.

Again following ethnographic technique, data were gathered from participant observation during the implementation phase, and informal discussions with doctors, nurses, ward clerks, general practitioners, community pharmacists and patients. Participants were asked what they thought of the new approach to pharmacists working along side doctors and nurses in this way.

A short questionnaire was administered to patients to assess their satisfaction with the standard of care regarding their drug therapy, and to gain insight into their understanding of their therapeutic regimen, and adherence issues. Open-ended questions allowed respondents to raise issues which were important to themselves.

4.2.6. Focus groups and in-depth interviews

Following the four month active study period on the wards I sought the views of health care workers about the new approach to pharmacy practice. Data from interviews and focus groups were triangulated with the case study data, to evaluate the new approach to pharmacy practice, and also to identify factors which could either enhance or inhibit its large scale implementation in a Trust. The case study data and interview and focus group data were combined to explore issues around the same topics and enable a broad examination of themes for discussion. The interviews and focus groups also provided an opportunity to investigate in more depth, issues relating to the use of medicines within the study hospital that participants felt were important, and to explore their experiences.

In order to develop questions to ask participants about implementation of the new approach to pharmacy practice I needed to consider issues relating to change in practice within organisations in general.

If the proposed new approach to pharmacy practice was to be implemented across mainstream general medical care within the study Trust, what is required for it to be successful? What are the barriers to its successful implementation? What will facilitate its successful implementation? How can the culture towards care of patients with respect to their medication be changed? How much of the model would require a hands-on approach from pharmacists, and which parts of the model could be delivered effectively by other health care professionals?

As it is the views of professionals that are sought, the most appropriate methods were focus groups and in-depth interviews, using constant comparative analysis to identify themes. This approach allows more detailed data to be collected and provides a rich insight into the issues addressed in the

research question. Interviews are an appropriate method of producing data as they provide opportunities for informants to discuss priorities, opinions and ideas. As it was necessary to obtain the views of staff who are in key positions to influence implementation of the model, theoretical and purposive sampling were used (Bowling, 1997). Interviewees were selected following theoretical sampling, which involves selection of informants based on the developing analysis and coding of data. Interviewees were therefore selected to gather additional information in an attempt to corroborate, or otherwise, existing data and to elaborate of the categories. The process of gathering new data stops when additional data is not adding to the analysis i.e. theoretical saturation. Theoretical sampling was considered impractical for the focus group recruitment. Appropriate focus group participants were identified using purposive sampling, whereby participants are recruited with a known particular characteristic, i.e. the pharmacy staff who would be involved with the proposed service developments.

4.2.6.1. Interviews

Following the four month evaluation of the interventions on the wards, semi-structured interviews were conducted with the four general medicine consultants and one nurse who were involved with in the project. Semi-structured interviews were also conducted with two registrars, two senior house officers, three house officers and one senior nurse who had not been involved in the project, but were working in general medicine. This method allowed me to cover the areas which I wished to explore, but also to probe issues raised during the interview.

I telephoned the four consultants and asked if they would be willing to take part in an interview and they all agreed. I asked them to suggest some other doctors of varying grades and nurses whom I could interview. Following their advice I contacted the doctors and nurses they suggested, by paging them or telephoning the ward. I explained the purpose of the interviews and asked them if they were willing to take part. All agreed, although one of the nurses was unable to participate as she was on holiday.

These staff were then sent a covering letter confirming the interview and what it would involve, with additional information about the project depending upon whether or not they had prior involvement in the project. The doctors and nurse without prior involvement received a letter, which informed them about the aims of the study, what the project involved, the main findings, and the main issues to be covered during the interview (see appendix 6.10). The consultants and one nurse involved in the project received a letter which briefly informed them of the main issues to be covered in the interview (see appendix 6.11).

I conducted all interviews and used an aide memoir which varied depending on the health care worker interviewed and whether or not they were involved in the project (see appendices 6.12 and 6.13). This included a list of issues and questions, which enabled the interviewee to develop ideas and speak more widely on the issues raised.

From these interviews, I hoped to gain the opinions and views of the medical staff on the proposed change in pharmacy practice following the study interventions, and the problems relating to medicines they currently experience. Issues covered included:

- whether they were supportive of the proposed changes
- how they feel about pharmacists being fully integrated members of the multidisciplinary team
- what the perceived barriers are and how can these be overcome
- whether patients' care would be improved
- whether there any cultural problems which may impede implementation, and how can these be tackled.

Doctors and nurses were asked about:

- views of pharmacists as professionals
- their perceptions of the roles of pharmacy staff
- exactly how pharmacists could further contribute to patient care and
- how they could help them in their work

- involvement of patients in their own care, for example patient education
- the problems as they perceive them, relating to medicines within the study Trust, such as medication errors
- their own competencies, and those of their colleagues, including whether they have sufficient knowledge of therapeutics, and whether they receive enough training and support about drug therapy.

This would help refinement of the model of pharmacy practice, for wider implementation. Potential interprofessional and interpersonal problems were explored.

A pilot interview was conducted with a pharmacist playing the role of doctor, to help refine the actual questions, and to train myself in the use of the technique. Some questions were felt to be too long, and were rewritten to be shorter and more succinct. Some were felt to be closed, and were therefore revised.

With the permission of the informants the interviews were tape recorded and transcribed in full, by myself, following the interview. All but one agreed to the interview being tape recorded. One participant refused and I took notes, which were fully transcribed immediately following the interview. Supplementary notes were taken even in the recorded interviews, in case of failure of recording equipment.

4.2.6.2. Focus groups

Following the four month evaluation of the interventions on the wards, four focus groups were conducted with pharmacy staff from the study Trust. It was decided to group pharmacists and technicians separately, as they have different professional responsibilities and are therefore likely to raise differing concerns and issues about the proposed developments in pharmacy services. Bringing people together on the basis of shared experience is often most productive; however, differences between participants are often illuminating (Kitzinger, 1994a).

After a brief presentation to inform pharmacy staff about the project and focus groups as a method, then they were invited to participate. Sixteen pharmacy

staff participated in four focus groups see (tables 4.1 and 4.2). At the time of the study there were 13 pharmacists in post, and 17 technicians. All volunteers were given a letter which briefly summarised what was involved in focus groups and informed them about the aims of the study, what the project involved, the main findings, and the main issues to be covered during the focus group (see appendix 6.14).

Table 4.1 Focus group participants – pharmacists

Focus group	ID	Grade	Job description	Years qualified
1	A	E	Formulary / electronic prescribing	10
	B	D	Orthopaedics / plastics	5
	C	D	Medical admissions	4
	D	D	Quality and performance	18
2	A	D	Surgery	12
	B	C	Orthopaedics	2
	C	D	General medicine – elderly	6
	D	E	Principal clinical pharmacist	2

Table 4.2 Focus group participants – pharmacy technicians

Focus group	ID	Grade	Job description	Years qualified
1	A	MT02	Dispensary	23
	B	MT02	Ward based	10
	E	MT02	Ward based	12
	C	MT02	Dispensary / aseptics	3
2	A	MT02	Dispensary	34
	B	MT01	Dispensary	1
	C	MT02	Dispensary / aseptics	17
	D	MT02	Ward based	20

A schedule was used as an aide memoir for the focus groups (see appendix 6.15). The objectives of the focus groups were to obtain the views of pharmacy staff on implementing the proposed patient centred pharmacy practice throughout mainstream care of general medicine. In particular:

- their feelings about taking on new / extended roles
- pharmacist integration into the multidisciplinary team, providing patient-focussed rather than the traditional pharmacy-based services
- perceived barriers and how to overcome or tackle these
- training requirements and support needed
- appropriate professionals to deliver the different components of the service
- the level of pharmacist involvement required
- monitoring and audit of the service

Participants were asked their views on the new approach to pharmacy services piloted within the Trust, in particular their perceived advantages and disadvantages for patients, doctors, nurses and themselves.

Each focus group was approximately one hour in length. They were held in the education and training department of the study Trust. Participants and the moderator sat in a circle to help establish a relaxed atmosphere. Refreshments were served, but there was no break, as staff were needed back at work, so there were time limitations. As the participants all knew each other introductions were not required.

It was important to set up a non-threatening environment conducive to expression of opinions. The moderator must therefore be seen to be impartial and objective, with no vested interest in the outcome. For these reasons I decided to have an individual who was independent of the research, and the study Trust, to moderate the focus groups. It was decided that the moderator needed to have background knowledge of the subject area, so another pharmacist, from a different Trust facilitated the groups. She was given a summary of the research and the aide memoir prior to conducting the focus groups. She had prior experience of focus group moderation. This was an

advantage as the role of the moderator is to guide the discussion, listen to what is said, but not to participate, share views, engage in discussion, or shape the outcome of the group discussion (Kruegar, 1998). Skill is needed to balance keeping quiet, with knowing when to intervene. A key skill is to ensure that interaction between research participants is encouraged.

With the informants' permission, the focus groups were tape recorded. Informants were asked if they had anything to add after the tape recorder had been turned off. I was a non-participant observer in the group, observing non-verbal behaviour, interaction between individuals and group dynamics to ensure that as much data as possible is available for analysis. Field notes were made to supplement the transcripts.

4.2.7. Analysis

Data from the case study approach were analysed using the software package SPSS, (Statistical Package for Social Sciences). Differences in drug histories and changes to medicines following this and the medication review were quantified, and categorised. Patient characteristics were entered into SPSS, along with their abbreviated mental test score.

The proportionate scores for patients' knowledge of their medication for each criterion along with the overall score and the ranges in which these were placed were entered into SPSS.

Patients' responses to the four items, relating to compliance with their medication regimen, from the questionnaire were entered into SPSS. For example for the each item the response could be one of four alternatives, as described in section 4.2.3.2. Answers to the open ended questions were categorised and the resultant categories entered into SPSS.

All interventions into drug therapy were entered into SPSS as categorical variables, including errors intercepted and instances where prescribing behaviour had been altered. The short patient questionnaire to assess satisfaction with the service was also analysed using SPSS. Responses to open ended questions were analysed and used to illustrate patients' feelings.

A descriptive analysis was carried out, with frequencies calculated for categorical variables and mean and standard deviation for quantitative variables. Relations between variables were assessed using Pearson's correlation.

Observational work, informal discussions and open ended questions were transcribed, and analysed in the same manner as the interviews and focus groups data.

I transcribed the interviews and focus groups verbatim. The transcripts were supplemented with observational data obtained during the interviews and focus groups. A large amount of very rich and dynamic data was generated from these.

QSR NUDIST software package was used to facilitate analysis of the transcripts. This package enables complex organisation and retrieval of data and avoids 'cut and paste' techniques i.e. cutting sections of data and pasting them on to index cards that could be filed under the appropriate category. Within the computer package themes are categorised and stored by their contextual theme using labels and the themes also maintain their contextual position in the raw transcripts. NUDIST makes the categorisation of qualitative data easier by enabling entry of verbatim transcripts and marking of text by theme which the computer can retrieve and sort as instructed. While programmed coding of words and phrases, with 'look up' tables and dictionaries stored in the machine, can be carried out by qualitative analysis packages, concept matching remains the job of the researcher. Within this study I used NUDIST to create names and phrases (themes) and highlight related areas of text from my transcripts to be categorised (coded) under the created headings. This enabled me to build and modify subsets of categories which ultimately aim to describe the full range of data. Whilst NUDIST facilitated the data analysis, the creation of themes and categorisation of data was undertaken by myself. Basically the computer took over the manual tasks associated with the coding process e.g. writing marginal codes, making photocopies of transcripts or field notes, cutting out all chunks of text relating to a code, and pasting them together. NUDIST does not automatically do these things, I had to interpret my

data, code and then retrieve the data, but the computer takes over the manual labour involved (e.g. wielding scissors and pasting paper together).

The transcripts were read many times and the data systematically examined to identify and group recurrent themes and coding, and to classify and develop categories. This is known as 'open-coding', whereby the data are examined word by word and line by line, and codes were freely generated, often reflecting the words of the respondents themselves. For example, the code 'patient education' was given to the response:

> *"Often we don't educate patients about their medications, just because we're busy....."*
>
> House officer EB

QSR NUDIST was used to carry out this coding process. A constant comparison approach was followed, whereby each category was searched in the entire data set and all instances were compared until no new categories could be identified (Strauss and Corbin, 1998, Pope and Mays, 1995). Each item is systematically checked or compared with the rest of the data to establish analytical categories. Categories are added to reflect as many of the nuances in the data as possible, rather than reducing the data to numerical codes. Sections of the data, such as discrete incidents, frequently included multiple themes, and QSR NUDIST software facilitated cross referencing to deal with this (Pope and Mays, 1999). The global codes were then reviewed and sorted into broader codes. This can be referred to as data reduction, whereby data are condensed, focussed and simplified (Miles and Huberman, 1984). Once the data were coded they were re-examined to look for similarities which would allow the global codes to be collapsed into substantive codes and grouped together into categories.

Data analysis was inductive, following a grounded theory framework, the core category of which is conceptualisation (Strauss and Corbin, 1998). Grounded theory is the generation of emergent conceptualisations into integrated patterns, which are denoted by categories and their properties. This is accomplished by the rigorous steps of grounded theory, woven together by the constant

comparison process, which is designed to generate concepts from data (Glaser, 2002).

4.2.8. Summary

An action research approach was followed for this project:

Phase three was the action stage of the project and I developed and implemented patient centred pharmacy practice, whereby the pharmacist worked along side doctors and nurses on the two wards studied providing the specified services.

Phase four was the evaluation stage. A case study approach was used to evaluate the new approach to pharmacy practice. *Focus groups and interviews* supplemented this and provided information about factors which could either enhance or inhibit its wholesale implementation in a Trust. Health care staff were also asked in more depth about issues relating to the use of medicines within the study hospital.

4.3. PHASE FOUR: RESULTS TWO – EVALUATION AND REFLECTION

This section provides a summary and reflections of the findings from the evaluative study, focus groups and interviews. Discussion of the emergent topics are given in chapter 5.

As a reminder, initially an assessment study was conducted, using ethnographic technique, to assess, the current situation within the study Trust, with respect to the use on medicines, and how patient care could be improved by more appropriate employment of the expertise of the pharmacist.

Then a new approach to pharmacy practice was developed, with specific interventions aimed at addressing problems identified, and improving patient care. As described, this new model for pharmacy practice was then implemented and evaluated on two acute medical wards.

I begin by describing my experience of conducting the research.

4.3.1. Experience of conducting the research

In this section, I will try describe my experience of conducting the research and give an insight into my interactions with doctors, nurses and patients, their reactions to this project, and my own feelings about undertaking the work. Throughout the research I recorded all my actual interventions into patient care and activities undertaken and made detailed descriptive field notes in a number of instances which I felt were particularly significant, for example about conversations, attitudes, interprofessional dynamics, relationships with patients. In hindsight, it would have been helpful to keep even more detailed field notes of all my activities for example the every day encounters with patients, staff and other people involved in the project. However, at the time of conducting the research I felt I had insufficient time to record data in this manner. In retrospect, it would have been useful to keep a brief day-to-day diary throughout the project.

4.3.1.1. Stakeholders

At the beginning of the project, I felt it was important to identify the key stakeholders. These included the director of quality and performance at the local Health Authority, the four consultants I was to be working with, and the head of pharmacy at the study Trust. Doctors, nurses, and other ward staff and pharmacy staff were also very important. The local Health Authority funded two years of the research programme.

An important early task was to identify the political issues around this project and the different agendas of each group. Negotiation and consensus with stakeholders was necessary to recognise and deal with the politics of the project in a creative and constructive way.

The head of pharmacy at the study Trust had originally sought funding from the Health Authority for a research project to investigate medicine practices in the hospital and the professional roles of pharmacy staff. The main objectives were to highlight suspected problems in current practices and the benefit of developing ward based pharmacy services. The head of pharmacy had a specific agenda in that he wanted the Trust to invest in pharmacy. The

consultants also wanted more pharmacy input on the wards. At times, I felt under pressure and pulled in different directions and I felt it was important that this did not adversely influence the project. The main stakeholders were keen to see service development and I sometimes found it difficult to balance this with a robust research programme. Furthermore, on occasions, negotiation and justification about my chosen research methodology was necessary as some people had different ideas about how the research should be undertaken.

4.3.1.2. Initial concerns

Although I had some experience of working on hospital wards prior to this project, this had been limited to a service which involved me simply visiting designated wards on a daily basis to monitor prescriptions and attending selected Consultant ward rounds. However, I had not worked along side doctors and nurses, based on wards fulltime rather than in the pharmacy, as was the intention in this study. The prospect of working in this way was initially extremely daunting. I was unsure how the doctors and nurses would react to me and was afraid some may dislike having a pharmacist working along side them and perceive me as interfering, 'nit picking' or checking up on them. I worried that they may feel having a pharmacist working on the ward in this way was unnecessary. I was concerned that doctors and nurses would be confused about my role, as I was introducing a completely novel service within that Trust. Furthermore, my role as a researcher may add to this confusion as I was also trying to evaluate the service at the same time and would be undertaking activities that were unique to a study setting i.e. measuring and recording activities. I worried this would cause problems in understanding of my role or worse still may cause people to be wary and suspicious of me.

Moreover this study was conducted within an acute general medical setting and my previous work on wards had been, primarily, provision of clinical pharmacy services to neonatal and paediatric departments, and a neuro-rehabilitation department. Although I had provided clinical pharmacy services to general medical wards to cover for other pharmacists whilst they were on holiday I was did not have a great deal of exposure in this area. I was concerned about whether this would influence my 'performance' within this study.

I was however, able to reassure myself of my competence as I have always quickly adapted to new working environments and have a broad therapeutics knowledge base. In addition to ward-based work, my previous experience includes managing patients' anti-coagulation, developing evidence-based treatment guidelines, providing education and training for pharmacy, nursing, and medical staff, providing drug information and manufacturing services; and reporting to clinical directorates on drug usage and costs when required. Furthermore, during the preliminary, assessment phase of the project I spent a lot of time the study wards and became familiar with the setting and practices, and the staff. This gave me a good grounding from which to begin the intervention phase in which I would provide specified services on the wards.

4.3.1.3. Preliminary dialogue prior to intervention phase

Before actually starting the intervention phase on the wards I arranged meetings with the doctors, nurses and pharmacy staff to introduce myself and explain about the research. I discussed the activities I was proposing to undertake and asked for feedback.

It was difficult to arrange these meetings as all staff were very busy, but I managed to have a meeting with the doctors from the two study wards, one with the some of the nurses from each ward and a meeting with various pharmacy staff.

4.3.1.3.1. Doctors

The meeting with the doctors comprised three house officers, two senior house officers and one registrar. All felt it would be useful having a pharmacist as a resource on the ward for medicines information, and as a group, they seemed on the whole to be keen about the project. Three of the doctors had prior experience of pharmacists working on the wards along side them and had found it very helpful. In particular, they liked having someone to ask for advice about therapeutics. The doctors were curious as to why there are differences in the level of pharmacy input on wards, between hospitals. I explained that this varied depending on management of pharmacy departments, support from Trust management and resources.

Some of the doctors felt that it would be very useful to have me attending the ward rounds but the registrar said he felt I would be bored for most of the time as only a small proportion of time on ward rounds is spent talking about drugs. I felt however, that it was important for me to attend ward rounds as this is when the main therapeutic decisions are made and I would be more involved with not only patients, but also the medical team. I also believed this would facilitate my work on the ward and help with inter-professional relationships.

Some of the doctors commented that I would be stopping their 'sloppy' prescribing, which was quite surprising, as they were openly admitting that they did not always take care when writing prescriptions. I worried that the doctors may therefore feel it was not necessary to improve their prescribing, as I would be a safety net. Whilst the doctors were keen to have this added layer of security I worried that this may put strain on the doctor pharmacist relationship if they perceive me as checking up on them and acting as a prescribing police woman.

The doctors echoed some of the issues I highlight throughout the study, in particular the delay between medicines being prescribed and patients actually receiving a dose. They complained that drug kardexes frequently state 'out of stock / no stock', or 'on order'. They also said that medicines patients bring into hospital with them are often 'lost' when patients are transferred from the admissions ward. I agreed with them and explained that these are the types of problems I intend to address whilst working on the wards.

All agreed taking a second drug history would be beneficial, as they are very busy on the admissions ward and it is often difficult to obtain and accurate and complete drug history, especially if patients are confused or ill and they cannot tell doctors what medicines they take. If carers come in with patients, often they don't know about the medicines and patients frequently do not bring their medicines with them. The doctors acknowledged that the computer print offs patients get from their GP are not always reliable and up to date, yet my experience on the wards found that these slips are often used for the drug history.

All of the doctors said that the elderly people they see on the wards are frequently on many medicines, some of which are inappropriate. Despite acknowledging that admission to hospital is an ideal time to review patients' medicines they said this is rarely done, unless the medication is relevant to that particular admission. They all said it would be very worthwhile for me to undertake a structured medication review in the study.

All the doctors said that a great deal of time is wasted with discharge prescriptions, in particular errors that they themselves make which are then queried by pharmacy and sometimes patient discharge is delayed. They all said that they find it difficult to write discharge prescriptions during ward rounds, so they are left until the end. This often means prescriptions do not go down to pharmacy until late afternoon and delays in discharge result. I explained that I would also be writing discharge prescriptions and they all felt that would be extremely helpful, would free up a lot of their time and would result in quicker discharge for patients.

One concern was raised about drugs such as prednisolone, which require a tapering dose. I explained that I would discuss the discharge prescriptions with the medical team before I wrote them.

I had a number of concerns about writing the discharge prescriptions for doctors. Taking over this job would hopefully improve patient safety and increase efficiency; however, doctors may not then improve their prescribing practices. In addition, freeing up doctors' time would only be beneficial if they used it appropriately, for example for other clinical activities.

The doctors admitted that they do not give GPs enough information about changes made to patients' medicines whilst they are in hospital. They said it would improve continuity of care if I give GPs additional information about drug therapy.

The doctors also were keen for me to educate patients about their medicines as they said they do not do this very often. They also felt it would save the nurses' time.

I explained that I would be promoting prescribing from the hospital formulary list of drugs, which is in development with the surrounding Primary Care Groups (PCGs). The registrar asked, *"What are formulary drugs?"* This was quite alarming, not only because he should have known, but also because he was the most senior doctor at the meeting. I felt this was a reflection of the current level of pharmacy input on the wards within the study Trust. I explained to the doctors what was meant by 'formulary drugs' and gave examples. This highlighted to me that I would need to pay particular attention to this when working on the wards, and educate doctors about the formulary whenever possible.

I found this meeting very encouraging and felt more confident about starting work on the wards. It seemed that the doctors would welcome my input into patient care. I suspected that the main reason they were keen was that I would be relieving them of some of their workload, although they did seem to think patients would benefit also.

4.3.1.3.2. Nurses

I met with 6 nurses from the two study wards prior to the intervention phase. They had many concerns relating to medicines use all of which I had identified in my preliminary study. They were supportive of all the activities I proposed to undertake on the wards and were extremely enthusiastic about the project. They were particularly keen about having someone to ask advice about therapeutics, writing discharge prescriptions, monitoring prescribing and educating patients. They believed that patients would be discharged quicker as the prescriptions would be written in a more timely fashion. They said however, that waiting for patients discharge medication is not the only reason for delays in discharge. One nurse said that a study should be undertaken looking at social services. She said that patients spend weeks waiting for placement in care homes or alterations to their houses.

The nurses also felt that pharmacy take a long time dispensing prescriptions and that this holds up discharge. I explained that if discharges were anticipated in advance and prescriptions written earlier, medicines could be on the ward ready for patients to go home. The nurses agreed but felt that this is not always

possible. They all felt that patient safety would be enhanced if pharmacists wrote the prescriptions as the doctors frequently make errors.

Like the doctors, their primary concern appeared to be lessening their workload, although they did seem more concerned with the benefits for patients than the doctors did. This may be because the nurses spend all their time caring for patients and perhaps form more of a bond with patients. They may be more aware of the needs of patients and the shortcomings in care. As with the doctors, this meeting made me feel more comfortable about starting my work on the wards.

4.3.1.3.3. Pharmacy staff

The meeting with pharmacy staff comprised three pharmacists (Operational services manager, formulary pharmacist and a clinical pharmacist) and five pharmacy technicians. The pharmacists agreed that drug histories taken by junior doctors are often inaccurate and incomplete, and they felt this was a very good use of a pharmacist on the wards.

One of the pharmacists gave an example of the problems that can arise from the drug history process. A patient he encountered on a surgery ward was prescribed completely different medicines to those listed in the admission drug history. The pharmacist queried this with the doctor. It came to light that the patient had been assessed prior to their operation in the admissions clinic and the doctor said that when she was asked about her usual medicines she had just 'made them up.' When she was actually admitted, she brought all her medicines in with her, and was prescribed them all hence the difference.

All felt that the admissions ward was not the best place for pharmacists to take a second drug history. They said that this should be undertaken when patients are transferred to another ward, as long as it is done shortly after admission.

All believed that a structured medication review was also a good use of pharmacist time, as they felt GPs do not get much time to do this. One of the senior pharmacists felt strongly that surgeons would be more reluctant than general medical doctors to change medication, as they are more concerned

with the operation than other concomitant medical conditions and the associated therapy. Although in this study I am working in a general medical setting, this will be an important consideration if services were to be rolled out across other directorates.

All were particularly keen for me to write discharge prescriptions as they felt it would enhance safety and efficiency. They reinforced my own views that much time is wasted sorting out errors on discharge prescriptions and that this can result in delays in discharge. They also felt that this would reduce waste as doctors frequently prescribe unnecessary medicines on discharge prescriptions. They felt that doctors just copy all the medicines from the drug chart whether the patient needs them or not and sometimes even prescribe drugs on the discharge prescription that have been stopped on the drug chart.

Pharmacists felt that I should communicate information about drug therapy to GPs, as this is currently not effectively done. They felt that information about monitoring drug therapy was particularly important yet very rarely given to GPs. One pharmacist said that GPs may change patients back to the medication they were taking prior to admission if they are unclear as to why drugs have been stopped or started.

All were keen for pharmacy staff to fill in patient medicine reminder charts as the nurses currently do this and errors have occurred. They all felt that another member of pharmacy staff should check this before giving it to the patient as patients frequently use only these when taking their medicines without looking at instructions on the labels. We discussed the issues around this and we decided, for this study the safest system would be for me to write the reminder chart on the wards and then send it down to pharmacy with the discharge prescription so it could be checked by another member of pharmacy staff.

We discussed issues concerning the hospital formulary. One pharmacist raised concerns about changing people from combination products, which aren't on the hospital formulary, to their component parts, as this may result in compliance problems when patients are discharged. I agreed and we decided it would be better to consider patients individually and if compliance was felt to be

a problem, combination medicines should not be altered. A pharmacy technician asked what should be done if a patient is prescribed a non-formulary drug but they bring their own medication in with them. The formulary pharmacist said that if they have enough to last them until they go home and sufficient to take home, then it could be continued. If not then it must be changed.

I finally asked the pharmacists and technicians what they thought about the project, and they all said it is extremely valuable, and believed, without doubt, that it would improve patient care and efficiency of services. They thought I was taking a lot on however, and had concerns about how I was going to manage everything I proposed to do.

After this meeting, I felt much happier about starting work on the wards as I felt I had the support of pharmacy staff. I found their insights into practices relating to medicines extremely helpful. Initially I worried that some pharmacists may be slightly resentful towards my working on the wards as I had not worked in the Trust previously and they themselves may have liked the opportunity to undertake similar work. In addition, some of the pharmacists were already visiting wards and undertaking various activities such as prescription monitoring and I worried that they may feel that the project was unnecessary. After the meeting, I knew this was not the case and they felt the project was extremely valuable in developing services. I knew that I would need their support for the project to be successful, as without it I could encounter numerous problems.

4.3.1.4. Implementing and evaluating the patient centred pharmacy services

When I started the intervention phase of the project I worked on ward A for two months then worked on ward B for two months. My working hours were 8.30am until 5.00pm. Although I had met with the doctors and nurses and explained what I was intending to do on the wards, when I started there was still uncertainty about my role. It also took time to acclimatize to working on the wards full-time, as I had not done this before. On the first Monday morning, I felt very much thrown in at the deep end and I had to get started straight away. I was extremely busy undertaking all the activities whilst simultaneously collecting data for evaluation and sometimes I found it very difficult. I had to

work very hard and frequently worked beyond my designated working hours. I believe that had this not been research project and I was not also collecting data my work would have been much easier.

I found the ward clerks helpful in informing me of admissions and discharges and keeping me up to date with what was happening on the wards. I built up a good relationship with each of the ward clerks as they worked in the ward office, and that is where I sorted through much of my data.

4.3.1.4.1. Taking drug histories

I found it time consuming taking the drug histories, as initially I followed up all possible sources, such as interviewing the patient, contacting their GP, talking to carers, and contacting the community pharmacist if necessary. Most patients were perfectly happy to cooperate, although a few questioned why I was asking them to recall their medicines again, as they had already done this following their admission. Two patients refused to cooperate and give a drug history. A number of the patients were aware that they had not been receiving some of their usual medicines and were concerned. Some had actually mentioned this to nursing staff but still the medication was not prescribed.

Following the second drug history, I discussed any changes I proposed with the doctors. They accepted all my recommendations and they did not appear to feel that I was criticising or threatening them. Although the doctors were grateful that these mistakes were being highlighted, they rarely appeared concerned about their errors. Junior doctors did not appear overtly concerned about the consequences of inaccurate drug histories. I recorded in patients' notes if they were taking any other medicines for example over the counter medicines, homeopathic or herbal medicines although the doctors were rarely interested in this.

4.3.1.4.2. Undertaking the medication review

As with drug histories, doctors were happy for me to suggest changes to patients' medication, although often they preferred to wait until the consultant ward round. I was not afraid to suggest changes to medicines and the doctors reacted very positively. From my observations prior to the intervention phase, I

found that doctors only made changes to medication relating to the admission, usually because they have insufficient time to follow up the history behind the prescribing. I therefore felt that my review was particularly helpful. On occasions, however, the doctors were unwilling to alter patients' medicines that were not pertinent to the admission. The medication review was time consuming as it often involved telephoning patients' GPs and sorting through previous medical notes and investigating indications for drugs.

4.3.1.4.3. Interaction with patients

Most patients were very pleased that I was taking such an interest in their medicines, and talking to them about their treatment. I was able to find out much information about patients' medication practices by chatting with them. The patients seemed to be honest when I asked them questions about compliance and several openly admitted to not taking their medication as prescribed. I sensed that they are less honest with the doctors and nurses, but in addition doctors and nurses tend not to have in-depth conversations with patients about their medication regimen and compliance with this. Some patients asked me not to tell the doctors, as if they were afraid of them. The doctors and nurses frequently commented that patients wouldn't tell *them* some of the things they were disclosing to me, for example if they weren't taking their medication as prescribed.

On some occasions, information I discovered from patients about their medication practices greatly influenced subsequent care and treatment decisions. I identified patients at risk of medication related problems who otherwise, probably would have gone unnoticed. For example, I identified that a blind person may have difficulty with her medicines following discharge. She said she knew which ones to take by feeling them. She had just been started on warfarin and many other tablets had also changed. I arranged for her to have a compliance aid and organised the management of this following her discharge. The nursing staff were amazed when I told them about this as they said that it would never have occurred to them that the patient was blind and would therefore need extra help with her tablets on discharge.

The doctors and nurses were more than happy for me to talk with patients and I was often asked to educate patients about their medicines. As the doctors and nurses became accustomed to having me on the ward I was increasingly asked to talk with patients about their medicines in particular when changes had been made, non-compliance was suspected or when patients were being discharged. They often commented on how helpful it was having me there to do this.

4.3.1.4.4. Attending ward rounds

Initially when I participated in ward rounds I sensed that the doctors and nurses felt there was no point to me being there, as some asked what I was doing there yet still did not involve me in discussions. The consultants, however, being supportive of the study, actively involved me in discussions about patients. Eventually the doctors and nurses became accustomed to my attendance at ward rounds. One junior doctor however appeared to continue to resent my presence on ward rounds as she continued to ignore me or make derogatory comments about my being there. This may be because she felt insecure, although I sensed also there was a degree of arrogance and she felt that as a pharmacist I was of lower status. On several occasions she unfairly dismissed my comments. This made me feel uneasy when I was on ward rounds with her, and I was uncomfortable suggesting changes to patients' treatment. This only occurred with one doctor however.

I found the ward rounds very helpful, as they enabled me to keep well informed about the patients. I was able to influence prescribing in a proactive rather than reactive approach. A considerable amount of time on ward rounds involved talking about issues not relating to therapeutics, but much of this was still valuable for me to gain a more complete understanding of the patient's condition. I was able to remind the consultants about treatment plans for patients. I believe that my attendance at ward rounds also ensured that patients' drug therapy was always fully discussed as the mere fact that I was there drew attention to the medication.

In addition to this, I felt that attending ward rounds improved inter-professional relations. The junior doctors and nurses became more accustomed to having me involved in the team, and they saw that the consultants respected me and

my input into patient care. Patients also saw that I was working with the doctors and nurses, and was not just someone who looks at their drug chart and chats to them about their medicines. This appeared to increase their confidence in me and after ward rounds patients would often stop me and ask me to explain things that had been discussed. Being accepted as part of the team was one of the most important factors for the success of this project.

Whilst on the ward rounds I would attempt to anticipate when patients would be discharged and if their medication was unlikely to change, I wrote the discharge prescription. This worked very well on the whole as the prescriptions could be sent to pharmacy and the medicines would be ready on the ward for discharging patients. On a few occasions however, changes to patients' therapy after the prescription had been written meant a subsequent prescription had to be written which was inconvenient. All staff were happy for me to write the prescriptions, mainly because it was more efficient. The junior doctors were happy they didn't have to do a job they dislike, whilst the nurses were pleased they no longer had to pester doctors to write prescriptions. It was however, difficult to separate the patients included in my study from the other patients on the ward when it came to my writing discharge prescriptions. At first, I tried to write them only for patients in my study, but doctors and nurses were confused, as it was not obvious to them which were study patients and which were not. I had indicated this on the patient board in the office but whilst on the ward round obviously this was not available. In addition to this, I feared I may lose credibility with the doctors and nurses if I were to refuse to do things for certain patients yet not others. I therefore wrote most of the discharge prescriptions, both for all the study patients and other patients on the wards. This was very time consuming.

4.3.1.4.5. Monitoring and advising on prescribing and administration of drugs

I intervened in prescribing on many occasions whilst working on the wards. However, I found it uncomfortable questioning the doctors about their prescribing. The majority of doctors were pleased when I pointed out errors or offered advice, and only very occasionally seemed irritated or annoyed. I think

that often junior doctors were pleased an error had been spotted and rectified before the consultant had seen it.

Doctors responded better when I pointed out errors due to inaccurate admissions drug histories rather than other errors occurring on the study ward. I think that this is because, generally, they were not responsible for the inaccurate drug history and therefore do not feel 'blamed'. They could blame another doctor. When talking to a doctor about an error for which *they* are responsible they are more likely to feel criticised. I had to be very diplomatic and sensitive in my approach when highlighting errors or questioning and advising about prescribing. Whenever possible tried I to ensure it was only myself and the doctor present.

Sometimes when advising about prescribing, the doctors pointed out reasons why my suggestion was not a good idea. When I first started working on the wards, I was slightly embarrassed when this happened, especially if the reason was fairly obvious. As time passed and I built up working relationships with the doctors I felt more relaxed about this and was more at ease having conversations with them about prescribing.

As the doctors became more accustomed to my activities on the ward, they began to refer problems associated with patient's medication to me. Whilst I was very pleased that I was developing a good relationship with the ward team, and they were finding it useful having me on the wards, I had to prioritise the patients included in my study and this meant that sometimes I could not do what they requested. This sometimes led to problems and misunderstandings and I kept having to remind them about the research.

The nurses in particular valued me as a resource. Throughout the day, they regularly asked my advice about medication. They frequently commented on how useful it was having me on the ward and regularly asked me to sort out problems with patients' medicines, such as drugs that were prescribed incorrectly or supply problems.

When I highlighted medication problems associated with nursing practices the nurses frequently became defensive or denied any knowledge about the

situation. For example, when drugs had not been administered and annotated 'on-order' on the drug chart the nurses would often say that the previous shift must be dealing with it. On some occasions however, medication continued to be omitted, even when I had ensured is was available on the ward and when this was highlighted to nurses often they would say that they knew nothing about it. Because of shift changes and different nursing staff working on the wards administration problems such as these were often difficult to resolve. Nurses avoided taking individual responsibility for patients' medicines and I found it difficult to influence them to change.

4.3.1.4.6. Role ambiguity

A degree of confusion about my role continued throughout the study. Doctors and nurses would regularly ask me questions such as, *"so do you do this....."* and, *"do you do that....."*. When new staff arrived on the ward there was added confusion and it was necessary to explain my role and activities again. Some staff never grasped the concept of a pharmacist working on the wards. Some nurses confused me with the pharmacy technician who comes to top up the ward's drug cupboard. The whole process of becoming accepted on the ward and getting doctors and nurses familiar with my role, had to be repeated when I changed wards after two months. However, the second time was easier as I had experience from the first two months.

