MEDICINES MANAGEMENT ACROSS THE PRIMARY – HOSPITAL HEALTHCARE INTERFACE: A STUDY OF PAEDIATRIC PATIENTS

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Thesis Summary

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A comparison of medicines management documents in use by NHS organisations in the West Midlands confirms that there are important differences between the primary care and hospital sectors in respect to medicines management interface issues. Of these, two aspects important to paediatric patients have been studied. These are the transfer of information as a patient is admitted to hospital, and access to long-term medicines for home-patients. National guidance provided by NICE requires medication reconciliation to be undertaken on admission to hospital for adults. A study of paediatric admissions, reported in this thesis, demonstrates that the clinical importance of this process is at least as important for children as for adults, and challenges current UK guidance. The transfer of essential medication information on hospital admission is central to the medication reconciliation process. Two surveys of PCTs in 2007 and again in 2009 demonstrate that very few PCTs provide guidance to GPs to support this process. Provision of guidance is increasing slowly but remains the exception. The provision of long-term medicines for children at home is hindered by this patient population often needing unlicensed drugs. Further studies demonstrate that primary care processes regularly fail to maintain access to essential drugs and patients and their carers frequently turn to hospitals for help. Surveys of hospital medical staff (single site) and hospital nurses (six UK sites) demonstrates the activity these healthcare workers perform to help children get the medicines they need. A similar survey of why carers turn to a hospital pharmacy department for urgent supplies (usually termed rescue-medicines) adds to the understanding of these problems and supports identifying service changes. A large survey of community pharmacies demonstrates the difficulties they have when dispensing hospital prescriptions and identifies practical solutions. This programme concludes by recommending service changes to support medication management for children.

Key words or phrases: medicines-management; admission-to-hospital; seamless-care; paediatrics; medication-reconciliation

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This work is dedicated to my clever, handsome, kind father known affectionately as Joe. He would have loved the chances in life I have been given.

"Medicines management is anything the government says it is."

Anon

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List of abbreviations

AMO Admission Medication Order

APC Area Prescribing Committee

BCH Birmingham Children's Hospital

BMJ British Medical Journal

BNF British National Formulary

CP Community Pharmacist

DH Department of Health

DTC Drugs and Therapeutic Committee

ESCA. Essential shared care agreement

FP10(HP)s Prescriptions issued by hospital prescribers able to be dispensed by CPs

GP General (Medical) Practitioner

IFR Individual Funding Request

LPC Local Pharmaceutical Committee

NMC Nursing and Midwifery Council

MR Medication reconciliation

MTRAC Midlands Therapeutics Review Advisory Committee

MUR Medication use review (usually by community pharmacists)

NHS National Health Service

NHSBSA National Health Service Business Services Agency

NICE National Institute for Health and Clinical Excellence

NPSA National Patient Safety Agency

NRES National Research Ethics Service

NSF National Service Frameworks

PbR Payment by Result – the process whereby hospitals are paid for the work

they do, according to a national tariff.

PCT Primary Care Trust

PODs Patient's Own Drugs (medicines obtained in primary care).

RfPB Research for Patient Benefit. A research funding organisation.

SLA Service Level Agreement

SOP Standard Operating Procedure

SPSS Statistical Package for Social Services – a software tool to analyse data.

TTO To Take Out prescription. A form of early discharge letter

UKCPA. United Kingdom Clinical Pharmacy Association

vCM Validated Continuing Medication

Glossary of terms

Continuing-care patients. Patients where some or all of their long-term medications are provided by hospital services. Prescribing responsibility rests with hospital staff.

Home-patients. Patients located outside hospital, usually at home and for whom prescribing responsibility rests with their GP.

Lean methodology. The practical application of system diagnostics to simplify processes and reduce costs.

Medicines Management. Medicines management encompasses the entire way in which medicines are selected, procured, delivered, prescribed, administered and reviewed to optimise the contribution that medicines make to producing informed and desired outcomes of patient care.

Medicines Reconciliation. The process of collecting, confirming and communicating a patient's medication requirements as the patient moves from one healthcare setting to another.

Pharmaceutical Care. The responsible provision of drug therapy for the purpose of achieving definite outcomes which improve the patient's quality of life.

Background

Why undertake this study? There are a number of reasons, all of which are based on common observations of current health care arrangements in the UK. These issues build towards an inevitable conclusion that medicines management across the healthcare sectors for paediatric patients is problematic and in need of reform. These reasons include:

1. Seamless care across healthcare sectors in England is not robust.
2. Medicines management for children at the healthcare interface may be prone to additional problems due to the nature of long-term medicines required in paediatric practice.
3. Some key aspects of paediatric medicines management is not well reported, including
   3.1. essential medication information on transfer to hospital (admission) is poor
   3.2. access to long-term medicines outside hospital, as home-patients, is problematic.

Chapter 6 describes the identification of medicines management issues across the healthcare sectors.

The Department of Health states that the use of medicines is the most common therapeutic intervention provided by the NHS.(1) However operational systems and communication arrangements dealing with medication often breaks down at the interface between healthcare sectors (e.g. between primary and secondary care), leading to poor patient care.(2) In particular there are problems with transmission of essential medication information on admission to hospital and this issue is examined in Chapters 7 and 8. There may also be a lack of clarity over which sector will prescribe any long-term medication. For adults this is usually the patient's GP. But for children it may be more appropriate for the hospital consultant to retain prescribing responsibility due to the need for unlicensed drugs (Specials) or licensed drugs used off-label. The Department of Health provided guidance on this issue in 1991 in the form of an Executive Letter EL91(127).(3) Whilst this guidance is nearly 20 years old it continues to provide the current basis for professional guidance.(4) This issue is examined in Chapters 9, 10 and 11.

A number of publications indicate that better communication across the health care interface will reduce prescribing discrepancies and reduce drug related problems for patients.(5, 6) This is emphasised in the care of children discussed in the National Service Framework for Children (1), which states:

> *(5.6) Effective communication is required between hospital consultants and general practitioners. Children and young people and their parents or carers sometimes experience difficulty in accessing medicines in the community following discharge from hospital resulting in confusion and anxiety for parents, carers and young people.*

National and probably local guidance concerning medicines management as a patient moves from one healthcare sector to another is scant and when provided focuses on communication needs during discharge (5, 7-16) with little emphasis on admission.

However the significance of ‘interface’ issues is beginning to be acknowledged and recent guidance seeks to address some of the issues. In December 2007 the National Institute for Health and Clinical Excellence (NICE) and the National Patient Safety Agency (NPSA) published a joint document concerning medicines reconciliation.(17) This guidance, the first ‘Technical Patient Safety Solution’, offers direction to NHS organisations admitting **adult** patients to provide medicines reconciliation services to patients on admission to hospital. The document comments that:

> *The aim of medicines reconciliation on hospital admission is to ensure that medicines prescribed on admission correspond to those that the patient was taking before admission.*

It is disappointing that this guidance specifically excludes children under 16 years of age.

Paediatric patients may be particularly prone to ‘interface’ issues since many children with long-term conditions will require unlicensed medicines. The issue of which sector should prescribe has already been highlighted. But the provision of a prescription may not ensure a timely supply. There may also be problems in obtaining unlicensed medicines from community pharmacies. Issues relating to the dispensing of hospital prescriptions by community pharmacists are examined in Chapter 12.

There are a number of reasons then why continuity of agreed care for children may be compromised with potential for adverse clinical consequences. This study focuses on two major interface issues for children. Firstly the transfer of essential medication information on admission to hospital and secondly issues relating to access to medicines for children needing long-term medication when they are not in hospital.

1. Introduction

1.1. Medicines management – what is it?

As a relatively new term it is perhaps not surprising that the meaning of medicines management has been evolving, with a number of organisations and authors providing various definitions over recent years. Before the term medicines management came into vogue a number of other terms and phrases were used to express the beneficial application of pharmaceutical sciences to patient care. Two of the most familiar terms are 'Pharmaceutical Care' and 'Clinical Pharmacy'. Pharmaceutical care was defined by Hepler and Strand (18) in 1990 as:

> '… the responsible provision of drug therapy for the purpose of achieving definite outcomes which improve the patient's quality of life.'

Definitions of clinical pharmacy are less easy to come by. Indeed the United Kingdom Clinical Pharmacy Association (UKCPA) in its document 'Statement on Pharmaceutical Care' (19), perhaps surprisingly, does not define the term clinical pharmacy. Until 2007 UKCPA documents used the term 'pharmaceutical care' to express the benefits their members provide. However in December 2006 the UKCPA announced that it intended to canvas its members on whether it should include the term 'medicines management' within its mission statements,(20) the reasons cited by the then Chairman as

> *" … to reflect the use by Government and other bodies of the term 'medicines management' rather than 'pharmaceutical care' and to emphasise the need for standard setting."*

The membership agreed to the change and the term 'medicines management' was adopted. The current Mission Statement (21) reads:

> *To promote expert practice in medicines management for the benefit of patients and the public by establishing standards, developing the workforce and advancing innovation in all health care settings.*

However the UKCPA does *describe* clinical pharmacy within its statement (19):

> *Clinical pharmacy has become part of the mainstream of the pharmacist's contribution to patient care. There is now widespread recognition of this development not only within the Health Service but also by professional bodies and by Schools of Pharmacy. The term clinical pharmacy no longer implies any degree of exclusivity but has come to be used generally to describe the knowledge, skills and attitudes required by a pharmacist to contribute to patient care.*

In general, the terms 'pharmaceutical care' and 'clinical pharmacy' both tend to focus on the individual patient, and the delivery of patient centred clinical pharmacy services is a corner stone of good medicines management. This is made clear by clinical pharmacy organisations and is endorsed by national guidance.(5, 19, 22, 23)

The Nuffield Report (24) was published in 1986. Whilst this influential document supported the

development of clinical pharmacy and described some aspects of what we now refer to under the heading of medicines management, it never actually used the term medicines management. Similarly the Department of Health described the concepts of medicines management in 1988, including the aims of clinical benefit with good financial control, in the document 'The Way Forward for Hospital Pharmaceutical Services' (22), without actually using the phrase medicines management.