4.3.1.4.7. Interpersonal and professional dynamics

Most of the doctors and nurses were very pleasant to me throughout my time on the wards and appeared to appreciate my efforts. On occasions however, some staff were less accommodating.

One of the registrar's behaviour towards me was trivialising. He was pleasant and courteous, but on occasions made sarcastic and derogatory comments about my role on the ward, suggesting that my purpose was simply to re-write drug charts and do the jobs that the doctors did not wish to do. I felt that he did not value my input into patient care and saw me as someone to do the trivial jobs on the ward. This made me feel as though I needed to justify my being on the wards and prove myself. Some doctors who were slightly cynical at first,

with time came to appreciate the work I was doing when they began to see benefits for patients and themselves.

I found it very hard work to undertake all my activities on the wards, practising as a pharmacist, and record all the data I needed. The time constraints meant I did not get much opportunity to engage in the social aspects of ward life. I didn't have time to go on tea breaks with the nurses and I feel this may have affected interpersonal dynamics. Had this not been a study and I did not have to collect data as well as undertake the activities I think I would have had more time to form relationships with the ward staff and therefore may have been accepted to a greater extent. Despite this however I did get along very well with all the doctors and nurses on a personal level, and most of them on a professional level. I think however, at the end of the day, all the staff knew I was only going to be working on each ward for two months in a research context and so this must have had an affect on the relationship I built with them.

4.3.2. Case study findings

During the implementation stage of the project 90 patients were recruited, based on sampling criteria outlined in section 3.3. Their ages ranged from 60 to 100 years, with an average age of 77 years. 49 patients were female (54.4%), and 41 were male (45.6%). The length of stay in hospital varied from 1 to 35 days, with a mean of 9.91 (standard deviation 7.25 days), and there was no significant difference between males, 8.95 (SD 6.08) and females, 11.35 (SD 7.79), ($t(88) = -1.6$, $p = 0.176$).

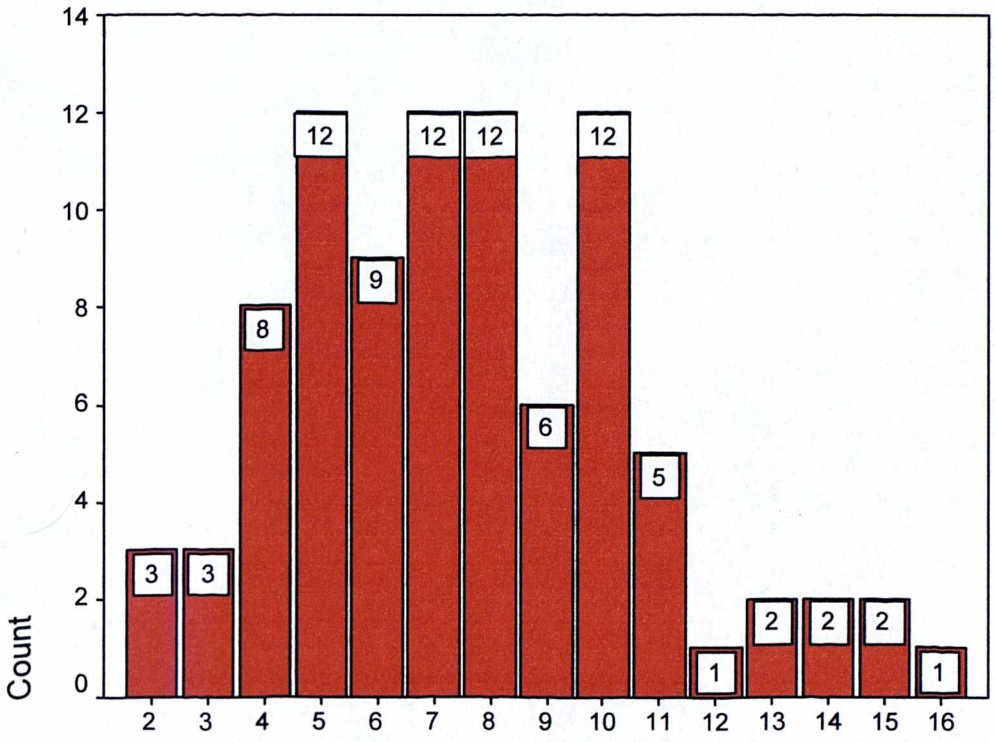
Patients recruited into the study had diagnoses within the following categories:

Respiratory system 30%
Cardiovascular system: 20%
Gastrointestinal system 12%
Other infections 12%
Central nervous system 11%
Collapse 4%
Inflammatory conditions 1%

The mean abbreviated mental test score (AMTS) for patients was 8.5 out of 10, ranging form 5 to 10, and there was no significant difference between males, 8.44 (SD 1.45) and females, 8.53 (SD 1.56), ($t(88) = -0.29$, $p = 0.647$).

At the time of admission, on average 7.58 medicines were being taken per patient, a total of 682 medicines, ranging from 2 to 16 per patient, see figure 4.1. Females were, on average, taking more medicines than males, 8.37 (SD 3.3) *vs* 6.63 (SD 2.51), ($t(88) = 2.7$, $p = 0.007$).

Figure 4.1 Number of drugs taken by patients at the time of admission



4.3.2.1. Knowledge about medication

As described in section 4.2.3.2, patients' knowledge of their medicines was assessed. For two patients it was not possible to assess their level of knowledge of their medication regimens, as both did not want to cooperate as they were not interested in their medication. For the remaining patients, the mean score was 5.8 out of 10 (SD 2.9), ranging from 0 to 10. There was no significant differences in knowledge of medication regimen between males 5.6 (SD 3.2) and females 5.9 (SD 2.6), ($t(88) = -0.442$, $p = 0.66$).

The scores for knowledge and understanding about medication correlated significantly with the abbreviated mental test score (Pearson correlation equals 0.55, $p<0.01$). As expected, patients with lower cognitive ability, determined by the AMTS, knew less about their medicines.

Hardly any patients could give a comprehensive accurate account of the medication they were taking at the time of admission (0 to 2 days after

admission), and most had a poor understanding about their treatment regimen. Some patients relied heavily on their relatives or carers to manage their medicines and knew very little themselves. A few however, were very well-informed about their medicines, and appeared to manage them very well.

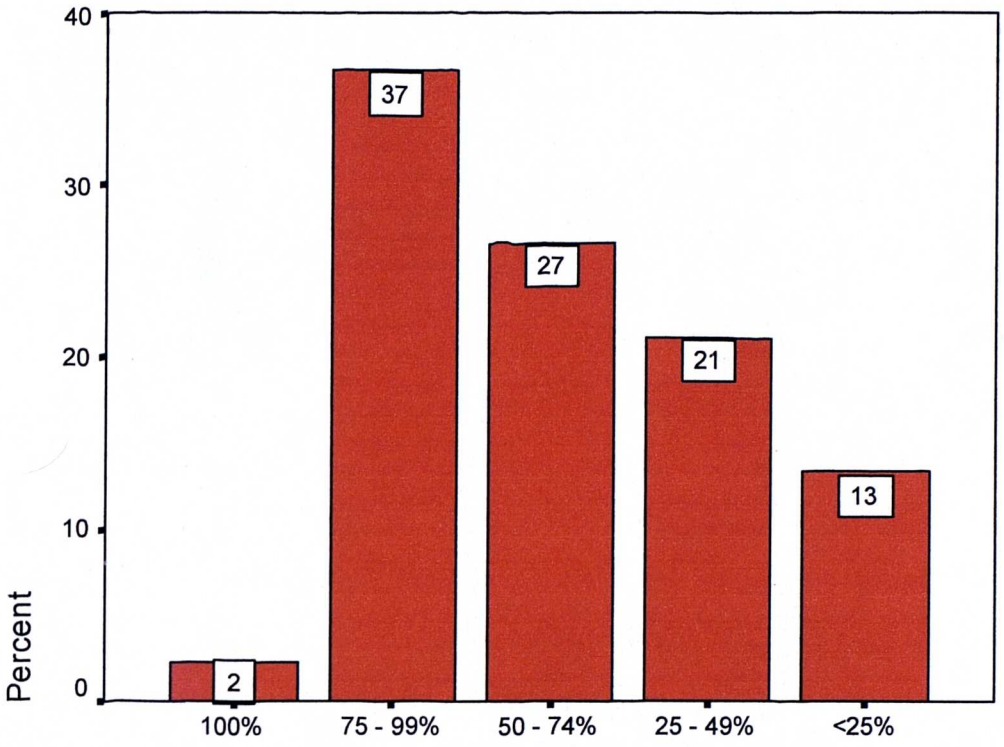
When relatives and carers were questioned about patients' medication, in general, they were very knowledgeable about the exact medicines the patient takes, the doses, and the purpose of the drug. One patient however who was admitted in November 2000, had not been taking her medication prior to admission, see case 1. On questioning, she appeared disinterested in her medication, and her husband knew nothing about her drug therapy. He said he thought she'd been taking them all.

Only 2% (n=90) of the patients had 100% knowledge about their medicines. 39% (n=90) had more than 75% knowledge, 27% (n=90) had between 50 and 74%, whilst 34% (n=90) of patients knew less than 50% about their medicines see figure 4.2.

One patient, who was taking 8 tablets, when questioned, said:

> "I can't remember any of them, I take that many.....they're all for my heart....."
>
> Patient EF, see case 2

Figure 4.2 Patients overall knowledge of their medication regimen given as percent



38% of patients correctly communicated the number of drugs that they took, see figure 4.3, however, only 21% of patients could remember or partially remember the names of all of their medicines, see figure 4.4. Many patients referred to their medication as the 'little white ones' or the 'blue tablets'. In these circumstances, I had to investigate the identity of tablets. Certain drugs such as inhalers were easy to identify from the colours patients gave. In fact most patients referred to their inhalers by their colour rather than name, for example the 'blue one' invariably referred to a salbutamol inhaler, 'the brown one' was generally beclomethasone, and the 'green one' was ipratropium.

18% of patients knew the purpose of all their medicines, but 16% did not know why they took ¾ or more of their medicines, see figure 4.5.

29% of patients knew the correct overall doses of all their medicines, but 14% could not recall the doses of 75% or more, see figure 4.6.

Figure 4.3 Proportion of their medicines that patients recalled

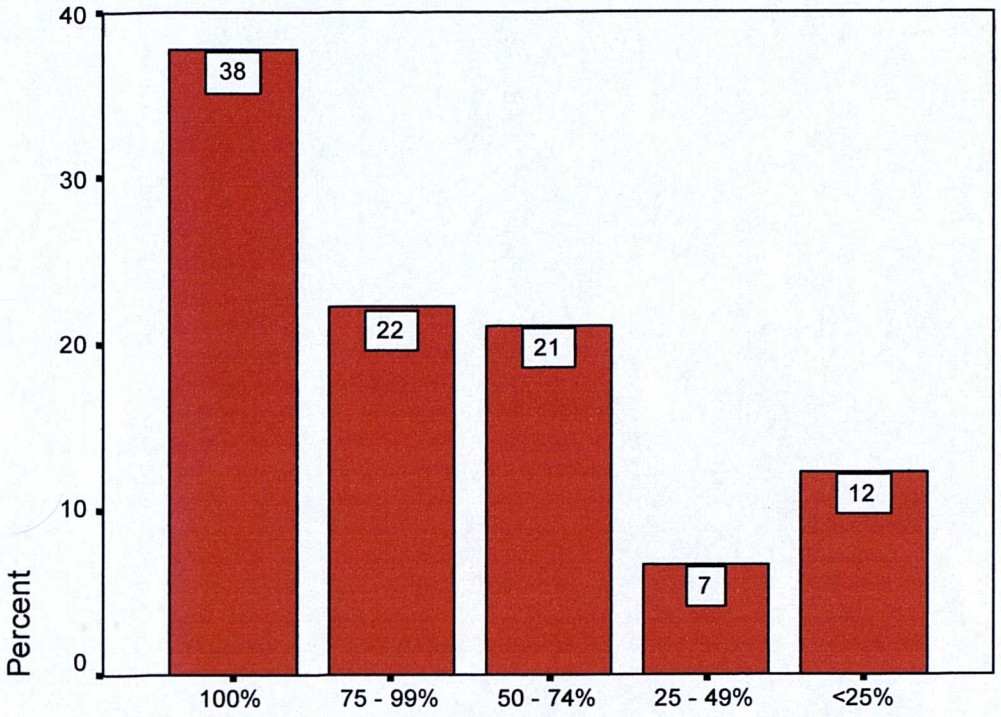


Figure 4.4 Proportion of their medicines that patients know / partially know the names

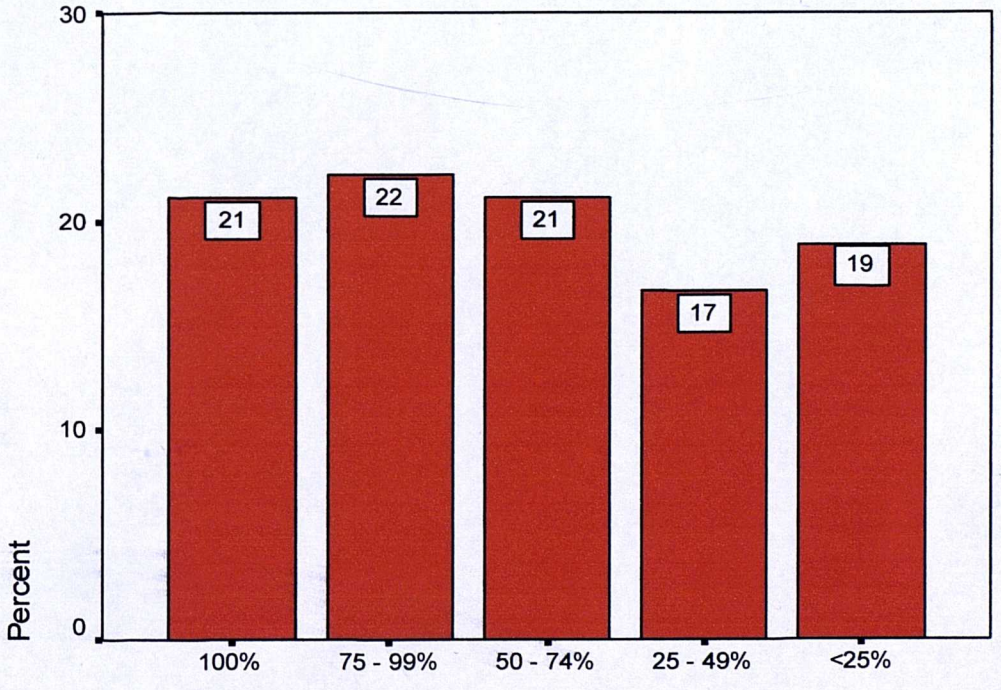


Figure 4.5 Proportion of their medicines that patients know the purpose of

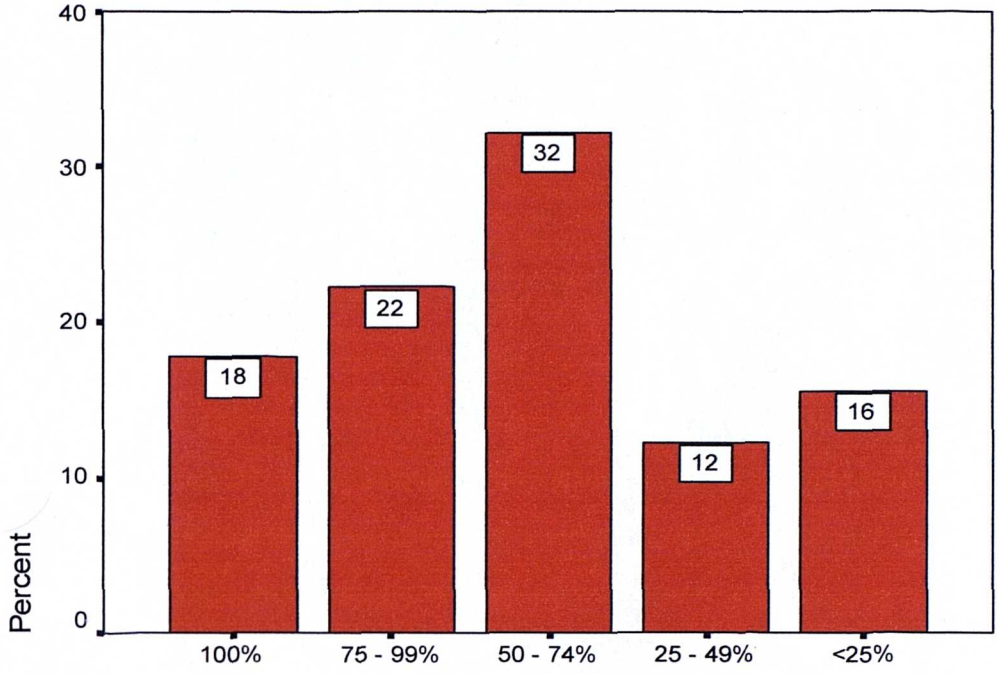


Figure 4.6 Proportion of their medicines that patients knew the correct overall dosage

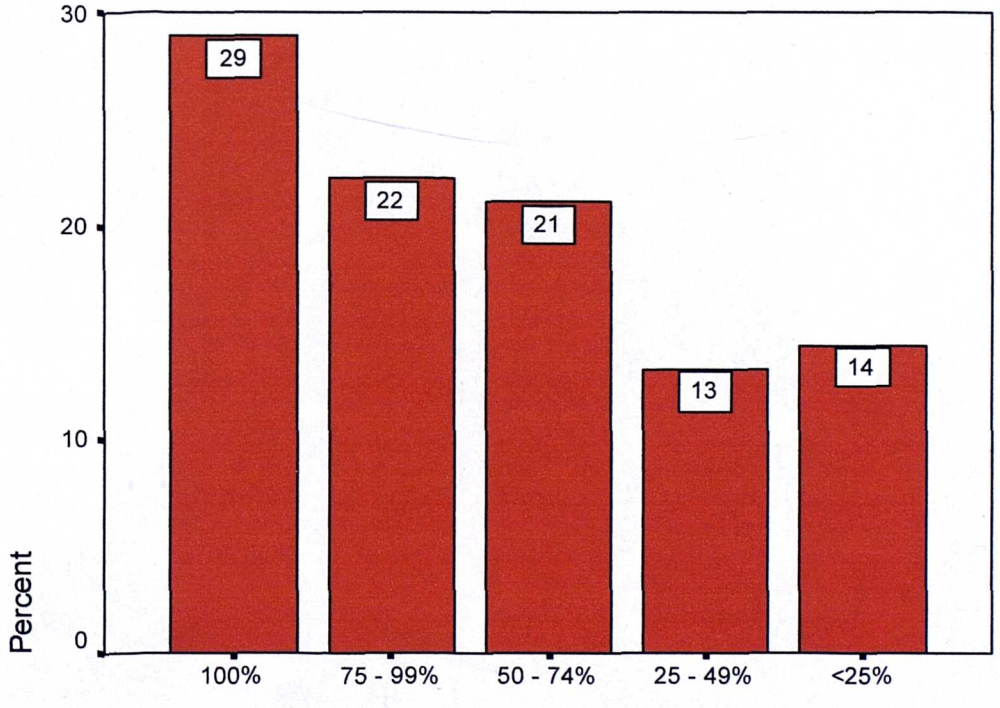


Figure 4.7 Proportion of medicines that patients knew the frequency of

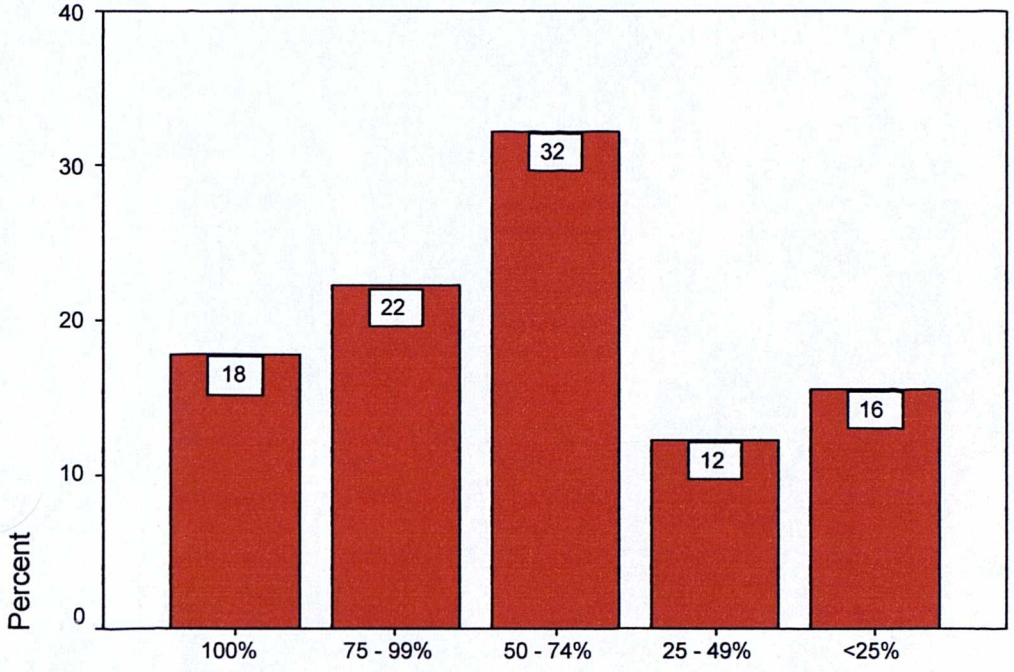
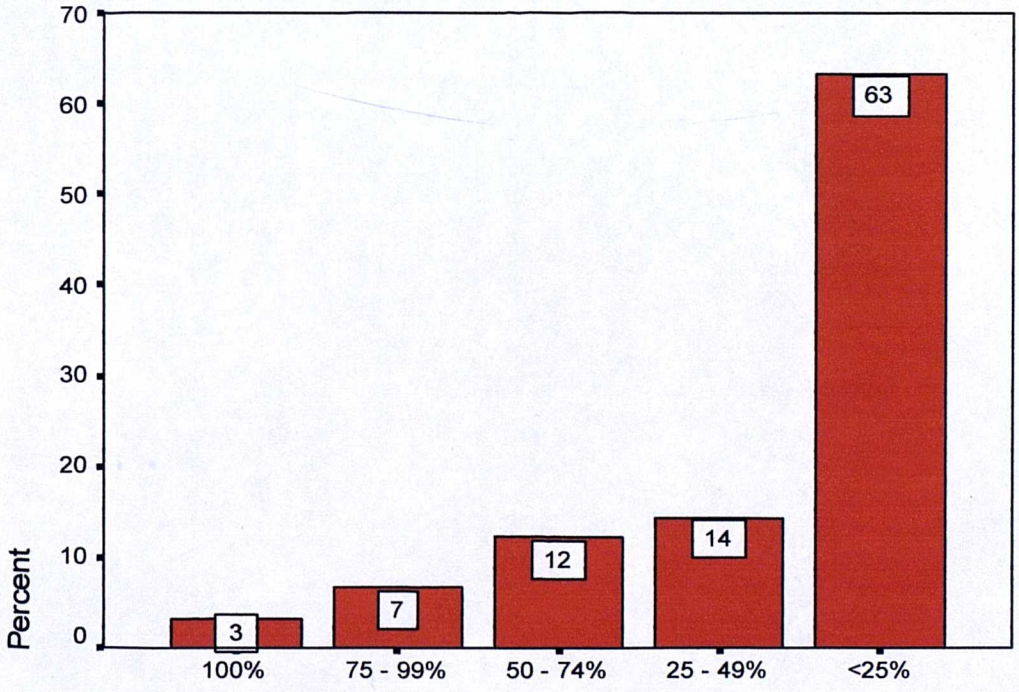


Figure 4.8 Proportion of medicines, where appropriate, that patients knew the strength of



72% of patients recalled the dose frequency of over half of their medicines, with 40% able to recall this for 75% or more, see figure 4.7. However, 63% of patients did not know the strengths, where appropriate (i.e. tablets, syrups and suspensions, creams and inhalers that are available in different strengths) of 75% or more of their medication, see figure 4.8.

4.3.2.2. Compliance with prescribed medication regimen

For two patients it was not possible to assess their compliance, for the reasons stated above. Of the remaining 88 patients, only 1 patient admitted to forgetting to take their medicines at least once daily, but only 53.3% said they almost always remembered to take their medicines as prescribed, see table 4.3. Reasons for forgetting to take their medicines are given in table 4.4.

4.5% of patients said they took their medicines late every day, with only 51.1% claiming that they nearly always took their medicines on time, see table 4.5.

Table 4.3 How often patients forget to take their medicines (n=88)

	Frequency (n=88)	Percent
Once a month or less	48	53.3
A number of times a month	23	25.6
A number of times a week	14	15.6
At least once a day	1	1.1
N/A	2	2.2

Table 4.4 Reasons associated with those who go forget to take medicines (n=40)

	Frequency (n=40)	Percent
Simple forgetfulness	18	45
On holiday / day out	6	15
Forgets medicines that consider are less important	4	10
No reason offered	3	7.5
Forgets dose but takes later that day	3	7.5
Forgets when unwell	3	7.5
Person who usually reminds patient isn't around	1	2.5
It is a new medicine	1	2.5
Too busy	1	2.5

Table 4.5 How often patients take their medication late (n=88)

	Frequency (n=88)	Percent
Once a month or less	46	51.1
A number of times a month	23	25.6
A number of times a week	13	14.4
At least once a day	4	4.5
N/A	2	2.2

71% of those who take their medicines late attributed this to forgetfulness, and other reasons were: when on holiday; if out of house; inconvenience; and watching a late film.

6.7% of patients said they deliberately did not take one medicine every day, and 63.6% said they nearly always take their medicine as prescribed, see table 4.6. Reasons for omitting medicines include: omits if going out to drink alcohol; because of adverse effects; to alter pain relief; cutting back sleeping tablets; patient does not believe their medication is doing any good; omits 'water tablet' as it is inconvenient if they are going out; their medication is unpleasant to take; the patient feels they do not need their medication; they are not aware it is to continue after the first prescription runs out; and the patient doesn't know why they are taking the medication.

One patient who had stopped his frusemide prior to admission, said:

> "I stopped the water tablet because it drove me round the bend, going to the toilet all the time....."

The same patient had been started on digoxin for atrial fibrillation 1 month ago, according to his records from the GP. On questioning however, the patient denied that he took digoxin, and said that he had started taking it but he ran out of tablets. When asked why he had not requested more tablets from the doctor, he said he didn't realise he was to keep taking them.

Another patient said that her GP used to change her tablets so often that when he started her on isosorbide mononitrate (for angina) she decided not to take it, see case 2.

Table 4.6 How often patients decide to not to take at least one medicine (n=88)

	Frequency (n=88)	Percent
Once a month or less	56	63.6
A number of times a month	11	12.2
A number of times a week	13	12.2
At least once a day	6	6.7
N/A	2	2.2

3.3% of patients said they reduced the dose of their medicines every day, whilst 68.9% of patients said they rarely took less than the prescribed dose, see table 4.7. Clearly there are occasions when it is not detrimental for patients to alter their own medication, for example not taking or reducing the dose of painkillers if they don't need them, or other 'when required medication'. Intentional non-compliance in these circumstances is a good thing.

Table 4.7 How often patients decide to reduce the dose of their medication

	Frequency (n=88)	Percent
Once a month or less	62	68.9
A number of times a month	9	10
A number of times a week	11	12.2
At least once a day	3	3.3
N/A	3	3.3

Reasons for reducing doses included: altering pain relief; reducing sleeping tablets; the patient feels they do not need the medication; and adjusting insulin according to their BM.

89 patients gave information about whether or not they received help taking their tablets at home. Only 42 patients said that they managed their medicines completely on their own, see table 4.8.

Table 4.8 Help patients receive with their medicines at home

	Frequency (n=89)	Percent
None	42	46.7
Yes – carer / relative always helps or reminds me	21	23.3
Yes - carer / relative sometimes help or reminds me	10	11.1
Yes – carer / relative administers my medication	5	5.6
Friend helps me	2	2.2
Yes – carer / relative fills up dossette box	8	8.9
Yes – chemist fills dossette box	1	1.1

73 patients stated they had routines to help them remember to take their medication. Most said they take them around their meal times (26.7%). 10% said they always kept their tablets in a visible position. 14 patients said they had no routines and 3 said someone else always gives them their medication. Other examples include, putting all their tablets 'out' the night before or in the morning and leaving them in pots, and recording that they've taken them in a diary.

4.3.2.3. Inaccurate drug histories

Drug histories taken by the admitting doctor were frequently incomplete and inaccurate, see table 4.9. The mean number of drugs the admitting doctor recorded the patients as taking was 5.29 (range 0 to 13, SD 3.05), in total 476 drugs for all 90 patients. The mean number of drugs I recorded the patients as taking after the second drug history was 7.58 (range 2 to 16, SD 3.09), in total 682 drugs for all 90 patients. The difference between the two drug histories was statistically significant, ($t(89) = 9.3$, $p < 0.01$), with the admitting doctor missing, on average, 2.29 drugs from each patient's history (maximum 11 drugs, in total 206 drugs for 90 patients).

Table 4.9 Results from analysis of medication histories (n=90)

Number of:	Total no. drugs	Mean	Min	Max
Drugs patient takes according to admitting Dr	476	5.29	0	13
Drugs patient takes according to myself	682	7.58	2	16
Drugs recorded in error by admitting doctor	5	0.006	0	1
Drugs omitted in error by admitting doctor	211	2.34	0	11
OTC medicines patient taking (none recorded by admitting Dr)	50	0.6	0	3
Drugs prescribed in error after admitting Dr's drug history, stopped after my drug history	5	0.006	0	1
Drugs started after my drug history, after being omitted in error	98	1.1	0	9
Drugs prescribed at incorrect dose after Dr's drug history	38	0.4	0	4

80% of all patients had one or more errors of omission (drugs in use but not recorded in the doctor's drug history) or commission (drugs recorded in the doctor's drug history but not being used by the patient), and 34.5% had three or more.

At the time of admission, patients took a mean of 0.6 over the counter medicines i.e. every other patient took 1 non-prescription medicine, none of which were recorded in the patients' notes. These included analgesics, medicines for coughs and colds, supplements and vitamins, herbal and homeopathic medicines, and sleeping tablets.

Following the second drug history, a mean of 1.1 drugs were added to patients' therapy, after being mistakenly omitted (maximum 9 drugs, and the total number for 90 patients was 98). For the 90 patients 5 drugs in total were stopped following the second drug history, as the patient had been prescribed them mistakenly. For example, a patient was prescribed bendrofluazide

following admission, as this had been recorded in the admitting doctor's drug history. The patient had never taken bendrofluazide and it was not indicated. Another patient was recorded by the admitting doctor as taking 'hydrochlorin', and this was prescribed on the drug chart following admission. There is no drug with this name. In total there were 38 dose changes following the second drug history (maximum 4 for one patient, mean 0.4).

The second drug history was taken when the patient arrived on the study wards having been transferred from the admissions ward. As this could be up to three days following admission, changes to medication based on the second drug history were often delayed. One patient was prescribed an additional 9 of her usual medicines following the second drug history, but this did not happen until she arrived on the study ward, which was two days after she had been admitted. She was taking amlodipine, aspirin, bendrofluazide, citalopram, nitazepam, ferrous sulphate, thiamine, cimetidine and vitamin B compound strong. One man possibly suffered a withdrawal reaction, as his usual perphenazine was not prescribed following admission (see case 3).

Even when doctors took accurate drug histories patients did not necessarily receive their correct medication. Medication was sometimes inadvertently omitted, or doses were incorrect. For example, a patient's drug history stated that she took penicillamine 500mg and thyroxine 75mcg each morning, and Lodine®-SR 600mg at night. However, the doses she was prescribed were incorrect. She was prescribed penicillamine 250mg and thyroxine 50mcg each morning, and her Lodine® was prescribed for the morning. Incorrect doses of inhalers were often prescribed despite the correct dose recorded in the doctor's drug history. All errors such as these were corrected following the second drug history taken by myself. After the second drug history a complete and accurate drug history was recorded always in the notes.

Table 4.10 presents the class of drugs prescribed after the second drug history, after being omitted in error. The largest number were from BNF class 2, cardiovascular system drugs.

Table 4.10 Drugs added to patients' therapy after the second drug history is taken, by British National Formulary (BNF) class (98 drugs in total)

BNF class	Total no. of drugs	Percent
1 – Gastro-intestinal system	5	5
2 – Cardiovascular system	37	38
3 – Respiratory system	19	19
4 – Central nervous system	11	11
5 – Infections	0	0
6 – Endocrine system	7	7
7 – Obstetrics, gynaecology and urinary tract disorders	1	1
8 – Malignant disease and immunosuppression	0	0
9 – Nutrition and Blood	8	8
10 – Musculoskeletal and joint diseases	3	3
11 – eye	3	3
12 – Ear, nose and throat	0	0
13 – Skin	4	4

Table 4.11 summarises the outcome when a drug was identified as being omitted from the drug history. Of the 206 drugs discovered as having been omitted from the admitting doctor's drug history, 72 were prescribed following my drug history. Despite being recorded in the admitting doctor's drug history, 26 drugs had been mistakenly missed off the patient's prescription, and were added to the drug chart after my second drug history. Despite being omitted from the admitting doctor's drug history, 60 out of the 206 drugs *were* actually prescribed following admission (28.6%), however, there was no documentation in the notes that the patient was taking that particular drug at the time of admission. I recommended an alternative drug be prescribed for 17 of the omitted drugs identified in the second drug history, and advised that 15 drugs

should not be prescribed as there was currently no valid indication, or the drug was inappropriate.

Table 4.11 Outcomes when drug identified as omitted from drug history on admission

	Frequency	Percent
Drug prescribed after discovering omission	72	34.3
Hydroxocobalamin injection given 3/12 monthly (information only)	2	1
Dr's decide good opportunity to try the patient without drug*	1	0.5
Dr's prescribe formulary alternative*	1	0.5
Dr's decide patient doesn't need drug*	6	2.9
Patient takes when required, but currently don't need* (information only)	22	12.4
I recommend a formulary alternative	7	3.3
Patient says drug not effective therefore requests drug not be prescribed*	1	0.5
I advised prescribing a drug with fewer side effects or interactions	10	4.8
I advised not to prescribe as currently no valid indication or the drug is inappropriate	15	7.1
Patient receiving drug by alternative route	8	3.8
Drug prescribed despite omission from drug history	60	28.6
Dr has prescribed an alternative*	1	0.5
Total	206	100

*The reason why these drugs had been omitted, or alternative drugs prescribed, was not recorded in the patient's notes by the prescriber.

4.3.2.4. Structured medication review

In total there were 152 changes to patients' medication following the review (mean 1.7). A mean of 0.94 drugs per patient were stopped after the structured medication review, i.e. nearly 1 drug per patient, see table 4.12. A mean of 0.57 drugs were started following the review, as I identified that patients were not receiving drugs from which they might benefit. Patients' medication was reviewed several times throughout their admission, depending on the length of their admission and the complexity of their medication regimen.

Table 4.12 Results from structured review of medication following admission

Number of:	Sum	Mean	Min	Max
Drugs stopped following structured review	85	0.94	0	5
Drugs started following structured review	51	0.57	0	4
Dose changes following structured review	16	0.13	0	2
Total changes to medication regimen following structured review	152	1.7	0	9

The changes to medication as a result of review are summarised in table 4.13. The figures represent the number of interventions following the medication review, and a single intervention may include one drug being stopped and another started, therefore the total number of interventions does not match the total number of changes to medication presented in table 4.12.

18 drugs were stopped as they were not indicated, for example, four drugs were stopped for one patient, (see case 5).

Analgesics were changed to minimise the risk of adverse effects, for example non-steroidal anti-inflammatory drugs (NSAIDs), dihydrocodeine, codeine or co-proxamol to paracetamol, where possible. Patients were commenced on drugs from which they might benefit, for example, in appropriate patients, aspirin and / or simvastatin for cerebrovascular disease prophylaxis; bisphosphonates for

osteoporosis prophylaxis; aspirin for patients with atrial fibrillation in whom warfarin was deemed inappropriate.

Patients admitted on treatment doses of lansoprazole, were assessed and if there was no indication for the high dose, it was reduced to the maintenance dose. Sub-therapeutic doses were increased, for example low doses of inhaled beclomethasone.

Following my review, contraindicated drugs that had been continued following admission were stopped, for example thymoxamine in a patient with suspected liver disease. The doctors were apparently unaware of the drug and that it was contraindicated in liver disease.

Drug therapy was altered in an attempt to improve compliance, for example three times daily captopril changed to once daily lisinopril, frusemide twice daily changed to once daily, nicardipine three times daily changed to amlodipine once daily. Attempted withdrawal of benzodiazepines was initiated, in collaboration with the patients' GPs.