The term medicines management began to emerge during the early 1990s and indeed was used as the general title of a series of articles published in The Pharmaceutical Journal during 1996 (25-29). These articles developed a number of themes and in particular extended the previous definitions from purely a patient focus to population based considerations. In 1998 Tomlin in an article in the journal Pharmacy Management (30) described (hospital) pharmacy activity as managing medicines and suggested that the term pharmaceutical care was perhaps less well understood by other health professionals.

Clearly by the early years of the new millennium 2000, the term medicines management was in regular use – although this phrase may be more common in England and Wales, with perhaps other countries continuing to use the term pharmaceutical care for the same concepts.(31) In his article in the Pharmaceutical Journal in 2001 Simpson (31) describes medicines management as the wider term with pharmaceutical care a section of it. Some of the most cited definitions of medicines management are:

> *Medicines management encompasses the entire way in which medicines are selected, procured, delivered, prescribed, administered and reviewed to optimise the contribution that medicines make to producing informed and desired outcomes of patient care. (32)*
>
> *Medicines management is a system of processes and behaviours that determines how medicines are used by patients and by the NHS. (33)*
>
> *Medicines management is all aspects of the supply and therapeutic use of medicines from an individual patient level to an organisation level. (34)*

In considering the development of medicines management the Welsh executive of the RPSGB (35) concluded:

> ' … medicines management is not a new concept but an evolving concept towards patient focused care and the services that help deliver that care.'

Delivering the benefits of medicines management requires more than the application of clinical pharmacy skills at the patient's bedside. Strategic delivery of medicines management requires organisational adoption and support. Accepted definitions of medicines management therefore include an organisational component. Stephens discusses this important aspect of medicines management in his book Strategic Medicines Management.(36)

Knowing what is a medicinal product is fundamental to identifying the benefits that medicines management may bring. The Medicines Act 1968 was enacted on 25th October 1968 and remains the primary legislation that controls all aspects of medicinal products within the UK.(37) It was introduced as a result of concerns raised about the control of medicines following the thalidomide tragedy of the 1960s. Part VIII of this statute defines a medicinal product as:

> any substance or article (not being an instrument, apparatus or appliance) which is manufactured, sold, supplied, imported or exported for use wholly or mainly in either or both of the following ways, that is to say:
> (a) use by being administered to one or more human beings or animals for a medicinal purpose;
> (b) use as an ingredient, by a practitioner or in a pharmacy or in a hospital or in a business comprising the sale of herbal remedies, in the preparation of a substance or article which is to be administered to one or more human beings or animals for a medicinal purpose.

The Act also defines the meaning of 'Medicinal purpose' as:

> (a) treating or preventing disease;
> (b) diagnosing disease or ascertaining the existence, degree or extent of a physiological condition;
> (c) contraception;
> (d) inducing anaesthesia;
> (e) otherwise preventing or interfering with the normal operation of a physiological function, whether permanently or temporarily, and whether by way of terminating, reducing or postponing, or increasing or accelerating, the operation of that function or in any other way.

For all their many uses, medicines pose a number of risks. According to the Audit Commission in the publication A Spoonful of Sugar these risks may be summarised under two heading – clinical and financial.(23) Successful medicines management will minimise these two related risks without limiting the benefits that medicines may provide.

Clinical risks from medicines are significant. Even when medicines are used appropriately according to the patient's condition adverse reactions can result posing a hazard to the patient. It has been reported that 6.5% of hospital admissions are related to adverse drug reactions (ADRs) with 80% of these admissions directly caused by the ADR.(38) Furthermore the Department of Health publication in 2001 'Medicines for Older People: Implementing medicines-related aspects of the NSF for Older People' (39) states that medicines are implicated in 5-17% of hospital admission in this patient group, and goes on to comment that whilst in hospital 6 – 17% of older people experience adverse reactions to medicines.

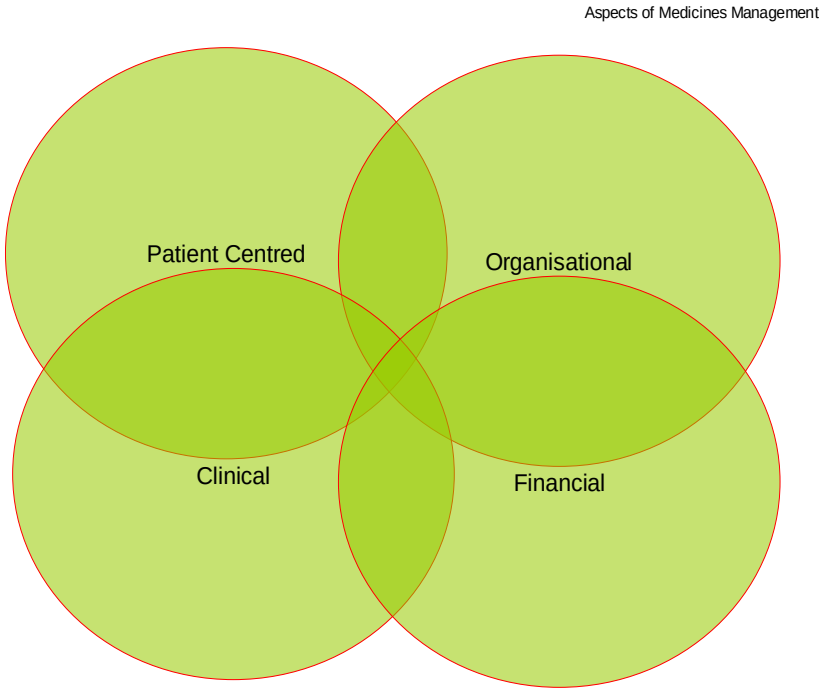
The potential hazards of using medicines are further enhanced when mistakes and misuse are considered; and further added to by other issues – for example physical or psychological dependence or physiological resistance to previously effective drugs. In order to support risk reduction from medicines, the NHS executive produced a standards document for medicines management within hospitals. The revised version was published in 2000 seeking to measure organisational compliance to relevant legislation.(40) The standards focused on the safe and

secure handling of medicines within secondary care. The application of medicines management as described within the standards was designed to support the twin aims of reducing clinical risk and improving financial control.

The effective implementation of medicines management is now considered as a primary mechanism for reducing drug related clinical risk (22, 41-43) and can also be applied with the aim of controlling drug budgets.(41, 44, 45) The NHS spends a huge amount of money on medicines – over £8.8 billion in primary care alone in 2009 (46) and both costs and numbers of prescriptions continues to rise, the later faster than the former.(47) The application of medicines management seeks to maximise health benefits whilst minimising costs and reducing risks.

Medicines management therefore has four aspects. At its heart is patient focused clinical pharmacy, but medicines management also has an important financial component. Strategic delivery of these aspects requires organisational engagement, often directed by national guidance. The four components of medicines management is illustrated in Figure 1 below.

Figure 1 The four key components of medicines management



There are a number of national organisations that seek to ensure successful strategies for improved medicines management. For example in 1996 the Department of Health opened the National Prescribing Centre (48), with aims to facilitate high-quality, cost effective prescribing and medicines management. Another organisation, the Healthcare Commission conducted the first NHS Annual Health Check in 2005-2006 (49) and this has been continued by the Care Quality Commission since 2009.(50) This process provides guidance and support to NHS

organisations through a programme of audits which aims to ensure better care for everyone in hospital, in a care home or at home.

1.2. National guidance on medicines management at the healthcare interface

The NHS Plan (32) was published in July 2000 followed a few months later by the document Pharmacy in the Future - Implementing the NHS Plan.(5) The NHS Plan set out a programme of reform for the NHS based on patient focused services and Pharmacy in the Future described the role that pharmacy would play in this process. These documents encourage the expansion of hospital pharmacy services whilst retaining well established functions such as efficient drug procurement, safe and secure handling of medicines and clinical pharmacy services. A number of new services were encouraged including pharmacists working on admission wards to ensure that patients' medication issues were resolved early during their in-patient episode. A number of studies confirm the suitability of pharmacists taking medication histories.(51, 52) Other initiatives included the use in hospital of patients' own drugs (PODs), one-stop dispensing to speed up the discharge process and the implementation of in-patient self-administration of drugs schemes. The introduction of emerging technologies such as robotic dispensing was also highlighted.

The Audit Commission's report titled A Spoonful of Sugar (23) was published in spring 2001. This report addressed a number of medicines management related issues within NHS hospital services, commenting that:

> *This report has been written to help hospital trusts identify how well they manage medicines. It addresses the main strategic challenges and issues facing hospitals in improving the effectiveness of their medicines' management, and suggests ways in which potential barriers can be met and overcome.*

This report includes guidance on improving working across the primary-secondary healthcare interface and emphasised the importance of developing drug formularies, linked to NICE guidance, through locally established Drugs and Therapeutics Committee (DTC). Furthermore it comments that the DTC, a hitherto predominantly secondary care committee, should have primary care involvement. A change designed to improve medicines management across the local health economy.

During July 2003 A Vision for Pharmacy in the new NHS (53) was published. Building on previous publications this document again emphasised the need to design services around patients and commented on a number of specific medicines management initiatives including:- the Community Pharmacy medicines management project; the Hospital Pharmacy Medicines Management Framework and the Medicines Management Collaborative.