Table 4.13 Nature of changes to drug therapy following medication review

	Frequency n=104
Changed to alternative drug with less risk of side effects	21
Drug not indicated	18
Dose altered as inappropriate	16
Drug changed to formulary preference	15
Patient hasn't been taking drug	5
A different drug in the same class prescribed	5
Drug has the potential to cause/is causing side effects	4
Drug stopped as of limited benefit	4
Patient would benefit from a drug previously not prescribed	3
Drug changed to aid compliance	3
Drug prescribed twice as different formulations	3
Drug interaction	2
Formulation changed	2
More effective drug prescribed	2
Duration of therapy outside BNF recommendation	1

4.3.2.5. Interventions into patients' drug therapy, interception of errors and impact on prescribing

All my interventions into drug therapy, were recorded and categorised according to their nature, see table 4.14. The main staff involved in the intervention, the primary reason for the intervention and the time taken were also recorded. Each intervention was graded according to its clinical significance, by a hospital pharmacist independent to the study. As this process is largely subjective, a second hospital pharmacist graded the interventions, and the level of agreement between the two was assessed.

On average, there were 7 interventions into drug therapy for each patient, ranging from 1 to 16, total 627. As expected, the number of interventions correlated significantly with the number of drugs the patient was taking (Pearson correlation equals 0.654, $p<0.01$). There was no relationship between the length of stay, the age of the patient, or patients' knowledge and understanding of their medication regimen and the number of my interventions into drug therapy.

4.3.2.5.1. Nature of intervention

Interventions into drug therapy were classified according to their nature, see table 4.14. A high percentage of interventions related to educating patients about their medicines and a large proportion of interventions involved ensuring that patients were prescribed the correct medicines at the appropriate dosage.

Table 4.14 Nature of my interventions into drug therapy

	Frequency	Percent
Patient / relatives / carers educated about medication	163	26
Dose alteration	80	12.8
Drug incorrectly omitted from prescription	60	9.6
Advise about choice of therapy	56	8.9
Information about medication added to patients notes	52	8.3
Drug stopped as inappropriate / not indicated	27	4.3
Associated with administration / formulation / route	27	4.3
Miscellaneous	25	4
Recommend instigation of tests (U&Es, LFTs etc)*	24	3.8
Prevention / detection of adverse drug reaction	23	3.7
Drug / drug or drug / diseased interaction	20	3.2
Information provided to Dr / nurse / patient / GP	18	2.9
Non-formulary drug changed to the formulary preference	15	2.4
Drugs prescribed but not administered (no valid reason recorded)	14	2.2
Medication prescribed as indicated but previously not prescribed	13	2.1
Therapeutic drug monitoring or pharmacokinetics recommendations	10	1.6
Total	627	100

*U&Es – Urea and electrolytes, LFTs – Liver function tests

4.3.2.5.2. Main people involved

Table 4.15 presents the main people who were involved when I made an intervention into patients' drug treatment. For example, for interventions involving educating patients about their medicines, the patient would be classed as the main person involved, or when advising about drug therapy on a ward round, the consultant may be classed as the main person.

Table 4.15 Main people involved in intervention into drug therapy

Main person involved	Frequency	Percent
Total	627	100
House officer	186	29.7
Patient	164	26.2
Consultant	123	19.6
Myself only	84	13.4
Senior house officer	24	3.8
GP / community pharmacist	22	3.5
Nurse	21	3.3
Registrar	3	0.5

4.3.2.5.3. Primary reason for intervention

The primary reasons for interventions are listed in table 4.16. 'Maximising patient care and minimising risk' include interventions that safeguard the patient, for example from drug interactions, overdoses or adverse drug reactions. 'Ensuring effective use of therapy for maximum benefit to patient' interventions are aimed at optimising therapy, such as ensuring drugs from which patients would benefit are prescribed, or making sure that therapy is used in a way that it gives maximum therapeutic benefit to the patient. The 'drug changed for economic reasons' category includes interventions that aim to increase the cost effectiveness of prescribing. The final category covers

interventions that ensure hospital policy and legal requirements for prescriptions are upheld.

Table 4.16 Primary reason for interventions into drug therapy

	Frequency	Percent
Total	627	100
Maximising patient care or minimising risk	450	71.8
Ensuring effective use of therapy for maximum benefit to patient	144	23
Drug therapy changed for economic reasons	29	4.6
Ensuring prescription written according to hospital / legal requirements	4	0.6

4.3.2.5.4. Clinical significance of interventions

The clinical significance of interventions as assessed by the independent pharmacists, 1 and 2 (not myself), are listed in tables 4.17 and 4.18, respectively.

Table 4.17 Clinical significance as determined by independent pharmacist 1

	Frequency	Percent
Information only	216	34.4
Minor benefit to patient care	62	9.9
Moderate benefit to patient care	196	31.3
Significant benefit to patient care	128	20.4
Very significant benefit to patient care	18	2.9
Potentially life saving	7	1.1
Total	627	100

Table 4.18 Clinical significance as determined by independent pharmacist 2

	Frequency	Percent
Information only	246	39.2
Minor benefit to patient care	35	5.6
Moderate benefit to patient care	162	25.8
Significant benefit to patient care	137	21.9
Very significant benefit to patient care	40	6.4
Potentially life saving	7	1.1
Total	627	100

A measure of agreement between the two assessors was obtained using Cohen's Kappa, which equals 0.34. A value of 1 indicates perfect agreement, whilst a value of 0 indicates that agreement is no better than chance. Although it appears that there is a lot of disagreement between the two assessors, looking at the cross-tabulation (table 4.19) often they only differ by one category, for example, 'information only' for one assessor, while the other says 'minor benefit', or 'minor benefit' according to one assessor, and 'moderate benefit' according to the other. For example, a patient was prescribed his usual alfuzosin following admission, which was not stocked on the ward. He had brought his own in with him, but had handed them to staff on the admissions ward. When the patient was transferred from the admission to the study ward, his medication was not and the nurses on the study ward were going to order more from pharmacy. I ensured the medical staff were aware that he had brought his own medication into hospital and retrieved it from the admissions ward, so it could be used during his admission. The patients therefore received his medicines promptly, as it was not necessary for the ward to order it from pharmacy, and the tablets were returned to him when he was discharged, thus preventing waste. One assessor categorised this intervention as 'information only' and the other, as 'minor benefit'.

Another example is that of a patient who was prescribed lansoprazole 30mg daily (treatment dose) following admission, instead of her usual dose of 15mg daily (maintenance dose). No dose was recorded in the drug history, and the house officer was unaware of why the patient was taking this medication. From previous notes I discovered the drug had been prescribed for oesophagitis in 1996, and so a maintenance dose of 15mg daily was sufficient. The house officer was informed, this was recorded in the patient's notes and the dose was reduced. One assessor classed this intervention as 'minor benefit', while the other classed it as 'moderate benefit'.

The assessors also varied in the consistency of their intervention classification. For example the same assessor categorised educating patients about their medicines such as using inhalers via a volumatic device or the special instructions for taking bisphosphonates in the 'information only' category for some instances, but for others classed it as a 'significant' intervention, or starting certain medicines after obtaining an accurate drug history was categorised as 'very significant' on some occasions, but only 'moderately' beneficial for others.

Clearly this is a somewhat arbitrary and subjective method for assessing the perceived clinical significance of my interventions into patient care. However these criteria were already in use in the study hospital (Campbell, D – personal communication) and give an indication of the impact of the my activities in this study.

Table 4.19 Cross tabulation showing level of agreement between the two assessors on the clinical significance of interventions

		Significance according to assessor 2						Total
		Information only	Minor benefit	Moderate benefit	Significant benefit	Very significant benefit	Potentially life saving	
Significance according to assessor 1	Information only	163	11	21	17	4		216
	Minor benefit	13	14	29	5	1		62
	Moderate benefit	52	8	72	48	16		196
	Significant benefit	18	2	39	58	11		128
	Very significant benefit			1	9	8		18
	Potentially life saving						7	7
Total		246	35	162	137	43	4	627

4.3.2.5.5. Examples of interventions within each category

Interventions classified as **'information only'** include instances I provided basic information to patients about their medicines. Also included in this category were:

- recording a complete and accurate drug history in the notes when the admitting doctor's was inaccurate
- general advice to doctors and nurses about therapeutics
- recording treatment decisions and plans in patients' notes and
- communicating medication changes and treatment plans to GPs.

Interventions categorised as being of **'minor benefit'** included:

- making sure medicines were ordered by the ward in a timely fashion, so avoiding missed doses
- stopping drugs that had been prescribed regularly when the patient usually only takes them when needed, such as analgesics and laxatives
- changing the dosage or formulation of medication to help patients manage their therapy
- when appropriate, changing non-formulary drugs to the hospital formulary preferences, for example omeprazole to lansoprazole
- if non-formulary drugs were to be continued, ensuring these were obtained in a timely fashion either by using the patient's own, or making sure they were ordered promptly from pharmacy
- where appropriate changing the dosage times to those the patients were used to at home
- giving patients information about medication so they could make informed decisions regarding their therapy, for example explaining the risks and benefits of warfarin
- ensuring that medicines that patients usually take are prescribed following admission, although there would be low potential for harm if they had been

omitted. For example hypromellose eyedrops, cod liver oil capsules and fybogel which, if not prescribed during the admission are unlikely to adversely affect patient care, but when omitted, can cause distress for patients and disrupt their routines.

Examples of interventions classed as being of **'moderate benefit'** were:

- making sure patients' usual medicines are prescribed which, if omitted, are more likely to be detrimental to patient care, for example simvastatin, long term benzodiazepines, hormone replacement therapy, osteoporosis treatment or GTN spray
- making sure medications which were being administered incorrectly, are given as they should be, such as etidronate[1] and alendronate[2]
- making sure the correct formulations are prescribed *and* administered, for example nifedipine 60mg 'long acting' once daily had been prescribed but the nurses were giving three 20mg 'modified release' tablets of nifedipine, (this happened quite frequently) and bezafibrate 400mg was prescribed once daily, without indicating that it was the 'modified preparation' so the standard preparation, which should be given as three daily divided doses, was given. This would result in sub-optimal blood levels.
- interventions to prevent adverse drug reactions, for example reducing the dose of bendrofluazide from 5mg to 2.5mg daily, stopping ibuprofen in a patient who was admitted with abdominal pain and changing co-proxamol and NSAIDs to paracetamol wherever possible
- stopping drugs of limited efficacy such as thymoxamine and oral salbutamol; optimising antibiotic prescribing

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[1] Food should be avoided for at least 2 hours before and after a dose of Disodium Etidronate, particularly calcium containing products such as milk.

[2] Alendronate tablets should be taken with a full glass of water on an empty stomach at least 30 minutes before breakfast (and any other oral medication). The patient must then stand or sit upright for at least 30 minutes and not lie down until after eating breakfast.

- ensuring drugs were prescribed for the correct duration, for example steroids and antibiotics
- instigating investigations both during admission and by the GP, following discharge, such as baseline liver and thyroid function tests in patients commenced on amiodarone
- advising doctors about therapeutic drug monitoring
- assessing patients' appropriateness for warfarin therapy and advising doctors
- optimising drug therapy to patients' preferences where possible, for example changing a potassium formulation, as the effervescent tablet burned the patient's throat; and ensuring patients' usual dosages of medication are prescribed, for example beclomethasone 100mcg twice daily prescribed instead of the patient's usual dose of 500mcg twice daily.

This category describes interventions which bring about a more acceptable and appropriate level of care.

Interventions considered to be **'significant'** included:

- ensuring patients usual medicines are prescribed, which if omitted *would* compromise patient care, for example co-careldopa, beclomethasone, ipratropium and salbutamol inhalers, nitrate patches, thyroxine, diltiazem, isosorbide mononitrate, digoxin, aspirin, gliclazide, and fluoxetine were started after I intervened. Two patients were also given their 3 monthly vitamin B12 injection after I contacted the GP and discovered they were due.
- ensuring therapeutic doses are prescribed, for example ACEI in heart failure, carbamazepine for trigeminal neuralgia, thyroxine and penicillamine
- reducing excessive doses of drugs such as nitrates, proton pump inhibitors and sedatives
- undertaking a detailed drug history to find out which drugs have been tried in the past in a patient with Ménières disease, and advising the doctors which drug to prescribe

- advising patients taking long term benzodiazepines about the risks of these drugs, and liaising with GPs and hospital doctors to reduce the dose, with a view to stopping the benzodiazepine, (see case 2)
- interventions to prevent drug-disease or drug-drug interactions, for example, stopping trazadone in a patient who had suffered a myocardial infarction
- reducing doses or stopping drugs where appropriate in renal and liver disease
- stopping dothiepin in a patient also taking fluoxetine
- stopping co-prescription of GTN patches and isosorbide mononitrate
- ensuring a patient did not take indomethacin which he was prescribed for gout flare-ups at the same time he took ibuprofen for his back pain
- stopping drugs which had the potential for or had caused serious adverse effects, for example stopping Co-proxamol and dihydrocodeine in a patient admitted with falls, (see case 7)
- ensuring patients actually received their prescribed medication
- stopping drugs when there was no current valid indication, (see cases 5, 8 and 9)
- altering medication in an attempt to improve compliance for example, changing three times daily captopril to once daily lisinopril, three times daily nicardipine to once daily amlodipine or isosorbide mononitrate from three times daily to twice daily for a patient who admitted to forgetting her evening dose; educating patients who were confused about medicines (see case 9) or patients who had not been taking medicines correctly, for example inhalers or Didronel PMO
- ensuring patients were given key information about their medicines, such as warfarin and steroid instructions or avoiding sunlight with amiodarone
- advising patients how to reduce the risk of adverse effects from their medicines, for example washing their mouth out after using high dose steroid inhalers

- ensuring evidence based prescribing for example, stopping inappropriately prescribed enoxaparin for 3 patients, and adhering to national guidelines such as the British Thoracic Society guidelines for asthma, (see case 6) the NSF for CHD, or the British Hypertensive Society Guidelines for blood pressure control
- distinguishing 'true' allergies to antibiotics from side effects that patients perceive to be an allergy, and thus enabling useful antibiotics to be prescribed
- ensuring drugs were not inadvertently stopped.

When my input into patients' drug management was considered to considerably improve care and prevent serious toxicity or discomfort this was classed as a **'very significant intervention'**. Examples were:

- ensuring prophylactic therapy is prescribed where appropriate for example cardiovascular disease and osteoporosis prophylaxis, and prophylaxis against deep vein thrombosis
- instances where I ensured medicines were started which had been omitted and this could have been extremely detrimental for the patient such as anticonvulsants and antidepressants with the potential for severe withdrawal reactions
- discontinuing a patient's usual insulin on their drug chart when an insulin drip had been started to ensure both weren't administered by mistake
- stopping co-prescribing of drugs that could lead to severe adverse reactions such as regular Lodine® *and* ibuprofen, warfarin and NSAIDs, or bendrofluazide and frusemide (where no indication to be given together)
- preventing co-administration of certain IV drugs which would interact if given in the same bag, or via the same y-site connection.

The following is a further example of an intervention classed as 'very significant'. During a patient's admission he was prescribed a course of antibiotics for a chest infection. He usually took penicillin prophylactically following a splenectomy, but had not been receiving it because he was taking

antibiotics prescribed for his chest infection. Once that course had finished the penicillin was not re-prescribed, so I ensured that this was re-started. I also prevented warfarin being inadvertently given to a patient with a previous history of haemorrhagic cerebrovascular accident (see case 9).

The seven occasions that interventions were considered to potentially life saving were instances where I highlighted that patients were allergic to an antibiotic and this had not been recorded on the drug chart or in the patients' notes.

4.3.2.6. Doctors and nurses views

I had Informal discussions throughout the four month intervention and evaluation of the interventions on the wards with the four consultants involved in the project, four house officers, two senior house officers, and four nurses. During these discussions, I asked the doctors and nurses their views on the service developments undertaken in the study, and the effect on patient care.

4.3.2.6.1. Consultants

The four consultants involved in the study all felt the new approach to pharmacy practice was very successful, and greatly improved patient care with respect to their medicines. Educating patients was felt to be particularly useful. Having a pharmacist involved in the entire patient journey, from taking a drug history through to coordinating discharge medication was considered very beneficial. "*They* (patients) *got better assessed at the start because you were taking history, it meant that discharges were happening more quickly and more reliably and it meant that we, we knew we wouldn't be giving people adverse drug reactions*,"

The consultants said that patient care was improved by my monitoring of prescribing, reviewing patients' drug treatment, flagging up drug interactions, preventing errors and adverse drug reactions and advising about therapeutics. They felt my presence gave a feeling of security, reduced risk and created a safer environment.

The consultants all felt that discharge of patients was much quicker with less risk, *"also the speed at which we were getting the discharge medication written up and knowing that it is going to go down to pharmacy and not return with a query was also a great advantage."* One consultant said that the discharge summary written by myself was much clearer and more detailed than those written by junior medical staff. My observational work supported this as discharge summaries were often very brief and contain little or no information regarding medication changes. Whilst having a pharmacist write discharge prescriptions and summaries is an option, it should be obligatory that all doctors provide accurate and complete information to GPs when a patient is discharged from their care. Systems should be in place to ensure this happens.

They appreciated having me permanently on the wards and attending ward rounds in the study. One consultant however, felt that in practice, if this approach to pharmacy practice was to be implemented across the Trust, it may not make the best use of pharmacist's time attending all ward rounds, as only a small proportion of time is spent discussing medication. It may be more practical for pharmacist and doctors to have regular liaisons and keep up good communications.

The value of having a professional with expertise in therapeutics readily accessible to medical staff and patients was acknowledged by the consultants. It was considered considerably more useful having a pharmacist working along side the doctors and nurses, rather than simply visiting the wards and leaving messages about medication for doctors and nurses, for example 'post-it' notes on drug charts.

> *"Well, from my point of view, from a consultant point of view, having a pharmacist on the ward round, informing me on the spot of what the consequences of my decisions were with respect to medication changes was really very very useful.....that was one of the great things about having you on the pilot, was the fact you've got an instant reference."*

This was however in direct opposition to the previous remark, so opinions about the value of a pharmacist attending ward rounds differed between some consultants. Nevertheless, I felt it was extremely useful as I was there at the time decisions regarding drug therapy were made, therefore was in the full 'picture' as far as patients' medication was concerned and didn't have to investigate why certain decisions had been made. I feel, had I not attended ward rounds, more of my time may have been wasted because I would need to chase up doctors and to enquire about therapeutic issues.

It was felt that I increased awareness and knowledge of therapeutics.

> *"And it also, I guess, improved the level of knowledge of certain drugs, certain interactions, certainly to the junior staff and I guess the seniors as well."*

The consultants were supportive of all the activities I carried out and were keen to see this continue.

> *"All of it, I liked all of it....."*
>
> *"I would like the pharmacist doing everything that you did in the study, for example teaching patients about their medicines, making sure they know all about their medicines."*
>
> *"I think it was a luxury to have a ward-based pharmacist and I think that is something that I would always want."*

They said that the doctors and nurses on the wards studied also greatly appreciated a pharmacist's input.

> *"The doctors and nurses loved it; they came to rely on you..."*
>
> *".....certainly the nurses found that they were confident in having you around"*

They said some patients were very positive about the care they received from myself.

"One or two patients came back to the outpatient clinic and when they were talking about their medicines they said 'oh well the pharmacist said to do this, and the pharmacist said to do this and the pharmacist said to do that' and they seemed to be very positive about it."

The consultants were very positive about my work and the concept of having pharmacists working as I did in the study and did not identify any disadvantages. However, they had been working closely with me for the previous four months and were very supportive of the study, which may have caused them to suppress any negative views they did have. They may have not wanted to upset me by highlighting disadvantages. In addition, they are consultants in general medicine and medication is a very significant part of their patient care. Consultants from other specialities, for example surgery, where medication is perhaps less of a priority, may not be so enthusiastic about the approach to pharmacy practice developed in this study.

4.3.2.6.2. Nurses

The nurses working on the wards studied all expressed their appreciation of having a pharmacist working along side them on the wards.

"Every ward should have a permanent pharmacist; life has been so much easier having you around." (Staff Nurse)

They felt that the project had been a success and were very supportive of the new approach to pharmacy practice. In particular, they felt nursing time was saved, so they could undertake other important clinical activities.

"*That's particularly important because we're always understaffed."* (Staff Nurse)

This was a particular factor for the nurses as they had less work to do. It might be argued that this is the main reason they appreciated having me around. Perhaps if there were more nurses and the ward was less understaffed they may not be so supportive.

Discharges were felt to be much 'smoother', and less rushed, and this approach to pharmacy practice could result in discharge being speeded up by at least one day for some patients.

> *"The discharge prescriptions get written in plenty of time and since we've had you on the ward there's never an occasion where the patient is waiting for their discharge medication to go home."* (Staff Nurse).

The nurses appreciated not having to worry about the discharge prescriptions. Nurses felt that money is saved as a pharmacist helps prevent 'bed-blocking' due to delays in processing of discharge medicines. *"Before* (the project) *we were forever chasing the doctors to write discharge prescriptions.....on the ward round they'll* (the doctors) *will decide the patient can go home, but then they don't write the prescription until after the ward round is finished, then it doesn't go down to pharmacy until the afternoon and doesn't get back to the ward until the evening. Then it's often too late, especially if the patient needs an ambulance."* (Ward Manager).

The nurses said that more information was given to GPs about medication when I was involved and they felt that the risk of errors on discharge prescriptions was reduced. *"Because the discharge prescriptions are written so quickly, there is very little information put on about the drug treatment the patient has received in hospital, changes to medication and so on, and there are frequently mistakes and problems which delay discharge.....with the pharmacist doing them, it's much quicker and safer, and the GP gets more information."*(Staff Nurse)

The nurses said that the doctors also appreciated having a pharmacist around permanently, *"they have more time to do other things.....they trust you to write the discharge prescriptions, and it saves them time and saves them the risk of writing prescriptions in haste."* (Staff Nurse). Again though, it may be that they simply liked having less work to do.

All felt that the risks associated with prescribing are minimised when a pharmacist is on the ward, available to advise junior doctors, at the time of

prescribing. *"The junior doctors make mistakes and it's really helpful having a pharmacist on the ward to monitor what they are doing."* (Ward Manager)

They said that an important aspect of having a pharmacist on the ward, working as part of the team was improved communication between the healthcare professionals. The relationship between pharmacists, and doctors and nurses was much better, and they cooperated more fully which led to further improvements in-patient care.

Nurses said that patients received more information about their medication regimens from a pharmacist. *"The nurses haven't really got time to go through all the patient's medication the way you have been doing, and sort out any problems.....discharge is usually very rushed and all we can do is quickly and briefly talk through their medicines, but that's not sufficient. At least you can spend some time with them and explain everything."* (Staff Nurse)

The nurses did not have any negative comments, but again this could be because I worked with them nurses throughout the study, and they may not have wanted to upset me.

4.3.2.6.3. Doctors – registrars, senior house officers and house officers

The doctors appreciated having a pharmacist working along side them, as it freed their time to pursue other clinical activities. They found it very helpful having a pharmacist on the ward to advise at the time of prescribing, and gave them more confidence having their prescribing monitored. The doctors said that having a pharmacist on the ward reduces the risks associated with drug therapy.

> *"It's brilliant for me, it saves me a lot of work, as well as making prescribing safer, looking at the drug chart scanning through everything, checking there's no interactions or anything we've missed obviously, which on a busy ward round is easy for us to miss, things like that"* (House Officer)

"Having them double checking, it is nice to know that someone else is looking at the scripts you've written, cause I think we all do make mistakes." (House Officer)

Having a pharmacist intimately involved in patient care ensured all medicines were reviewed and prescribed, if appropriate.

"Sorting out the medication that patients are taking really helps. When you're on nights, and you can't get a drug history it can be really difficult". (House Officer)

"Reviewing patients' medications is very useful as well, because it doesn't get done routinely, as we just don't have the time...." (Senior House Officer).

The doctors were happy for me to write the discharge prescription, as this saved them time, made life easier for the nurses as they were always chasing the doctors up to do this in the past, and errors were reduced. They also felt more and information was communicated to the GP relating to medicines.

"For us it saves time because if patients are going home and we have to write a discharge prescription, you know, if they're on a huge number of medications, it can just take ages, to do five of those or whatever, and so it saves loads of time in that respect...." (House Officer)

Doctors particularly appreciated having a pharmacist's assistance in warfarin management. *"It's great having a pharmacist there to deal with the warfarins and stuff which is a big area I think where we are hopeless at doing..... having someone that knows a bit about what they're doing prescribing that and organising the blood forms, cause again it's easy to forget you've got a patient that's on warfarin."*

The doctors felt that patient care is benefited by having a pharmacist to give patients comprehensive verbal and written information about their medication. *"Knowing someone checks their tablets, I mean most patients haven't got a clue what they're on and why they're on, and at least if someone takes an interest it*

might make them think about it and try and remember what they're on and why they're on it and things." (House Officer)

Advising about the hospital formulary was found to be helpful, and doctors felt that having a pharmacist working along side them on the wards improved their knowledge of therapeutics.

> *"it is helpful.....when you don't know what low weight heparin they use or, or you know we use lansoprazole here, where, where I worked before we used omeprazole, and you know it's just helpful having someone saying, "well this is the one we use," so that you know which one to prescribe"* (House Officer)

> *"I think, certainly one of the big values of having a pharmacist is, it it's very good for our education, cause if someone comes and says, "look, you've prescribed that wrong," then you don't do it twice, certainly"* (House Officer)

Some junior doctors appeared reluctant to be 'told' about drugs and I felt some initially didn't appreciate having me around, although none said anything to me about this. However, this may be because I had less contact with seemingly hostile doctors and if I had, then their comments may have been less positive.

It may be that the doctors are supportive of pharmacists working in this way just because it means they have less work to do, rather than any effect it has on the patients.

4.3.2.7. Patient satisfaction

Patients had very positive views on the care they received from myself. Many felt they received more information from a pharmacist than the other healthcare professionals involved in their care.

88 patients (97.8%) said that they found it helpful having a pharmacist giving them information about their medicines. The 2 remaining patients were indifferent and said they would take them anyway.

Some patients said that when they had been in hospital in the past they did not come into contact with a pharmacist, throughout the admission. 87 patients had been in hospital before, and 90.8% of these said the care relating to their medicines was better during this admission. "*In the past when I've been in hospital no one has actually sat down and explained what has been done with my medicines, and it was very confusing when I went home.*"

> *"Last time I didn't get any information, I was just given them and expected to take them."*

Seven patients (8%) said the care was the same, and only one patient felt the care relating to his medicines that he had been given during this admission was worse than previous admissions. The reason for this was that previously he had been allowed to keep his medicines in his bedside locker and administer them himself. Self administration of medicines was not policy in the study Trust so this was not possible.

96.7% of patients felt better about taking their medicines following the information given to them by a pharmacist. *"It's good to be given information; you're scared to take them if you don't know anything about them."*

Patients appreciated being given a chart with all their medicines listed, along with the doses, and what each is for. Some said they did not absorb information very well in the hospital environment, so it was useful to have some information to refer to at home. *"People don't realise when you're at home often you can't remember what you were told in hospital about your medicines. Older people do have a tendency to forget."*

Some patients commented that they would have kept taking medicines that had been stopped during this admission if I had not explained why they should not continue to take them. Other patients were not aware that the tablets started in hospital were to continue, until I explained this to them.

Patients felt more at ease asking me about certain issues, for example if they could have a couple of pints with their tablets, and whether new medication can have side effects.

A few patients commented they didn't have to wait around as much after having been told by the doctors they were being discharged, compared with previous admissions.

I didn't have any negative views from patients, but there may be several reasons for this. As it was me who had implemented the interventions, and was also evaluating them, patients may not want to have offended me. Basically I was asking them what they thought about what I was doing. Another explanation may be that patients just liked having someone to talk to. The doctors and nurses are very busy and perhaps some patients just liked having a chat.

4.3.2.8. Case summaries

The following are a selection of detailed case summaries from the 90 patients enrolled in the study, which highlight my activities during the intervention phase of the study. Each case illustrates various ways I contributed to patient care and compliments the data presented in section 4.3.2. I selected these vignettes as they were particularly interesting from a therapeutics perspective, and I had a lot of involvement in the care. The cases however, were selected deliberately because they involved multiple therapeutic problems therefore presenting a biased view and overestimation of the positive benefits of the intervention.

Case 1 – SH

This case highlights my contribution to patient care by identifying and attempting to improve non-compliance with medication. It demonstrates the value of involving patients and families in their care to optimise care and minimise the risks associated with medication and the role pharmacists can have in this. It also illustrates how pharmacists can improve communication about medicines between primary and secondary care.

Admission 1

This 72 year old lady was admitted from November 16th 2000 and was discharged after eight days, only to be readmitted November 28th for a further eight days. The first admission was with right sided weakness. She had an

AMTS of 7/10, and lived with her husband. She also suffered from angina, arthritis and epilepsy. The admitting doctor took an accurate and complete drug history which comprised:

aspirin 75mg 2 each morning

isosorbide mononitrate 20mg twice daily

glyceryl trinitrate (GTN) spray 400mcg to be used when required

sodium valproate EC 200mg 2 each morning, 1 at lunchtime, 2 at night

All her usual medicines except the GTN spray were prescribed following admission and I ensured this was added.

When I spoke to the patient, she was unable to give clear information about the medicines she was taking (her knowledge score was 3.8 out of 10) and gave the overall impression that she did not place any importance on her drug therapy. Her husband was also present and he knew nothing about her medication. SH said that she took tablets for epilepsy and her heart, and she used a GTN spray when she gets chest pain.

She had brought all of the medication listed above, in with her. The labels on the boxes indicated they had been dispensed in February 2000, although none had been taken, and the GTN spray had not been used. When I contacted the GP surgery, the receptionist said that the last prescription issued to the patient was February 2000. She had clearly not been taking her medicines for up to nine months.

When SH was asked about compliance, it was also clear that she was not taking her medication, and she did not appreciate that she needed to take them. She said that she doesn't think her tablets "do her any good" therefore she doesn't take any of them. Her husband said he had assumed that his wife had been taking all her tablets herself, but she hadn't been. He said that now he knows, he would make sure she did take them. All her usual medicines were prescribed, as although she hadn't been taking them for nine months, the doctors felt she still needed them.

Aspirin was correctly omitted until day four of admission a Computerized Tomography (CT) scan revealed she had suffered a left parietal lobe infarct rather than a haemorrhagic stroke.

On day five she was diagnosed with atrial fibrillation (AF), and amiodarone was commenced at the usual dose titration. I advised the doctors to check baseline liver and thyroid function tests. A baseline chest x-ray had been performed when she was admitted.

As SH was in atrial fibrillation (AF) warfarin was indicated. This was discussed during a ward round, and I explained to the consultant about her poor compliance and knowledge about, or interest in, her medicines of which the doctors and nurses had been unaware. I advised it might be safer for the patient to remain on aspirin, as the risks with non-compliance with warfarin were considerable. The dose of aspirin was increased to 300mg daily on my advice.

I advised a medidose (compliance aid) be given on discharge, to help with compliance, and contacted the patient's usual community pharmacist, to ensure they would continue to refill the compliance aid when the patient returned home. I arranged for weekly prescriptions to be issued by the GP surgery, as requested by the community pharmacist, to enable the compliance aid to be refilled each week.

She was discharged on all her usual medicines, with amiodarone and aspirin 300mg. The doctor did not put any information on the discharge prescription about medication. I completed an additional information sheet for the GP, which included: the reasons why warfarin had not been commenced; all medication changes and rationale; instructions for the GP to monitor LFTs and thyroid function tests every 6 months (BNF, 2002); and information relating to the patient's compliance problems and steps taken to address this. I ensured the patient's discharge notification letter was written and her medication ordered 2 days before she was discharged.

I counselled SH and her family thoroughly prior to discharge, in particular the specific instructions to avoid sunlight when taking amiodarone, and about the compliance aid and the procedure for refill by the chemist.

Admission 2

SH was readmitted four days following discharge, with dyspnoea. The admitting doctor recorded a drug history, but omitted the GTN spray, and the dose of sodium valproate was incorrect. I ensured the GTN spray was prescribed and corrected the dose of sodium valproate.

'Impression – LVF secondary to cardiac event' was recorded in her notes, and she was prescribed frusemide. On day two she was seen by the cardiac consultant who stopped the amiodarone, as sinus rhythm had not been restored. He recorded that she should not be prescribed digoxin unless her heart rates exceeded 100 beats per minute.

A chest x-ray showed she had a chest infection, so she was prescribed antibiotics, nebulised bronchodilators and oral steroids for seven days, and her frusemide dose was increased.

An echocardiogram revealed she had good left ventricular function, and she was discharged on December 6th 2000. I ensured the discharge notification letter was written the day before discharge, and her medication was on the ward in a timely fashion. She was discharged on the following medication:

Isosorbide mononitrate 20mg bd

Sodium valproate 200mg EC, 2 each morning, 1 at lunchtime, 2 at night

Aspirin 300mg EC each morning

Frusemide 120mg daily

GTN spray 1-2 puffs prn chest pain

Again no information was given by the doctor about changes to her medication. I provided an information sheet for the GP explaining why amiodarone had been stopped, and why digoxin had not been started. I suggested to the doctors that the frusemide should be reviewed as she had not been taking it prior to admission. They agreed and I instructed the GP to do this.

The patient and her husband told myself that the compliance aid supplied to them during the previous admission had really helped with her medication. Her

husband said he had 'kept her right' and she said she hasn't forgotten to take any. They both agreed that the information I gave about her medicines was very helpful, and made them realise how important it was to take them. The patient's GP was contacted two months following discharge, to investigate whether she had been obtaining repeat prescriptions. The GP revealed that she had indeed been getting her weekly prescriptions, and also informed me that he had recently checked her blood level of sodium valproate and this was within therapeutic range, a further indicator that the patient was now taking her medicines as prescribed.

When I asked the GP whether he found the additional information about this patients medication that I gave him useful he said that he found it '*extremely thorough and definitely facilitated the continuing care of this patient..*'

He said '*.....often when patients are discharged, and their medicines have been changed, the information we receive is incomplete and useless....*'

'*.....important information such as diagnoses, changes to medication, investigations needed and the future management plan should be accurately communicated to GPs as soon as possible, when all patients are discharged.*'

He commented that the attention paid to addressing the patient's poor compliance was especially helpful, and that it is easy for patients like SH to 'slip through the net' in primary care.

Case 2 –Patient NW

This case demonstrates the advantage of a pharmacist taking a second drug history and review of prescribing following admission. Again, the pharmacist's role in attempting to minimise the risks associated with medicines is highlighted.

This 67 year old lady was admitted having suffered a myocardial infarction. She had a past medical history of: type 1 diabetes mellitus (diagnosed in 1992 and poorly controlled), three previous myocardial infarctions, atrial fibrillation, arthritis, osteoporosis, raised cholesterol and gout. The admitting doctor recorded the patient as taking: allopurinol, aspirin, digoxin, frusemide and co-

proxamol, but had missed the following from the drug history: simvastatin, isosorbide mononitrate, lormetazepam, GTN spray and insulin. Despite this the GTN spray and insulin had been prescribed, along with the other drugs recorded, but simvastatin and isosorbide mononitrate had not. I recorded a complete and accurate drug history in the notes, and ensured simvastatin and isosorbide mononitrate were prescribed. She was taking 10 drugs in total prior to admission.

The patient usually takes lormetazepam 1mg at night for sleeplessness, but I advised this be omitted from her prescription as it is recommended for only short term use (BNF, 2002), and should be avoided in the elderly, as it may predispose to falls. Rather than stopping the benzodiazepine abruptly, I advised gradual withdrawal be initiated according to guidelines in the BNF. I explained the risks of benzodiazepines to the patient, and she agreed to try a withdrawal. NW was transferred to the equivalent daily dose of diazepam (1mg lormetazepam ≡ 5mg diazepam). The GP was instructed to reduce the diazepam dose to 2.5mg daily after two weeks, then after a further two weeks, stop, or withdrawal could be slower if necessary. However, I do not know what lasting effects this intervention would have. It is difficult to withdraw patients from benzodiazepines and it is possible that she remained on them following discharge.

The patient's usual co-proxamol had been prescribed following admission, and I advised this be changed to paracetamol to reduce the potential for adverse effects. Again, following discharge, her usual co-proxamol may be re-prescribed.

NW scored 4.3 out of 10 on her knowledge of her medicines. When asked about compliance with her medication, she claimed she never forgets her tablets. However, she said that the GP prescribed isosorbide mononitrate a few years ago, but she decided not to take it, *'..... the doctor used to change my tablets all the time, so when he started that one I decided not to take it.....I didn't like them and I kept forgetting to take them.'* When I contacted the GP surgery this was confirmed as she hadn't ordered a prescription since March 2000. I informed the doctors about this and advised them to change her daily

dose from three times daily to twice daily, which they did, to help compliance. It may be however, this would have no effect and the patient would continue to be non-complaint following discharge.

The patient also said she suffered side effects from ibuprofen prescribed by her GP a couple of months ago. *'I took one but later, I collapsed on the kitchen floor and I felt terrible so I didn't take any more.....I feel like my doctor uses me like a guinea pig.'*

I educated the patient about all her medicines and the importance of taking them, as she appeared to have been non-compliant prior to admission. I communicated all medication changes were to the GP and as she had been started on lisinopril (an ACEI), I asked the GP to check her U&Es after 2 weeks, and review the dose if necessary. The patient clearly was suspicious about the medical profession and it is conceivable she may ignore the advice I gave her. She was non-compliant before admission and may continue to be following discharge, despite my efforts.