The UK Government published a white paper concerning pharmacy services in 2008 called Pharmacy in England Building on Strengths – Delivering the future.(54) This document is intended to build on both A Vision for Pharmacy in the New NHS and another document titled Our health, our care, our say: a new direction for community services, published in January 2006.(55) Encouragement for collaboration across the healthcare sectors is at best low profile in this otherwise influential document. Whilst the document supports collaboration, it does so primarily within healthcare sectors, rather than across them. For example it states in reference to primary care pharmacy services:

"… there are benefits where pharmacists are active partners in collaboration with GPs."

It does however encourage cooperation between the healthcare professions. This document also comments on the role PCTs must play in ensuring prompt access to medicines, which as will be described later, is a major line of enquiry within this research programme.

1.3. Medicines Management at the Primary – Secondary Care Interface.

1.3.1. Prescribing and medicines access.

The vast majority of patients entitled to healthcare under the NHS will obtain prescription medicines through primary care agencies; prescribed by their GP and dispensed by a community pharmacist. According to the latest report published by the NHS Information Centre (46) the annual drug spend in primary care in England in the year 2009-10 exceeds £8.8 billion with over 840 million items dispensed each year. Numbers and costs of prescriptions continue to grow currently at approximately 5% per annum.

When a patient is admitted to hospital the responsibility for prescribing and providing the required medication transfers from primary care to the hospital. Following admission, patients are usually seen by medical staff (often as part of the clerking process) and required medication is prescribed on hospital approved stationery, usually dispensed by the hospital pharmacy and most often administered by registered nurses (or under some circumstances self-administered according to local protocols). Prescribed medication will be reviewed and amended as necessary according to the patient's clinical condition and further supplies made if required.

Clinical pharmacy services will often be involved in the medication process in hospitals, with clinical pharmacists adding their own expertise to optimise the choice of medication used. Patients are routinely encouraged to bring their own medication into hospital, including any items prescribed by their GP. Patients' own drugs (often termed PODs) may be used for that specific patient during their in-patient episode. The drugs will be assessed for suitability for use by pharmacy staff, and if deemed appropriate, made available to the nursing staff for administration to the patient. Using PODs may reduce drug costs by minimizing waste and

ensures that the patient continues to receive a familiar product, as opposed to a generic substitute. PODs may also be used as a medication reconciliation (MR) source to identify current medication regimens on admission (see Chapter 7).

Where the hospital pharmacy is required to provide medication supplies the items may be dispensed in anticipation of discharge. Dispensing for discharge arrangements require the item to be labelled for the individual patient in such a way that the patient can be given that same item to take home with them on discharge. Dispensing for discharge may speed up discharge and reduce pressure on dispensary services. Where long-term medication is required, the quantity of the item provided to the patient on discharge may have been agreed, in general terms, between the commissioning PCT and the Hospital Trust. Arrangements vary between PCTs and hospitals although a minimum of 10 days supply may be a typical arrangement, with on average a 3 week supply of continuing medication provided as the patient leaves hospital. Such arrangements may support patients during the early discharge period and give patients, GPs and community pharmacists sufficient time to arrange for further prescriptions and supplies. There may also be a financial benefit from such arrangements since hospitals commonly pay less for their medicines than the cost listed in the Drug Tariff which provides the financial framework for medication supplies via community pharmacies. Whilst hospitals pay VAT (where appropriate) on medication purchases and community pharmacy drug purchases are VAT exempt, nonetheless purchase costs in hospital are less than in community often as a result of drug purchasing contracts. Such contracts are usually negotiated on a regional basis with volume related price reductions.

1.3.2. Shared care arrangements

Shared care arrangements are an agreement between NHS organisations in different healthcare sectors that clarifies prescribing arrangements for non-hospitalised patients when both sectors (hospital consultant and GP) need to retain involvement in the patient's care.(56) That is, due to the nature of their medicinal needs some patients will require the continued involvement of their hospital consultant even though they are outside hospital and under the care of their GP. PCTs may provide guidance on the suitability of a drug for prescription in primary care, either via the GP as usual, or via a shared care agreement, and classify each drug accordingly.(57) These documents are typically presented as colour coded lists often using a traffic light arrangement to declare the category of the item; where a red drug is 'unsuitable for GP prescription' and green is 'suitable for GP prescription', with amber usually indicating that some further patient specific consideration will be required.(58) It is usually amber drugs that require shared care arrangements to ensure collaboration between the patient's GP and their hospital consultant. The list of drugs, the style of presentation, and the individual categorizations varies between PCTs with no national standard available.

To support PCTs some regional bodies provide guidance on shared care arrangements between primary and secondary care based on an individual drug's usage and prescribing characteristics e.g. Midlands Therapeutics Review and Advisory Committee (MTRAC) (59) - indicating when a specific drug may be appropriate (or otherwise) for GP / primary care prescribing. National guidance at this level of detail is limited. Even where regional advice is provided, local guidance, often provided by Medicines Management Committees of Primary Care Trusts (PCTs), concerning which medications a GP would usually prescribe may vary from PCT to PCT.

There are occasions when a drug classified as unsuitable for GP prescription in one PCT (a 'red' drug) may be considered appropriate for shared-care management and GP prescription in a co-terminus PCT (an 'amber' drug). For example, the drug Pulmozyme contains the active ingredient dornase alfa. This drug is used by inhalation for cystic fibrosis patients. The traffic light category of this drug varies between PCTs. In Morecambe Bay PCT it is red,(60) in East Lancashire PCT (co-terminous with Morecambe Bay) it is amber.(61) Paediatric hospitals may take tertiary referrals and may therefore accept patients from a wide geographical area. The variability in PCT classification of drugs adds to the complications of agreeing long-term supply arrangements. Furthermore the GP or primary care prescriber may accept or decline this local advice, adding to the variation in the process. This is further complicated when the patient needs an unlicensed drug. An unlicensed drug is a medicinal product that does not have a marketing authorization provided by the MHRA, and therefore has not been approved by the regulatory authorities. Unlicensed drugs, which are frequently used in paediatrics, are usually classified as either amber (suitable under defined circumstances for GP prescription, or for shared care arrangements) or red (not suitable for GP prescription).

The active ingredient of a medicinal product does not in itself determine whether the product is licensed or unlicensed. Omeprazole is one of the most commonly prescribed medicines in the UK and the manufacturers of omeprazole provides a number of formulations that are licensed in the UK, including oral dosage forms and injectable preparations. However an oral liquid preparation is not available from manufacturers that hold marketing authorizations. But an oral liquid preparation can be obtained if requested from a 'Specials' provider. These companies will reformulate existing preparations on request. The resulting products will not be licensed in the UK and are often very much more expensive than the licensed formulations. A GP may therefore prescribe a medicine that is, in some formulations, licensed in the UK only for the dispensing pharmacist to supply an unlicensed product, if the patient cannot take or tolerate the licensed formulations. This scenario has particular relevance for children. A GP may continue to provide prescriptions for long-term medication whilst the patient requires a licensed product but may decline to prescribe should the patient need an unlicensed formulation; in which case the prescribing responsibility returns to the hospital consultant.(3)

Therefore who will prescribe the required drug may change not simply because of which drug is needed. Prescribers will also be influenced by which formulation the patient requires and in which PCT area the GP practice is situated. Predicting whether a patient's GP will prescribe a medication for a specific patient is at best a challenge. Hospitals providing services to patients from a number of PCTs, which is typical of paediatric hospitals, may therefore find it particularly difficult to predict when a GP will be willing to maintain the supply for a child. Approximately 1 in 3 medicines provided by the Pharmacy at Birmingham Children's Hospital (BCH) are either unlicensed medicines or used outside of the license agreement (so called 'off-label' medicines). In general practice, at least one in ten medicines prescribed for children are off-label or unlicensed (62). Healthcare professionals should be aware that their own responsibility when prescribing unlicensed drugs is greater than when prescribing a licensed medicine within the terms of its license. According to the MHRA: (63)

> *Prescribers should pay particular attention to the risks associated with using unlicensed medicines or using a licensed medicine off-label.*

According to Tomlin et.al. legal liability may also be an issue for prescribers since prescribing an off-label or unlicensed medicine carries a greater risk of legal liability to the prescriber if any harm occurs to the patient (this article cites Davis v Jacobs [1999] Lloyds Rep Med 72).(64)

The interaction and co-operation between primary care clinicians and those in secondary care is complex and variable although drug choices in general practice are often guided by hospital specialists.(65) In 1994 the Audit Commission (66) estimated that 16-20 per cent of primary care prescribing was initiated in hospital and a further 40 per cent could also be strongly influenced by hospital consultants.

Variations in the formulation of unlicensed medicines may add to complications by adversely affecting medication continuity; careful and timely communication is required if errors are to be avoid. Unlicensed medicines may be prepared to a wide range of formulations and provided to the patient in unfamiliar strengths - with potential for confusion over dose and therefore volume required for administration.(64) The usual requirement to alter dosage as a child grows complicates this issue. The lack of standardisation of 'Specials' medicines may lead to the children being provided with an unexpected presentation of the medicine - which may hinder access to the medicine and complicate administration, and may result in the patient receiving the wrong dose. Local experience is that many patients call upon the hospital to provide medication urgently because of supply / access difficulties elsewhere e.g. medication from their usual route of supply is unable to be provided before they run out. Either because they cannot get a prescription in time or they have a prescription but cannot locate a timely source of supply from a community pharmacy.

These difficulties are illustrated in a recent survey (67) , which reported that 9 different liquid

formulations of captopril (unlicensed) were being used in 13 tertiary paediatric cardiac centres and their referring hospitals. Only 3 centres and their referring hospitals were using the same "special" liquid captopril formulations, and 10 centres and their referring hospitals were using completely different formulations. Three of the liquid formulations came from specials manufacturers, one from an NHS manufacturing unit, four were prepared "in-house" and one was imported from Australia; with further probable variations in community dispensing. This study concluded that:

> *This degree of inconsistency raises issues about optimal captopril dosing and potential toxicity to a level where its use may influence paediatric cardiac –surgical and interventional outcomes.*

Once a prescription is obtained getting the medicine dispensed may also be problematic. Unlicensed medicines are unlikely to be held in stock by a community pharmacy unless held in anticipation of regular prescriptions for an existing patient. Obtaining an unlicensed drug either as a Special (made in the UK, according to the individual patient's needs) or as an import (a drug possibly licensed and commercially available in another country, but not in the UK) may take some time. A number of days may be required to obtain some unlicensed medicines in some circumstances. Such a time delay may be unacceptable clinically and the hospital providing the patient's secondary care may have no choice but to prescribe and dispense the medicines concerned, at least initially. One published study has quantified medication access problems within paediatrics.(68) During a three month period 338 patients discharged from a specialist paediatric hospital were prescribed 709 unlicensed or off−label medicines. Obtaining these medicines in primary care was a problem for a third of patients who could be contacted (72 of 216) and 25% of these patients report that some treatment disruption followed. This study concluded that there were two major problems: (1) community pharmacies being unable to supply; and (2) GPs' refusal to prescribe.

A patient or their carer with a prescription that cannot be dispensed quickly in the community pharmacy may consider requesting that the hospital pharmacy dispenses the item(s). However, many hospital pharmacy departments may not be in a position to legally dispense GP prescriptions *per se*. Many hospital pharmacy departments are not registered with the regulatory body as a Pharmacy and the few of those that are will not usually possess a Pharmaceutical Contract in order to legally dispense GP issued prescriptions and claim payment for doing so. In order for the hospital to provide the GP prescribed medicine it may therefore be necessary for a hospital prescription to be written before the hospital pharmacy may dispense the item. It should be noted that in extreme circumstances a small number of hospital pharmacy departments have indicated that they would be willing to provide medicines prescribed by a GP on an NHS prescription (commonly called an FP10) on humanitarian grounds. In the West Midlands region the cancer network has indicated that there are two hospital pharmacies offering this service.(69)

Whilst GP prescriptions would normally go to the community pharmacy for dispensing, hospital prescriptions for out-patients may follow other paths. Hospital prescribed continuing-care medication may be prescribed on 'internal' hospital prescriptions or on so called FP10 prescription forms, and patients may commonly obtain medicines from three sources:

a. Hospital Pharmacy

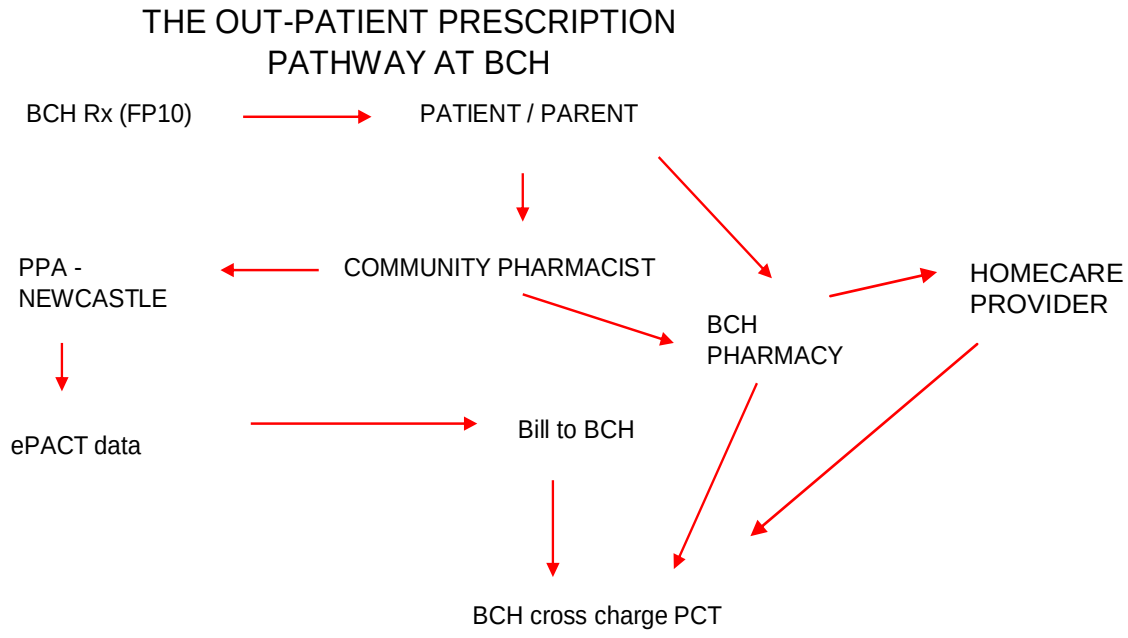
b. Community Pharmacy

c. Homecare provider

Since children and their caregivers may travel some distance for hospital specialist care options b. or c. may often be the favoured route after the initial consultation. Yet the community pharmacy may not always be in a position to provide the medicine within the appropriate time frame. Figure 2 describes the out-patient prescription pathway at BCH.

Accurate and timely communication between all health care professionals involved in the medication process (prescribing - dispensing - administration of medicines) is required to avoid error and ensure continuity of medication, including that between hospital consultants and GPs.

Figure 2 The out-patient prescription pathway at Birmingham Children's Hospital



1.3.3. Admission and discharge

Patients may be admitted to hospital as either a planned (elective) admission or as an

unplanned (emergency) admission. Whilst a planned admission may include some communication from the GP as to the current medicines being taken by the patient, until recently there were no national standards to guide this process and the quality of information is at best variable.(70) There are a number of publications which consider essential medication information transfer on admission.(3, 4, 6, 32, 71-73)

Many patients leaving hospital after an in-patient episode will be the subject of a form highlighting their current medication. These forms are often called TTOs (to take out – medicines) or TTAs (to take away - medicines) and are typical of an 'early discharge letter'. Their purpose is two fold. First to authorize the dispensing or release of medications for the patient when they leave hospital and secondly to act as an early method of communication to the patient's GP to show which medicines the patient should continue taking. These forms are also used in some NHS hospitals as the major prompt to claim income from the patient's PCT for the episode of care provided. The quality of information provided by these forms has been criticised and discharge arrangements are discussed in a number of publications. (3-5, 13, 14, 16, 56, 62, 63, 68, 72, 74-79)

The 1991 guidance provided by the Department of Health (3) concerning prescribing arrangements between hospital and primary care, confirms that prescribing responsibilities rest with the doctor who holds clinical responsibility for the patient. After discharge hospital prescribers may retain the responsibility for some medicines and therefore may be obliged to maintain medication supplies by providing prescriptions for patients who have been discharged from hospital. Studies within the Service Delivery and Organisational Research programme have confirmed that patient transfer between primary and secondary care (in either direction), when there is a change of usual professional providing care, is a key risk factor for the breakdown of continuity of care.(71) Good inter-professional communication is an important consideration if the risk to paediatric patient safety is to be minimised.(72)

Both primary and secondary care organisations are cash limited. That is, they have a finite budget with which to provide their services. It is possible therefore that there are financial incentives for both sectors to pass the prescribing responsibility, and therefore expenditure, on to the other. PCTs are the major source of income for NHS hospitals. The money that hospitals receive is dependent on the amount and type of work they do. The payment rates are largely fixed by a national tariff and the current process is termed 'Payment by Results' (PbR).(80) It should be noted that some services are excluded from PbR arrangements and costs can be negotiated locally, and is a source of additional income for the provider. Continuing care (81) is one such exception. In effect the hospital may cross-charge the PCT for the costs of providing 'continuing care' including long-term medication. The hospital may charge for the process as well as the direct drug costs, so long-term medication provided by the hospital may cost the NHS more than if it were being provided in primary care.

1.3.4. Seamless care in England

Seamless care is the term often applied to integrated medicines management processes as experienced by a patient when they are admitted and discharged from hospital. During this process the responsibility for the patient's medicinal and pharmaceutical needs transfers from primary healthcare services to secondary healthcare services and back again. Ensuring that this process works well is important for the clinical care of the patient. A definition of seamless care was provided by Canadian pharmacy organisations (82) in 1998 as:

> *The desirable continuity of care delivered to a patient in the health care system across the spectrum of caregivers and their environments. Pharmacy care is carried out without interruption such that when one pharmacist ceases to be responsible for the patient's care, another pharmacist or health care professional accepts responsibility for the patient's care.*

There are fundamental differences in the processes to ensure seamless care between the countries of the UK. For example patients discharged from hospitals in Northern Ireland will not be provided with take-home medicines (TTOs) and must rely on sourcing supplies of medicines immediately from primary care services.(83) This is in contrast to discharge from English or Welsh hospitals where a supply of take-home medicines is integral to the processes designed to ensure seamless care.

A number of important national documents have been produced in recent years to support seamless care in England. These documents include:

- Moving patients, Moving Medicines, Moving Safely. Guidance on Discharge and Transfer Planning.(16) Published in 2005-6 by a number of national Pharmaceutical bodies the document, and the accompanying workbook, aims to: *"… provide practical guidance in developing systems to tackle discharge and transfer problems between different settings and is based on experiences and evidence available, including examples and paperwork from existing schemes."* It is noteworthy that these documents focus on discharge planning and provides little guidance on admission arrangements.

- PSG001 Technical patient safety solutions for medicines reconciliation on admission of adults to hospital.(17) This publication was the first patient safety guidance produced jointly by NICE and NPSA. It was published in December 2007. This guidance supports the introduction of medication reconciliation for adults on admission to hospital. The exclusion of children from this guidance has prompted a major line of enquiry within this research programme.