Case 3 – Patient HP

This case illustrates the value of having a pharmacist on the ward to investigate why patients are taking certain medication and advise doctors and nurses.

This patient was admitted with shingles, which had become infected. The GP letter stated that the patient had emphysema and had recently been started on antibiotics and prednisolone for a chest infection. The admitting doctor recorded the patient as taking: multivitamins, salbutamol nebules, amitriptylline, perphenazine, prednisolone and amoxicillin for a chest infection, diclofenac and dihydrocodeine for pain, but omitted the patients' usual inhalers: salbutamol, beclomethasone and salmeterol which I recorded.

Following admission, antibiotics were prescribed for his chest infection and for the infected shingles. Oral, high dose steroids had been prescribed for his chest, and paracetamol and his usual amitriptylline were prescribed. The patient's phenerzine had also been prescribed immediately, following admission, but was discontinued with no doses having been given, as the

doctors thought it was for short term relief of itch associated with his shingles. Chlorpheniramine was prescribed to relieve his itch. He was prescribed acyclovir for his shingles.

On day two of his admission, when he arrived on the study ward, I undertook a second drug history, and his usual inhalers were then prescribed. I contacted the GP and discovered that for 2 years, the patient had been taking 2 Triptafen® each night, for depression. The constituents of Triptafen® are amitriptylline 25mg and perphenazine 2mg. The BNF now recommends this preparation is 'less suitable for prescribing', so the GP had recently changed the patient's prescription to the separate components at equivalent dosages, amitriptylline 50mg and perphenazine 4mg each night. This was recorded in the patient's notes and the doctors informed.

The patient had been complaining of hallucinations and 'feeling like a monster'. I advised the consultant that this may be a withdrawal reaction because his usual perphenazine had been abruptly withdrawn. The perphenazine was then re-prescribed, but I contacted the GP and advised that when the patient is discharged this should be slowly withdrawn as it is of questionable benefit. I knew this drug was not stocked by pharmacy and asked if the patient could arrange for his own tablets to be brought from home. I contacted the patient's wife and she brought in the tablets. I placed the tablets in the drug trolley and informed the nurses. She also wrote on the patient's prescription chart 'Patient's own in drug trolley'.

The hallucinations could also be a side effect of aciclovir. The patient was admitted with an eight day history of shingles, and had been started on aciclovir following admission. Aciclovir is only effective if started at the onset of infection. In light of this, and the potential for adverse effects, I advised the doctors to stop his aciclovir.

Despite ensuring the perphenazine had been prescribed on day two of admission, the patient had not received any by day four and the nurses were annotating the prescription chart 'no stock'. I again told the nurses his own tablets were in the drug trolley, and after this perphenazine was administered.

Case 4 – Patient DB

This case demonstrates the value of reviewing medication to ensure prescribing is appropriate. It also shows the risk of errors and the value of having a pharmacist on the ward for therapeutics advice.

DB was a lady of 76 years, admitted with a fractured pelvis. She also had osteoporosis, type 2 diabetes, hypertension, mitral valve regurgitation, and had a mastectomy for breast cancer four years ago.

An accurate drug history was taken following admission. DB was very knowledgeable about her medication with an overall score of 8.3 out of 10. She was able to recall 12 of her 13 medicines and knew the purpose and dose of them all. She said that she took all her medicines as prescribed, although admitted to forgetting her evening dose of nicardipine, which is to be taken three times daily. She tries to cut down on her painkillers as much as possible, and occasionally she misses her Fosamax® as it must be taken with a full glass of water and this sometimes makes her feel sick. To help her to remember to take her medicines, each morning she puts her tablets out into rows, and then and puts them in her drug box (a little trinket box).

Following my review of her medication, the ferrous sulphate was stopped as it was no longer indicated having been started in 1963 because she had heavy periods, and had been continued ever since, even though she had a hysterectomy in 1965. It was making her constipated and the dose was sub-therapeutic. I suggested nicardipine be changed to once daily amlodipine and three times daily captopril be changed to once daily lisinopril to help with compliance, so the doctors did this.

She had been prescribed alendronate (Fosamax) at 10am and the nurses had incorrectly been giving it after breakfast. I advised this be given at 7.30am half an hour before breakfast, according to the manufacturer's instructions.

DB complained of nausea, caused by the morphine she was taking. The doctors had not prescribed an antiemetic so I ensured this was started. Despite being

prescribed an enema, one day later this still hadn't been administered, so I reminded the nurses.

By day 10 of admission, the patient was in increasing congestive cardiac failure and the consultant wanted to give IV frusemide instead of oral bumetanide. She asked me to calculate the equivalent dose, which I did.

Her insulin dose was altered several times during the admission, and she was eventually prescribed a glucose, potassium and insulin infusion. The house officer forgot to cross the usual insulin off the drug chart, so I highlighted this to prevent insulin from being given twice. It would be hoped however that a vigilant nurse would have spotted this and not administered it twice.

The patient had been taking tamoxifen for four years, since her mastectomy, for breast cancer. A possible side effect is oedema. As she has congestive cardiac failure and it had become a struggle to control it with diuretics, I suggested the tamoxifen be stopped, and the doctors accepted this advice. This may or may not have been considered had I not highlighted it.

She was transferred to a community hospital for convalescence, so I counselled her on all her medicines before she left.

Case 5 – Patient RC

This case is a good example of the benefit of a pharmacist reviewing medication to ensure prescribing is appropriate and patients are not continued on unnecessary medication. It also demonstrates the advisory and educatory role of pharmacists.

RC, aged 66, was admitted on November 12, 2000, with shortness of breath which was found to be caused by a pulmonary embolism (PE). She had a past medical history of breast cancer in 1996, and a left hip replacement. Prior to admission she was taking tamoxifen, dihydrocodeine, indomethacin, dothiepin, diazepam, ferrous sulphate and cimetidine for indigestion. The admitting doctor took a complete and accurate drug history. The GP surgery confirmed this list of medicines except for dothiepin, for which they had no record. The patient told

me this had been prescribed when a doctor had been called to the house. It presumably had not been added to the GP computer system. The doses of indomethacin and dihydrocodeine however were different to those given by the patient.

The patient was very knowledgeable about her tablets, scoring 9.5 out of 10. She knew the name and purpose of all of her medicines, and knew the dose of all but one. She explained that ferrous sulphate was started two to three weeks ago, as the GP thought anaemia was causing her shortness of breath. Diazepam had been started two to three weeks ago as the GP thought the shortness of breath was caused by panic attacks. Dothiepin had also been prescribed by the GP for presumed panic attacks two to three weeks ago.

She told me that she cuts back on her painkillers every day, if she can, but never forgets to take medication.

Following admission a VQ scan confirmed a pulmonary embolism. Tinzaparin was commenced, and warfarin was added.

Following my medication review the following changes were made. Dothiepin and diazepam were stopped since they had been started for panic attacks. The symptoms of shortness of breath were found to be due to a pulmonary embolism, not panic attacks. Ferrous sulphate was also stopped, as she was not anaemic. Dihydrocodeine was changed to paracetamol, to reduce the potential for adverse effects and indomethacin was stopped, to the reduce risk of gastric adverse effects and interaction with warfarin. Cimetidine was changed to ranitidine to avoid interaction with warfarin. RC was very pleased the ferrous sulphate, dothiepin, and diazepam had been discontinued. She said that she knew she wasn't having panic attacks, and was not happy about being prescribed dothiepin and diazepam in the first place.

No reference was made to medication changes in her PDL so I completed an additional information sheet to the GP explaining them all. I arranged her warfarin follow-up in the community. She was to be managed in a warfarin clinic ran by a local community pharmacist, to whom I then provided a written record of the patient's INR results and warfarin dosages throughout the admission, a

copy of the discharge prescription and additional information relating to the patient. Later, I was contacted by the community pharmacist who said that the information provided had been extremely helpful for EK's continuing care. He commented that usually they receive very little information when patients are discharged, and are rarely given data relating to warfarin initiation, INR control and warfarin dosages during patients' admissions. It was therefore very difficult to provide continuity of care when patients are discharged. He said that communication of this nature was an excellent idea, and he wished he received this level of information for all his patients following admission to hospital.

Case 6 – Patient ET

This case illustrates the benefits of a pharmacist taking a second drug history following admission, and undertaking a structured medication review. It also highlights the role pharmacists have in ensuring evidence and national guidance is adhered to, providing advice about therapeutic monitoring, and patient education.

ET was a lady of 70 years admitted on January 25th 2001 with increasing shortness of breath. She had recently suffered a myocardial infarction, and had been discharged from the study Trust the day prior to this. She also suffered from asthma, hypertension, angina, peripheral vascular disease and had left ventricular failure on echocardiogram.

At the time of the current admission she was taking dothiepin, aspirin, lansoprazole, frusemide, lisinopril, simvastatin, verapamil, paracetamol, and was using a salbutamol and salmeterol inhaler, and a GTN spray. The admitting doctor recorded and prescribed all of these except the salmeterol inhaler and the GTN spray. I recorded these omitted drugs and ensured they were prescribed.

During the previous admission it was thought that the patient's pain could be gastric in origin, so she was prescribed lansoprazole at a treatment dose of 30mg daily. Later, a myocardial infarction was confirmed by cardiac markers, but the lansoprazole was not stopped. Following my review of her medication, the lansoprazole was stopped as it was not indicated.

The patient was allergic to penicillin but this had not been recorded by the admitting doctor, nor recorded on the patient's drug chart, so I did this. Later in the admission, the patient was prescribed amoxicillin and co-amoxiclav. I made sure this was stopped before any doses were given, and changed it to erythromycin.

I advised the doctors to revise her asthma treatment as it was not in line with current national guidelines. This was done, salmeterol was stopped and a regular inhaled steroid, beclomethasone, was prescribed, according to current guidelines. The GP had actually written in the referral letter "the patient has been taking repeated courses of steroids for her chest." Despite this the GP had not commenced a regular steroid inhaler. I educated the patient how to use her inhalers via a volumatic, as her technique was poor.

ET was not very knowledgeable about her medicines, scoring only 3.2 out of 10. She said however, that she never forgets to take her medication, as her husband takes care of it all.

The patient told me that during her previous admission, she had not received her usual inhalers at all. On looking through her notes, the drug kardex for the previous admission the nurses had been writing 'self' in the box to record administration. When the nurses write this, it means that patient is administering the medication themselves, and the nurses should be satisfied that this is actually happening. She didn't have any inhalers, so she couldn't administer them herself. On the discharge prescription from the previous admission, it was marked that the patient had her own inhalers, so none were supplied by pharmacy, but the patient said she did not have her own. During the current admission despite the beclomethasone having been prescribed, the patient was still not receiving it two days later, although the nurses had again been writing 'self administered' on the drug chart. The patient had not been given a beclomethasone inhaler. I therefore made sure the patient was given inhalers, and was using them as prescribed.

During this admission the patient was found to have paroxysmal atrial fibrillation (PAF) so Amiodarone was prescribed. The doctors had not checked her

baseline liver and thyroid function, so I ensured this was done. A low molecular weight heparin, enoxaparin was prescribed by the doctor who diagnosed PAF. In this clinical situation, there was no evidence base to support prescribing enoxaparin. The junior doctor's knowledge of therapeutics in this area was clearly lacking. Inappropriate prescription of enoxaparin injections leads to unnecessary risk and discomfort to the patient, along with substantial waste of resources. I advised the doctors and the enoxaparin was stopped.

The patient was not considered appropriate for warfarin therapy, so aspirin was continued. She was found to be vitamin B12 deficient and was therefore commenced on replacement therapy.

During admission she had a persistent temperature and was treated for a chest infection with antibiotics. She made a slow recovery and was discharged February 17th. As she was found to be hypotensive, verapamil was stopped.

I educated ET about her medicines. ET said that she finds her medicines can be baffling, *"even when you have it all written down it's helpful to have someone go through it with you."* When asked about information given to her during her previous admission, she said no one had talked to her about her medicines when she was discharged, *"it all happened very fast last time....in the blink of an eye we were home, so there was no time...."* She said that the information about her medicines given to her this time was definitely better. I talked this patient through all of her medication and gave her written information, and she seemed to take it all in although I cannot be certain of the long term affect. She was on a lot of medication, and it is possible she will forget a lot of what I told her. I hope that having written information also will help. This, of course, will be the case for many patients whom I educated about their medicines, however it is still important that information is given to patients, and even if only a small amount is retained, it is better than receiving none or very little education.

I ensured the discharge medicines arrived on the ward in a timely fashion. The doctor who wrote the discharge summary did not refer to any of the changes to ET's medication. I completed the additional information sheet detailing all changes to therapy, and requested the GP follow up thyroid and liver function

tests, in light of the Amiodarone. The discharge notification letter written by the registrar, followed a month later. The only reference to medication was that vitamin B12 and Amiodarone had been commenced. Nothing was mentioned about lansoprazole and verapamil being stopped or beclomethasone inhaler started

Case 7 – Patient SP

This case illustrates the educational role of the ward pharmacist, and the lack of communication between medical staff and patients about changes to medicines. SP, aged 82 years, was admitted on November 1st , with falls. She was prescribed co-proxamol, dihydrocodeine, voltarol gel and quinine sulphate prior to admission. She told me that she had falls and headache with codeine.

The admitting doctor omitted the voltarol gel and quinine from the drug history. I recorded these in her notes. Following my drug history I advised the voltarol gel not be prescribed, in accordance with the prescribing policy. The patient was adamant that she wanted to receive her quinine saying that she 'swears by it'. Although it is not efficacious, I advised it be added to her therapy, as she was distressed at the prospect of not receiving it.

Following my review of SP's medication, co-proxamol was changed to paracetamol, to minimise the risk of adverse effects, in particular falls, the reason for this admission. Dihydrocodeine was stopped also as it may predispose to falls. The doctors may or may not have stopped these drugs anyway, but the doctors had not considered her medication to have contributed to her falls, prior to me highlighting it.

The patient scored 10 out of 10 for knowledge about her medicines and she said she never forgets to take her tablets, but often takes fewer painkillers if she can.

The doctors had not explained the changes to her medicines, and when the nurse tried to give her the new painkillers, she became very confused. She said 'these are not my usual ones.' I explained to SP that co-proxamol and dihydrocodeine had been stopped as they may have been causing her to fall,

and that she was being given paracetamol instead. I told her that she should not take co-proxamol and dihydrocodeine together in the future, it would be best to avoid them altogether and stick with just paracetamol. She was grateful for the explanation and said, *"no one had told me and I was really worried when the nurse brought in my tablets, I thought they're not mine!"*

There was no information about the medication changes in the discharge summary, and as it was likely her medication was partially responsible for the admission, this should have been stressed. I completed an additional information sheet to the GP explaining why her analgesia was changed to paracetamol alone, and that co-proxamol and dihydrocodeine should not be re-started. I believe my interventions would have a lasting effect in this case, as the patient was very knowledgeable about her medication and understood that her previous regimen may have contributed to her falls.

Case 8 – Patient DF

This case highlights poor documentation of drug therapy in patients' notes and bad communication about medication across the primary/secondary care interface. The potential for errors and the value of a pharmacist obtaining a second drug history and medication review are demonstrated. This case also shows the value of pharmacists educating patients and being involved in discharge.

DF, aged 72 was admitted with increasing shortness of breath. She also suffered from asthma, ischaemic heart disease, congestive cardiac failure, and epilepsy (post meningitis). The admitting doctor recorded the following drug history:

carbamazepine 400mg bd

frusemide 40mg od

aspirin 150mg od

phenytoin 300mg od

Calcichew D3 2 od

betahistine 8mg tds

nitrazepam 20mg on

co-codamol prn

senna prn

salbutamol inhaler

Becloforte inhaler

Atrovent inhaler

GTN spray 2 prn

On looking through the patients notes from previous admissions (24.10.99 and 30.12.99), documentation relating to her medication was clearly incomplete and accurate. In October betahistine had inadvertently been omitted from the admission drug history, and not prescribed throughout this admission. The consultant also omitted it from the discharge letter, but following discharge, the GP however had continued to prescribe it, as when she was re-admitted in December, she was still taking betahistine. She was discharged on 11 medicines following this admission, but the consultant provided dosages for only four of these in the discharge letter.

When the patient was discharged in December, her salbutamol and beclomethasone inhalers, phenytoin and thiamine were omitted from her discharge prescription and the consultant discharge letter, with no explanation. On looking through the notes from these admissions, none of these drugs had been stopped on her drug chart prior to discharge, and no reference was made to this in the notes, it therefore appears to be a mistake at the time of discharge. Despite this error, however, the patient was still taking these medicines at the time of this most recent admission.

I took a second drug history, which revealed that the admitting doctor had not recorded that the patient uses salbutamol and ipratropium nebules, or takes spironolactone and thiamine. Recorded at the incorrect dose were: carbamazepine, which should have been controlled release 200mg twice daily and 100mg standard preparation once daily; aspirin, which should have been

75mg daily; phenytoin, which should have been 200mg twice daily; and nitrazepam, which should have been 10mg each night. The inhalers did not have any doses recorded.

The patient brought in a repeat prescription sheet with her when she was admitted, dated **14.10.99**. The admitting doctor's drug history matched this identically, so it appeared that this had been used to obtain the drug history, which is why the doses of some of her medications were incorrect, and spironolactone had been omitted. The patient was unclear of the doses she took so I contacted the GP surgery to clarify this and the GP explained her anticonvulsant doses had been altered and spironolactone started on 30.10.00. I recorded this in the patient's notes.

The doctor also recorded that the leading up to this admission, the patient 'thought she was able to manage with OTCs (over the counter medicines)', but did not specify what OTCs were being used. I recorded she had been using buttercup syrup. This would have no effect on patient care but ensured all medication was documented.

Despite being omitted from the admitting doctor's drug history, thiamine was prescribed. The doses of her anticonvulsants were changed, following my drug history, and the aspirin dose was reduced to 75mg od. The nitrazepam dose was reduced to 10mg on, and the consultant decided against prescribing spironolactone.

DF actually took 17 medicines, but could recall only 8 of these to me, and knew the name of only 6. DF told me that her daughter fills up a medidose container (compliance aid) with her medication, each week, although some tablets are too big so they are left in the boxes. She has carers who come in the morning and at night and check that she has taken her medication, so compliance was assumed to be good.

Correspondence from the doctors she had seen in the outpatient clinics to her GP, on two occasions questioned why she was taking thiamine, and suggested this be stopped, however, the GP had not done anything about this. I advised

betahistine and thiamine be stopped to rationalise her drug therapy, and the doctors agreed.

She was treated for a chest infection, with steroids, antibiotics and nebulised bronchodilators. I assessed her inhaler technique and found it to be very poor. She said that she couldn't manage at home only on her inhalers, without using her nebules, and insisted her inhalers didn't work. The reason she was not getting any benefit from her inhalers was her poor technique. I contacted the GP who said he didn't think she needed a nebuliser and that she could manage with her inhalers but she refuses to. He welcomed any attempt to reduce her nebuliser usage, as they are very expensive. I educated her how to use her inhalers via the volumatic device and she co-operated. I followed up by assessing her technique each day. Her technique improved and she was maintained on inhalers throughout the rest of the admission. The patient would not have received intense counselling and follow-up had I not been there. From my participant observations it was clear that this does not happen. Nurses and doctors said they don't have the time to undertake such activities. The nurses told me that after the decision has been made to discharge a patient, often they must wait for their medication to arrive on the ward from pharmacy as the prescription is seldom written in advance, and this holds the discharge up. By the time their medication arrives on the ward, patients are obviously keen to leave as soon as possible and may be agitated having had to wait. In addition the nurses are keen to get patients off the ward to free up the bed. Inhaler technique is rarely addressed at this point and education about medicines, if provided at all, tends to be minimal. My observations also lead me to believe that inhaler technique is rarely considered during admission.

Nothing was written on the discharge summary about the changes made to DF's medication, so I completed an additional information sheet for the GP explaining all therapy during admission and all changes to medication, with the reasons. I recorded that DF had been counselled on using her inhalers and that ideally this should be followed up by the practice nurse, and communicated that her blood levels of her anticonvulsants had been within the therapeutic range.

Case 9 – Patient RG

This case highlights the role pharmacists could have in ensuring accurate documentation of therapeutics is maintained, and that patients receive their usual medication whilst in hospital. It also demonstrates the important role pharmacists have in minimising the risks of drug therapy, providing therapeutics advice, providing accurate and complete information to GPs about medication following discharge and patient education.

RG was a gentleman of 82 years of age, admitted in November 2000 with a chest infection. He also had two recent admissions previously this year, in July he was admitted having suffered a haemorrhagic stroke. He had been receiving warfarin prior to this, but it was discontinued following the stroke. In August he was in hospital for 11 days with a chest infection.

The admitting doctor recorded the following brief drug history:

Frusemide x2 / day

?medication unsure

On interviewing RG, I was able to record the following history:

Frusemide 80mg om

Captopril 12.5mg bd

Ipratropium bromide inhaler 40mcg bd

Beclomethasone inhaler 500mcg bd

Lactulose 10ml bd

Naproxen EC 250mg od

Salbutamol inhaler 200mcg prn

Paracetamol 500mg-1g prn

Senna 2 on prn

Vistamethasone drops 1 drop to the right eye bd

However, despite the incomplete drug history taken by the admitting doctor, seven out of ten of the patient's medicines were subsequently prescribed, (the

exceptions being the eye drops, naproxen and lactulose). I ensured the eye drops were prescribed, but advised lactulose and naproxen be discontinued. Naproxen should be avoided if possible, as it can cause gastrointestinal side effects and lactulose is not the hospital formulary laxative. The patient had been prescribed frusemide 40mg twice daily, so I made sure it was changed to 80mg once daily, so the patient did not need to get up to the toilet during the night which, in addition being inconvenient, also increases their risk of falls.

On talking to the RG and his wife, I discovered the steroid eye drops had been prescribed by the eye infirmary following a cataract operation and he was to use these until the end of the month. This was then recorded in the notes, along with the date the eye drops were to stop.

Following my review of his medication, the patient was changed from twice daily captopril to once daily lisinopril, to help with compliance.

An electrocardiogram following admission revealed that RG had fast atrial fibrillation so digoxin was commenced. Antibiotics were started for his chest infection. On day three he was found to have paroxysmal atrial fibrillation, so digoxin was stopped and Amiodarone commenced. His baseline liver function and thyroid function had not been measured, so I ensured this was done, and recorded in his notes that this should be repeated every 6 months.

On day three, I found an old warfarin book for RG on the ward. One of RG's old warfarin books, from a previous admission, which had been filed in his notes had somehow found its way to the box where all the warfarin books of patients currently on the ward, were kept. Patients on warfarin have a hospital warfarin record book which is kept separately from their notes, often in a little box in the ward office. This book is used to prescribe warfarin, rather than the drugs chart, as warfarin doses change depending on the patient's INR. The book only contains information relating to the warfarin, with no reference to concurrent conditions or other medication. Warfarin is usually prescribed, by the junior house officers after 5pm, when blood results arrive back on the ward. The junior doctors are inexperienced in prescribing warfarin, request frequent blood tests and alter warfarin doses regularly. When the blood results arrive, the doctor

goes through all the warfarin books and prescribes the warfarin dose for that day, or the next few days if the patient's INR is stable, and indicates when the next blood test is required.

Often warfarin is prescribed by junior doctors who are not familiar with the patients, if the nurses cannot get in touch with the house officer actually responsible for that patient. For example as the blood results often arrive back on the ward after 5pm, most house officer have gone home for the night. The on-call house officer is then called to prescribe the warfarin. They tend to just go through the books and prescribe the warfarin based on the most recent INR and previous warfarin dosages.

Because of this system, there was significant potential for warfarin to be inadvertently prescribed to RG, and as warfarin is contraindicated in patients with a previous history of haemorrhagic CVA, the potential for serious harm to the patient is high.

Although the patient's vistamethasone eye drops were prescribed, the patient told me that he was not receiving his usual eye drops. On his drug chart, the nurses had been writing 'self' in the box to record administration. In the case of RG he was not administering his drops himself, as he could not manage it and at home his wife does it. This therefore meant the nurses had just been writing 'self' and really had no idea whether he was administering them. I highlighted this with the nursing staff and ensured he did receive his drops from that point onwards.

On day nine of admission it was noted that he was becoming increasingly confused at night. It was thought that the amiodarone could have caused this.

He was seen by the cardiovascular consultant, who said that the amiodarone may well have caused his confusion and he would therefore recommended it be stopped and replaced with a beta-blocker for rate control. He noted that the patient had COPD, and stated that as beta-blockers are contra-indicated in COPD, nothing should be prescribed, as he is not symptomatic.

The patient was advised that if he has symptoms of atrial fibrillation or atrial tachycardia, such as palpitations, dizzy spells, he should go to his GP.

The house officer wrote in the notes on day nine, '? restart warfarin.' I advised the doctors that warfarin is contraindicated in patients with a history of haemorrhagic CVA, and recorded this in the notes.

Nothing was written on the discharge notification letter about medication, so I added:

> *'changes to medicines – captopril changed to lisinopril, lactulose stopped, naproxen stopped, only 1 week betamethasone eyedrops needed until stop (post cataract)'*

4.3.3. Focus groups and interviews

Semi-structured interviews were conducted with the four general medicine consultants and one nurse who were involved with the project. Semi-structured interviews were also conducted with two registrars, two senior house officers, three house officers and one senior nurse who had not been involved in the project, but were working in general medicine. The interview schedules can be found in appendices 6.12 – 6.15. The interviews varied in length from approximately 30 minutes to one hour and 30 minutes. Participants varied in how much they said. Some spoke at length with very few prompts, others said less and I needed to encourage them to talk.

Four focus groups sessions were held, two with pharmacists and two with pharmacy technicians, as detailed in the previous chapter. Each focus group included four participants. The focus group schedule can be found in appendix 6.15. The focus groups also varied in length. The pharmacists talked a lot and needed few prompts, whereas the technicians spoke less and at times needed much encouragement. This may be because the pharmacists were more confident than the technicians. From my observations it appeared that the technicians found the focus group environment intimidating.

As was explained in more detail in sections 2.7.4.5 and 4.2.7 analysis of the focus groups and interviews was carried out following the principles of grounded theory. Constant comparative analysis was used to develop categories and identify emerging themes. The themes identified and sub-categories are listed in table 4.20.

Table 4.20 Main themes and subcategories identified from the focus groups and interviews

Themes	Sub-categories
Aspects of medicines related care within the study Trust	Inefficiency of care Time limitations Quality of care Patient involvement in their care Intra-professional variation Culture towards medicines within the Trust Experience of services provided by pharmacy
Medicines safety	Errors Admissions due to medication problem Competency of doctors and nurses Appropriate prescribing
Enhancing management of therapeutics	Drug histories Medication review Efficiency of services Expedite discharge Enhancing safety Prescribing guidance and focus on therapeutics Cost of therapeutics Communication Concepts of patient centred pharmacy services Concerns about suggested service development
Educative role of the pharmacist	Patient healthcare professional relationship Health literacy Educating patients Educating Drs and nurses
Changing practice	Resources Inter-professional dynamics Competency of pharmacy staff Facilitating change Implementing patient centred pharmacy services Professional aspirations of pharmacy staff Roles and professional boundaries

As the analysis is interpretive, coded data are not quantified and statistically analysed. The concern is not so much with distribution within populations, rather process, view points and social mechanisms within the study setting. A non-mathematical process of interpretation is carried out for the purpose of discovering concepts and relationships in the raw data and then these are organised into a theoretical explanatory theme in the following chapter.

4.3.3.1. Aspects of medicines related care within the study Trust

This section describes the existing practices and culture relating to medicines use in the study Trust from admission, throughout the inpatient journey and on discharge back into the community, as viewed by the participants. It excludes interventions and changes in practice made in the acute phase of the study. Inefficiency of services relating to medicines was a concern and this is discussed in section 4.3.3.1.1. Another issue raised was time limitations and staff shortages examined in section 4.3.3.1.2. Problems relating to poor quality of care are presented in section 4.3.3.1.3 and lack of patient involvement in their care, in section 4.3.3.1.4. Section 4.3.3.1.5 is about intraprofessional variation and section 4.3.3.1.6 presents participants views about the culture relating to medicines in the study Trust. Finally in section 4.3.3.1.7, participants experiences of services provided by pharmacy, prior to this study, are examined.

4.3.3.1.1. Inefficiency

When asked about problems relating to medicines junior doctors, nurses and pharmacy staff expressed frustration at the inefficiency of patient care relating to medicines. Systems and procedures relating to medicines, and shortcomings of staff were blamed. Unnecessary delays in discharge were felt to be the main problem, which results in beds being blocked. The junior doctors admitted that failure to have discharge prescriptions written in a timely fashion resulted in delays.

> *"I suppose the biggest problem from our point of view is getting discharge scripts done, and stuff, cause we're under such pressure to get, you know if you're doing a ward round and you're accumulating discharge scripts, it's lunchtime before your finished the ward round and then you have to sit down and write them all out and then they have to go to pharmacy, and if the patient's going that afternoon it, that's a big problem."* (House Officer)

Whilst doctors acknowledged their delays at writing discharge prescriptions as a problem, none suggested any solutions. Pharmacy staff were frustrated as

doctors tell patients they can go home, but the discharge prescription has not been written.

> *"On the ward round the patient's told 'oh you can go home' but it will be another what three hours before the doctor returns to write the prescription and then it will be sent down, and obviously you know it could be later in the day the pharmacy's busy so it will be another three hours until it's dispensed, so that patient could be waiting six hours easily to get their medication..."*(Pharmacist)

In addition doctors and nurses said that ambulances cannot be booked until discharge medicines are ready, which also holds up discharge. Frustration was expressed about delayed supply of medicines to wards. Pharmacy staff however, feel that nurses do not always order medication in a timely fashion. Doctors appeared, however, to have very little insight into the supply of drugs from pharmacy, and the problems that are sometimes encountered in obtaining medicines from suppliers.

> *"I get cross, well I don't understand why it takes so long for the drugs to come up from pharmacy, the nurses say it everyday, and sometimes it's a really important drug that the patient really needs, but because it's an unusual drug or one that we don't stock in the hospital it seems to take about four days before they get it, which prolongs the patient's admission, so it's wasting a lot of time and money all round really, and not helping the patient's satisfaction, that is a big problem actually."* (Senior House Officer)

The hospital drugs formulary also leads to inefficiency in supply of medicines.

> *"Non-formulary drugs causes a problem, sometimes if they come in on an item that's non-formulary, it takes a while to get an alternative sorted out."* (Pharmacy Technician)

Pharmacy staff felt wastage of medicines is a big problem as the nurses do not re-use patients own and do not mark on prescriptions when patients have their own supply, according to pharmacy staff. They claimed that delays are also

caused when prescriptions are sent to pharmacy with information missing, such as doses of medicines, and essential patient details. In addition, often when patients are transferred between wards the nurses do not also transfer the patient's medicines, so the ward that is receiving the patient re-orders medicines, resulting in duplication of work and waste.

4.3.3.1.2. Time limitations and staff shortages

The consultants said time limitations also resulted in inaccurate, incomplete drug histories taken by their junior doctors. They are aware that discharge prescriptions are written hastily leading to mistakes and omission of important information.

The registrars and junior doctors also said that they do not have sufficient time to take drug histories, undertake medication reviews, educate patients and write discharge prescriptions.

> *"Sometimes the patient doesn't know what they're taking if they're confused or very ill, and the relatives often don't know. You want to go back and find out what they're taking, but often you forget or you're too busy and then it doesn't get done."* (Senior House Officer)

> *"When you're really busy and you write a discharge prescription you don't necessarily put in, we don't always put enough information on it....."* (House Officer)

All grades of doctors felt that because they had insufficient time, medicines were often not comprehensively reviewed. Staff shortages and lack of time were blamed for medicines not being administered despite being prescribed.

> *"If they can't get a cannula in, the person misses the antibiotics.....you know you accept people are busy..... they don't do it in a malicious way, it's not done because they're lazy it's done because they've got their time full with other things."* (Consultant)

Doctors said they cut corners because they are rushed.

"You think 'oh I should look this up but I haven't really got time to look it up because if I do it's going to take me an extra how ever long'" (House officer)

"I know that's terrible but you don't always have time to look everything up and you know, so sometimes you don't question things" (House Officer)

The nurses also said that neither they nor doctors have sufficient time to talk to patients about their medicines.

4.3.3.1.3. Quality of patient care relating to their medicines

Most participants, particularly the consultants appeared to feel that the quality of patient care with respect to medicines is lacking. Resources were felt to be a major factor in this. When asked about the culture within the Trust, with respect to quality of patient care and clinical governance one consultant said:

"People are trying to do their best, but there is not enough funding, and so we just have to try and do what we can with what there is. They (Trust management) *are very pro patient care and clinical governance, or they say they are, but they are working within a budget so there is only so much they can do."*

On describing the culture within the study Trust with respect to quality of patient care and clinical governance, another consultant said, *"It's probably fairly lacking actually."* Resources again were blamed for this, *"I mean the culture of governance, of actually moving things on is really not that great but that as with many other things comes down to a financial matter. If you look everywhere else they have employed governance people, to an extent the modern matrons who drive these things forward, who measure, who get good practice and disseminate, we don't have that yet."*

Some participants felt that whilst everyone wants to do their best for patients, the Trust appears to be more concerned about cost savings and reducing waiting times than quality of care or clinical governance. The consultants said

that there are insufficient resources, and a lack of adequate systems in place to monitor quality of care.

> *"I don't think we're at the top of the table on making measures for governance, certainly it's compulsory but I don't really feel that governance governs us."* (Consultant)

This was felt to be marker of the pressures being applied from Government.

> *"All they're* (Government) *interested in, is not having bodies waiting on trolleys for emergency admissions, people not waiting for their operation for longer than however long it is, and to keep financial stability."* (Consultant)

Another consultant expressed similar views, *"in every hospital in the country it's driven by the patients charter and by government standards, and so the sort of thing they focus on is how long they wait to see someone in out-patients and yet they don't look at the quality of care delivered and the sort of figures published are how long people wait to have an operation, but nobody looks at the outcomes of those operations."*

One consultant felt that the quality of patient care suffered during holiday periods such as Christmas and Easter as speech and language therapists, pharmacists, physiotherapists and occupational therapists go off on holiday leaving the doctors and nurses to work and discharge people without the people behind them.

4.3.3.1.4. Patient involvement in their care

When asked whether patients are given sufficient information about their medicines all participants felt that patients' involvement in their own care was lacking, blaming lack of time and inclination on the part of doctors and nurses.

> *"From my point of view my patients on the rehab unit, no they don't get enough counselling."* (Registrar)

> *"Doctors don't have time to counsel patients properly."* (Consultant)

"It's not really good enough to plant a cupful of tablets in front of someone and say, 'take them', and that's what happens." (Staff Nurse)

Several participants suggested that nursing staff had inadequate knowledge about drugs, to educate patients. Many nursing staff are not confident in giving patients accurate and complete information. The following comment from a ward manager was particularly concerning as she is in charge of all the nurses on the ward.

"A lot of the nurses probably don't actually really know the ins and outs of the drugs themselves." (Ward Manager)

Doctors and nurses appeared unclear as to whose responsibility it was to educate patients about their medicines and doctors said they rarely talk to patients about their medicines. It appeared, from some comments, that educating about medicines patients is not a priority.

"We just say, you know 'you're on steroids, you're on antibiotics, you've been given some nebulisers,' I think that's about as far as we ever get, to be honest... " (House Officer)

"We prescribe and don't think to explain why we've prescribed. I know, certainly I've written stuff up on ward rounds and haven't said why..... certainly I think we prescribe a lot without involving, as if the patient wasn't there, saying, 'well let's double the dose of this,' without saying, 'oh we're going to increase your tablets,' we, you know we just do it." (House Officer)

Some doctors, however, acknowledged that they should be doing more.

"I really only ever do it for warfarin, I suppose that's really bad isn't it?" (Senior House Officer)

"To be honest I don't remember counselling anyone since I started this job, and I probably should do cause there has been the odd one who we've given, you know, who we've started an inhaler on, and you have to wonder what their ability was." (House Officer)

Whilst admitting, for various reasons that they did not talk to patients enough about their medicines, the doctors and nurses did not consider what could be done to improve this.

From their comments it appeared that the doctors interviewed make value judgements about the level of information they perceive that patients can understand and how much they 'know' their disease. Doctors also appear to make judgements about what constitutes a 'minor' change to medication as oppose to 'significant' changes, whilst also admitting that they are not even very good at letting patients know about 'significant' changes. Some doctors did not acknowledge the importance of informing patients of the purpose their medicines.

4.3.3.1.5. Intra-professional variation

Three of the consultants felt that patient care with respect to medicines varies across the directorates, and that the importance placed on medicines differs between individual doctors, and nurses. When asked about nurses' knowledge and competency in therapeutics one consultant said:

> *"Some nurses are really interested in prescribing and drugs, sometimes when I do things on the wards some nurses will say 'why did you do that? Why did you prescribe this?'"* (Consultant)

Talking about reviewing medication, the same consultant said:

> *"Being a geriatrician and having experience in pharmacology I try to do this anyway, I try to review every drug kardex during each ward round. This may not be the case for some of my colleagues"* (Consultant)

This may be speculation on the part of the consultants, or through past experience of working as junior doctors or within other directorates. This opinion was however, supported by comments from other participants.

Doctors working in surgery and orthopaedic directorates were felt to be less interested in the medicines aspects of patients care than those working within general medicine. Talking about the attitudes within other directorates a nurse

commented: *"I mean the geriatricians are very keen, but I don't know about the other physicians, like the surgeons, because there it seems the drug therapy isn't considered of great importance, whereas in general medicine it's essential."*

One consultant said that the competency of junior staff varies and this affects the attention paid to medicines on ward rounds.

> *"I think the times that we don't look at charts it's because we've been distracted into doing something or we don't make decisions to review medication is cause we're too busy doing something else at that moment, and it, in a way it reflects the sort of quality of junior staff you're working with, so at the present I have to think entirely for them, because the staff I'm working with at the moment are not at the level of presenting problems to me.....whereas older juniors present how far they've got, and then you can stand back and make changes."*

4.3.3.1.6. Culture towards medicines within the Trust

Some doctors and nurses interviewed appeared to have a blasé attitude towards medicines and do not see them as an important part of patient care. On talking about taking a drug history one Senior House Officer said, *"well it's partly that we can't be bothered, to get exact doses and exactly what the story is...."*

The doctors referred to 'important', and 'not important' medicines, and distinguished between significant and minor therapeutics events, when talking about errors or changes to therapy. They expressed frustration that nurses do not realise which medicines are 'important' and sometimes do not administer them. Participants felt that medicines are not taken seriously and that they simply do not matter, right from the doctors and nurses through to the Trust management.

> *"I think people should be taking medication more seriously.....it always surprises me that important drugs, people are very happy, not to give the phenytoin, or amiodarone, or digoxin, and just write, 'out of stock'"*
> (Consultant)

"This Trust seems to have an attitude of, 'medicines don't matter' and you see it from the top, right down to the nursing staff.....it boils down to this, that 'medicines are only a small part of their job,'" (Pharmacist)

"The drug and therapeutics committee has no teeth what so ever....." (Pharmacist)

Many participants, in particular consultants, felt that health care professionals involved in patient care do not feel any ownership of care provided, so ultimately no one takes responsibility. For example, when patients are admitted and it was not possible to obtain an accurate drug history, the admitting doctor often does not follow it up. Also, the nurses do not feel an individual responsibility to ensure patients actually receive the medicines they are prescribed.

"You ask why it hasn't been given, and no one knows. And that happens quite a lot I think, and they just say 'it was someone else from another shift', you know, and I said, 'well why does it happen?'" (Consultant)

4.3.3.1.7. Experience of services provided by pharmacy

Pharmacy services to wards prior to the study were appreciated by all doctors and nurses, but the consultants said they don't have a lot of contact with pharmacy staff on the wards.

"Although we have ward based pharmacists here we often don't know who they are. We've got one at the moment on ward one, and I don't know her, cause you don't see her at the intervals when I'm there." (Consultant)

It was felt that pharmacy did not have prominence in the study Trust, and the location of pharmacy in the basement of the pharmacy contributed to this.

"I think it's probably got worse now they're in the dungeons, and no one sees them, you know, at least you got to see people on the main corridor, but I rarely see the pharmacists now, which is a shame" (Consultant)

It was clear that wards get varying levels of service, which doctors and nurses were aware of, and questioned why. A basic level of ward pharmacy services are provided to most wards within the Trust which comprise: a pharmacist generally visits the ward on a daily basis, and reviews patients' drug charts and pharmacy technicians refill the wards' drug cupboard. On a few wards technicians actually look at drug charts and order medicines that are not kept as stock on the ward. Pharmacy staff are not based on the wards, and spend the majority of their time in the pharmacy department. At the time of the study, within the pharmacy department staff are involved in supply to the wards and answering queries about medicines. Pharmacists also provide outpatient anticoagulant management clinics.

It was apparent that only one pharmacist in the Trust attended ward rounds at the time of the study, but only once a week. This, however, was greatly appreciated by the doctors working on the ward involved. One of the house officers said that on this ward round if patients are being discharged the pharmacist will write the drugs on the discharge prescription for the doctor to then complete. She reviews the drug charts, checks for interactions, advises on prescribing, shows the doctors exactly how to write prescriptions for controlled drugs and manages warfarin prescribing. The house officer working with the pharmacist felt that the risks associated with drug therapy are greatly reduced with pharmacist involvement; patients are discharged quicker because the discharge medicines are sorted out sooner and warfarin therapy is managed better.

Some pharmacy staff expressed frustration with current pharmacy practices, and they felt progress to expand ward pharmacy services within the Trust was hindered by their lack of time, the culture towards medicines and lack of resources. They commented that ward pharmacy services vary greatly across directorates and between Trusts, and that true multidisciplinary teams with true integration of pharmacy staff, exist only as pockets of excellence within NHS hospitals.

Pharmacists were frustrated that they cannot make simple alterations to drug charts, because of Trust policy. Some felt their services weren't seen as an important part of patient care.

> *"The thing is at the minute, if you don't go to the ward, would you be missed?.... the ward doesn't stop functioning if you're not there, I think we've got to get to a point where if we're not there, they're asking why."* (Pharmacist)

They said that ward staff are more concerned with the supply function of pharmacy.

> *"Particularly wards that have got technicians, I think they would miss the technician more than the pharmacist, cause I think the nurses are just bothered about, the ordering to be honest they want the drugs there."* (Pharmacist)

Some pharmacists are now involved in pre-assessment clinics which have proved successful. Pharmacists commented that even though they are not based on the wards, by visiting on a daily basis they build up relationships with the ward staff, which is helpful in sorting out medication queries.

Doctors said that pharmacists currently leave 'post it' notes, or 'little green sheets' on drug charts to communicate prescribing advice, which although generally useful, the doctors sometimes found these irritating. Doctors said that often when messages are left by pharmacists in this manner, the pharmacist is unaware of information about the care of the patient, which would explain why certain therapeutic decisions have been made.

Doctors and nurses appeared to be appreciative of activities that lessen their work load but appear to place less importance on potential improvement in patient care and enhanced safety. Data indicate that some doctors are relatively ambivalent about the patient centred approach to pharmacy practice piloted in this study, acknowledging the benefits of delegating routine or arduous tasks, such as taking medication histories, counselling patients and ensuring medicines arrive on the wards in a timely fashion, yet conversely, are not

entirely convinced of the advantages of full involvement of pharmacists in patient care.

Doctors appreciate having the back up of someone monitoring their prescribing, for example flagging up errors, advising about interactions and adverse drug reactions, advising about therapeutics, obtaining unusual drugs and reminding them of stop dates for antibiotics and steroids. However, they said that having pharmacist actually based on the wards would be better as they would be more likely to ask their advice. Doctors commented that because pharmacists are not closely involved with patients their contribution to patient care is limited.

> *"Most of the time they're* (pharmacists) *not well-informed enough, to make a decision on my patient, I mean, I will like have, sit down with them and tell them all about this patient, this patient has this, that and the other, but this, that and the other, so I mean it, it does take a long time it would be easier if there was somebody there."* (Registrar)

Some of the doctors reported prior experience of working with pharmacists and commented that pharmacy involvement was better in other hospitals. When asked about her experience of working in places with more pharmacist involvement in patient care, a doctor said that in her previous workplace she knew all the names of the pharmacists whereas here she doesn't, *"I don't feel that same sort of connection.... I don't feel it has much impact on what I'm doing day to day."*

Some doctors had experience of pharmacists reporting errors back to doctors which they felt was valuable. The nurses also appreciated pharmacy involvement on the wards, but again would like greater integration into the team, pharmacists attending ward rounds, educating patients about their medicines and coordinating discharge

4.3.3.2. Medicines safety

Many issues involving the safety of medicines use were raised by participants. In section 4.3.3.2.1 participants views about errors are presented and then in section 4.3.3.2.2 admissions due to medication problems are discussed.

Concerns were raised about the competency of doctors and nurses in therapeutics and these are presented in section 4.3.3.2.3 issues relating to inappropriate prescribing of medicines are discussed in section 4.3.3.2.4.

Often safety issues arise when hospital policy relating to medicines in not adhered to for example patients keeping medicines in unlocked bedside cabinets. Pharmacists said that often doctors are unaware that patients are self medicating and the medicines they are taking are not prescribed on the drug chart. A pharmacist when asked to talk about medicines safety highlighted this.

> *"It does happen and they don't tell you that they've been taking their favourite painkillers and leaving them in their handbag, on top of what they're given in hospital. One lady, on ward 6 this week, didn't let on she'd been taking her zopiclone, and she came in with respiratory arrest, and yet the day after she took her own sleeping tablet out of her handbag without telling anybody, 'til I sort of queried it. They ((the doctors)) were quite horrified, she'd respiratory arrested and she was taking these tablets."* (Pharmacist)

4.3.3.2.1. Errors

When asked about issues relating to medicines safety, all participants spontaneously said that errors frequently occur, and many of the doctors and nurses seemed to accept it as an inevitable part of patient care. Some doctors and pharmacists said that nurses sometimes administer medicines when the prescription is illegible which can lead to mistakes. The nurses complained about doctors' writing.

> *"They've* (doctors) *got to be careful how they're prescribing these things. They cannot always just fob it off on the nurse, saying 'oh, well it was the nurse that gave it, so it's her fault.' They've got to take responsibility for how they're writing everything."* (Ward Manager)

Doctors and nurses spoke very openly about errors and needed very little prompting. Junior doctors said they often miss drug interactions and adverse drug reactions, or start patients on contraindicated drugs. Some doctors, nurses

and pharmacists said that doctors often forget to fill in the drug allergies section of the medication charts and quite often people are given penicillin when they are allergic to it. The nurses said that junior doctors sometimes confuse drugs with similar names, for example one of the nurses described an incident in which a patient had been prescribed sodium valproate instead of sodium docusate, and received three days of the wrong drug.

When asked why errors occur doctors said they happen when drugs are being transcribed for example, from one drug chart to another or to the discharge prescription. They indicated drugs are sometimes continued when they shouldn't be.

> *"Errors do happen, we had a patient on the ward last week who, Sando K wasn't stopped for ages and he ended up with a really high potassium and things like that which can be serious, but no one had picked that one up"* (House Officer)

Nurses said that they frequently give intravenous drugs without another nurse checking them. One nurse said that the design of the current drug chart reinforces this practice. She said that for intravenous drugs there is only space on the drug chart to sign that it has been administered, with no space for a second nurse to sign that they have checked it. She told me that she cannot convince the nurses that they must have a second nurse check intravenous drugs.

> *"It's going straight into a vein, it's highly dangerous, so it's, there, there is obviously a problem within the Trust in actually seeing just how serious this is."* (Ward manager)

Many doctors, nurses and pharmacists said that when junior doctors first start there are lots of medication errors and this was felt by most doctors and some consultants to be part of their learning experience.

> *"it's mostly the house officers who make the mistakes obviously, and it's all a learning experience, so I do try and let them know if they've done*

something wrong, just as part of their learning, but everyone's human aren't they?" (Senior House Officer)

"Lots of minor things, dosages wrong, or wrong time, a classic one is wrong time of day, people given frusemide at night.....cholesterol things in the morning and you know all those sorts of things, and that happened a lot when we all first started, obviously because we'd never prescribed anything before" (House Officer)

Doctors said that errors occur more frequently when they are tired, or short of time. Several doctors, as indicated above, appeared to believe that mistakes are inevitable, as for this doctor:

"You've often got 10 patients waiting to be seen, to be clerked in, and if the GP's written the doses on, you haven't got, really got time to clart on clarifying that..... and you know, it's not 'til a couple of days later sometimes the mistakes are spotted" (House Officer)

When asked about medication errors doctors qualified them as 'minor' or 'significant', and appeared to be unconcerned about the 'minor' ones as long as were spotted.

"Most people, if they've made a minor error, and it goes spotted or something, then they don't think about it twice." (House Officer)

"There's a kind of medical culture of 'Oh well that's only gone wrong once, and it's not a major thing anyway, that's, that's kind of alright'" (Consultant)

When asked whether she feels that doctors rely on nurses to spot prescribing errors a nurse said they do and that errors will therefore happen if nurses haven't got an 'up to date' education. She recalled an incident where a nurse successfully highlighted an error, although the doctor involved seemed unconcerned:

"We had a patient prescribed, oh it was haloperidol, 50mg of haloperidol instead of 5, and even when it was pointed out to the doctor, the doctor

couldn't see the problem with that, so that's worrying, when an SHO cannot see the problem with prescribing 50mg of such a powerful drug." (Ward manager)

She said that the consequences of making mistakes should be stressed to doctors and nurses, not just for patients but litigation and their own registration, *"I mean in some respects this Trust desperately needs one of those massive court days."*

The doctors also said that they treat the nurses as a safety net relying on them to detect their prescribing errors. On the other hand, nurses said that they receive insufficient training about therapeutics within the Trust, and therefore may not notice prescribing errors.

"I mean from our point of view, I mean this might seem like a real cop out, but whatever's prescribed we can give, unless it's like a glaring error that we would notice." (Staff nurse)

Although all participants felt that it is important to investigate why errors happen, they also said that mistakes are inevitable. Doctors who had been involved in medication errors said that they were more cautious now, for example one doctor who had prescribed penicillin to a patient who was allergic to it said that she now checks whether a patient has drug allergies more than she would have done previously. Despite acknowledgement that the Trust is trying to nurture a 'no blame' culture, participants said that errors are frequently not reported, especially if they are deemed 'minor' and doctors and nurses are frightened to admit to mistakes because they feel they will be blamed. One consultant said that doctors aren't told about the procedures of reporting an error.

All participants felt that errors are taken more seriously by the nurses than doctors.

"I think the nurses take an error very seriously, whatever it is because they are the people who give out the medication." (Consultant)

Pharmacy staff said that nurses sometimes order incorrect medicines, and sometimes prescriptions are illegible. They felt that the attitude of the doctors and nurses when pharmacy staff highlight errors is blasé without consideration of potential consequences. They said that some wards made more of an issue of medication errors than others. It was felt that junior doctors get complacent about making mistakes and they are protected by the system. They said no one indicates that what they are doing is wrong and seniors do not set examples, as confirmed by this consultant:

> *"I mean I guess in the end it is their* (the junior doctors) *prerogative to...to get it wrong in the end."* (Consultant)

4.3.3.2.2. Admissions due to medication problems

When asked about problems they encounter relating to medicines doctors and nurses said that patients are frequently admitted to hospital because of medication problems. They felt that a substantial number of admissions were due to non-compliance with medication and re-admissions often occur because discharge medication is not explained properly.

Doctors said that people are frequently admitted with heart failure due to non-compliance with diuretics, or digoxin toxicity. Patients discharged on reducing doses of medicines such as amiodarone are sometimes readmitted, having misunderstood the instructions and continued taking three doses daily. Doctors and nurses felt that if patients had a better understanding of their medication admissions could be avoided.

Patients sometimes are admitted due to medication errors in nursing homes. One doctor recalled a patient who was admitted from a nursing home with a five times overdose of phenytoin and phenobarbitone. Her levels were highly toxic, and for two days the doctors thought she had suffered a stroke, but realised it was drug toxicity when results of her blood levels returned.

4.3.3.2.3. Competency of doctors and nurses

When asked about their knowledge of therapeutics many doctors said their understanding was lacking in this area in particular dosages, adverse reactions,

contraindications of drugs, drug interactions and special instructions for certain drugs, and admitted they are 'hopeless at managing warfarin'. Consultants, nurses and pharmacy staff reinforced this.

Junior doctors said they do not feel confident about prescribing. They said medical students are not taught how to prescribe, and therapeutics constitutes a very small part of the medical school curriculum. When asked how she felt when she first started work, a Senior House Officer said, *"I didn't have a clue, I felt, you know, I mean we did pharmacology and things at university but that was in the third year, so by the time you got to the fifth year you'd forgotten it all."*

> *"I can't even remember how much we did, but I think it was in the third year we did pharmacology for a couple of weeks or something, and you're supposed to be able to prescribe everything, so obviously it's not really adequate training, and I think you just end up learning most things on the job."* (House Officer)

Junior doctors said that during their induction week they are only given brief guidelines about how to prescribe, and how not to. They felt however, that they are given so much information during this first week that they remember very little. Doctors also felt that postgraduate training in therapeutics was lacking.

> *"I suppose the difficulty is we were told about them at the beginning, but they tell you so much at the beginning that you only remember, it's probably 5% of what they told you."* (House Officer)

> *"I think it probably isn't that well taught, it's on an ad hoc basis more often by consultants."* (Consultant)

> *"When you think about, you know drugs are basically the total management of medical patients and it seems to be that education for us in terms of drugs is really neglected."* (House Officer)

Doctors, nurses and pharmacy staff said that doctors frequently take inaccurate and incomplete drug histories, and they always overlook 'over the counter' medicines.

> *"Our juniors are notoriously poor at drug histories because they don't have the time to spend but also they don't ask the right questions..."* (Consultant)

Doctors admitted that they rarely communicate comprehensive information about medicines, and treatment plans to GPs.

> *"Sometimes when I'm writing summaries I forget to say, 'we definitely stopped this, we meant to,' and I think sometimes GPs just go back to what patients were on before because they think it's been an error, rather than a definite decision, and I think I'm bad at being able to say that on the discharge summary,"* (Consultant)

When asked about reasons for prescribing errors doctors said that occur because they sometimes do not check doses.

> *"A lot of doctors will just scroll down what they think the dose is, or what it should be and just hope, which is sad really because there are enough BNFs round the place, I mean it's not that difficult to use."* (Consultant)

Nurses said that doctors do not take sufficient care when prescribing and often there is insufficient information on prescriptions to enable medicines to be administered.

When asked about problems they encounter, relating to medicines, pharmacy staff said that nurses often do not supervise patients taking their medicine whilst undertaking the drugs round, instead signing the drug chart indicating the medicine has been administered, but tablets are placed in a little pot and left by the patient's bedside. They said, sometimes for inhalers nurses write 'self' under the administration record when patients do not have their relevant inhalers.

"Quite often if someone is on more than one inhaler, they might have just one of their inhalers, and the nurses say, ' have you got your inhalers?' and they'll say, 'yes I've my inhaler,' but they haven't taken all of them, then the nurses will sign for all three." (Pharmacist)

Pharmacists said that when patients are nil by mouth often important medicines aren't administered when they could be. They claimed that patients sometimes go home with medicines that were stopped during the admission because nurses have not retrieved those medicines that patients brought into hospital.

Doctors criticised nurses, as they sometimes do not administer medicines, and annotate the drug chart as 'no stock', or sometimes give no reason. Some said they think nurses do not understand the importance of making sure patients receive certain medicines and don't always ensure that medicines are obtained, for example when pharmacy is closed they do not phone around other wards or call in the on-call pharmacist.

"There's not perhaps so much understanding among the nursing staff, what is and isn't important when it comes to medicines." (House Officer)

Pharmacy staff also recognised missed doses as a problem and said that doctors are not always aware if a patient isn't receiving prescribed medicine.

"Things like missed doses, I think there's a culture there of, 'it doesn't matter if a patient misses a dose.' The drug's not there on the ward so they just think, 'we'll give it tomorrow'" (Pharmacist)

4.3.3.2.4. Appropriate prescribing

Doctors admitted that they aren't good at reviewing medicines and are reluctant to stop drugs.

"A patient came in today, he'd been on warfarin 15 years, he didn't have a clue why, and no one else had a clue why either in his notes, people had obviously just kept prescribing it because it's there and no one's thought about it." (House Officer)

When asked about reviewing medication, doctors said that generally they would only attempt to rationalise the medicines that were pertinent to the problem with which they were admitted. Patients sometimes continue to take drugs which are not needed or inappropriate simply because no one thinks to stop them. Often elderly patients are taking too many sedatives. Many participants said that antibiotics, especially intravenous antibiotics are often continued too long in hospital.

Some participants felt that sometimes patients are prescribed warfarin when the risks may outweigh the benefits.

> *"Patients who have come in and they're blind and they're on warfarin, you're like, 'how do you manage your warfarin?' and they go, 'well it's the bottle which is difficult to open,' I'm like 'OH MY GOD' and you think maybe this patient shouldn't be on warfarin, or someone else should supervise their warfarin taking."* (House Officer)

Some participants said that when inappropriate medicines have been changed during admission the GP often restarts them.

4.3.3.3. Enhancing the management of therapeutics

All participants were fully supportive of the service developments piloted in this study. They felt that patient care would be improved if the service was implemented across the Trust. In section 4.3.3.3.1, participants views on a pharmacist taking a second drug history are discussed, and then in section 4.3.3.3.2 I discuss their views on a pharmacist undertaking a structured medication review. In section 4.3.3.3.3 I talk about participants views on how efficiency of patient care may be improved if pharmacists worked in the way I did in this study. In section 4.3.3.3.4 I explore perceptions about how pharmacists may expedite discharge and in section 4.3.3.3.5 I look at the role pharmacists may have in enhancing safety. In section 4.3.3.3.6 I discuss a theme related to pharmacists provision of prescribing guidance and focus on therapeutics and section 4.3.3.3.7 examines the effect of pharmacists on the cost of therapeutics. Section 4.3.3.3.8 is concerned with communication relating to medicines and section 4.3.3.3.9 focuses on participants concepts of patient

centred pharmacy services. Finally, in section 4.3.3.3.10 I look at concerns that were raised, relating to the proposed service developments.

4.3.3.3.1. Drug histories

When asked if it would be useful if a pharmacist took an additional drug history all participants felt that patient care would be improved as patients would receive their usual medicines promptly and drugs would not be inadvertently omitted. Doctors said that it would be a great help if pharmacists could decipher patients' medicines following admission, and phone GPs when there are uncertainties. As already highlighted, making sure patients receive their usual medicines following admission is a significant problem within the Trust.

> *"I think a second drug history is a major advantage, in the cool of the day."* (Consultant)

I asked when the pharmacist drug history should be taken and some doctors felt that this should be done on the admissions ward as then patients would receive their usual medicines sooner. They said that sometimes patients wait several hours to be seen by a doctor on the admissions ward.

> *"And by that time they've missed whatever regular meds they're supposed to have had at say 2 o'clock, they haven't had, they don't get them til six or something because we've not been around and often if we don't get to them til after five and the GP surgery shuts so you can't even ring the GP to ask about the meds, so having someone that could write down their regular meds on their drug chart and bring it to us and say can you sign these would be really helpful."* (House Officer)

Other doctors felt the second drug history should be taken when the patient is transferred to a longer stay ward, as patients may not have all the information about their medicines if they have been rushed it and they may not know exactly what they take.

Participants said that pharmacists would be better than doctors at obtaining accurate and complete drug histories, as medication is their main focus. This would also free up doctors' time to pursue other important clinical activities.

Some potential disadvantages of pharmacists taking drug histories were highlighted, for example problems may occur with very sick patients as they must be assessed by doctors and their medicines sorted out very quickly. Most felt that a second drug history was a good idea as it was a double check but one pharmacy technician said this may be considered by some to be a waste of time. Another pharmacy technician commented that elderly patients may get confused if lots of people are asking them questions. On the other hand, some participants felt patients may be more open with pharmacists than doctors, and if they know they aren't receiving a medicine they should be, they are more likely to mention this to pharmacy staff than busy nurses and doctors, understood to be busier.

4.3.3.3.2. Medication review

Doctors and nurses were asked what aspects of having a pharmacist on the wards would be helpful. Doctors felt that having a pharmacist present on the wards and attending ward rounds would remind them to review medicines more often. Having the pharmacist undertake a formal medication review would be extremely useful, as doctors said that unless pertinent to the admission, medicines are not reviewed.

All participants felt that patient care would be improved if pharmacists actually investigated why patients are taking all their medicines, because the doctors haven't the time to do this, which results in inappropriate medicines being continued.

> *"Sometimes when patients come in, it's unclear what they're on, why they're on certain things, especially why they're on certain medications if they've been on them for a long period of time, and when you get elderly people coming in with huge long lists of tablets and you want to know which ones you can stop, I definitely think pharmacists could be involved in deciphering why people are on medicines."* (House Officer)

One of the consultants said that pharmacist review of medicines may be more useful in areas other than general medicine, as within other directorates medicines are not such a priority and are not reviewed at all.

4.3.3.3.3. Efficiency of services

When asked about having pharmacists based on wards working closely with doctors and nurses as I did in this project, all participants felt efficiency of patient care with respect to medicines would be enhanced.

Pharmacy staff said that the study wards and wards with more pharmacy involvement don't phone pharmacy as much with queries on prescriptions, and this saves an enormous amount of time, *"it's already making a difference, but it would be much better if it was the whole hospital"* (Pharmacy Technician). Duplication of work is reduced on these wards because communication is better. All participants believed having a pharmacist undertaking the activities piloted in this study, would free up doctors and nurses time for other important clinical activities.

> *"I think definitely in patient care would be much better, plus I think the doctors would concentrate maybe more on the patient, they would be away from the prescription and things, so probably they would get some more time to concentrate on the patients' management, so that would make a difference"* (Registrar)

> *"Because if you can free up some doctors time to do more clinics then you'll cut their waiting lists...."* (Pharmacist)

All participants felt that if patients had access to pharmacists they would not need to ask doctors and nurses about their medicines. Having a pharmacist working along side doctors and nurses would also mean that drug related problems would be resolved more efficiently, as ward staff would have instant access to somebody.

> *"Like sometimes if you ring pharmacy, it can take ages for somebody to get back to you, whereas if they're there, you know you've got someone on the case....."* (House Officer)

> *"If we were going to look them* (drugs) *all up, would just take hours, because we're not so familiar all the time, especially at our level as we're just junior, and pharmacists deal with them all the time."* (House Officer)

Doctors and nurses said that having a pharmacist on the ward rounds, adding medication to the drug charts, writing discharge prescriptions and reviewing medicines would speed ward rounds up greatly.

4.3.3.3.4. Expedite discharge

I asked participants about the potential effects having a pharmacist undertake the activities piloted in this study may have on discharge of patients. All believed the length of patients' admissions could be reduced, because of better management of therapeutics and quicker discharge of patients.

> *"I think it may well shorten a person's stay in hospital, particularly if you can sort of make arrangements quickly, for discharge, it might save a day, in discharge, so I think it has potential for shortening the length of stay."* (Consultant)

Participants believed that processing of discharge prescriptions would be quicker if pharmacy staff were intimately involved in the planning, as all the appropriate information such as strengths of inhalers, and type of insulin, would be communicated to pharmacy. Pharmacy staff could anticipate discharges in advance and therefore ensure that discharge medicines are on the ward sooner.

4.3.3.3.5. Enhancing safety

When asked about potential benefits if this new approach to pharmacy practice was implemented throughout the Trust, all participants said that the risks associated with medicines would be reduced. All participants felt that because pharmacists would have more impact at the point of prescribing, there would be fewer errors and less unnecessary prescribing.

All participants felt that if pharmacists wrote discharge prescription there would be fewer errors. When asked if it would be helpful for pharmacists to write discharge prescriptions, a nurse said:

> *"Particularly this past week where I've had two scripts written by the doctors that have been incorrect, if I had a pharmacist doing it, I would*

feel more safe that that script was being written correctly." (Ward Manager)

When asked how safety relating to medicines could be improved all doctors and nurses felt that errors could be reduced if pharmacists reported them back to medical staff, although they emphasised that the approach must be non-confrontational to avoid antagonism.

"it is just helpful having someone to point it out, cause often perhaps you're off duty by the point it's spotted and one of the nurses have said, "ooh there's something odd, someone's prescribed this tds you only get it bd," and it's just changed, it would be helpful if someone said, 'right well any mistake of that nature need to be handed back to the person, who ever it is, whether it's a consultant,'" (House Officer)

"I think that would be valuable, because I think we've all made mistakes and if someone stood there and said, 'look this week I went to ward 5 and spotted 15 mistakes in one day,' I think everyone would turn around and go, '15 mistakes in one day, you know that, that's fairly significant,' ..... I mean you don't necessarily have to name names" (Senior House Officer)

Some suggested a newsletter reporting common problems, and high risk areas. When asked how they would feel about educational sessions led by pharmacists, all doctors and nurses said these would be well received. Participants suggested that these could include anonymous examples of frequent mistakes, serious errors, and errors that have occurred in other Trusts. Within these sessions, doctors and nurses could be invited to examine the processes and systems within the Trust relating to medicines, and explore ways of preventing errors.

"Maybe the pharmacist on the ward should keep a list of all the mistakes that have been made and once a month, have a meeting with the junior doctors and discuss how things could be different, what mistakes were, why, how, when, what should have been done etc, and that way they can learn from their mistakes." (Senior House Officer)

A consultant warned that feedback of errors should be not so infrequent it doesn't make any difference and not so frequent that people actually saturate and turn off, and it should be relatively hard hitting.

With greater pharmacy involvement in patient care all participants felt that errors could be identified and rectified sooner.

> *"Patients would get the optimum treatment because mistakes would be rectified sooner."* (Senior House Officer)

Junior doctors said they would greatly appreciate having a pharmacist checking their prescribing.

> *"....to spot the odd error that we make, dosage wise or interactions wise, and things on the chest ward particularly, things like antibiotics interacting with theophyllines and all those sorts of things that we always forget about."* (House Officer)

> *"There will always be a role for a pharmacist in doing that kind of double checking, because as much as you can say to a doctor 'you mustn't make any errors', it happens and you need someone else, because there will obviously be times when nurses not aware of what a correct dose is or whatever....."* (Senior House Officer)

When asked about specific areas in which pharmacist could improve medication safety, doctors and nurses identified warfarin management, in particular, monitoring and prescribing during admission, identifying patients at risk of adverse effects, educating patients, and coordinating management arrangements following discharge. It may be that they said this simply because it is an aspect of their job which they dislike, although my own experience and ethnographic data confirm that this is an area of patient care that is particularly badly managed by doctors and nurses.

Many participants felt the risks associated with patients taking medicines incorrectly would be reduced as patients would receive more comprehensive education about their medicines and this may lead to fewer re-admissions.

Because of the risks associated with drug therapy in hospital and the benefits of the pharmacy service developments which were demonstrated in this study, one consultant said it would be detrimental not to implement this throughout the Trust. He said that patient care would be improved because pharmacists would assume greater ownership of care with respect to medicines, than doctors and nurses do.

The ward manager interviewed felt very strongly that the culture towards medication errors within the Trust must be changed. She said that there needed to be 'champions for the cause', going out and drumming the message home to doctors and nurses. She talked about the new policy for the prescription, supply and administration of drugs which is about to be published.

> *"It really needs for the drugs policy to be explained verbally, rather than just giving out drugs policy to a ward and saying 'read that, go away', because everyone will just carry on what they're doing. We need to go out to the wards, explain it, all the reasons behind it."* (Ward Manager)

4.3.3.3.6. Prescribing guidance and focus on therapeutics

Pharmacy staff said that if they were based on wards, providing patient centred pharmacy services they would have greater impact on prescribing, with more significant interventions into patients care. They felt prescribing advice would be proactive rather than reactive as it is with standard pharmacy services.

When asked whether they would find it helpful having a pharmacist working on the wards, doctors and nurses all welcomed the concept, in particular to offer advice about choice of therapy, drug dosages, administering and prescribing drugs they are less familiar with, and the drugs formulary. They said having the pharmacist 'on-tap', actually working on the wards would be a huge advantage and doctors and nurses said they would be more likely to ask for advice.

> *"I mean, just an external agency who knows what they're on about is useful, flagging things up, any inaccuracies but also potential benefits of doing something, and we can take it or leave it you know, but it's great having that extra input."* (Consultant)

"When you've got a fairly clear diagnosis but the best treatment for it is in doubt in the sense that there are a number of things that you can use, and maybe some things that we haven't even heard of, and it think in that sort of role, choosing between things, that's where a pharmacist could really help." (Consultant)

"if they're on the ward then you're more likely to ask their advice about maybe things that you hadn't used before, you feel more able to talk to them and discuss it rather than, I mean certainly here I have phoned up the pharmacy a few times about things but you just feel more able to, to ask their advice if they're there in person." (Senior House Officer)

Of course, those interviewed may have simply been saying what they thought I wanted to hear, although when I was working on the wards the doctors and nurses did appear to appreciate having me there a resource for advice about therapeutics.

When asked if pharmacists should be based on the wards working as part of the team most doctors felt this would be beneficial as pharmacists would know the patients, therefore prescribing advice would be more useful.

"Having someone that knows the patient on the ward and knows the situation. I had a patient recently who had very complicated, antibiotic regimen to go home with, lots of IV antibiotics and all that sort of thing, so having someone that knew the patient and knew what was going on would be very helpful." (House Officer)

"If you had a person allocated to your ward, available for questions, and the person knows the patients because they work on the unit and they see them, and you ask their advice, rather than having to speak to some stranger on the phone, who doesn't know the patient, doesn't know what the problems are and having to go through the whole history, I would see that as a major advantage…." (Registrar)

Some participants felt it would be beneficial to have a pharmacist responsible for the medicines to ensure continuity of care as many different health care

professionals will be involved in a patient's care throughout the admission and patients may be transferred to different wards.

> *"I think it is important to have someone whose sole job is that, you know, or at least someone who's a lead in that.....and that is your only goal, it's a priority to you, it won't be a priority to the nursing staff, cause they've got ten other priorities, and now that the Juniors' hours are down, their priorities are very different."* (Consultant)

> *"On the ward rounds I was happy when you'd done the discharge paper because someone with time to focus does it properly, you know, the juniors are swapping, they're going to emergency ward, they're on nights, they've just been on days off, I mean it's a nightmare, you never know quite who you'll see on the ward round. The only continuity these days is senior staff."* (Consultant)

Consultants said that it was important to have the specialist knowledge of pharmacists available to doctors and nurses, and the need for pharmacist input into patient care equated to that of occupational therapists and physiotherapists.

4.3.3.3.7. Cost of therapeutics

When asked about the economic implications of pharmacists working in the manner proposed in this study, most participants believed that the costs associated with therapeutics would be reduced. They felt that savings would be made for the Trust and for GPs through more effective use of patients' own medicines brought into hospital, minimisation of wastage and more rational prescribing.

> *"I think it would save money, especially people that are on expensive drugs like lansoprazole and they don't need to be on it and antibiotics that they've had for too many days, especially IV antibiotics are a big problem and prescribing the wrong antibiotics, all that sort of thing, it would save an awful lot of money, I'm sure."* (Senior House Officer)

Some participants also said that by reducing the risk of errors, the Trust would reduce the potential litigation and the associated costs.

"We need to think about if there were any major problems, you know, a patient was prescribed inappropriate medication and suffered as a result, the cost implications of that" (Pharmacist)

When asked whether they thought the proposed pharmacy services would be cost effective most participants felt they would be as readmissions would be reduced through closer involvement of pharmacists in patient care, and cost savings would therefore be achieved.

"10% of admissions are due to drug related problems as cited by several articles. If we could for example prevent half of these, so 5% of these admissions are avoidable by improving compliance or avoiding drug interactions, making sure patients are taking their medicines properly. For example in this trust last year there were 15,000 admissions, with each admission on average cost 350 pounds per patient per week. If 750 of these admissions, which are 5% could be avoided, we would save 262,500 pounds. That makes having pharmacists doing this kind of work, cost effective." (Consultant)

"If you talk about it in terms of preventing the revolving door syndrome, then it's definitely cost effective having pharmacists working like that, definitely." (Staff Nurse)

One consultant however, said that he was unsure as to whether money would be saved in terms of drug costs, as pharmacists, as well as stopping inappropriate medication, would be unearthing drugs to be added to patients' therapy which wouldn't have been prescribed otherwise, through obtaining accurate drug histories. He said however, that overall, the Trust would save money through avoidance of medication related problems.

Another consultant felt that the money would be saved as the length patients' admission could be reduced with greater pharmacist input into care.

4.3.3.3.8. Communication

When asked about the value of having a pharmacist involved in the discharge process all participants felt that communication about medicines to GPs would

improve. They felt that this might help prevent GPs reverting to the medicines patients were taking prior to admission, when they have been changed in hospital and GPs would have sufficient information to follow the treatment plan. when asked about communicating information to community pharmacists some felt that in some circumstances this would be useful.

All participants spontaneously said that communication about medicines between all the health care professionals involved in patients' care would be improved with closer pharmacy input at the ward level. Attendance of pharmacists at ward rounds, and working as part of the team was felt to be extremely important for communication. Documentation about medicines would be improved if pharmacists were involved. Communication between ward and pharmacy staff would be better, which would enhance the contribution of pharmacy staff to patient care, and increase the efficiency of services. This would also improve intra-professional relationships as there would be greater understanding of the pressures different staff are under.