- Medicines Reconciliation: A guide to implementation (70) was published by the NPC in March 2008 and aims to support the delivery of medication reconciliation as a patient is admitted and discharged from hospital. This document defines for the first time a

nationally recognised minimum dataset for transfer of essential medication information between primary and secondary care.

- Medicines Adherence: involving patients in decisions about prescribed medicines and supporting adherence was published by NICE in January 2009.(84) This work acknowledges that patients may be under the care of healthcare professionals from different disciplines and specialties at the same time. Responsibility for patients' care may also be transferred between healthcare professionals. The document comments that: *"Good communication between healthcare professionals is needed to ensure that fragmentation of care does not occur."* and encourages the development of robust processes for communicating between healthcare professionals involved in the patient's care.

- Managing patients' medicines after discharge from hospital (14) was published by the Care Quality Commission in October 2009. This document provides advice on managing both admission and discharge and focuses on audits conducted in 12 different PCTs. This work also introduces the summary care record designed to encourage the transfer of essential patient medication information between the sectors. The document highlights the responsibility of GPs in providing information to acute Trusts on admission of their patients to hospital and comments: *"GPs and PCTs need to agree expectations for the information provided to acute trusts ... as it is so critical to safety"* and *"PCTs need to ... take action when GPs do not meet expectations ..."* This document was published at the end of the data collection period of the studies described in this thesis but confirms important current and future national expectations concerning key aspects of medicines management between the healthcare sectors.

2. Scheme of Study

This programme of research focuses on key aspects of the practical arrangements for medicines management in place across the primary – secondary healthcare interface for paediatric patients. Primary care in this context is limited to PCTs and their contractor professionals dealing with medicines and in particular GPs and community pharmacists. Secondary care includes the NHS hospital sector, incorporating tertiary care where that is also provided by a secondary care provider. Medicines management arrangements within social care, schools, the voluntary sector, or that provided by non-medical prescribers *per se* are outside the scope of this research programme.

A diagnostic of the care pathway for children on admission and discharge to hospital has not been undertaken within this programme of research. Such diagnostics, often using lean methodology, are used by NHS organisations with multi-disciplinary healthcare professional involvement to redesign service delivery. Rather than use the lean-diagnostic methodology to identify service aspects for redesign, this research programme uses a comparison of medicines management documents in the two sectors to identify key interface issues where there appears to be a difference or a disparity in emphasis. Chapter 6 describes this process in detail and key findings. Based on this approach two key aspects of medicines management for children at the healthcare interface have been investigated. These are:

1. Access to medicines for patients outside hospital requiring long-term medication.
2. Continuity of care as a patient moves from primary care to secondary care and (usually) back to primary care.

Access to medicines in this context has two major components – i. obtaining prescriptions and ii. getting these prescriptions dispensed so that the intended therapy is not compromised by delays in obtaining the medication and therefore treatment interruption. Continuity of care will centre on communication of medication arrangements between healthcare professionals in the two sectors and their patients (or their carers) and particularly during admission to hospital. Whilst the medicines management communication arrangements for adults are relevant to this work the main focus will be on paediatric patients. Service improvements in these two areas may reduce clinical risk. Errors in prescribing and administration of medicines to children are at least as common as in adults. However, the consequences of these errors can be more serious for children.(62)

The overarching hypothesis of this research is that medicines management across the primary – secondary healthcare interface for paediatric patients is sub-optimal in the two focus areas, and current systems and processes can be improved.

Aims of this programme of study include:

1. To identify circumstances where medicines management systems across the interface are variable between the healthcare sectors and may compromise patient care (Chapter 6).

2. To investigate key aspects of medicines management systems across the interface, where there are identifiable concerns (Chapter 7 and 8 – continuity of care and in particular transfer of essential information on admission, Chapters 9 to 12 – access to long-term medication for paediatric home patients).

3. Based on this programme of study to make recommendations for changes to medicines management systems across the interface.

3. METHODS

3.1. Analysis of medicines management documents from NHS organisations in the West Midlands

This method was used to compare medicines management documents used by NHS organisations in the West Midlands Regional Health Authority, and specifically to identify differences relating to interface medicines management issues between the two main sectors: primary care and hospital care. A preliminary study (2007) was used to inform latter stages of the research programme and served as a baseline to identify changes in the documents over time.

Two sets of documents were obtained: initially in early 2007 and then later in the summer of 2009.

3.1.1. Preliminary study 2007 – document collection

During December 2006 and January 2007 a purposive sample of seventeen NHS bodies including Primary Care Trusts (7) and NHS (Hospital) Trusts (10) in the West Midlands health region were contacted and a copy of their then current Medicines Management Strategy or Policy requested. Personal contact was made with each Head of Medicines Management (PCTs) or Head of Pharmacy (Hospital Trusts) to make the request. The 17 organisations were all regularly represented in cross-sector pharmacy meetings organized at the time of the study by the West Midlands Strategic Health Authority.

3.1.2. Main study 2009 – document collection

An email request for relevant documents was sent to the most senior pharmacist (usually Chief Pharmacist or Head of Medicines Management or equivalent) of each of the NHS organisations in the West Midlands. See Appendix 1.

The wording of this request was piloted on 8th June 2009 with 3 PCT Chief Pharmacists and 1 Acute Trust Chief Pharmacist, 3 of whom confirmed that this was suitable wording to obtain the appropriate documents for the study. No response was received from one pilot (PCT Chief Pharmacist).

Recipient email addresses were obtained from existing NHS distribution lists and sent commencing 6th July 2009 from the office of the regional lead pharmacist for medicines management at the request of the lead researcher. A first reminder was similarly sent by email to non-responders on 21st July 2009. Further reminders if necessary were made by personal telephone call to the recipient with data collection closed on the 14th September 2009.

3.1.3. Document analysis

The documents to be analysed were imported into NVivo software (v8, ESR international). The following process was followed for the analysis:

1. A preliminary coding frame was determined by: i. examination of medicines management documents obtained during the preliminary study and ii. interface issues of interest identified by the lead researcher and supervisors e.g. medication on admission to hospital. The coding frame was entered as free-nodes into NVivo.
2. Each document was imported into NVivo as an internal source and each in turn was examined and any text relating to codes identified and recorded. Further codes were added as new issues were identified within the documents.
3. After the above was completed each document was searched electronically for key terms relating to each of the now expanded coding frame, to ensure all relevant text was selected. For example, the code 'one-stop dispensing' prompted searches for the terms: 'stop'; 'one-stop'; and 'discharge' (as in the phrase 'dispensing for discharge').
4. The text for each individual **code** was selected for **all** documents and was then examined in turn. This was done to ensure consistency of selection and to aid refinement of code definitions. For example: the code 'Access to Medicines' was refined so that physical access to medicines in each organisation was excluded. That is, text relating to drug cupboards was not considered relevant to this code within the context of the study.
5. MS Excel 2003 was used to create a spreadsheet of results from NVivo, including the frequency of occurrence of each code within each document.
6. Results were transferred to SPSS-PASW 18 for the production of descriptive statistics and significance testing.

3.2. Focus Groups

Two focus groups were undertaken within this programme of study. These were:

1. A group to consider CP dispensing of hospital prescriptions (CP focus group)
2. A group to consider management of home-patients requesting urgent medication from hospitals (Medical staff focus group)

3.2.1. Community pharmacy focus group

This focus group was designed to support the development of the community pharmacy questionnaire (see Chapter 12) investigating aspects of hospital generated prescriptions being dispensed by CPs. Group members were convened to ensure input from community pharmacists, hospital pharmacists, pharmacy management (both in community and in hospital)

and academic pharmacy practice.
The focus group took place on 27th February 2009 when the following met:

AS (hospital & community experience, and senior management)
KW (Academic pharmacy & pharmacy policy maker)
JM (Academic pharmacy)
FL (Community pharmacy, middle management)
AH (Community & hospital experience at practitioner level)
CN (Hospital experience & as a community pharmacist locum)
DT (Hospital & community pharmacy experience, senior management in hospital and PCT)

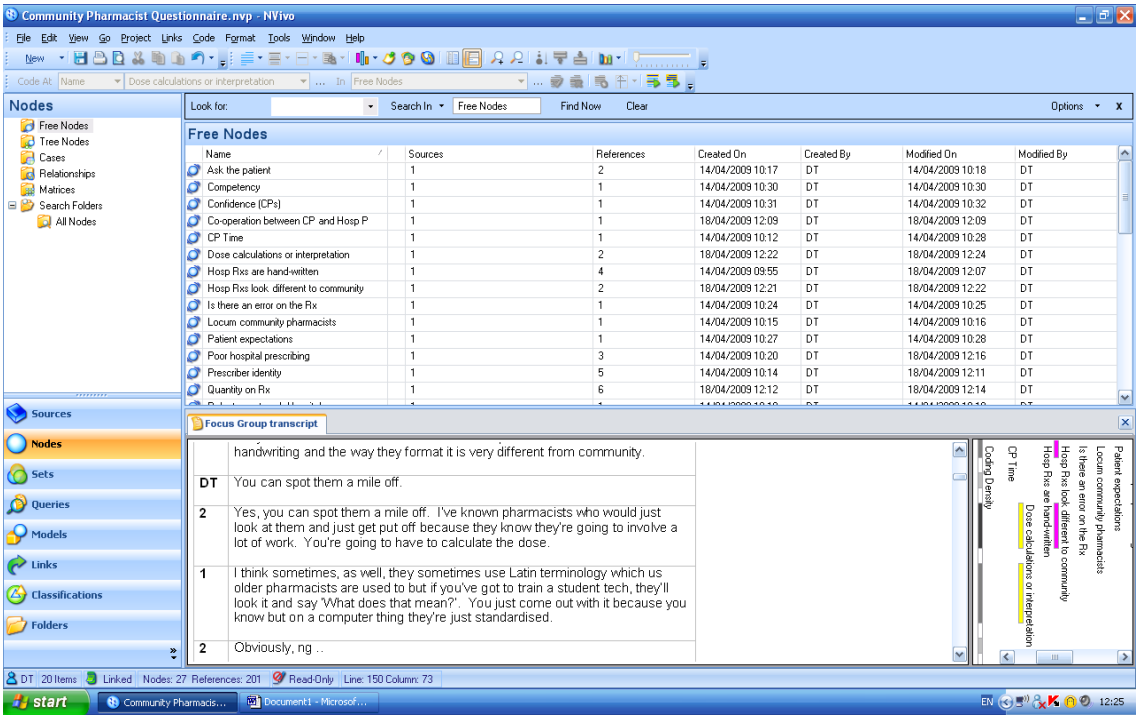
A semi-structured meeting guide was developed including questions to be placed by the facilitator to ensure coverage of pre-determined themes identified by the project support team (DT with JM, AS, KW), otherwise free conversation was encouraged to stimulate a wide-ranging discussion. Questions were designed to identify views and perceptions, types of problems and quantification, problem resolution and suitable service changes.