4.3.3.3.9. Concepts of patient centred pharmacy services

When pharmacy staff were asked at the beginning of the focus group what *they* considered 'patient centred pharmacy services' to comprise, most were vague and unclear in their answers. Answers included:

> *"Making the patient the number one priority so that they get the best service"* (Pharmacy Technician)
>
> *"I think you have the patient, and all the services go to the patients."* (Pharmacy Technician)
>
> *"That there's more focus on the patient, you're doing it more for them."* (Pharmacy Technician)
>
> *"Patients having involvement in their own care."* (Pharmacy Technician)
>
> *"Trying to locate things around the patient so the patients aren't moved around the hospital too much, just a more flexible approach so that*

services kind of go to patients, rather than having them transported around the hospital for various different things." (Pharmacist)

Some pharmacists identified some key activities which matched my own concept of patient centred pharmacy services, such as educating patients, taking drug histories, working in teams alongside medical staff, pharmacy staff based on wards caring for patients throughout their admission and coordinating the medicines aspects of discharge.

All participants were aware of the work I had been undertaking on the wards and with probing, they began to explore how pharmacy services could be developed. All felt that patient care would be improved if pharmacists took drug histories, reviewed medicines, wrote discharge prescriptions, participated in ward rounds, advised on prescribing, and liaised with GPs. Technicians said that efficiency would be enhanced if they were responsible for ordering all drugs on the wards, as there would be less duplication of work. Pharmacists said that they should be proactive rather than doing everything retrospectively, and that they should be able to prescribe certain medicines such as laxatives, analgesics and warfarin to improve patients' access to medicines.

When asked how they would like to see pharmacy services developed the consultants said they would like pharmacists to undertake all the activities piloted in the study: taking medication histories, reviewing medicines, educating patients, advising on and monitoring prescribing, attending ward rounds, taking total responsibility for medicines aspects of discharge, communicating information relating to medicines to GPs, reporting errors and feeding back to staff, and educating doctors and nurses about therapeutics. Pharmacist involvement throughout the entire patient journey was considered by all to be really valuable. They said that pharmacists ideally should be more visible and have a presence on wards.

The doctors and nurses echoed the consultants' views. The junior doctors were particularly keen that pharmacists were closely involved and familiar with patients so they could offer useful patient specific advice. They also would like pharmacists to take over warfarin management, write discharge prescriptions,

sort out other medication issues such as compliance aids, and ensure drugs are available on the ward in a timely fashion. Nurses wanted pharmacy technicians to order all drugs for the ward. Most importantly, all participants felt that pharmacists should be integrated into the ward team to maximise their input into patient care.

It may be however that doctors and nurses simply want to do less of the work they don't enjoy, hence state they would like pharmacists to undertake these activities.

4.3.3.3.10. Concerns about suggested service developments

When asked about potential problems with the proposed service developments a number of participants raised concerns. One technician felt that if she was out on the wards, she would miss out on what was happening in the pharmacy.

> *"I personally feel that if I was out all day on the wards, I'd miss out on a lot in the dispensary, just the general goings on, you'd miss what was happening"*

A pharmacist pointed out that patients experiencing these enhanced pharmacy services would then have high expectations and may be dissatisfied if they are re-admitted to either this or another hospital and the service is not the same.

Pharmacists felt that in order to get support for patient centred pharmacy services it was necessary to actually highlight how bad things were, and they feared this might upset people.

Some of the junior doctors said that it would be more useful for pharmacists to attend only the consultant ward rounds as when they do ward rounds alone, they make few changes to drug therapy. One consultant felt that it was not always necessary for pharmacists to attend ward rounds, as long as there were regular communications between doctors, nurses and pharmacists. .

A concern about pharmacists pre-empting discharge and writing discharge prescriptions in advance was that sometimes prescriptions were amended at the last minute.

"the problem is if you change things at the last minute, cause quite often we change things at the last minute, make fine tuning"

(House officer)

One doctor identified a potential disadvantage of pharmacists taking over anticoagulant management. When doctors are arranging for INRs to be checked, they often coordinate this with other blood tests if needed, so the patient does not have many separate blood tests. If pharmacists were arranging the INRs and not liaising with doctors, patients may end up having many blood tests separately.

Doctors, nurses and pharmacy staff expressed concerns that junior doctors may not use their extra time usefully if pharmacists were carrying out the activities in the study. Some felt that it was important that doctors do not become lax in prescribing and rely on pharmacists to detect all their errors.

"Maybe they wouldn't think about what they were doing as much as we do now, you know, 'does this drug interact with that drug,' and 'should I be reducing this in renal failure,' you know, maybe they won't be thinking about it as much..." (Registrar)

Another potential problem with the proposed service developments highlighted by participants was deskilling of staff. Some pharmacy technicians felt that if they were to undertake more ward based activities they may lose other 'core' skills such as those for dispensing and aseptics. There were also concerns about deskilling of doctors and nurses if pharmacists undertook more activities traditionally carried out by them. Pharmacy staff stressed that doctors still need to learn how to prescribe and manage drug therapy.

Some pharmacists worried that doctors may just leave jobs such as drug histories, until a pharmacist is around, which may result in delays in patients receiving their medicines.

4.3.3.4. Educative role of the pharmacist

Providing education about therapeutics was viewed as a major area in which pharmacists should become involved and doctors, nurses and patients would all

benefit. In section 4.3.3.4.1 participants views about relationships between patients and healthcare professionals are discussed and any potential advantages for patients if pharmacists had greater involvement in their care. In section 4.3.3.4.2 views about health literacy of patients are presented and in section 4.3.3.4.3 pharmacists' involvement in patient education are discussed. Finally in section 4.3.3.4.4 participants opinions about pharmacist involvement in education of doctors and nurses are examined.

4.3.3.4.1. Patient healthcare professional relationships

When asked about advantages for patients, in having pharmacists working on the wards some participants said that patients are more likely to approach pharmacists about medication problems because doctors and nurses are perceived to be busier. In addition patients could build up a relationship with the pharmacist and this would encourage them to ask questions about their medicines.

One consultant said that many patients would prefer to hear information from a pharmacist rather than from a doctor, as often patients don't believe what she says, or don't listen. Another felt that older people fear doctors. One consultant said that he felt patients would be more open with pharmacists about compliance issues, and that problems may be uncovered through close involvement of pharmacists in patient care, that otherwise might not have been.

> *"I got the impression that the patients had been much, much more honest about compliance issues to you, than the doctors, which was revealing in a number of instances"*

4.3.3.4.2. Health literacy

Participants felt that most patients were not knowledgeable about their medicines, in particular their purpose. When asked what they think patients need to know about their medicines some doctors agreed they do need information but were sceptical about the value of this.

> *"I think they need to know basically why they're on what they're on, but most patients that goes in one ear and out the other.....others just don't*

want to know, and there are some patients that are hopeless and just won't remember what you've said or are confused and therefore not appropriate to talk to," (House Officer)

All participants felt that the level of information given to patients should be tailored to individuals, although doctors said they do not have time to assess a patient's level of knowledge or understanding.

Doctors said that patients often claim they have allergies, when in reality they don't, or they have suffered a side effect of a medicine and incorrectly categorised it as an allergy. Pharmacy staff said that often patients don't regard some of their medication as drugs, for example, eye drops, inhalers, alternative medicines and over the counter drugs, and therefore fail to tell doctors when a drug history is taken.

One nurse said that the traditional system of managing medicines in hospital has an adverse effect on patients understanding of their medication. Patients are disempowered and the system does not help patients gain an understanding of their drug therapy.

"a patient comes into hospital, and they have been self medicating for years, and suddenly they have all their medication taken off them, they might be in for a few weeks, even a few months, and we dish out the tablets, we don't tell them what they are and we just put them in front of them and then all of a sudden we send them home and expect them to do it again, plus there might be new ones or they might be having different strengths of the ones they've been on before, it's bound to be confusing, and I think it's vital that they know, they maybe don 't need to know exactly how it works or what it does or what it interacts with, but they need to know what it's for, what the dose is, when they should take it and why they shouldn't take what they were taking before, because I think if patients don't know what tablets are for then they're not going to take them." (Staff Nurse)

4.3.3.4.3. Educating patients

When asked about pharmacists' role in educating patients about their medicines many doctors and nurses felt that pharmacists are therefore the ideal people to do this as they have greater knowledge in therapeutics

> *"If the medicines are described by somebody from the pharmacy to the patient, it will be more authentic and genuine as well, from someone who knows about the drugs much more than someone who has not much idea about that, and I think the patients would feel better about that as well."* (Registrar)

> *"If the patients had any worries about their medication they can ask pharmacy staff 'cause the nurse might not necessarily know, which is a benefit to the patient and also to the doctors and nurses because they're* (patients) *asking pharmacy direct...."* (Pharmacy technician)

Some participants felt that educating patients should be a corroborative effort by pharmacists, doctors and nurses, *"it has to be kind of two way process in terms of pharmacists doing more, but us also being aware of the importance of it, and doing more."* (Senior House Officer)

Doctors and nurses felt that pharmacists could have a particularly important role educating patients about more complex therapies, such as warfarin.

> *"That's something else that pharmacists do very well that we're rubbish at, is the warfarin counselling, I mean, you know I've never had any training in warfarin counselling, we just make it up as we go along, going through the little book and that saves us ages (of time), 'cause some patients have a million and one questions."* (House Officer)

Some participants recognised the importance of reinforcing medicines education whenever possible, in particular for 'revolving door' patients who have frequent admissions because they aren't taking their medicines properly.

> *"They need counselling every time you have contact...you need to pass something positive on to them every time you have contact with*

them..... so if they can remember another thing when you've seen them that day...." (Pharmacist)

Pharmacy staff felt that patient compliance with medicines could be improved if they were based on the wards, and actually observe how patient manage their medicines. For example some patients cannot take Sando K as it burns their throat, but doctors and nurses often aren't aware of problems such as this. Pharmacists could also assess which patients are appropriate for compliance aids, educate patients and their carers, and coordinate arrangements for discharge.

Some participants felt it was important not to overload patients with information about medicines as this may be counter productive. If pharmacy staff were on the wards they could educate patients throughout the admission, instead of the patient being bombarded with information immediately prior to discharge.

"If you had a pharmacist working with you could spend time explaining exactly what the tablets were for, whenever you're giving the tablets and therefore it's not just a huge big shock, at the end of the hospital stay, 'right you're on your own now'" (Staff Nurse)

A number of participants said that more time should be spent educating patients with cognitive impairment, and relatives and carers of patients. Some people thought that pharmacy staff should get involved with structured patient education, such as talks or seminars to patients about rehabilitation following a heart attack.

4.3.3.4.4. Educating Drs and nurses

When asked how pharmacists might help doctors and nurses, participants said that by anticipating and highlighting adverse drug reactions and interactions, and flagging up prescribing errors their practices relating to medicines would be improved.

"When someone brings up an issue with you and discusses it, you're far more likely to remember it and take on the information, because there's no way we can sit down and memorise everything, but when you're using

it in practice and when people are highlighting issues to you, you do tend to remember it the next time you come to prescribe something." (House Officer)

Participants felt that pharmacy led provision of therapeutics education and support, along with pharmacists working with doctors and nurses daily on wards, would promote the safe use of medicines and could have a huge impact on the culture towards medicines within the NHS.

"You are hopefully going to be instilling into them, habits of a lifetime that they're going to take forward and then when they are specialist registrars or GPs or consultants, they will, they will feed on to their own juniors, so it's something, as much as anything, you're doing for future generations." (Registrar)

Some doctors said that they would appreciate a resource pack on each ward with information and protocols relating to prescribing in specific patient groups, for example patients admitted with respiratory or gastrointestinal conditions, or elderly patients. Many doctors felt that the Trust should have a prescribing guide, which includes prescribing protocols for medical conditions they are likely to encounter, giving them the drugs to use, the dosage and the duration.

Some junior doctors and nurses also said they would appreciate guidance in what to tell patients about their medicines. They said that if pharmacists are physically on the wards, they would be more likely to use them as an educational resource.

"There are many different types of tablets, and many different types of patients, so it would be great to refer back to a pharmacist on the ward on a regular basis....." (Registrar)

Pharmacists felt they could educate doctors and medical students to prescribe effectively. They felt it would be useful if student doctors and nurses spent a small amount of time in pharmacy to improve their understanding of the service and enhance intra-professional relations.

4.3.3.5. Changing practice

From the interviews and focus groups, many issues were identified that could influence the proposed development of pharmacy services across the Trust. These are summarised below under various headings. In section 4.3.3.5.1 issues raised about resources are examined and in section 4.3.3.5.2 I present views about how interprofessional relationships might influence development of services. I section 4.3.3.5.3 matters relating to competency of pharmacy staff are discussed. I move on to talk about participants view on how change might be facilitated within the Trust, to enable development of services in section 4.3.3.5.4, and then in section 4.3.3.5.5 I discuss the practical aspects raised, by participants. In section 4.3.3.5.6 views about the professional aspirations of pharmacy staff are examined and finally in section 4.3.3.5.7 I talk about issues raised relating to roles and professional boundaries.

4.3.3.5.1. Resources

When asked about barriers to implementation of the proposed service developments throughout the Trust, resources were felt by many participants to be the principal inhibitory factor. Pharmacy staff worried that moving more pharmacists and technicians to wards would leave too few staff in the pharmacy department to carry out the 'core' pharmacy functions of supply and aseptics. They said that the activities piloted in the study could not be implemented across the Trust, with current staffing levels. Pharmacists felt that although there would be cost savings made through better management of medicines, the financial implications of employing more staff must be considered. They believed however, that implementation of this approach to pharmacy practice throughout the Trust would reduce workload on the dispensary and improve the efficiency of services.

Some participants said the cost implications of not providing the services should be considered, for example drug errors, inappropriate prescribing, adverse drug reactions, and readmissions because of medication problems, although this is extremely difficult to quantify.

Most believed that there are insufficient resources available in the Trust to invest in pharmacy services, and other areas are likely to be given priority. Some felt that the trust may only invest in the proposed services if they involved a considerable reduction in costs.

> *"If you reduce the drug budget, or save them having a major litigation case you know, you might stand a chance of, of putting the thing into practice."* (Consultant)

The consultants said that resources within the Trust are limited and although doctors' and nurses' time would be freed up through implementation of the services piloted in the study, investment in such services would unlikely be instead of more doctors and nurses.

> *"A ward based pharmacist could be totally responsible for the discharge of the patient, in terms of tablets.....and that would release that staff nurse who's in short supply anyway for some other role.....I would place that highly if I thought it was going to take off pressure from the existing staff, but I don't think I could support a pharmacist per ward if I still had too few staff nurses or junior doctors, because the overlap between jobs wouldn't be that great whereas the nurses are allowed to give out tablets, discharge patients, phone social workers and all the rest, you would not be taking on some of their role, other than the medication role...."* (Consultant)

4.3.3.5.2. Interprofessional dynamics

When asked about potential interprofessional problems, a number of pharmacy staff felt that some nursing staff may not want them encroaching on what they perceive is their territory. They said some doctors and nurses may think pharmacy staff are interfering or criticizing them, but others would see them as a valuable part of the team. Pharmacy staff felt that some doctors look upon them as 'nit pickers', or having a sort of policeman role for medicines use but this might be improved with greater integration into the medical team.

"You've got this sort of monitoring, teacher, policeman role, of like you know marking the kardex, ticking the boxes." (Pharmacist)

"You'd probably feel part of the clinical team more, rather than just the policeman who comes around and, you know I get upset when the doctors say to me, 'have you spotted any errors?' and I hate that, it gives the impression that all I'm doing is picking on them, and, you know, that's the last thing I want to do." (Pharmacist)

It was felt by a number of pharmacists, that to be fully accepted as part of the medical team and to provide the best care for patients, the working hours of pharmacy staff should be more in line with other healthcare workers in the Trust. The current services run from 8.30am until 5pm at night, with an on-call service for supply of appropriate medicines, and medicines information.

"We won't be accepted fully until we're like in the same boat as, you know if the doctor sees you on the ward at 10 o'clock at night, when he's on the ward, or she's on the ward then, they'll be much keener to kind of welcome you as an allied profession, cause if they think, 'I suppose you're in the same boat.' I think at the moment they think 'oh well, it's alright for you, you're on your way at 5 o'clock, you don't know what you're on about'"

Some pharmacy staff also said that patient care would only be improved if GPs were prepared to listen, because changes made to drug therapy must be continued following their discharge.

Some pharmacists felt that the doctors and nurses are not actually aware of what pharmacy staff do either on the wards, or within pharmacy and intra-professional relationships would be improved with greater understanding. Most pharmacy staff believe that medical staff would vary on their uptake of the service developments and there are some consultants that they would not wish to approach.

Many doctors and nurses said that pharmacy staff must emphasise they are there to help doctors and nurses, and they should be careful and non-threatening in their approach.

> *"Some people may feel threatened by an outside person coming on to the ward; they may feel that they are picking out their mistakes. So it is important to let them know that you're there to help them and you are not witch hunting."* (Consultant)

> *"Don't treat the doctors like idiots. In a previous presentation, the pharmacist was talking about how to write prescription charts, and was telling the doctor to print their name out in capital letters under the signature, and the doctors were saying to me afterwards 'of course we know that, the pharmacist was treating us like idiots'"* (Consultant)

> *"It's a threat to them, they're trying to prove that they know these things and they don't want to have the thought of somebody coming up and saying, 'actually you've got that wrong,' so where at the moment they may be seeing it in a negative viewpoint, it's a case of changing that round so they can see the positive sides to that where the pharmacist is actually there helping them to grow in their knowledge of pharmacy and drugs."* (Ward Manager)

The consultants felt that it would be important to get it across to doctors that pharmacists are an added layer of protection and an added layer of service for the patients, and communication should be non-confrontational. Participants acknowledged that some medical staff may not welcome assistance in therapeutics from pharmacy staff and that the degree of appreciation would vary. Some doctors may feel they are losing some of their 'power', or having their decisions questioned, or losing freedom to choose what they prescribe. Junior doctors may appreciate advice about therapeutics and having their prescribing monitored, as they have limited experience. On the other hand however, they may feel threatened, defensive or humiliated, or feel that they ought to know more about therapeutics.

"My guess is their (junior doctors') *insecurity breeding a degree of arrogance and assuming they know everything, most of them will anyway, it is a problem, done it myself at times"* (Consultant)

"yes...a degree of who are you?....you know I am the medic...I am omnipotent....I know everything...I don't need anyone else to tell me what to prescribe, I have decided, therefore it should be given, sort of approach from some of the juniors...one or two consultants as well." (Consultant)

One consultant talked about the negative effect of publicity about medication errors (Audit Commission, 2001), on doctor – pharmacist relationships.

"The publicity from that report that has been on the radio, doesn't help pharmacists....., it is painting doctors in a bad light. Basically what they are saying is that the pharmacists are going to clear up after these terrible doctors, when really this just gets doctors' backs up, and it is not the best thing to do."

All participants felt that the senior staff must be supportive in order for junior medical staff to alter their prescribing habits based on pharmacy involvement and if there were problems with junior staff, senior staff should address these. Many participants said that doctors and nurses would start to depend on pharmacy input as they do speech and language therapists, dieticians, occupational therapists, or physiotherapists involvement, however sometimes pharmacists are perceived to be 'pedantic' and obsessional about drugs, which can be irritating for medical staff.

Overall, the medical staff felt that patient care would be improved by having pharmacy staff working along side them on the wards, and they anticipated very few problems providing communications were good and pharmacists were sensitive in their approach. This integration of pharmacy staff into the medical team was felt to be critical in changing practice, and to implement truly patient focussed care professional boundaries must be crossed. Doctors also said that they would be happier to take advice or even criticism about their prescribing if they had this kind of relationship with pharmacy staff.

"Everybody must be focussed on the patient reduce the boundaries of hierarchy, you know, this is your job, that's my job, keep out of my way, whatever, and if we're to be serious about the concept of patient focussed care, people have just go to get over it, and if, if doctors do have a bit of a problem with that, well tough." (Staff Nurse)

4.3.3.5.3. Competency of pharmacy staff

Although doctors and nurses could see advantages of the proposed activities, in the focus groups, pharmacy staff actually expressed concerns about their own competency. Pharmacists said they wanted to work in the manner proposed in this study, but some questioned their own ability and knowledge. When asked about education requirements, pharmacy technicians said they would need more training about therapeutics, such as drug interactions, counselling patients about their medicines. It was felt that training requirements should be continually reassessed as this would alter as pharmacy staff take on new roles. Even after training some technicians felt they may not be able to undertake certain activities for example taking drug histories, coordinating discharge arrangements, providing medical staff with medicines information, dispensing unsupervised. All pharmacy technicians were unwilling to have ultimate responsiblity for medicines aspects of patient care.

"From a personal point of view, I just don't feel I have a deep enough knowledge, and I don't feel that I ever will unless I go back to college and do a degree in pharmacy. Yeah and I don't feel I will ever have a deep enough knowledge to have the confidence to like check every interaction." (Pharmacy Technician)

All participants said that written procedures should be produced detailing the activities to be undertaken and technicians always want the ability to refer back to a pharmacist, when necessary. They also said that they would need practical knowledge of what actually happens on the wards, as many don't have this experience.

"It's about having the background knowledge, but also not just on clinical stuff and drugs but also what goes on, on the ward, I feel that I'm very

ignorant of what, I've never been on..... the wards" (Pharmacy Technician)

Some pharmacists said they would not feel comfortable with reviewing patients' medicines with their current level of knowledge, especially pharmacists who had been qualified longer as they felt pharmacy training was less clinically orientated in the past. Some pharmacists felt that although they had undertaken a postgraduate clinical diploma, because they had not used it in their everyday work they had forgotten it.

Pharmacy staff felt that the best method to improve their knowledge and confidence was through mentorship, whereby they work on the wards along side more experienced colleagues to learn about therapeutics, and the provision of patient centred pharmacy services. Mentorship should be a continuous process and pharmacy staff also felt they would learn and gain experience through actually working on the wards. No pharmacists had experience of this type of mentorship, but all felt it would be advantageous.

When asked how they felt about taking on new responsibilities, some pharmacists appeared not to have the confidence to participate in ward rounds, as they fear how they will be viewed by doctors. Some pharmacy technicians said they would not have the confidence to interact with doctors and nurses.

When asked their views about the proposed activities doctors also recognised that there would be training needs for pharmacists. Some consultants worried about intra-professional variation between pharmacists.

"You (referring to myself) *were very dedicated and fitted in very well on the wards. You wanted the project to work and to be successful. Will everyone else who comes along afterwards be this dedicated? Other people may have different personalities and may not integrate into the ward team as effectively."* (Consultant)

"Some may not want to take on this additional role because they might feel that it is not something they're trained for, advising and seeing patients might feel quite alien to them." (Consultant)

Consultants felt that pharmacists often lack empathy with patients, and this may be a reflection of minimal patient contact in their training. They commented that pharmacists do not seem to feel comfortable on the wards.

> *"The only criticism I do have of pharmacists is that they, a lot of them seem very remote to the patients they're trying to treat with medication, it's, it's as if the patients are almost not part of the equation, they're almost more focussed on the drugs than they are on the people taking it, and I think that just reflects lack of training."* (Consultant)

It was suggested that the undergraduate pharmacy degree should involve more training based on wards and working with patients.

4.3.3.5.4. Facilitating change within the Trust

When asked about uptake and acceptance of the proposed change in practice participants felt that inevitably some people would be reluctant. Pharmacy staff said that they would support the practice changes as long as they were fully informed and felt involved. They said that consultants who are supportive should be encouraged to promote the idea to their colleagues, and once the service was implemented successfully in one area within the Trust it is likely that others would desire the same. Participants felt it was likely that doctors and nurses would be supportive of patient centred pharmacy services if they were told that it would save them time.

There was a strong feeling that to gain support within the Trust, the new approach to pharmacy practice must be continually shown to demonstrate improvements in patient care, but proving this has inherent difficulties. Some suggested presenting data to show errors prevented, interventions into patient care, occasions when discharge has been quicker or when patients have received their medicines more promptly. However, the limitations of these data were recognised, as they are not necessarily indicative of improved patient outcomes. Others suggested using re-admissions rates and length of hospital stay as markers of the impact of pharmacy services, but acknowledge that any effect pharmacy input has on these is very difficult to isolate.

All participants felt that the trust would only support patient centred pharmacy services if money would be saved. Whilst the overall opinion was that cost reductions would be made for example through prevention of drug errors, avoidance of litigation, and reduced re-admissions, participants agreed this would be difficult to quantify. Some participants felt that pharmacy staff could sell the proposed service developments to Trust management as evidence of clinical governance. Consultants said however, that Trust management, would only support services if they impacted on the 'golden criteria': waiting lists, emergency admissions and the Trust overspend.

When asked how best to introduce the services, consultants said this should be done by writing to each clinical director, all consultants and senior nurses, as these people are pivotal to successful implementation. Senior staff must ensure that doctors and nurses know what pharmacists are there for and that they are part of the team, not merely an 'add-on extra'. Pharmacists could then run small teaching groups with doctors and nurses to say who they are, what they do, what they aim to achieve, and what they can offer. They said that senior house officers and particularly the nurses would be the most important as they are more permanent staff, whereas house officers move every six months.

> *"What generally happens is, if the nurses take something on board, it becomes part of the ward routine and the junior doctors adapt to that, that's in practice, what happens."* (Consultant)

Doctors said that a session to introduce pharmacy services during junior doctors' induction week may be useful, but as they have many other things to concentrate on it may be overlooked. They felt that the weekly doctors' lunchtime educational meeting would be an excellent forum to promote patient centred pharmacy services as many doctors attend and GPs were also present. Each directorate also have regular meetings and pharmacy staff could also speak at these. A nurse felt that implementation of the services may be more successful though a campaign with a multidisciplinary team of a pharmacist, doctor, and nurse providing educational sessions, complemented by wards visits.

4.3.3.5.5. Implementing the new services – practical aspects

When asked about implementing the proposed services, appropriate training and resources were considered a pre-requisite. Good communication is vital and ward staff should have written protocols of what pharmacy technicians and pharmacists do, and don't do on the wards which should be provided when the services are introduced to enhance efficiency and prevent confusion or exploitation. There will be misunderstandings of the activities to be carried out by pharmacy staff, but this is inevitable when any new services are introduced. When asked if they felt the proposed services would be successful, all participants felt that, with perseverance, patient centred pharmacy services will become embedded into the culture of the ward.

All participants felt that development of pharmacy services would require collaboration between all staff from the beginning in order to obtain their support, and ensure the continuity of patient care.

> *"Obviously before it starts everybody would have to be involved, it would be no good pharmacy saying 'right this is what we're going to do,' you'd have to integrate the doctors and the nurses..."* (Pharmacy Technician)

When asked about the practical aspects of the new pharmacy services, all participants felt that uniformity of service across the Trust would be very important, and pharmacy staff must be adequately covered over holidays or sick leave by staff who will provide the same level of service, to maintain confidence of medical staff and patients in the service. The service provision must be consistent, over a long period of time, for a change in culture to occur. It must be a continuous service, not sporadic.

Pharmacists said they want to have certain activities they undertake formalised such as writing up warfarin doses for doctors to sign, altering dosage times, and re-writing drug charts.

When asked about potential difficulties, participants felt that provision of patient centred pharmacy services to community hospitals might be problematic. These wards and rehabilitation wards however, would need less pharmacy input as

there are fewer admissions and discharges than acute wards. Some participants felt that pharmacists should work on the admissions wards taking drug histories and influencing prescribing immediately following admission, whilst others thought they were better placed on the longer stay wards.

It was felt that pharmacy working patterns should change to reflect those of doctors and nurses not only to improve interprofessional relations but because doctors and nurses may need pharmacy input more outside of normal pharmacy hours. Some doctors and nurses felt that patient centred pharmacy services should be available 24 hours a day 7 days a week, albeit in a limited capacity. Pharmacy staff had mixed views on this, with some supportive and willing to work out of their usual hours, whilst others were more reluctant.

Pharmacy staff said that resources should be maximised through skill mix, with assistant technical officers maintaining the supply role of pharmacy and aseptic services, freeing up pharmacy technician time to work on the wards. Acquiring more assistant technical officers would greatly facilitate implementation and with training, pharmacy technicians could carry out several of the activities undertaken in this study, such as obtaining drug histories, counselling patients and ensuring the medicines reach patients in a timely fashion. All pharmacy staff acknowledged that pharmacists must be careful not to simply delegate jobs they do not like, to technicians.

When asked about pharmacists' working patterns, all participants recognised that to ensure all patients receive appropriate services relating to their medicines pharmacy staff must be physically on the wards. The amount of time spent on the wards, however, should reflect the work load of the ward. The time input of pharmacists could be modified to target areas or activities where pharmacy staff can achieve the maximum input into patient care. Pharmacists must be visible and available on the wards so doctors, nurses and patients can seek their advice. Most participants felt that pharmacists should attend ward rounds in order to be fully involved in patients care and have maximum influence on prescribing. It was felt that pharmacy staff should have greater 'presence' on the wards, so they would be more familiar with the patients, and more approachable to patients, doctors and nurses. Pharmacists said that

problems may arise when they have other responsibilities and commitments, for the pharmacy department, which take them away from the wards.

4.3.3.5.6. Professional aspirations of pharmacy staff

When asked their feelings on taking on these new roles most pharmacy staff felt their jobs would be more rewarding and interesting if they were more involved with patients. They would feel they were doing a better job. Job satisfaction would be enhanced and it was felt that developing patient centred pharmacy services would also help in recruitment and retention of pharmacy staff, whilst also raising the profile of pharmacy within the Trust.

Some pharmacy technicians said that although they would like to work on the wards more, they also enjoy aspects of their work in the pharmacy department, such as aseptics so they would like to have a rotation system, which enabled them to work in a variety of areas. Some technicians were keen to get involved in educational programmes for patients.

A number of doctors and nurses expressed concern that some pharmacists may not want to take on extended roles.

> *"We're talking about a total cultural change for pharmacists. Some probably won't want to change. That is the same with all change in professions."* (Consultant)

Whilst acknowledging improved job satisfaction, some pharmacy staff felt uneasy about taking on extended roles, as they lack confidence in their ability and would be afraid to take on more responsibility. Although pharmacists were keen for technicians to extend their roles to provide more patient centred services, and provide medicines information services, some technicians were not keen to do this. Pharmacy technicians said they would not be prepared to write prescriptions, but all would be happy to counsel patients about their medicines. They would dispense prescriptions without the direct supervision from a pharmacist, so long as a pharmacist professionally checks the prescription, and is accessible for queries.

Pharmacy technicians said that they should be formally registered and accredited and this would facilitate the development of new services. Some technicians feel they are poorly rewarded in comparison with technicians working for other Trusts, and claimed technicians working within other hospitals in the region are paid higher rates to do the same job. They feel their grading and salaries do not reflect the work they currently do and are insufficient to take on extended roles.

4.3.3.5.7. Roles and professional boundaries

A great deal was said about professional boundaries, and the importance of being clear in defining the roles of people involved in patients' care. When asked about the practical aspects of service developments, all participants said that pharmacy staff must be clear in defining their roles and responsibilities right from introduction of the new services so services are consistent across the trust. This must be effectively communicated to doctors and nurses so they know what to expect from pharmacy staff. Often doctors and nurses are unaware of the roles of pharmacy staff, but with better communication they would know exactly what pharmacy technicians and pharmacists do. Pharmacy staff must be prepared to continually reinforce their responsibilities and not be afraid to refuse to do things asked of them which are outside of these.

Some pharmacy staff felt that the different roles of pharmacy technicians and pharmacists should be explained to patients, but doctors and nurses felt this may confuse them. Pharmacy staff felt that they were not easily identifiable which confuses patients, but by working as part of the team this would improve, as patients would be able to distinguish them from doctors and nurses. Patients would be more aware of the role of pharmacy staff, and would use them as a medicines information resource.

Participants were keen for pharmacists to extend their roles to encompass some of the activities traditionally undertaken by doctors. One consultant suggested developing the concept of 'pharmacy practitioners', just as nurse practitioners are now being used to provide more clinical help to doctors.

"Nurse practitioners are doing all sorts of things now which doctors did before, you might have to think about it in the same way with pharmacy……. perhaps it would be useful to have, say, a pharmacy practitioner doing all the stuff that the junior doctors are doing at the moment."

When asked whether pharmacists should be able to prescribe drugs, pharmacists were eager to extend their role in this manner as they feel this would improve patients' access to medicines, ensure efficiency of medicines use and minimise risk. Consultants were also in favour of this, but they were concerned about the lines of responsibility. They said this would be particularly useful when a diagnosis is clear, but there is uncertainty about the best treatment, for example deciding on anti-emetics, analgesia, laxatives or antibiotics.

5. CHAPTER 5 – DISCUSSION AND CONCLUSIONS

5.1. INTRODUCTION

In this chapter, I will summarise the main results the study. I will move on to relate my findings to existing literature and discuss how my work extends this. I will also explore the limitations of my study and the strengths and weaknesses of the methods adopted. I will then discuss the lessons for practice and finally consider implications for future research.

5.2. SUMMARY OF FINDINGS

Following an action research approach, this study comprised four phases:

Phase one - a preliminary phase to gain an understanding of the study environment

Phase two - reflection on emerging themes and identification of key issues relating to the use of medicines

Phase three - development and implementation of a new model of care, and

Phase four - evaluation of the model in the study setting and exploration of issues which would influence adoption throughout the trust

In this section, I will briefly summarise the main issues identified throughout this study.

5.2.1. Medicines safety

Many issues relating to medicines safety were identified during the study. Errors frequently occur and many of the doctors and nurses seemed to accept it as an inevitable part of patients care. Examples include medicines not being prescribed due to inaccurate drug histories, transcription errors, prescribing contra-indicated drugs, dosing errors and mixing up drugs with similar names. Prescribing errors were considered by some to be part of a doctor's learning experience. Doctors classified errors as either 'minor' or alternatively 'significant' and appeared unconcerned about 'minor' errors as long as they were spotted or caused little or no harm to patients.

Errors are frequently not reported, especially if they are deemed 'minor' and doctors and nurses are frightened to admit to mistakes because they feel they will be blamed. A ward manager expressed frustration that the Trust management do not feel that mistakes matter, and this filters through to the doctors and nurses.

Patients are frequently admitted to hospital because of medication problems and it appears that many of these admissions are due to non-compliance. Re-admissions can occur because discharge medication is not explained properly. In this study, few patients were able to give a comprehensive, accurate account of their medication regimen and nearly half of patients interviewed admitted to forgetting to take their medication as prescribed at least a number of times each month.

A number of unsafe practices were identified for example nurses frequently give intravenous drugs without another nurse checking them, patients keeping medicines in unlocked bedside cabinets, patients self medicating without the doctors' knowledge, doctors not taking sufficient care when prescribing for example not checking doses and writing illegible prescriptions. Nurses often do not supervise patients taking their medicines. Drug therapy is poorly documented in patients' notes, and doctors rarely communicate comprehensive information about medicines and treatment plans to GPs.

It appears that medicines related activities are not considered a priority by doctors and nurses. A lot of their job is concerned with other aspects of patients' care, which they perhaps take more time and consideration in undertaking, and medicines aspects come last. It may be however, that other aspects of patient care also suffer.

5.2.2. Culture relating to medicines

There appeared to be a blasé attitude towards medicines amongst doctors and nurses in the study Trust, and in interviews they made surprisingly frank comments about less than ideal practices. Consultants, junior doctors and nurses often blamed lack of time and resources for poor care relating to medicines. From my observations, it seemed that medicines are not seen as an

important part of patient care; for example, doctors rarely review medicines unless they are pertinent to that admission even though they are aware that some drugs may be inappropriate. If it is not possible to get an accurate drug history at the time of admission, this is often not followed up. Doctors and nurses conceded that patients are given insufficient education about their medicines, but seem not to consider this a particularly important part of patient care.

Throughout the study, doctors and nurses acknowledged sub-optimal aspects of medicines related patient care but appeared to accept this as an inevitable part of care and lack concern. There was however considerable intraprofessional variation with respect to the importance placed on medicines. My observations indicate that some doctors are more concerned about medicines than other doctors and similarly some nurses are more concerned than other nurses.

5.2.3. Inefficiency

Systems, procedures and shortcomings of staff lead to inefficiency of patient care. Delays sometimes occur in supply of medicines to wards because nurses do not order medicines in a timely fashion and sometimes patients can miss several days of their usual medicines. There are sometimes delays in obtaining non-formulary drugs, or ensuring an alternative is prescribed. Wastage of medicines is a problem, through not reusing patients' own drugs and failure to transfer patients' medicines between wards.

5.2.4. Competency of professionals

Doctors and nurses competency relating to therapeutics was sometimes lacking, for example knowledge of dosages, adverse reactions, indications and contraindications of drugs, drug interactions and special instructions for certain drugs. Junior doctors said they feel unprepared for prescribing when they leave medical school, as therapeutics constitutes a very small part of the medical school curriculum. Sometimes nurses do not administer medicines as they are out of stock or sometimes no clear reason is apparent. Several doctors and

pharmacy staff felt that some nurses do not understand the importance of making sure patients receive certain medicines.

The doctors rely on nurses as a safety net in detecting prescribing errors, but the nurses felt they have insufficient knowledge about therapeutics and therefore may not notice errors.

5.2.5. Effective management of therapeutics

This study identified various ways in which the management of therapeutics could be enhanced within the study Trust. Whilst doctors and nurses appreciated the limited existing pharmacy services provided to wards, they said that they would prefer more direct patient orientated pharmacy input, with better interprofessional communications and greater patient contact. At the time of the study, pharmacy services varied between wards and essentially comprised supply of medication, a medicines information service, and, for some wards, pharmacist visits to review drug charts. The new approach to pharmacy practice developed and evaluated in this study was found to be very successful.

5.2.5.1. Ensuring appropriate prescribing

As a result of my intervention, I believe patient care was improved because an accurate drug history was recorded in patients' notes, which resulted in patients receiving their usual medicines promptly, drugs were not inadvertently omitted or prescribed inappropriately and continuity of patient care was facilitated, especially when communicating information to GPs about medication changes. I feel that undertaking a structured medication review ensured prescribing was appropriate, patients were not taking unnecessary drugs and this ensured they received medication from which they would benefit. In interviews and focus groups doctors, nurses and pharmacy staff felt these were particularly useful interventions. Pharmacy staff may be the most appropriate individuals to undertake these activities.

I believe that having a pharmacist based on wards, providing more patient orientated, medicines focussed care enabled a greater impact on prescribing, and improved interprofessional communications. Prescribing advice was

proactive rather than reactive as with standard pharmacy services and I was more familiar with patients' management, therefore prescribing advice was more useful to doctors and nurses.

5.2.5.2. Enhancing safety

I feel that having a pharmacist working on the wards, attending ward rounds enabled better and earlier detection of prescribing errors and resulted in better documentation about medicines in patients' notes. Being present at the point of prescribing, encouraged doctors and nurses to ask for advice.

Pharmacist involvement in discharge reduced risk to the patient through fewer errors and minimised delays in discharge whist also facilitating continuity of care through improved information about medicines to GPs.

5.2.5.3. Educative role of the pharmacist

Therapeutics education for patients, nurses and doctors was a particularly useful intervention in this study and doctors, nurses and patients were very supportive of this. The risks associated with patients taking medicines incorrectly may be reduced if patients receive more comprehensive education about their medicines, which may lead to fewer re-admissions. Pharmacy staff may be the most appropriate individuals to undertake this as they have a more comprehensive knowledge of therapeutics and patients may feel more relaxed and open talking to them than the doctors and nurses. Pharmacy staff may have a valuable role in negotiating with non-compliant patients. Having a greater presence on the wards and subsequent increased familiarity with patients enabled me to educate patients more effectively.

5.2.5.4. Enhancing efficiency of patient care

As a result of my interventions the efficiency of patient care was enhanced, doctors and nurses time was freed up to pursue other clinical activities and pharmacy time was saved.

Doctors, nurses and pharmacy staff felt that better management of therapeutics, resulting from more intense pharmacy input into patient care may reduce the length of admissions and planning discharge medication in advance, for some,

patients may expedite discharge. Some doctors commented, however, that better management of therapeutics might incur increased drug expenditure if more drugs are prescribed.

My interventions reduced the risk of errors, which may minimise potential litigation and associated costs. Overall, it is possible that the Trust would save money through avoidance of medication related problems.

5.2.6. Changing practice

Various issues relating to changing practice were identified, for example resources, interprofessional problems, reluctance of pharmacy staff because of training and accountability issues, and intra-professional variation of pharmacy staff. I felt that pharmacy staff themselves might be one of the biggest barriers to developing services in this Trust. It may be that my desire for the project to work and ability to integrate into the ward team effectively may have significantly contributed to the success of this project.

5.3. RELATING MY FINDINGS TO EXISTING LITERATURE

In this section, I discuss how my findings relate to existing literature, whether they confirm or refute it and what my findings add. My findings relating to medication errors confirm and also add to existing literature. Error reporting is very poor in the study Trust, with many doctors not even being aware of reporting procedures. Several barriers to reporting medication errors were identified in this study and have also been identified in the literature (Department of Health, 2004), namely:

- Lack of an awareness of the need to report, what to report and why
- Some errors go unnoticed
- Errors which do not harm the patient and are deemed 'minor' are frequently not reported
- Fear of disciplinary action or litigation
- Lack of familiarity with reporting mechanisms
- Staff feeling they are too busy to report
- Lack of feedback when errors have occurred.

As reported in the literature (Bates DW *et al.*, 1995), prescribing errors were the most frequent medication errors I encountered during the course of my work on the wards, and the most common recalled by doctors, nurses and pharmacists in interviews. Reasons for prescribing errors were identical to those cited in the literature (Department of Health, 2004): inadequate knowledge of the patient and their clinical condition, inadequate knowledge of the drug, calculation errors, illegible handwriting, drug name confusion, dosage formulation, zeros and decimal points, unusual routes of administration, uncommon and/or complicated dosage regimens, repeat prescribing and poor history taking.

My results add to those of Dean *et al* who suggested that human error theory can be used to identify the causes of potentially serious prescribing errors (Dean B *et al.*, 2002). I believe this theory can also be applied to other causes of medication errors such as administration errors. Errors identified in my study could be divided into active failures and latent conditions using Reason's model of accident causation (Reason J, 1990). An **active failure** was present in most errors identified by myself or described by interviewees and took various forms. Slips included getting doses wrong. Lapses included forgetting to cross off a patients' insulin when an infusion had been put up or prescribing a drug at a new dose and forgetting to cross off the prescription for the old dose. Mistakes were made when doctors had insufficient knowledge, for example prescribing a low molecular weight heparin when there was no clinical indication. Examples of violations were when relevant rules were not applied, for example, doctors taking inaccurate drug histories, not filling in sufficient information on the discharge prescriptions correctly, nurses not ordering drugs in a timely fashion so patients miss doses, nurses allowing patients to keep medicines in unlocked bedside cabinets, and not ensuring patients can use inhalers correctly.

Latent conditions were also identified and doctors cited multiple factors contributing to errors, which supports existing literature (Dean B *et al.*, 2002). In my study, doctors and nurses blamed working conditions, for example, hastily written discharge prescriptions at the end of ward rounds. Time limitations and understaffing were blamed for errors following inaccurate drug histories, doctors not reviewing medication or nurses not administering medication despite it

being prescribed. Poor communication for example, illegible handwriting and lack of documentation about drugs also caused mistakes.

The culture relating to medicines also contributed to medication errors, as many doctors and nurses appeared to consider drugs unimportant. As a consequence, the culture of medication safety was poorly developed. Dean *et al* (2002a), on interviewing doctors who had made mistakes, also found that many doctors did not seem to consider the task of prescribing drugs important and I found this in my study. Classifying this as a latent condition, they state that the act of prescribing was often embodied in a drug's name ("put them on verapamil") and the details of the dose, form and frequency, route, duration etc, left to the house officer to complete. They found that there was a low self-awareness of making errors with another factor being doctors' and nurses' lack of knowledge of therapeutics and my findings support this.

The Government is committed to improving safety within the NHS and improving the safety of medicines (Department of Health, 2001a, Department of Health, 2004), but this does not appear to be filtering down to doctors and nurses actually working on the wards. Many doctors and nurses in the study trust did not appear to share this commitment, rather accepting medication errors as an inevitable part of care. Studies of medical training have shown how doctors are socialised into the norms of a culture where uncertainty and the inevitability of medical error are learnt and reinforced (Lester and Tritter, 2001).

Doctors, nurses and pharmacists felt that managers do not consider medicines important and senior doctors do not set examples, and it appears from the literature that this is not unique to the study Trust. The Audit Commission report (2001), which identified shortcomings in medicines management arrangements in many hospitals, found only 11 out of 105 hospital consultants surveyed in four hospitals, reported that reviews of the use of medicines fed into the wider clinical audit work and their clinical governance agendas. Individual consultants' clinical freedom still takes precedence over corporate clinical responsibility and prescribing practice is seldom reviewed systematically. Only nine of 105 consultants reported that prescribing practice formed part of their regular performance review meetings with clinical directors. Consequently,

opportunities are being missed to improve care through learning from errors and near misses. In another study a consultant felt that the hospital management in his hospital has a token attitude to risk management (Dean B *et al.*, 2002), and similar comments were made by interviewees in my study.

The negative culture towards medication errors within the Trust was reinforced as doctors had a strong sense of identification with each other with respect to their common uncertainties. They accepted that they all make mistakes, but did not criticise one another, rather spoke as if in unity with their colleagues. This has also been reported in the literature. Rosenthal interviewed 60 doctors and found that shared experiences of making a mistake created a powerful sense of mutual empathy which often led to understanding and forgiveness of mishaps and a strong norm of non-criticism, described as a 'conspiracy of tolerance' (Rosenthal M, 1995). He concluded a final common theme of the exclusivity of professional judgement, that is, the conviction that only a fellow doctor can make judgement about another doctor's mistakes. In a critical review of the literature on medical error Lester and Tritter suggest the learnt dispositions of medical cooperation is encouraged by the length of the medical degree and tribalism is encouraged by the apprenticeship style of medical education (Lester and Tritter, 2001). They suggest that these learnt dispositions may help explain aspects of doctors' responses to medical error, for example their reluctance to criticise other doctors and why, when challenged, doctors turn to each other rather than seeking help outside the medical network. Pharmacy staff in my study felt doctors are 'protected by the system'.

These are also important factors in barriers to learning from mistakes. Pride in individual and organisational expertise can lead to denial and to a disregard of external sources of warning, particularly if a bearer of bad news lacks legitimacy in the eyes of the individuals, teams or organisations in question. Human alliances lead people to "forgive" other team members their mistakes and act defensively against ideas from outside the team (Smith D and Elliot D, 1999, Toft B and Reynolds S, 1997, Firth-Cozens J, 2001). My interview data and ethnographic findings support this.

The doctors I interviewed were very open, honest and appeared blasé about bad practices relating to medicines, and errors. A reason for this may be that the doctors were not worried about any repercussions if they make errors. Some doctors however feared being blamed if they reported errors. Lester and Tritter also describe the importance given to the disposition of status in medical training and that this may also create a feeling of elitism and collegiality (Lester and Tritter, 2001). This was particularly noticeable in the comments of one consultant I interviewed who said:

> *"I mean I guess in the end it is their* (the junior doctors) *prerogative to...to get it wrong."* (Consultant)

In addition, my findings suggest that some doctors may also be unappreciative of pharmacists giving them advice and preventing errors for this reason.

> *"yes...a degree of who are you?....you know I am the medic...I am omnipotent....I know everything...I don't need anyone else to tell me what to prescribe, I have decided, therefore it should be given, sort of approach from some of the juniors...one or two consultants as well."* (Consultant)

This theory is in contrast however, with the work of Davidoff, who suggests that a cultural barrier to improvement in the healthcare system is shame, because ".....improvement means that, however good your performance has been, it is not as good as it could be." (Davidoff F, 2002)

The doctors in my study said that they rely on nurses to detect their errors, however Dean *et al* (2002a) found that doctors perceived pharmacists as their main source of defence. This may reflect the differences in pharmacy practice between that study setting and my own.

The significant potential for intravenous drug errors was highlighted in my study and this has been identified as being associated with considerable risk in several other studies (Taxis and Barber, 2003, O'Hare *et al.*, 1995, Hartley and Dhillon, 1998, Wirtz *et al.*, 2003). Despite this being one of the Government's prime targets in increasing patient safety (Department of Health, 2001a,

Department of Health, 2004), there seemed to be little attention paid to this in the study Trust and in the Trusts included in the studies cited above. In my study, this risk was only highlighted by nurses probably because nurses generally prepare and administer IV drugs. One factor they cited as contributing to this risk was the culture within the Trust, for example, nurses often administer IV drugs without a second check even though this is hospital policy and more worryingly they do not realise the importance of having a second check. In addition, the design of drug charts was also cited as a contributing factor as there is no place on the IV section of the chart for a second nurse to sign they have checked and this was felt to reinforce bad practice. In the literature reviewed, poor design of charts was not cited as a contributory factor, although misuse of drug charts was. It may be, therefore, that chart design is only a problem in the study Trust. Lack of appropriate training was cited as the main latent condition for IV drug errors in one study (Dean B *et al.*, 2002). My findings support this, as although nurses in the study Trust need to attend a training day before they can administer IV drugs, this is not regularly updated. This confirms other studies which had concerns about nurses' lack of training in handling IV medication (Campbell T and Lunn D, 1997, Wilkinson R, 1996).

I found that doctors and nurses competency relating to therapeutics was sometimes lacking and this also confirms existing literature (Audit Commission, 2001). Concerns about the poverty of therapeutics training in undergraduate programmes for doctors have been raised in the literature (Department of Health, 2004, Department of Health, April 2001, Barber *et al.*, 2003, Maxwell *et al.*, 2002), and my findings support this. Doctors themselves expressed concerns about their competency and said they received insufficient training in therapeutics both pre and post qualification, which again supports previous work (Audit Commission, 2001, Clack GB, 1994, Jones *et al.*, 2001, Panayiotou and Fotherby, 1996b).

The GMC recommends that undergraduates must know about and understand the principles of treatment and this should include the effective and safe use of medicines as a basis for prescribing (General Medical Council, 2003). Doctors in my study, however, who came from a range of medical schools, said they do

not feel confident about prescribing because, as medical students, they were not taught how to prescribe, and therapeutics constitutes a very small part of the medical school curriculum. This supports the findings of Maxwell *et al,* who found that few courses ensure that undergraduates are taught and tested on how to prescribe and give drugs safely (Maxwell *et al.*, 2002). Dean *et al* found that junior doctors lacked knowledge about how to choose the dose of drugs as the doctors they interviewed were not taught this at medical school. I also found that lack of knowledge of doses was a particular problem and doctors said they end up learning most things 'on the job'.

The GMC recommend that that good prescribing practice, acute and chronic pain relief, the principles of evidence-based practice and assessing the quality of care should be covered through in-house service training and where appropriate educational sessions. From interviews with doctors and my ethnographic work, it appeared that in-house training in therapeutics in the study Trust was lacking and this confirms existing literature (Audit Commission, 2001, Wilton J, 1995, Wilson DH, 1993, Bogg J *et al.*, 2001, Grant J *et al.*, 1989, Standard Committee on Post-graduate Medical Education, 1991, COPMED and UK Conference of Deans, 1995, Panayiotou and Fotherby, 1996a).

Many nurses in my study seemed to lack knowledge of therapeutics and this corroborates existing literature (Thornton T, 1997, Jordan S, 1994, Latter *et al.*, 2000, Boggs P *et al.*, 1988, Markowitz JS *et al.*, 1981, Ives G *et al.*, 1996, King, 2004, Manias and Street, 2001). The nurses also said they receive insufficient training in therapeutics both pre and post registration and this supports existing literature (Courtenay M, 1991, Morrison-Griffiths *et al.*, 2002, Jordan S and *et al*, 2002, Davis J and Hemingway S, 2003, Hemingway S and Freeman J, 2002, Hemingway S, 2003). This is particularly worrying, as in both my study and that of Dean *et al* (2002a), doctors saw nurses as a source of defence against medication errors, although in my study nurses felt they had insufficient training and may not notice errors unless they are glaringly obvious. Many nurses in my study felt they had insufficient knowledge of therapeutics to communicate information to patients and their carers, which has also been found in the literature (Latter S *et al.*, 2000).

I found that communication about medicines were poor, particularly inaccurate, incomplete drug histories taken on admission and this is consistent with existing literature (Feely M *et al.*, 1984, Lau *et al.*, 2000, Beers M H *et al.*, 1990, Walker C, 1991, Gleason KM *et al.*, 2004). Lau *et al* (2000) found that 67% of patients had one or more registration errors (the combination of omission and commission errors), and 18% had three or more. In my study 80% of all patients had one or more registration errors, and 34.5% had three or more. Unlike Lau *et al*, I also looked at OTC and homeopathic drugs and took dosing and regimen errors into account, although these were not included in the above figures. A difference in the number of registration errors may be a reflection of the different methods used to obtain a drug history. Lau *et al* interviewed patients and checked community pharmacy records, and these were the only sources of information about medicines used. I used multiple sources to obtain a drug history, whereas most existing studies use only one or two sources of information.

Beers *et al* used only a patient questionnaire to elicit a drug history, and compared this with the admitting doctor's. They found 83% of patients had one or more registration errors, and three or more were found in 46%. They included OTC medication in these figures however, whilst I considered these separately, so their results cannot be directly compared with mine.

In addition, I explored the consequences of taking an inaccurate drug history, while many studies tend to focus simply on the number of discrepancies between admitting doctors' drug histories and a second drug history. Unlike previous studies investigating the accuracy of medication histories, I triangulated my results with interview and ethnographic data, further corroborating my findings.

In my study, information relating to medication was poorly communicated to GPs following patients' discharge and this also consistent with the literature (Department of Health, 1991, Department of Health, 2004a, Mottram *et al.*, 1994). Both the preliminary discharge letter (PDL) and the subsequent consultant discharge summary (CDS), frequently omitted important information relating to medication. My results supported a study which found that very few

PDLs gave exactly the same information as the corresponding CDS (Gardiner, 1998). Doctors in my study admitted they aren't very good at communicating information about medicines to GPs when patients are discharged.

My findings support those from other studies, which suggest that patients being discharged from hospital have a poor understanding of their medication (Cantrill and Clark, 1992, Dyson *et al.*, 1995, Puller *et al.*, 1989, Cochrane *et al.*, 1992). This, compounded with incomplete information communicated to GPs about medication, can lead to medication problems when patients are discharged, although I was unable to follow this up in my study due to time limitations.

Many patients in my study admitted to non-compliance. Reasons included forgetfulness, lack of understanding of their treatment regimen, deliberate non-compliance because of side effects or perceived inefficiency of treatment, or lack of understanding of their condition. My findings support existing literature (Partridge *et al.*, 2002, Chewning *et al.*, 2001, Sung *et al.*, 1998, Insull, 1997, Cramer and Rosenheck, 1998, Donnan *et al.*, 2002, Buck *et al.*, 1997, Greenstein and Seagal, 1998, Chisholm, 2002, Chisholm *et al.*, 2000, Salzman, 1995, Barat *et al.*, 2001, Lowe and Raynor, 2000). I found that often patients are not given adequate information about their medicines which is also consistent with other studies (Barat *et al.*, 2001). My findings add to the literature with interview data from doctors and nurses who admitted they are not good at educating patients about their medicines or involving them in therapeutic management.

My findings confirmed my initial subjective view that pharmaceutical care services were lacking in the study Trust. Cotter *et al* and the Audit Commission, in large-scale surveys of Trusts reached the conclusion that development of these services was variable (Audit Commission, 2001, Cotter *et al.*, 1995). I was able to confirm from my in-depth study of medication processes that this was the case in the study Trust. In particular, at the time of my study, hospital pharmacists spent little time working on the wards and did not integrate effectively into ward teams. Pharmacist interventions into patient care tended to be reactive rather than proactive and only one pharmacist attended a ward round. The primary function of pharmacy services was that of supply.

Although there are many studies which examine factors required for the effective management of therapeutics and interventions by pharmacists to improve care, there appears to be a lack of evidence to support a holistic pharmaceutical care model in the secondary care setting. Studies have tended to focus on discrete, fragmented segments of care such as drug histories, pharmacist impact on prescribing decisions, errors intercepted by pharmacists, patient education about therapeutics and pharmacist input at discharge. This study is the first to examine how the management of therapeutics can be enhanced throughout the whole patient journey, taking a holistic approach. A pharmaceutical care model is, to my knowledge, unique. In this study, the care relating to medicines is examined from admission through to discharge, and a model of pharmaceutical care was developed to optimise this. This study did not focus on one discrete part of care, it explored a total new way of working for pharmacy staff to enhance patient care throughout their journey.

In addition, there appear to be no studies using action research to explore this area. This study is unique in that, I started by examining the problems within the study Trust, then tailoring interventions to improve care with respect to medicines based on my findings. Unlike my research, most studies evaluating interventions to improve management of medicines do not describe an evaluative phase in which problems are initially identified or a 'diagnostic analysis', rather assume the problems exist and then implement a pre-defined intervention. Also, adding to existing literature, I explored doctors, nurses, pharmacy staff and patients' views on the pharmaceutical care model, following up the intervention implementation and assessment with interviews and focus groups. This research also explores the factors, which may influence the proposed wholesale implementation of pharmaceutical care interventions throughout the Trust, and there appear to be no studies that have done this.

My results are in agreement with existing literature, that, in general, achieving wholesale change in practice may be difficult (Moss *et al.*, 1998, Moran and Brightman, 1998, Goldie and Sheffield, 2001). A strong theme emerged that pharmacy staff themselves, although expressing dissatisfaction and frustration with their current limited direct input into patient care may be reluctant to

change and this may be the biggest barrier to developing services. Bateson *et al* used similar methods to those used in my study such as observations and qualitative interviews (Bateson C and Duggan C, 2000). Similar to my findings, they also discovered that despite similar feelings of dissatisfaction and that their clinical role was not fully perceived by other health care professionals, pharmacists lacked vision of ideal pharmaceutical care and had a narrow understanding of the concept, even at mid-management level.

My findings about the reluctance of some pharmacy staff to undertake the activities I proposed support existing literature relating to changing practice. In a study about developing generic healthcare support workers Rolf *et al* suggested that blurring boundaries between professional areas of practice would have both positive and negative consequences (Rolfe *et al.*, 1999). Healthcare workers, from a variety of disciplines and clinical areas, felt that a move away from 'professionally' defined roles was threatening to their identity. They were concerned about interaction with an increased number of professional staff as they would be uncertain as to whom they would consult regarding care decisions. The support workers appeared insecure at the thought of not 'belonging' to a certain group of staff and were concerned as to where their support would come from.

This could also be the case for pharmacy staff. If they were to take on new roles based on the wards, they would no longer be working together in the pharmacy department. They may feel that they do not 'belong' to any group of staff. They would not 'belong' with nurses or with doctors, which may breed a degree of insecurity. No doubt pharmacists do feel a degree of security from the pharmacy department itself, and their colleagues. Out on the wards they would be working with doctors, nurses, other healthcare workers and patients. Rolf *et al* found that professional groups were concerned about the blurring of boundaries in relation to issues of responsibility and accountability of care.

In my study, another concern about the extended roles for pharmacy staff was the notion that pharmacists would be perceived as 'interfering', for example with clinical decisions made by doctors or management of medicines traditionally done by nurses. Whilst a number of recent studies suggest professional

boundaries in health care are now overlapping, other researchers working in this field have encountered similar problems relating to interprofessional relations (Snelgrove and Hughes, 2000). Snelgrove *et al* conducted an interview study with doctors and nurses to investigate perceptions of their roles and areas of overlap. Doctors drew a sharp distinction between medical and nursing roles, emphasizing their control over diagnosis, treatment and prescribing. Doctors perceived themselves as being the key figures in the management of the treatment process, and the carriers of medical knowledge, whilst nurses acknowledged their continuing subordination to doctors in many areas of work. Doctors sought to legitimize professional power, by maintaining that clinical responsibility must go hand in hand with the authority to make decisions unfettered by the intervention of others. My findings also suggest there is a notion of doctors' supremacy in the study Trust, which may adversely affect development of services.

5.4. CHALLENGES, AND LIMITATIONS AND STRENGTHS WITHIN THE STUDY

In this section I discuss some of the challenges I was faced with during the course of this research and the limitations and strengths of the approaches followed. I begin by discussing the methodological difficulties I encountered and examine the action research approach used in this study.

5.4.1. Methodological issues

As already discussed, an action research approach was adopted for this study, as it is particularly suited to identifying problems and their solutions in clinical practice (Hart and Bond, 1995). Using this approach allowed me to use a range of research methods, both qualitative and quantitative, and enabled triangulation of data to help reduce the limitations of any single approach.

I was able to follow the action research model very closely within this study, which I would categorise as the 'professionalising type' according to Hart and Bond's criteria (Hart and Bond, 1995). In keeping with this typology, my research was informed by an agenda grounded in practice, which also reflects

the aspirations the pharmacy profession hold to enhance their status and to develop a research-based practice.

There are inherent difficulties in trying to evaluate service developments, as it is rarely possible to link their effect directly to patient outcomes. The action research approach used in this study facilitated the development and evaluation of a new approach to delivery of patient care with respect to medicines. Closely following the model first described by Lewin (Hart and Bond, 1995), I undertook an initial evaluative phase to gain understanding of the existing problems (diagnosing), followed by a reflective phase to identify key issues (action planning). I then developed and implemented a new model of patient care relating to medicines (action taking), and evaluated this model and explored issues which would influence wholesale implementation (evaluation).

Evaluation of this model however, is difficult, as it is only one part of the total patient care package provided by health care professionals. From the diagnostic and action planning phases I have attempted to define the 'active ingredients' of the model of care, although there are many intangible elements such as my own personality and competency, patient characteristics, inter-professional relationships and organisational culture which also influence outcomes. I have combined quantitative and qualitative methods in an attempt to overcome the problems associated with the evaluation of this complex intervention into patient care.

Using a case study approach, I objectively evaluated the discrete segments of patient care, such as history taking, medication review, patients' knowledge about medicines and detection of errors. This provided insight into how patient care was improved although I could not be sure that patient outcomes truly benefited. I attempted to further strengthen my findings with qualitative data from ethnographic findings and interviews with patients and various health care staff.

5.4.2. Weaknesses of tools

There were weaknesses associated with some of the tools used to assess the discrete segments of the model of care, for example that used to ascertain

patients' knowledge of their medication regimen. Patients taking more drugs are more likely to have a lower score as they have more drugs to remember, and patients taking fewer medicines are more likely to have a higher score. Some patients may be very knowledgeable about their medicines as they only take a few, whilst other patients may be on many medicines and only remember some of them, but still recall quite a lot of information. This is clearly a flaw in the tool itself. For this and other reasons, differences in knowledge scores between patients, may not actually reflect real differences in their knowledge of their medication regimen. However, there will be exceptions.

The tool for assessment of compliance also had weaknesses. Firstly, it relied completely on the honesty of patients, and they may be untruthful about taking their medication. Secondly it did not differentiate between non-compliance and patients altering their medication regimen positively, for example reducing analgesia or hypontics.

Some patients brought a current list of their medicines into hospital, and used this when I asked them about their medication regimen, whilst others did not. There may be several reasons why some patients had lists with them and others did not. The patient's route of admission may be a factor. Patients admitted as an emergency may well have a comprehensive list of their medication but were not sufficiently prepared to bring it along. On the other hand patients may not be as organised about their medication and do not have a comprehensive list so even if their admission is planned they would not be able to recall their medication regimen from a list. The scoring system used in this study therefore cannot be considered a completely reliable and accurate reflection of the knowledge a patient has about their medication.

The tool to assess clinical significance of interventions into patient care also had flaws. I attempted to minimise bias by using two separate hospital pharmacists, independent to the study to rate interventions. Ratings were however, subjective although assessors were working to a set of criteria aimed at minimising any bias. In addition, using only pharmacists to rate interventions introduces bias. It would have been useful to have a group of healthcare professionals comprising pharmacists, doctors and nurses evaluating

interventions and arriving at consensus for clinical significance ratings. Time limitations within the study prevented this however.

5.4.3. Time limitations

With action research, a researcher can only loosely plan the approach in advance and has to learn to develop methods and strategies in the field. Energies are not only taken up with data collection, but also with facilitating change. Within this project I had to plan the research strategy, develop the methods, go out into the field as a participant and actually deliver the new approach to practice, and collect data to evaluate the project. Considerable amounts of data were assimilated, which placed large demands on my time.

I needed to gain access to the field then establish myself in the study settings, which involved a considerable amount of time. After a period of time, evaluating the model of care I then left the study setting to continue the evaluation. Because of my research time table, the need to complete my thesis and limited funding I feel I spent insufficient time in the study setting to achieve any long lasting, meaningful change.

The study is limited by involving only one hospital and a relatively small number of participants and settings. More time would have provided the opportunity to gather a wider range of data in more depth. For example, more follow-up of patients following discharge to gain more insight into the effect of enhanced communication relating to medicines, provided to GPs would have been useful. I had insufficient time to follow patients up following discharge to explore the effects of education on compliance with medication and also the effects of supplying information to GPs about drug therapy.

With hindsight, I realise that it would have been valuable to examine the Trust drug and therapeutic committee. This would have yielded valuable insights into the corporate approach to medication issues, and the interaction between senior management and professions in the Trust.

I did not undertake an economic evaluation, which would have been useful. Had I the time I could have explored the costs associated with implementing this

new model of care. This however, would be very difficult to measure. It would be very time consuming and would involve a different set of methodologies outside the current study. I would need to take into account the cost of iatrogenic illness, length of hospital stay, avoidance of litigation, the benefit of rational medicines management, formulary development and adherence.

5.4.4. Role duality and boundaries

When I, practising as a pharmacist, augmented my role within the research enterprise, some difficulties arose. In trying to establish and sustain a place within the multidisciplinary team and simultaneously maintain the research perspective, role conflict was occasionally encountered. For example, there was confusion over the boundaries of my activities. These mainly arose when new staff arrived on the wards and although the project purpose and the role of participants had been explained, some staff still did not fully understand. This resulted in my being asked to do things that were not related to the project, and because of time demands, stress was placed on me. Some staff could not understand why I was unable to undertake some activities and not others, and this required considerable negotiation and communication skills on my part.

5.4.5. Political dimensions

Diagnosing the issues to be addressed in action research requires the researcher to make judgements (Williamson and Prosser, 2002). These may be regarded as subversive, even as acts of sabotage, however collaboratively they have been made, because they involve questioning organisational and individual practices, norms and beliefs. This however, was very rarely the case in this project. I sought to generate useful information to inform decision-making and foster choice.

The change inherent within the action research process could prove particularly threatening to those who have a vested interest in *the status quo*; making some individuals feel particularly vulnerable. I was required to act tactfully to facilitate co-operation and progress, whilst minimising resistance, when issues such as these were encountered. For example, junior doctors sometimes did not appreciate being advised about their prescribing behaviour.

As an interviewer, I had an effect on participants. I believe that junior doctors, nurses and pharmacy staff responded differently towards me if I had been a consultant. I am an approachable young pharmacist and I am in no doubt that their responses would be different had I been an older, less approachable senior figure. Someone with more power would be intimidating and they may not have been as honest.

It may be that the apparent honesty displayed was a method by which doctors, nurses and pharmacy staff emphasized resource issues, and they possibly exaggerated the problems, but by triangulating interview data with my ethnographic findings and intervention evaluation it is clear that what they say does actually happen.

5.4.6. Ethical considerations

There were numerous ethical considerations within this project, as multiple methods were used. Within the overall action research approach, particular issues concerning the close relationship between the researcher and participants, and the explicit aim of changing practice, give rise to unique ethical dilemmas (Williamson and Prosser, 2002). For example, confidentiality and anonymity were problems in this study, and may be compromised by the fact that I can be easily associated with having worked within the study setting during data collection and therefore people from the organisation reading the finished thesis may be able to identify the key players. This has been highlighted in existing literature (Meyer, 1993).

Obtaining fully informed consent from participants was difficult, as the nature of the proposed change was unknown and determined by the emerging reality as the research process unfolded. Informed consent cannot be as meaningful as in other research approaches as neither researcher and/or participants know in advance exactly which direction the project will take (Meyer, 1993, Williamson and Prosser, 2002). Consent within an action research project centres around the participants' willingness to take part in the project ideas and acceptance of the researcher as a facilitator of change.

Meyer describes the problems associated with the collaborative nature of action research (Meyer, 1993). Collaboration implies equality of relationship between participant and researcher, which in theory is not present in other forms of research. The collaborative action research approach infers that research is done *with* and *for* people rather than *on* people. The extent to which this is possible is questionable. By acting as a participant observer on the wards, I inevitably found myself listening to people and building up the necessary rapport to successfully carry out my research. In essence, I became a people's friend. Despite attempts to remain neutral, information that people gave to me gave me power and as such can be threatening to others. I also had the power of not being a full member of staff and I knew that whatever occurred, it would not permanently affect me. Despite the intention to offer an egalitarian relationship with participants, an action research approach can actually place subjects at a greater risk of exploitation, betrayal and abandonment than more positivistic methods.

Because of the collaborative nature of my research, as staff, such as junior doctors and nurses on the ward changed during the intervention phase, I needed to constantly renegotiate. True collaboration was difficult as the staff were under an obligation to support the innovation because the consultants had agreed to the project. This introduced an element of a 'top down' approach in what started out as genuinely 'bottom up', which was contrary to the ideals of action research. Despite the need for renegotiation with new staff, a degree of close collaboration was achieved during this project, as I made considerable efforts to ensure that all participants had a clear understanding of the research and their role in it.

Within this research, despite my efforts to explain to patients and health care professionals, the purpose of the study and exactly what I was doing responses of participants ranged from misunderstanding by nurses who thought I was there to 'top-up' the drugs cupboard, to patients thinking I was a medical student. It was difficult to explain to everyone exactly what I was doing. To inform and obtain consent from 'everyone' who entered the study environment was problematic, and was compounded by the unpredictability of my

observations (Mulhall, 2003). Moreover, although participants may have given their permission to be observed, they may not always be clear as to the extent of the observation. For example, where nurses gave consent to being observed giving patient care, did they by default give consent to be observed when talking to colleagues? I encountered these ethical dilemmas in my research. It has been suggested that a prescriptive approach to ideal ethical practice will preclude researchers carefully considering social reality (Moore and Savage, 2002).

Informed, written consent was obtained from all patients recruited into the evaluative study. They were informed that this was voluntary and that any data collected relating to themselves would be kept confidential. Confidentiality and anonymity were assured to all health care staff interviewed and focus group participants. Consent to tape record the interviews and focus groups were sought from all participants prior to the sessions. Only one participant refused, and notes were therefore taken throughout the interview. Participants were given the opportunity to check the transcripts for accuracy, following the interviews and focus groups, to make any amendments they considered appropriate, but all declined. Where possible fully informed consent would be obtained from participants at each stage of the project, for example patients and health care staff to be observed in particular settings, patients to be included in the evaluative study and health care staff to be interviewed.

5.4.7. Validity and reliability

There are generally two concepts when discussing the credibility of scientific research, 'validity' (accuracy of measurement) and 'reliability' (consistency of measurement) (Silverman, 2001).

5.4.7.1. Validity

I have attempted to make the methods transparent to show I am 'measuring', or explaining, what I claim to be measuring or explaining. The validity of my results represents whether the data gathered reflected the reality. I have attempted to give a clear account of the processes of data collection and analysis.

By clearly documenting how people behaved in their "natural" everyday situations, and examining in detail what people mean when they describe their experiences, feelings, attitudes and behaviour, I have tried to give an accurate representation of the phenomena studied. Interviews, focus groups, observations, document analysis, informal discussions and data gathered during the case study approach were all fully documented and rigorously analysed. Instruments used for data collection were piloted, and I undertook pilot participant observations and a pilot interview, to refine my technique.

I have presented a clear analysis of decisions made during the conduct of the study, following an action research approach, to facilitate judgement of validity. This has been described as reflexive validity, whereby articulation of the researcher's influence on a study enables the reader to evaluate the appropriateness of their influence (Waterman, 1998). The movements in the action research spiral in this study (reflection, planning, acting and evaluation) and the questioning of each together create a 'process of validation'.

There is an emancipatory element to action research to improve things, and the ideals and philosophy behind action research contribute to the validity of its approach (Waterman, 1998). The validity of action research projects does not reside in their *degree* to affect change but in their *attempt* to improve people's lives (patients or professionals).

In this project, I actually enacted the change whilst also researching it. In other styles of research, this scenario would be seen to pose serious threats to validity because of the vested interests of the researcher. The characteristics of action research, questioning attitude, active search for opposing perspectives, the movement between theory, research and practice and multiple methods should hopefully reassure readers that action has been taken to minimise the difficulty of vested interests.

The effect of the observer on the observed is a possible limitation of the ethnographic methods used in this study. In my absence, error rates may have been even higher and doctors' and nurses' behaviour relating to medicines may

have been worse. However, I felt that the doctors and nurses within this study accepted me and that modification of their behaviour was minimal.

Triangulation refers to an approach to data collection, in which evidence is deliberately sought from a wide range of different, independent sources, often by different means. In this project, triangulation was used to enhance comprehensiveness and encourage a more reflexive analysis of the data, but also in an attempt to enhance validity. The research design explicitly incorporated a wide range of different perspectives from health care workers, so the viewpoint of one group was not presented as if it were the sole truth about any situation.

5.4.7.2. Reliability

Because the settings and groups studied in this research may be unique to the particular context or time period it is difficult to judge reliability.

Although this study cannot be repeated in the same way a controlled experiment can, this research was conducted rigorously and I have attempted to give a clear account of the methods, data collection, and analysis to allow readers to judge the evidence and interpretations presented. Meticulous records of observations, interviews and documentation of the process of analysis were maintained. However, it is not possible to say that, if repeated in the same way, other researchers would find similar results. Some findings may be the same others may not. Researchers with different personalities or characteristics may approach the research in a different way

5.4.8. Generalisability

Because of the nature of this research, the findings cannot be generalised to other Trusts. Sample sizes were small and non-random. Participants were selected based on specific criteria, to explore selected settings and practices.

Generalisability involves the extent to which you can make some form of wider claim on the basis of your research and analysis. The emphasis in this project was not generalisability, rather development of a change in pharmacy practice

within a specific Trust. Although the same phenomena may exist in other Trusts, the findings from this study cannot be directly applied to these.