Questions included:

1. What is your own experience of dispensing hospital prescriptions in CP?
2. What types of issues occur?
3. How common are problems?
4. How do you resolve problems and what barriers are there to these methods?
5. What can be done to improve service arrangements and minimize problems?
6. What support exists for CPs dispensing hospital prescriptions?

This focus group provided 12,785 words of text from which 42 codes were defined against which a total of 164 references were recorded. The figure below shows a screen shot of NVivo being used for this purpose.

Figure 3 Screen shot of NVivo software in use to analyse the CP focus group



The codes were then grouped into themes to inform the development of the survey. These were:

1. **Obtaining further information.**

    a. Patient may be accessible to consult with the CP - but are they a reliable source to solve script problems? CP may rely on patient opinion / information?

    b. Problems identifying hospital prescriber? Leads to audit trail / PMR problems.

    c. Hospital prescription problem referred back to GP?

    d. Are there occasions when problems discussed with the prescriber (GP) are referred to the hospital consultant? Are some GP prescriptions changed by CPs after discussion with hospital?

    e. Do community pharmacy standard operating procedures require confirmation of unlicensed / off-label prescriptions with prescriber?

    f. Who wrote the hospital prescription ... often difficult to identify. What happens when you cannot contact the prescriber? Governance issue not being able to identify prescriber - driven by inadequate allocation of identifiers?

    g. In what order would a CP go to for advice on a hospital prescription ... patient ... GP ... hospital prescriber ... medicines information?

    h. Dose / regimen confirmation issues. How to confirm?

2. Support for CPs.

a. Support for CPs? Training event; guidance for problem solving hospital prescriptions; resource sign-posting; fax back for help. Would CPPE be interested?

b. Hospital provided support ... e.g. website but would it be used? They can ring medicines information anyway ... how often does this happen? Hospital prescription problem ... ring this number?

c. Centralised IT / communications e.g. read pharmacy PMRs from other sectors?

d. Returning prescriptions to hospital for endorsement may present problems?

e. Create section in community pharmacy standard operating procedures for dealing with hospital prescriptions? What exists already?

f. Teaching (hospital) prescribers how to prescribe?

g. Should hospital prescribers say which number to ring in the event of problems e.g. a hot line?

h. Should there be a fax back option?

3. Hospital prescription problems

a. Is the frequency of problems on hospital prescriptions higher than those written in primary care? Estimation?

b. Most hospital prescriptions are hand-written - which may introduce problems? What problems and frequency?

c. Are hospital prescriptions more complex than GP prescriptions? What do we mean by complex? More work?

d. Hospital prescriptions problems - in what ways are they different ... types & frequencies compared with GP prescriptions?

e. Off-label use. Means outside standard texts therefore problem in confirming use / dose.

f. How often is there missing information on hospital prescriptions... could look at a large number and summarise?

g. Do CP's record interventions?

4. Practical issues.

a. How confident are CP in dispensing hospital prescriptions?

b. Do hospital prescriptions take longer to do? How much longer?

c. Should hospitals be allowed to issue prescriptions for community dispensing? Is there national guidance on when they should be used?

d. Should GP prescriptions indicate its prescribed on advice from ... hospital? What if it is?

e. Locums - additional problems ... lack of continuity?

f. Should all hospital out-patient prescriptions be on FP10's to maximise patient choice? Conversely should all out-patient prescriptions be hospital only, possibly due to reduced risk / access delays?

g. Is patient confidentiality adversely affected by dispensing by CP in comparison to hospital dispensing (e.g. hospital staff will know it has a HIV clinic in session)? Is the CP more familiar with patient?

h. Is there a reluctance to challenge hospital prescriptions? More so than for GP prescriptions?

i. Specials - delays in obtaining specials, increased costs, confirmation with prescriber, etc.

3.2.2. Medical staff focus group

This focus group was designed to support the development of the hospital medical staff questionnaire (see Chapter 9) investigating aspects of supporting home-patients requiring urgent medication. Group members were convened to ensure input from consultants and junior medical staff from a range of specialties and with various levels of experience.

The focus group took place on 5th October 2009 when the following met:
HM – Registrar Paediatric Respiratory Department
SA – Senior Registrar Paediatric Neurology (later Consultant)
PD - Consultant Paediatric Rheumatology
CM – Clinical lead Paediatric Dermatology

The group was facilitated by the lead researcher.

As for the CP focus group a semi-structured meeting guide was developed including questions to be placed by the facilitator to ensure coverage of pre-determined themes identified by the project support team (DT with JM, AS, KW), otherwise free conversation was encouraged to stimulate a wide-ranging discussion. Similarly questions were designed to identify views and perceptions, types of problems and quantification, problem resolution and suitable service changes.

Questions included:

1. What is your experience of problems your patients have getting medicines when they have left the hospital?
2. What types of problems occur?
3. How common are these problems?
4. Are these problems specific to paediatrics or are they more widespread?
5. How can the problems be resolved?
6. What issues are there for GPs prescribing long-term medicines for children?

7. Are there training issues for prescribers?
8. What practical changes to the system can be identified that will reduce problems?

This focus group provided 9,225 words of text from which 40 codes were defined against which a total of 129 references were recorded. Finally the codes were grouped into themes to inform the development of the survey. These were:

1. **Issues with GP**

    a. Communication poor
    b. "If you agree please supply …" letter
    c. Electronic communication
    d. Follow-up appointments
    e. GP receptionist – patients may have problems getting to the GP
    f. GP refuses to prescribe
    g. Repeat prescriptions
    h. GP quantity too small – so patient runs out.
    i. Interface rules unclear
    j. System failure

2. **Issues with CP**

    a. CP supply issues
    b. Change prescriptions
    c. Support for CPs e.g. where to get drugs

    [Also – from CP questionnaire the adoption of suggestions for greater clarity on prescriptions.]

3. **Duration of supply on FP10HPs**

    a. Length of supply – inadequate on hospital prescriptions, which may run out before GP can take over prescribing?

4. **Prescriptions**

    a. Electronic prescriptions
    b. Formulation issues
    c. Out-of-hours access to information
    d. Posting out prescriptions
    e. Prescribing responsibility
    f. Unlicensed medicines
    g. Teaching students how to prescribe
    h. Formularies

5. **Financial issues**

    a. Financial aspects of continuing supply

6. **Communication with other hospitals**

    a. Hospital doctor refuses to supply

7. **Parent-caregiver issues**

    a. Instructions to parents e.g. don't run out

b. Patient hot-line
c. Use hospital as if we were primary care
d. Urgent requests e.g. rescue-medication

8. Nurses

a. Nurse involvement in access to medicines
b. Nurse prescribing

3.2.3. Analysis of focus groups

The meetings were individually audio-recorded and professionally transcribed by a trained and experienced medical secretary into MS Word and checked by the facilitator (DT) for errors or omissions. On each occasion the facilitator revised the spelling of some technical descriptions. Participants were anonymously identified within the text (e.g. speaker 1, speaker 2 etc) to ensure the extent to which views were shared could be identified. Each participant was identified within the analysis as individual 'cases' to facilitate cross reference.

The transcripts were analysed using NVivo software (v8). Concerns and issues identified by participants were coded as free-nodes. All text within each code was re-examined and codes refined if necessary. A coding summary and themes structure was generated and used to inform the development of the survey instruments.

3.3. Questionnaire design and management

This programme of study led to the development of a series of surveys, where the survey instrument was a purpose designed questionnaire. These were:

- PCT survey 2007 (Advice to GPs concerning admission medication)
- PCT survey 2009 (Advice to GPs concerning admission medication)
- Medical staff survey
- Nursing staff survey (6 sites)
- Caregivers' survey (rescue-medication)
- Community Pharmacy survey

A description of the methods used to develop each survey instrument is provided below.

3.3.1. Methods for PCT surveys

Two survey instruments were used to meet the aims of the study. The first survey was conducted in 2007 and the follow-up study in 2009.

The PCT Survey 2007

Email was chosen as the medium for the 2007 survey. Conducting this survey by post would have taken longer and would have required more resources to prepare, deliver and record the responses, and would have added to the costs. Similarly a telephone survey was also rejected since approximately 150 subjects would need to be contacted and this would have been both time consuming and added to the costs of the study. However a list of email addresses of all subjects (Heads of Medicines Management, or similar, at all English PCTs) was not readily available and an email distribution list was assembled for the purpose of the study. An email address list from a local PCT was used as the basis of the subject address list and this was revised by telephone discussion with all PCTs not included in the original address list. The main switchboard of the PCTs was contacted using the telephone number listed for their organisation on their website. No PCT declined to provide the email address although a number were unclear as to who was currently the Head of Medicines Management or Lead Prescribing Advisor, often although not exclusively, as a result of PCT mergers.

The 2007 survey was designed as an email with questions incorporated within the text of the email itself. The survey included 5 questions or opportunities to comment or respond. Using an electronic survey would have offered some potential advantages in terms of both data collection and response limits however it was uncertain at the time how acceptable this type of instrument would be to the participants and the opportunity for direct email dialogue with the lead researcher may also offer advantages.

The 2007 questionnaire was piloted with the assistance of two senior PCT pharmacists (lead pharmacists for medicines management in their PCTs – JHo, JHa) and the then regional primary care advisor (NB).
Suggestions for improvement included:

1. *setting out the background and potential benefits to all concerned in more detail*
2. *rather than use post-discharge and published guidance as the first sentence, focus on the reasons why you are looking at what you are looking at and the advantages to you AND primary care of sorting out the system.*

Modifications to the introduction to the questionnaire were made as a consequence.
Other aspects of the development and delivery of the questionnaire are shown below.

- National Research Ethics Service (NRES) was consulted and confirmation that this study was ‘service evaluation’ and did not therefore require formal ethics approval was received by email on 14th May 2007.

- The final 2007 questionnaire was sent to all Heads of Medicines Management or Lead Prescribing Advisors of Primary Care Trusts in England via personal email to named recipients. At the time of this study there were 149 PCTs in England. However five PCTs were led by a single prescribing advisor and hence the questionnaire was sent to 145 recipients.

- The 2007 questionnaire was first sent out on 22nd May 2007.

- A total of 51 (35%) did not reach the intended recipient at the first attempt for the following reasons (and frequency): Mail box full (n=1); Failed delivery (n=1); Does not exist (n=13); Not reached (n=1); Not recognised (n=7); Unknown (n=1); Unroutable (n=27). A series of further telephone calls to PCTs were conducted in order to clarify email addresses. Repeat (first) emails failed on the second attempt on nine occasions (including 1 x mail box full). All were successful at the third attempt.

- A reminder was sent to non-responders +14 days and then + 21 days after the first successful email.

- The questionnaire was sent from David Terry as Operations Manager - Pharmacy at Birmingham Children's Hospital.

The introduction to the questionnaire is shown in Appendix 2.

Respondents were advised that the questions only required a yes or no answer, although longer answers were welcome. Where longer answers were provided these were coded to either yes, no or unclassified by the lead researcher in consultation with academic supervisors.
A schematic of the questionnaire is shown in Appendix 2.

The PCT Survey 2009

The 2009 survey was sent as an electronic questionnaire using LimeSurvey software version 1.71+ (5498). Whilst the 2007 email-free-text survey tool elicited a useful response, some advantages of using an electronic survey were identified. For example, the electronic tool requires the respondent to self code responses according to the options provided. The electronic capture of data also enabled data analysis to be less labour intensive since responses were directly uplifted into SPSS.

However, the expected benefits of email handling with the electronic survey were not realised due to NHS email filtering arrangements usually called 'grey filtering'. Unauthorised emails with non-NHS approved email characteristics are denied delivery to NHS recipients. The exact arrangements and filter settings are defined by each NHS organisation. During testing it was

identified that grey filtering may be applied to the emails carrying the link to the survey, since they originate from Aston University where the server is situated for the LimeSurvey software. Permission could have been sought from each recipient's organisation to authorise the delivery of the emails, but this was considered impractical with 146 different organisations involved. In many instances grey filtering can be overcome by repeat sending the email. That is, send the email once and then send it a second time 10 to15 minutes after the first. However, it was uncertain how often this would work and how often a recipient would receive the request to participate twice. Because of the grey filtering issue it was decided to send the links to the survey directly from the researcher's own NHS email account. This required extracting the individualised hyperlinks from LimeSurvey and sending the correct link to each individual recipient via personal email. Since the automated email system within LimeSurvey is now by-passed the email invitations also had to be modified to include appropriate text giving the recipients background information and instructions to use the hyperlink. This process was managed using an MS-Excel spreadsheet constructed for the purpose. Similarly since LimeSurvey software had not 'issued' the invitation it also did not record the delivery details of the response, although it did record the answers provided to the survey questions. A different strategy was adopted for some later sites of the Clinical Nurse Specialists' survey using LimeSurvey – see Chapter 10.

The 2009 survey was sent to all PCT lead pharmacists for medicines management with repeat emails at + 1 week and + 2 weeks for non-responders. The invitation text is shown in Appendix 3.

The 2009 survey was developed using the 2007 survey as a template in discussion with academic collaborators and sent in early September 2009 as a pilot to 3 PCT Heads of Medicines Management for their consideration (LT, JH, MH). Following their comments minor changes were made to the welcome page of the electronic survey.

Changes to questions in the 2009 survey in comparison to the 2007 survey are highlighted in the survey schematic shown in Appendix 3. The 2007 survey also included the question: Q3. *If you send guidance are you willing for your PCT to be identified within any report?* But this was omitted from the 2009 survey. Based on the few responses received in 2007, and ambiguous replies, it was agreed that permission to identify if necessary would be requested directly from the PCTs concerned.

On 14th September 2009 the head of Research & Development at BCH confirmed that this study was in the category of clinical audit/service evaluation and therefore no further application for formal ethics consideration was required or made.

The results obtained from this survey can be found in Chapter 8.

3.3.2. Methods for Medical staff survey

An electronic survey tool was chosen as the instrument for this study. The study cohort comprised of all medical staff employed at the time of the study by BCH. All subjects had Trust email addresses and internet access administered by a single NHS organisation. Management of this survey by the use of purpose designed electronic survey software was therefore considered to be both deliverable and efficient. The problem of grey filtering was discussed with the organisation's Information technology department who offered assistance if this prevented delivery of the survey.

The questionnaire development was supported by the medical staff focus group and the community pharmacy focus group. The community pharmacy focus group identified some actions that prescribers may take to support community pharmacists when dispensing hospital generated prescriptions and these were included in the survey. For example, a question was included to ask the doctors if they would be willing to use pre-inked stamps to show their contact details on FP10 prescriptions they sign. This question was included in the medical staff survey.

The themes and issues identified in the two focus groups were considered for inclusion in the survey, including for example the need for further training. The development was also informed by the nursing staff questionnaire that had been finalised before the medical staff survey.

A draft medical staff questionnaire was created on 7th December 2009 using LimeSurvey Version 1.71. This professional survey software posed a number of practical problems. For example the text SCRIPT is a protected word in LimeSurvey to facilitate data handling. In practice it is not possible to have the word PRESCRIPTION appear in capitals in the survey text, since the text string 'script' always appears in lower case, such that the output becomes PREscriptION. The program also centres all text, so that the opening introductory text is always centred. It would have been usual to left align this block of text (whole paragraphs) but a solution to the centre all problem could not be identified after taking expert advice.

The draft questionnaire was piloted with the four doctors who attended the medical staff focus group (CM, HM, PD, SA) and with academic supervisors (KW and JM) and the head of R&D at BCH. A number of comments were received leading to changes in the survey instrument. These included:

- Question 7 – add 'Not applicable' option
- Question 9 – add 'Not applicable' option
- Section B text – change word 'frequency' to uppercase (to add emphasis)
- Section C text – change some wording to uppercase (to add emphasis)

- Question 12 – reverse order of options
- Question 18 to 20 – add ‘Don’t know’ options

The resulting second draft was sent to a further group of medical staff for comments (BW, ME, FR, VD, IW). Further changes included:

- Question 6 – question re-worded
- Question 21 – comments box added

The final 30 point survey tool included: respondent demographics; frequency of prescribing, including for home-patients; reasons for medication access problems; interaction with community pharmacists and improving current arrangements.

The final survey was confirmed as service evaluation by the head of Research and Development of Birmingham Children’s Hospital (BCH) and was registered as an audit at this institution. Formal ethics committee approval was not required or requested.

The survey was tokenised to ensure that one invitation elicited one response only.

Email addresses were obtained with permission from the organisation’s personnel officers responsible for medical staff. The electronic list (Excel) was converted to a CSV file to enable uplift into LimeSurvey.

The invitation to participate was sent from LimeSurvey to the NHS Trust email addresses of the study cohort with a link to the survey. First emails were sent out on 25th January 2010, with reminders at +2 weeks and +3 weeks if necessary. Final responses were received on 24th February 2010. A total of 84 email addresses failed at the first attempt. 66 were corrected but a further 2 failed again at the second attempt. A total of 20 from the original list were therefore removed from the study.

Responses were exported from LimeSurvey into MS Excel 2003 and SPSS v16 for analysis and production of descriptive statistics.

3.3.3. Methods for Nursing staff surveys

An electronic survey tool was chosen as the instrument for this study. The study cohort comprised of all the Clinical Nurse Specialists (CNS) and Advanced Nurse Practitioners (ANP) employed at the time of the study by BCH and then later the same staff groups at the other 5 study sites. As in the medical staff survey all subjects within a single Trust had organisation specific email addresses and internet access administered by a single NHS organisation. Management of this survey by the use of purpose designed electronic survey software was

therefore considered to be both deliverable and efficient.