It is, however possible to generalise theoretically. The results can be used to guide practice in other Trusts, as it is unlikely the results are unique to this Trust alone. The analysis has not been based on data derived from a sample, which is representative of a wider population, therefore it is not the intention to make empirical generalisations, nevertheless I have no reason to assume this sample and therefore the analysis are atypical.

If the new approach to pharmacy practice is successful in this study, at least it has been demonstrated to be possible in a specified way and setting. Explanations of how and why these processes worked, through detailed and holistic analysis of the setting, derived from a range of data, sources and methods, are likely to be useful for informing practice development in other settings.

5.5. IMPLICATIONS FOR FUTURE RESEARCH

I had insufficient time to follow patients up following discharge. Future research is required to explore the effects of education on compliance with medication and also the effects of supplying information to GPs about drug therapy. This would be time consuming but very useful in informing the whole area of integrated pharmaceutical care. Visiting patients at home to check compliance and assessment of the knowledge they retained about their medicines would be helpful. Interviews with GPs following patients discharge could provide insight into their views on the quality of discharge information provided by pharmacists.

It would be useful to undertake experimental studies on specific elements of the model that require further investigation. There may be elements that are not particularly effective and if identified, I may wish to eliminate them. For example pharmacists attending all ward rounds in all settings or writing all discharge prescriptions. On the other hand, that some elements offer major benefit and are where resources should be concentrated in the future. For example patient education.

I identified that cultural change would be needed to implement the new services and that this would be difficult. This poses interesting questions about best to achieve the major cultural and organisational change that is needed. Research in this area would be particularly useful. It may be useful to interview Trust managers and others responsible for medicines use in the Trust, to ascertain why the Trust seems to have the attitude that 'medicines don't matter'. It would be valuable to examine the Trust drug and therapeutic committee to gain insight into the corporate approach to medication issues, and the interaction between senior management and professions in the Trust. It may also be valuable to explore the views about my project and general medicines management issues of health care workers and managers in Primary Care Trusts, in particular members of the Professional Executive Committee and prescribing sub-committee.

A further action research cycle should be undertaken to implement the model in other areas within the study Trust and other Trusts and refine it to reflect needs in different settings and hospitals. In repeating the study in different Trusts, it would be interesting to see whether the culture relating to medicines differs. I suspect it will not as the literature suggests the culture I encountered is actually widespread.

A full economic evaluation of the problems relating to medicines use identified in this study would be extremely useful further research. This should include assessment of the costs of iatrogenic illness, implications of poor practice on length of hospital stay, litigation due to medication errors and implications for the economy due to lost days work. The cost of implementing the changes suggested as a result of this study should also be estimated, taking into account increased funding requirements for pharmacy staff, more appropriate use of doctors' and nurses' time, potentially reduced length of admission, fewer admissions due to iatrogenic illness, avoidance of litigation, development of and adherence to a formulary and potentially improved compliance with medication.

It would be interesting to explore whether there are linkages between the attitudes and practices towards medicines identified in this study with wider determinants of good prescribing practice and medicines management, for

example attitudes to implementation of NICE guidance (Ralph S, 2004, Richards Mike, June 2004).

The Government's medicines management framework for hospitals (Department of Health, 2003c), which is a self-assessment tool for hospitals has two main purposes: firstly, to make clear to Trust Chief Executives their responsibilities regarding the management of medicines within their Trusts and the related health economy, secondly, to assist Trusts in developing systems ahead of the Value for Money audits planned for 2005. It would be helpful to undertake research to into whether this has had any impact in this or other Trusts.

5.6. IMPLICATIONS FOR PRACTICE

Although this project was undertaken in a particular setting and results cannot be generalised I have no reason to think this Trust is unique. The findings have implications for this Trust and wider.

I believe that the model of pharmaceutical care developed and evaluated within this study should be implemented throughout the study Trust and as a result patient care would be improved. Pharmaceutical services should be more patient orientated rather than primarily focussing on supply. Pharmacy staff should be working on the wards, fully integrated into the health care team, providing services to patients and medical staff in a structured, systematic way. Pharmacy staff should work to provide standard services following a cohesive and holistic approach.

The model of care would essentially comprise the activities evaluated in the study, although different settings within the Trust would require varying levels of input and activities should be tailored appropriately. Essentially, a pharmacist:

- is based on the ward full time, available for all patients and ward staff for consultation
- attends the ward rounds, monitoring and advising on the prescribing and administration of drugs

- takes a second medication history following admission to the study wards
- undertakes a formal medication review using indicators of appropriate prescribing
- plans and co-ordinates medicines aspects of discharge
- assesses patients' knowledge about their medicines and educates them accordingly
- provides information to GPs about patients' drug therapy during admission and following discharge

Usually the admitting doctor will take an initial drug history on the admissions ward and I propose that the pharmacist would take a second drug history when the patient is transferred to another ward. It may be better, however, to have a pharmacist working on the admissions ward and taking drug histories, then only one drug history would be required.

I propose that pharmacists should write discharge prescriptions, in advance where possible. Of course, there will be occasions where pre-empting discharge is not possible, for example if medication is changed at the last minute.

Pharmacy services should ideally be available seven days a week, and the daily hours of working expanded so they are more in line with those of doctors and nurses. This may be unpopular with some pharmacy staff, which may be problematic.

My findings and the literature however, suggest that this change in practice will be difficult to achieve. Pharmacy staff would need more training, guidance and support. Support of less experienced staff should take the form of mentoring, and the whole service should be developed and supervised by a suitably experienced manager. This manager must be extremely enthusiastic and motivated to encourage the professional aspirations of pharmacy staff, and dispel any professional insecurities. A whole change in the ethos of the pharmacy department would be necessary, from the head of pharmacy right through to the technical staff. As I discussed in section 5.3, it may be that pharmacy staff themselves are the greatest barrier to change. Pharmacy staff in

the study Trust felt that their services weren't seen as an important part of care, but my experiences were very different. I believe this is because I was undertaking activities in a much more structured and intense manner. The doctors and nurses became accustomed to having me on the wards. Had I not been there, the ward would still have functioned and the activities I was undertaking would fall back to the responsibility of the doctors and nurses. The situation is likely to return to how it was before for example, inaccurate drug histories, patients receiving inadequate information about their medicines, delayed discharges etc.

Doctors, nurses and pharmacy staff must all be fully informed and involved for this new approach to pharmacy practice to be successful across the Trust. Good interprofessional communication, definition of roles and consistency of pharmacy services is essential. Effective skill mix of pharmacy staff would help maximise resources.

Pharmacy staff who took part in the focus groups talked a lot about the use of protocols in delivering the service developments, and definitions of their roles. Indeed protocols are extremely valuable as they provide a clear statement of best practice. They allow reallocation of jobs, reorganisation of work practices, and ensure consistency of care, so that all staff follow best practice. They can encourage better team working as the process of actually drawing up and implementing protocols itself allows different professionals to understand each other's roles better than they had beforeIt would be dangerous to assume however, that a high level of consensus always promotes efficiency. The detailed specification of tasks entails a network of bureaucratic roles and reduces the parties' commitment to their job. Because roles can never fit every circumstance and cannot be kept completely up to date, people can always utilize the rulebook to defeat the ends it was supposed to serve. There is evidence to suggest that people often work best when there is a measure of dissent, encouraging the growth of new ideas and the expression of human individuality (Banton, 1965).

To gain support within the Trust improvements in patient care and cost savings should be demonstrated, but this is difficult to measure. Changes in services

may require additional funding which may be difficult to obtain. It may be that services should be initially targeted to areas in which they would have most impact. Pharmacist's time may not be best utilised by attending all ward rounds, as only a small proportion of time is spent discussing medication. It may be more practical for pharmacists to attend only selected ward rounds, have regular, scheduled liaisons with doctors and nurses and keep up good communications. Selection of the most appropriate ward rounds may be done through discussions with doctors and/or trial and error. Other directorates may not be as concerned with medicines as a general medicine setting. For example, surgeons may be more reluctant than general medical doctors to change medication, as they are more concerned with the operation than other concomitant medical conditions and the associated therapy. This is an important consideration when rolling out services across other directorates as these consultants may need more convincing of their value. Therefore the new services should first be instituted in non-surgical settings.

Another potential solution for developing services with limited resources could be that a pharmacist works intensively on a ward for a month highlighting to doctors and nurses errors and how bad things really are. This would hopefully raise the profile of medicines and improve practice. The pharmacist could then move onto another ward in the Trust and repeat the exercise.

For this model of pharmaceutical care to be successfully implemented within the Trust a change in culture relating to medicines is required throughout the organisation. The efforts of pharmacy staff alone will not be sufficient. Doctors and nurses must also change their ways of working and attitudes towards medicines. My experience and the literature suggest this again would be very difficult to achieve. It would entail a great deal of motivation and enthusiasm from pharmacy staff and Trust managers. In interviews, doctors and nurses appeared to accept a less than ideal quality of patient care and blamed this on understaffing and poor communication. Perhaps more doctors and nurses are needed, or perhaps they need to manage their time better. On the other hand, it may be that doctors and nurses use time limitations as an excuse for sub-standard care. Perhaps working patterns of doctors and nurses need to be

examined and their priorities assessed, in addition to the pharmacy service developments.

The consultants in particular seemed to express frustration about the pressures applied on them, differing priorities from managers and the Government, and lack of resources. This may be a reason why certain medicines aspects of patient care are not considered a priority, especially as the views of consultants will influence junior doctors and nurses. Any change in culture would require support from Trust management and consultants.

The Government are committed to improving patient safety, however my findings indicate this is not taken seriously in the study Trust (Department of Health, 2000d, Department of Health, 2004e). Mechanisms should be in place within the Trust by which all errors are reported, within a 'no blame' culture, then fed back to staff to enable learning and pharmacists could coordinate this.

Traditionally doctors make the treatment decisions, nurses carry out their instructions and pharmacy supplies medication. However, this division of labour no longer exists as the only form of interaction between doctors, nurses and pharmacists. For example, nurse practitioners have clinical responsibilities including assessment and diagnosis of patients and some nurses can now prescribe. Pharmacists are developing their roles to provide more patient centred services such as those piloted in this study. Whilst interviewees acknowledged that pharmacists should have significant involvement in patient care, there was an implicit assumption that the pharmacist is acting as the doctor's assistant or substitute.

The training of healthcare workers should address this multidisciplinary approach to patient care and breaking down of role boundaries which is required for optimum care of patients, and is part of Government's reform within the NHS. Government have said that pharmacists must work more flexibly and alongside other professionals and support staff. The training of, not only pharmacists, but also doctors, nurses and other healthcare staff should reflect this. Multidisciplinary training is a pre-requisite to ensuring that healthcare workers are able to provide the best care for patients. This may create positive

changes in collegiality, emphasising team working rather than medical allegiances, and may perhaps help to decrease medical error by providing a counterbalance to current problems of too much medical understanding and forgiveness of error, and of feelings of exclusivity. Examples of interprofessional training within the United Kingdom can be found at Southampton University and St George's Hospital Medical School, London. (Department of Health, 2001f).

All healthcare professionals should have training and education, which includes common learning with other professionals and this, should run from under-graduate and pre-registration programmes through to continuing professional development (Department of Health, 2001f). Common learning should take place both in practice and in the classroom, and should centre on the needs of the patient.

Increased participation in the multidisciplinary team will require pharmacy staff to view their role in terms of team care rather than provision of pharmacy services. Pharmacy education should emphasise the duty pharmacists have to patients, as opposed to a duty to professionals.

Another way to reduce errors might be for pharmacists to take on more of a prescribing role. Pharmacists already write discharge prescriptions in some hospitals (Jacklin and Patel, 2001), and I have shown it works well in the study Trust. Pharmacists can already prescribe as a supplementary prescriber and will soon be able to prescribe independently (Medicines and Healthcare Products Regulatory Agency, 2005).

There are however, potential disadvantages to this new model of pharmaceutical care I am proposing. Some doctors and nurses may adopt riskier behaviour than normal because they assume pharmacists are checking their work (Dean *et al.*, 2002a). Doctors and nurses must not simply rely on pharmacy staff to ensure the medicines aspect of patient care is safe and effective.

If pharmacy staff take on these new extended roles and junior doctors no longer routinely undertake activities such as taking drug histories, reviewing medication, educating patients, there is a risk that their familiarity with drugs will

be lessened. The opportunity to learn about drugs may be further compromised and deskilling of doctors and nurses may occur. The same may be said for pharmacy staff. If they are working on the wards as I propose, they may become deskilled at traditional 'core' pharmacy activities such as supply and manufacturing, which may cause problems if staff levels dropped. Another concern is that doctors and nurses may not use their extra time efficiently. Doctors and nurses must use the time that is freed up to undertake other more appropriate clinical activities.

There are a number of other practical improvements identified from this study that would not necessarily require employment of a pharmacist taking on an extended role outlined. For example a change in culture of complacency amongst doctors and nurses towards medicines might be brought about by a number of measures. Having pharmacists working within the medical team is likely to raise the profile of medicines, but medical and nursing schools should instil into their graduates the importance of medicines, which should then be reinforced in working practice. Doctors must be encouraged to follow good practices such as documenting the reason for prescribing a drug in patients' notes, obtaining accurate drug histories, detailing allergies on the chart, and adhering to existing prescribing policies. Prescription writing should be recognised as a high-risk activity, which must be reinforced by seniors and Trust managers. Actually discussing prescribing details, such as the dose, indication and potential side effects when a drug is prescribed would be beneficial and may encourage greater involvement of patients in their care if this is done on ward rounds at the patients' bedside. In addition, pharmacy staff could have greater involvement in formal training sessions for doctors and nurses and produce educational material.

In addition to a change in attitudes towards medicines, it is clear from this study that there is an urgent need to improve therapeutics education for doctors and nurses, both pre and post qualification. Junior doctors should be taught how to ascertain the correct dose of a drug and its frequency of administration, and how to identify when it might need adjustment.

It is important to establish a safety culture in the education of health care workers. Improving health care begins with the focus on improving medical education. Instead of a conspiracy of silence and a strategy of acceptance and covering up, medical and nursing schools should encourage a culture of openness about medication errors. It would be valuable to teach medical and nursing students about the positive value of medical error and move to a scenario where errors can be more openly admitted and discussed. In teaching about errors it must be emphasised that some error is inevitable, even amongst the most conscientious of individuals, and must not be perceived automatically as character flaws.

Systems should be put in place to ensure medicines are ordered and arrive on the ward in a timely fashion. This will involve changes at both ward and pharmacy levels. Instead of pharmacists, junior doctors could take a second drug history when patients are transferred from the admissions ward.

Doctors and nurses should be encouraged to involve patients in their own care and educate them about their medicines to foster the doctor-patient, nurse-patient relationship. This could lead to a greater value of the patient's perspective and less emphasis on the exclusivity of professional judgement.

5.7. CONCLUSIONS

In this study I have shown that action research methodology can be used to identify problems in medicines management in the hospital setting and to develop and evaluate potential solutions. I believe I am the first worker to adopt this approach in the area of prescribing and medicines use.

I identified a range of unsafe or suboptimal practices in medicines management. While many of these have been described in previous studies, ethnography provided a powerful tool which revealed a disturbing picture of inappropriate attitudes to and practices with medicines. While health professionals acknowledged these deficiencies they appeared to accept them as an inevitable part of patient care and, prior to the study, lacked motivation to address them.

Using action research meant that I quickly became integrated into the clinical teams that were the subject of the research. Staff knew that I was studying their practice but nevertheless did not appear to adjust their behaviour, enabling me assemble an in depth picture of the realities of medicines management in older people.

I developed and evaluated a holistic model of pharmaceutical care which aimed to ensure appropriate, safe and efficient medicines management through improved drug history taking, improved patient education, identification of iatrogenic factors in admissions, better communications with GPs, avoidance of errors, better documentation of drug treatment, optimised supply and administration of medicines, and education of other health professionals in medicinal therapeutics.

Errors and omissions in patients' medication were significantly reduced through intervention both at admission and during inpatient stay. The quality and quantity of information provided to patients and general practitioners at discharge was enhanced. Adverse drug reactions were identified and avoided. Evidence-based, appropriate prescribing was ensured in study patients. Successful interventions had the potential significantly to improve clinical outcomes. For example, in one patient nine medicines, all clinically necessary, were missed at admission, but promptly restored to her treatment following my intervention. Conversely, I identified a cocktail of medications that were being given to one patient prior to admission and which became redundant following an accurate diagnosis. These were mistakenly continued, with the risk of serious harm, until my intervention. In addition to these tangible improvements in care, interviews with patients also demonstrated increased satisfaction with their care.

While these findings are not directly generalisable to other care settings, there is no reason to assume that these findings are atypical. Therefore there are potential implications for medicines management in other hospitals. While there are a number of barriers to change, adoption of a pharmaceutical care model using the principles in this study has the potential to improve patient care.

6. APPENDICES

6.1. ETHICAL APPROVAL FROM COUNTY DURHAM HEALTH AUTHORITY ETHICS COMMITTEE

Direct Line: *0191 333 3274*
Email *Lianne.Sunter@qual-perf.durham-HA.northy.nhs.uk*

Date: Monday, 22 May 2000

Our Ref : ethics/05-00/06may00

Please reply to:
County Durham Health Authority
Appleton House
Lanchester Road
Durham DH1 5XZ
Tel: (0191) 333 3232
Fax: (0191) 333 3233

Sarah Smith
University of Durham
Centre for Health Studies
Elvet Riverside
New Elvet
Durham
DH1 3JT

Dear Ms Smith

Study 06/May00: **Efficacy of a structured model of pharmaceutical care for elderly patients**
Sarah C Smith

(Please quote 06/May00 on all correspondence)

At the meeting held on 15 May 2000 County Durham Local Research Ethics Committee approved the above numbered study pending clarification that confused patients who are unable to give their own consent would be excluded from the study. The Committee would also like sight of the questionnaire before it is sent out to patients.

On confirmation of these points Chairman's approval will be given in writing.

Yours sincerely

Jo Turnbull

Mrs Jo Turnbull
Chairman - County Durham Local Research Ethics Committee

County Durham and Darlington NHS
Health Authority

Appleton House
Lanchester Road
Durham
DH1 5XZ

Tel: 0191 333 3232
Fax: 0191 333 3233

Direct Line: *0191 333 3274*
Email ***Carol.Thorn@qual-perf.Durham-HA.Northy.NHS.UK***

Date: Friday, 16 February 2001

Our Ref: ct//Ethics/02-01/06May00

Ms Sarah Tulip
Pharmacy Department
North Road
Durham
DH1 5TW

Dear Ms Tulip

Study 06/May00 **Efficacy of a structured model of pharmaceutical care for elderly patients.**
Sarah C Smith

Further to your letter received in this office on 19 January 2001 confirming that you will not enrol confused patients who are unable to consent themselves in your study.

At the meeting held on 15 February 2001 County Durham and Darlington Local Research Ethics Committee approved the above numbered study.

I shall write to you once a year for a progress review. Otherwise, I would be grateful if you could forward a report to this office on completion of the project.

Yours sincerely

Carol Thorn

pp. **Mrs Jo Turnbull**
Chairman - County Durham & Darlington Research Ethics Committee

6.2. DRUG HISTORY PROFORMA, SIDE 1

PHARMACIST MEDICATION HISTORY		
Patient name: **Bed:**	**DoB:**	**DoA:**
Community pharmacist:	**Own meds:**	**AMT:**

Complete medication history

Drug	Dose and frequency	Source of information
		Side effects of meds (past/present)
		Allergies (details)
		OTC medicines
		Social drugs

Medication history taken by admitting doctor

Drug	Dose and frequency	Allergies noted
		Social drugs noted
		OTC drugs noted
		Any other notes

Drug history proforma, side 2

DETAILS OF HISTORIES OBTAINED FROM DIFFERENT SOURCES	
GP surgery	**GP referral letter**
Other	**Previous notes**
Changes to medication following pharmacist drug history	

6.3. COMPLIANCE ASSESSMENT FORM

1. How often do you forget to take your medicines?
   Once a month or less ☐

   A number of times a month ☐

   A number of times a week ☐

   At least once a day ☐

2. How often do you take your medicine late (more than two hours)?
   Once a month or less ☐

   A number of times a month ☐

   A number of times a week ☐

   At least once a day ☐

3. How often do you decide not to take at least one medicine?
   Once a month or less ☐

   A number of times a month ☐

   A number of times a week ☐

   At least once a day ☐

4. How often do you decide to take less medicine?
   Once a month or less ☐

   A number of times a month ☐

   A number of times a week ☐

   At least once a day ☐

5. Does anyone help you take your medicines?

6. Do you have any routines which help you to remember to take your medicines?

7. Do you have difficulty with the packaging of your medicines?

8. Do you have difficulty reading the labels on your medicines?

6.4. PATIENT REMINDER CHART, SIDE 1 AND SIDE 2 ON FOLLOWING PAGE

Name of Medicine	Dose	Purpose	Times to be taken					**Special instructions**
			Break-fast	Mid-morning	Lunch	Tea-time	Supper-time	

Additional Information:

KEEP THIS SHEET WITH YOU AS A RECORD OF YOUR MEDICINES AND TO HELP YOU REMEMBER TO TAKE THEM

We hope your stay has been as comfortable as possible with us, on ward 6 and that you have a speedy recovery.
Following your discharge, if you have any queries or problems about your medicines, please contact us:

Ward X tel no. xxxxxxxxx
Sarah Tulip (Pharmacist) Bleep xxxx

CONTINUE TAKING YOUR MEDICINES

- Do not stop taking your medicine when you start to feel better, always continue as instructed by your doctor

MAKE SURE YOU DO NOT RUN OUT OF MEDICINES

- Get further supplies from your own doctor in plenty of time following your discharge

SPEAK TO YOUR PHARMACIST

- For advise about your medicines
- Before buying any other medicines, tell your pharmacist what you are already taking
-

TAKE YOUR MEDICINES WITH YOU THE NEXT TIME YOU GO TO HOSPITAL

STUDY TRUST LOGO

WARD X

Taking your Medication

AFTER DISCHARGE

What you need to know

Patient Name:

6.5. FORM FOR DISCHARGE INFORMATION FOR GP

Patient name:	GP:	Ward:
		Consultant:
Address:		Date of admission: / /
	Community Pharmacist:	Date of discharge: / /
		Hosp pharmacist: Sarah Tulip (bleep xxxx)
Unit number:		

Medication on Discharge				
Medicine	Form	Dose	Frequency	Comments

Medicines stopped during admission		Summary of therapy in hospital	
Medicine	Reason		
		Allergies	ADRs

Monitoring of therapy after discharge	Summary of discharge treatment plan

Expected Compliance

6.6. ABBREVIATED MENTAL TEST SCORE (HODKINSON H M, 1972)

1. Age	**Score** for exact age only
2. Date of birth (year not required)	**Score** for correct date and month
3. Year	**Score** for current year only
4. Time of day	**Score** if correct to the nearest hour
5. Place	**Score** if exact address or name of hospital given ("in hospital" is insufficient)
6. Monarch	**Score** for current monarch only
7. Year of first world war	**Score** for year of start or finish (both not necessary)
8. Counting backwards from 20 to 1	**Score** if no mistakes or subject corrects himself or herself spontaneously
9. Recognition of two people	**Score** if roles of two people correctly recognised for example, doctor and nurse
10. Recall of three point address such as 42 West Street	**Score** if registered correctly near beginning of **test** and on recall at end of **test**

6.7. PATIENT INFORMATION SHEET, SIDE 1

MEDICINES MANAGEMENT FOR OLDER PEOPLE

You are being invited to take part in a 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 your time to read the following information carefully. Ask us if there is anything that is not clear or if you would like more information, before you decide whether or not you want to take part.

Thank you for reading this.

What is the purpose of this study?

Some people experience problems with their medicines, when they are admitted to hospital, during their hospital stay, or when they are discharged back home again. Some examples may be: not being given your usual medicines in hospital, receiving a drug which causes you side effects, taking certain medicines longer than you need to be, not being given enough information about your medicines, not being able to read the labels on your medicines, difficulty opening the containers your medicines are supplied in. In this study we hope to develop and implement a system to ensure your drug therapy in monitored and adjusted to your individual needs, and to ensure both you and your GP are given sufficient information about your treatment plan when you are discharged. The study is six months in duration.

Why have I been chosen?

Patients included in the study are over 65 years and are under the care of one of the following consultants at X Hospital: Dr X, Dr X, Dr X or Dr X.

Do I have to take part?

It is up to you to decide whether or not to take part. If you do decide to take part you will be given this information sheet to keep and be asked to sign a consent form. If you decide to take part you are still free to withdraw at any time and without giving a reason. This will not affect the standard of care you receive.

What will happen to me if I take part?

The pharmacist conducting the study will:

- Talk to you shortly after you have been admitted, to ask which medicines you usually take.
- Discuss your drug therapy with doctors on the ward, and your consultant to ensure your medicines are appropriate.
- Monitor your drug therapy throughout your stay.

Patient information sheet, side 2

- Give you advice about your medicines when you leave hospital, and provide you with a written reminder chart.
- Ask you questions about what you think of the care you've received in hospital.
- Write to your GP to communicate any changes to your medicines, following this admission.

Will my taking part in this study be kept confidential?

All information which is collected about you during the course of the research will be kept strictly confidential. Any information about you that leaves the hospital will have your name and address removed so that you cannot be recognised from it. Your GP will be notified that you are taking part in this study. You will not be identified in any report or publication.

Who has reviewed this study?

The Local Research Ethics Committee

County Durham Health Authority,

Appleton House,

Lanchester Road,

Durham

DH1 5XZ

Thank you for taking part in this study.

You will be given a copy of the information sheet and a signed consent form to keep.

6.8. CONSENT FORM

CONSENT FORM

MEDICINES MANAGEMENT FOR OLDER PEOPLE

Name of researcher: Sarah Tulip

1. I confirm that I have read and understand the patient information sheet for the above study ☐

and have had an opportunity to ask questions.

2. I give permission for the researcher to access my medical notes. ☐

3. I give permission for the researcher to visit me at home if I am one of the patients who is ☐

randomly selected for this part of the study.

4. I agree to take part in the above study. ☐

_____ _____ _____

Name of patient Date Signature

_____ _____ _____

Name of researcher DateSignature

1 copy for patient, 1 for researcher, 1 to be kept with the hospital notes

6.9. INTERVENTION RECORD FORM, SIDE 1

STUDY TRUST – CLINICAL PHARMACY INTERVENTION RECORD FORM								
1. Nature of intervention	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Patient/relative/carer education								
Dose alteration								
Drug incorrectly omitted from prescription								
Advise about choice of therapy								
Therapeutic information added to patients' notes								
Drug stopped as inappropriate/not indicated								
Associated with administration / formulation / route								
Miscellaneous								
Recommend instigation of tests (U&Es, LFTs etc)*								
Prevention / detection of adverse drug reaction								
Drug / drug or drug / diseased interaction								
Information provided to Dr / nurse / patient / GP								
Drug changed to the formulary preference								
Drug not administered (no valid reason recorded)								
Medication started as indicated not previously prescribed								
TDM or pharmacokinetics recommendations								
2. Main people involved								
House officer								
Senior house officer								
Registrar								
Consultant								
Nurse								
Patient								
GP/community pharmacist								
Myself only								
3. Primary reason for intervention								
Maximise patient care or minimise risk								
Ensure effective drug use for maximum patient benefit								
Drug therapy changed for economic reasons								
Ensure prescription written to legal/hospital requirements								
4. Clinical significance of interventions								
Information only								
Minor benefit to patient care								
Moderate benefit to patient care								
Significant benefit to patient care								
Very significant benefit to patient care								
Potentially life saving								

Intervention record form, side 2

Brief description of activity:	
1. **Date:** **Patient name:** **Details:**	**2.** **Date:** **Patient name:** **Details:**
3. **Date:** **Patient name:** **Details:**	**4.** **Date:** **Patient name:** **Details:**
5. **Date:** **Patient name:** **Details:**	**6.** **Date:** **Patient name:** **Details:**
7. **Date:** **Patient name:** **Details:**	**8.** **Date:** **Patient name:** **Details:**

6.10. LETTER TO DOCTORS AND NURSES WITHOUT PRIOR INVOLVEMENT IN THE PROJECT ABOUT INTERVIEW

Sarah Tulip

Research Pharmacist, University of Durham, s.c.smith@durham.ac.uk

Date

Participant X, Ward X

Dear Participant,

Re: Interview for research project: 'Medicines Management in Older People: An Action Research Study in a Hospital Setting'

Thank you for agreeing to participate in an in-depth interview as part of the final stages of my research project. I would like to confirm that the interview will take place on [date] at [time], in [place]. Please let me know if there are any problems with this. I also want to give you a little more information about the project.

The main objectives of the study were: to develop, implement and evaluate a structured approach to pharmaceutical care with the aims of improving the quality of care for older people, with respect to their medication, and minimise risk. The work is supported by Dr X, Dr X, Dr X and Dr X. A new approach to pharmacy services was piloted for 6 months on 2 acute medical wards within [the study Trust].

The care package comprised:

- A second drug history followed by formal medication review undertaken by a pharmacist
- A pharmacist based on the ward full-time, attending all ward rounds, monitoring and advising on the prescribing and administration of drugs planning and ordering discharge medication, in advance wherever possible
- Provision of written and verbal advice to patients about their medication
- Provision of additional information to the general practitioner about medication on discharge

Some of the main findings from the pilot study are summarised below:

- Comments from doctors and nurses were very positive:
  –Time was freed to pursue other clinical activities
  –Risks associated with drug therapy are reduced
  –Better communication across the primary/secondary care interface
  –Discharges speeded up
  –Improved patient information
- A second drug history recorded by a pharmacist is beneficial to patient care
- On average 1 drug per patient was added to each patient's therapy after the second drug history
- Prescribing practice is improved, e.g. in 90 'cases', 151 changes were made to therapy following a structured review

In the next 12 months I hope to investigate the feasibility of implementing this model of pharmaceutical care across different wards. I want to obtain the views and opinions of people who are in key positions to influence implementation, using in-depth interviews. Questions will seek to identify any perceived barriers to implementation, and find out what people actually think about the proposed changes to pharmacy services.

With your permission the interview will be tape recorded, although the report will be completely confidential. If you want to talk to me about the project please do not hesitate to get in touch. Thank you once again for agreeing to participate.

Yours Sincerely,

Sarah Tulip

6.11. LETTER FOR THE CONSULTANTS AND ONE NURSE WITH PRIOR INVOLVEMENT IN THE PROJECT ABOUT INTERVIEW

Sarah Tulip

Research Pharmacist, University of Durham

s.c.smith@durham.ac.uk

Date

Participant X

Ward X

Dear Participant,

Re: Interview for research project: 'Medicines Management in Older People: An Action Research Study in a Hospital Setting'

Thank you for agreeing to participate in an in-depth interview as part of the final stages of my research project. I would like to confirm that the interview will take place on [date] at [time], in [place]. Please let me know if there are any problems with this. I also want to give you a little more information about the project.

In the next 12 months I hope to investigate the feasibility of implementing this model of pharmaceutical care across different wards. I want to obtain the views and opinions of people who are in key positions to influence implementation, using in-depth interviews. Questions will seek to identify any perceived barriers to implementation, and find out what people actually think about the proposed changes to pharmacy services.

With your permission the interview will be tape recorded, although the report will be completely confidential. If you want to talk to me about the project please do not hesitate to get in touch.

Thank you once again for agreeing to participate.

Yours Sincerely,

Sarah Tulip

6.12. AIDE MEMOIR FOR INTERVIEWEES FAMILIAR WITH PROJECT (CONSULTANTS AND ONE NURSE)

What aspects of having me on the ward did you like/find useful?

Contrast with standard pharmacy services

Examples?

Aspects of the project disliked or could have been improved?

Impact on the quality of patient care / risk?

Economics of care – rolling out the service throughout the trust?

Although you've been involved with the project right from the beginning, are you still clear about the purpose of it?

How can we enhance doctors' nurses and patients' understanding of pharmacists' new roles and the proposed services?

If we think this model of practice is practicable how can we implement it across the board within this trust?

What problems / barriers do you think we would face?

Support form other consultants / doctors / nurses?

Interprofessional problems? Cultural issues

Support from Trust management

Resources and investment in pharmacy services

How would you describe the culture and attitude amongst doctors and nurses, with respect to medication errors?

Changing culture / practice

Competency of doctors and nurses in therapeutics

Training and support of doctors and nurses in therapeutics

Further service developments

What could / should we be doing in the future?

Role boundaries, should a line be drawn beyond which pharmacists can and can't do things?

6.13. AIDE MEMOIR FOR INTERVIEWEES UNFAMILIAR WITH PROJECT

In your opinion, are there any advantages of having a pharmacist permanently working alongside you on the wards?

Contrast with previous experience if applicable

What problems do you experience relating to medication within hospitals?

In what way could a pharmacist help you on the wards?

Which activities would be useful?

What problems would you perceive in having a pharmacist around all the time on the wards?

Interprofessional problems?

Perceptions of pharmacists as professionals

Competency of pharmacists

Understanding of roles / boundaries

De-skilling of doctors and nurses

Do patients get sufficient information about their medicines?

How often do you talk to patients about their medicines?

Best people to provide information

It is clear from my work that medication errors do occur quite frequently albeit most are not of major significance. In your work have you encountered this?

What are your feelings about this?

Culture towards errors

If we think this model of practice is practicable how can we implement it across the board within this trust?

What problems / barriers do you think we would face?

Support form other consultants / doctors / nurses?

6.14. LETTER FOR FOCUS GROUP VOLUNTEERS

Sarah Tulip
Research Pharmacist, University of Durham

Date
Dear Participant,
Re: Interview for research project: 'Medicines Management in Older People: An Action Research Study in a Hospital Setting'

Thank you very much for volunteering to participate in a focus group as part of the final stages of my research. I would like to confirm that the interview will take place on [date] at [time], in [place].
I am sure you know quite a lot about the project already but here is a little more information. The main objectives of the study were: to develop, implement and evaluate a structured approach to pharmaceutical care with the aims of improving the quality of care for older people, with respect to their medication, and minimise risk. The work is supported by Dr X, Dr X, Dr X and Dr X. A new approach to pharmacy services was piloted for 6 months on 2 acute medical wards within [the study Trust].

The care package comprised:

- A second drug history followed by formal medication review undertaken by a pharmacist
- A pharmacist based on the ward full-time, attending all ward rounds, monitoring and advising on the prescribing and administration of drugs planning and ordering discharge medication, in advance wherever possible
- Provision of written and verbal advice to patients about their medication
- Provision of additional information to the general practitioner about medication on discharge

Some of the main findings from the pilot study are summarised below:

- Comments from doctors and nurses were very positive:
  -Time was freed to pursue other clinical activities
  -Risks associated with drug therapy are reduced
  -Better communication across the primary/secondary care interface
  -Discharges speeded up and improved patient information
- A second drug history recorded by a pharmacist is beneficial to patient care
- *Prescribing practice is improved, e.g. in 90 'cases', 151 changes were made to therapy following a* structured review

In this stage of the research I hope to investigate the feasibility of implementing this model of pharmaceutical care across different wards. I want to obtain the views and opinions of people who are in key positions to influence implementation. Focus groups are therefore being conducted with pharmacy staff, and your contribution will be extremely valuable.

Focus groups are a form of group interview. A moderator will guide the interview while the group will discuss the topics that the interviewer raises. Focus groups are a way of listening to people and learning from them. Technicians and pharmacists have been grouped separately as they have different professional responsibilities and are therefore likely to raise differing concerns and issues.

A number of issues will be explored within the focus group:

- Participants feelings about taking on new / extended roles
- Opinions about the care package evaluated in this study
- Perceived barriers to implementing this on a wider scale, and how to overcome or tackle these
- Views on integration of pharmacy staff into the multidisciplinary team, providing patient-focussed care rather than the traditional pharmacy-based services
- Training requirements and support needed
- Appropriate skill mix

With the permission of the volunteers, the groups will be tape-recorded, but in the report no names will appear so it will be completely confidential. If you have any questions, please do not hesitate to contact me. Thank you once again for agreeing to participate.

Yours sincerely,
Sarah Tulip

6.15. FOCUS GROUP SCHEDULE

1. **When you hear the phrase patient-centred pharmacy services, or patient-focused services, what comes to mind?**
2. **What medicines related problems do you encounter in this hospital?**

   Examples? Why do these problems happen? How could they be avoided?

2. **What do you think about this project?**

   Advantages and disadvantages of having pharmacy staff working along side doctors and nurses on the wards?

   For patients, doctors, nurses, yourselves?

3. **If we think this model of practice is practicable how can we implement it across the board within this trust?**

   What is stopping us doing it now? What is holding us back?

   What problems / barriers do you think we would face?

   Would all pharmacy staff be supportive of it? If not, why not?

   How can we get everyone on board?

   How can we enhance doctors' nurses and patients' understanding of pharmacists' new roles and the proposed services?

   Interprofessional problems?

   Skill mix – technician, assistant technical officers' involvement

4. **How do you feel about taking on these new, extended roles?**

   Competency of pharmacy staff, training requirements and support

5. **How would you describe the culture and attitude on the wards, amongst doctors and nurses, with respect to medication errors?**

   How can prescribing practice be improved?

6. **How should we monitor and audit the service?**
7. **Further service developments**

Is there anything else you think pharmacy staff should be doing?

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