An electronic survey tool was constructed with the support of an ANP (AD). The 12 point draft questionnaire was piloted with 6 members (KH, NF, AP, BC, AK, AD) of the study cohort who provided the following comment:

- The start of section B. The instructions are quite difficult to follow - complex sentences. Even though I know what it's about, I found it difficult to decipher what was wanted. It also ends with the phrase answer the questions below - better following questions. On one of the questions there is the phrase GP prescribe. It's not really clear what this means.

Changes to the text of section B of the survey and Question 11 were made accordingly. For example Question 11 wording was changed from "Require GPs to prescribe" to "Require GPs to prescribe all medicines". The text of the invitation email was also amended. See Appendix 8. As described for the medical staff survey there were practical problems with LimeSurvey with the word 'script' and with text layout limitations.

The survey was tokenized to ensure that one invite elicited one response only.

Recipient BCH email addresses were obtained from staff records with permission of the Chief Nurse. The electronic list (Excel file) was converted to a csv file and imported into LimeSurvey. For the BCH site 9 email addresses failed at first attempt. Of these 1 was amended and was successfully delivered at the next attempt, 5 nurses had left the Trust and emails were deleted, 2 email boxes were full, 1 was not resolved.

The final questionnaire was sent to NRes for ethics considerations on 24/09/08 who expressed the opinion that the survey constituted service evaluation and that formal ethics committee approval was not required.

The invitation to participate was sent to the BCH email address of the study cohort with a link to the survey. First emails were sent out on 29th September 2008. All recipients received two reminders if necessary at approximately weekly intervals.

After the successful completion of the BCH nurse survey the study was extended to other sites in the UK. Further sites were chosen because of their leading role in paediatrics within their region (country) including: Belfast, Glasgow and Cardiff. Two further sites were included from England to ensure that results were obtained from another geographical area with a specialist paediatric hospital (Sheffield) and to ensure participation of a large paediatrics unit within a large Trust (Leeds).

The Chief Pharmacist (or equivalent) of each of the additional 5 sites was initially contacted who each gave their support for the study. A project proposal was then sent to the Chief Nurse or equivalent for their consideration and permission to survey their staff. The proposal included a sign off sheet giving authority to proceed and confirmed that NRes considered the study to be service evaluation. Permission to conduct the study was received in writing from each site before proceeding.

Email addresses were provided by the study sites which were uplifted into LimeSurvey. The survey tool was individualized for each study site e.g. replace the text Birmingham Children's Hospital or BCH with Sheffield Children's Hospital or SCH, as appropriate. Within LimeSurvey each site survey was held as a separate file. Undeliverable email addresses were managed as for BCH. Grey filtering problems were encountered for the first time when sending the survey to Leeds in June 2009 and then for the later study sites Cardiff, Glasgow and Belfast. To overcome this problem, initial email invitations were sent twice within about 15 minutes of one another. The text of the invitation was modified to include the sentence:

> *Please accept my apologies if you receive this survey invitation twice. NHS email filtering arrangements (grey filtering) sometimes makes this inevitable.*

3.3.4. The caregivers' survey (rescue-medication)

A survey tool was constructed to identify the experiences of caregivers who requested rescue-medication directly from the Pharmacy Department of BCH. The cross-sectional self-completion survey instrument was designed with input from key stakeholders including hospital and academic pharmacists and pharmacy technicians and piloted with 3 caregivers. The tool was created using MS Word 2003 and registered as a service evaluation audit of BCH on 28th November 2008 (PHA10). The 18 point instrument included: patient and healthcare professional demographics, circumstances leading to the request for rescue-medication, and questions to identify the opinions of respondents. The final questionnaire is shown in Appendix 9. Since the survey was offered to caregivers at the point of requesting urgent help from the Pharmacy at BCH the front page of the instrument offered the respondent the option to decline completing any more of the survey; and the reasons why.

Patient identity was not requested nor obtained and this study was confirmed as service evaluation by the head of Research & Development at BCH: formal ethics approval was not required.

Caregivers requesting urgent support to obtain medicines were invited to complete the survey if attending the Pharmacy BCH during normal weekday opening and where it was clear that the

primary care route of supply was judged to have failed or was likely to fail.

PCTs were identified from the GP's postcode, or if that was not available the patient's postcode was used as a proxy for the GP code (n=4). A patient's PCT is determined by the location of the medical practice they are registered with. The postcode was entered into the following website to determine the PCT:
https://www.ndtms.org.uk/emids/cgi-bin/ons_locale.cgi.
Accessed 15/3/10

Classification (coding) of free text answers (questions15 and 16) was determined by an expert panel of pharmacy staff – three pharmacists with both hospital and community experience; and two pharmacy technicians, one with relevant caregiver experience. The panel was given suggested codes by the lead researcher and code assignments to answers given and asked to modify according to their judgment. The modifications were passed to all panel members and further modifications requested until consensus was reached or no further agreement could be obtained. Since free text answers could cover more than one issue a maximum of two codes per answer were assigned. Where answers covered more than two issues the first two issues mentioned in the answer were coded.
Responses were entered into MS Excel 2003 and SPSS v16 for analysis.

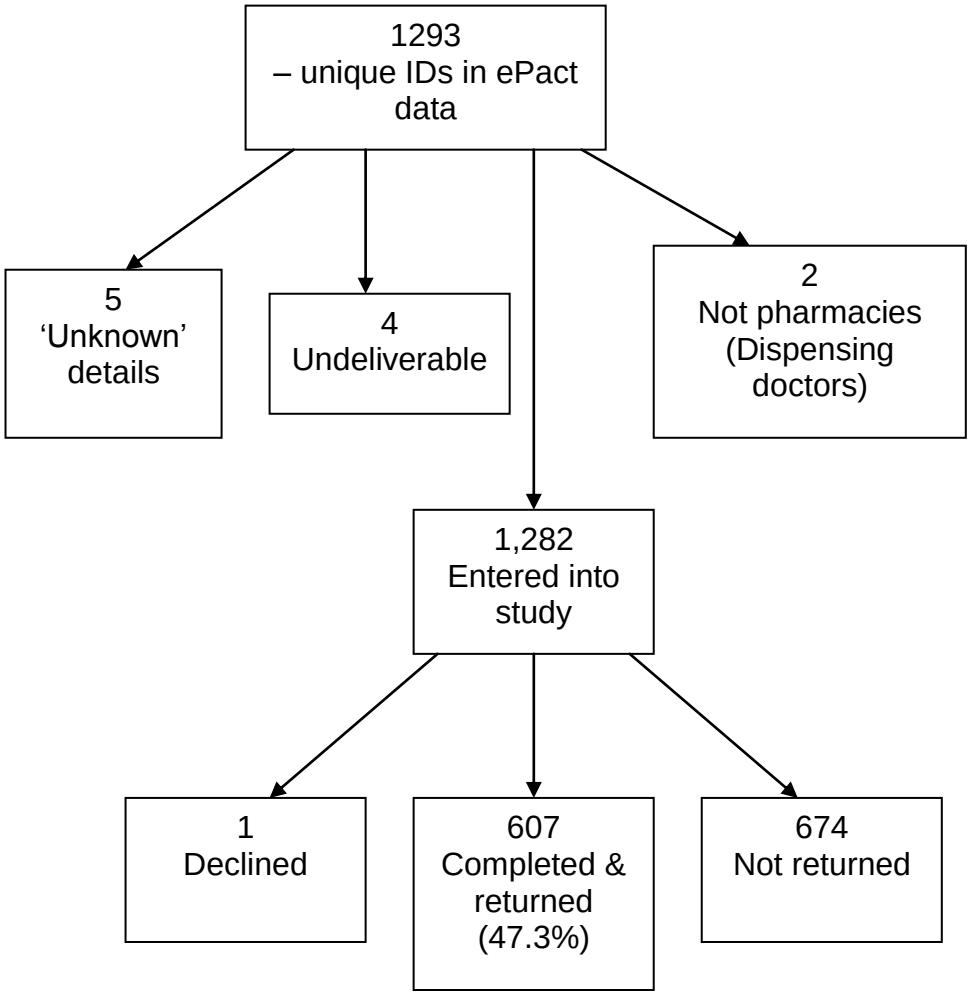
3.3.5. The community pharmacists' survey

3.3.5.1. Cohort selection

BCH issued 34,799 hospital generated FP10s (items) that were dispensed by community pharmacists during the period June 2008 to May 2009 (data selected 23rd July 2009). Each community pharmacy can be identified from ePACT records provided by the Business Services Agency of the NHS. All these subjects will therefore have recent experience of dispensing at least 1 hospital generated prescription. Whilst response rates to surveys are known to vary for this subject group (85-87) it seemed possible that a return rate of c. 50% would be achieved. Allowing for variation in prescription workload from both general practice and hospital and for possible differences in practice, opinions and experience between the main community pharmacy types (large chain, small chain, independents etc.) it seems methodologically sound to survey the largest group that can be practically processed. The following cohort was therefore selected:

> **All community pharmacies with a deliverable postal address identified through ePACT data that are known to have dispensed a BCH FP10 during the period June 2008 to May 2009**

Figure 4 Community pharmacy survey. Schematic of response



3.3.5.2. Survey type

A postal self completion questionnaire was used for this survey for the following reasons:

1. In April 2008 there were approx.13,000 community pharmacies registered with the RPSGB however only 800 (6.2%) of these had recorded email addresses (Personal communication Registration Department RPSGB to D Terry 10th April 2008: Used with permission). Obtaining email addresses for an electronic survey may therefore be impractical.
2. 1,282 pharmacies with deliverable postal addresses were identified as dispensing BCH FP10 prescriptions during the period June 2008 to May 2009 inclusive. Identifying the pharmacist managing each pharmacy may not always be possible and where it is possible will have resource implications to identify over 1,200 or more pharmacists. Questionnaires were therefore addressed to the 'Pharmacist in Charge'.

3. ePACT data provides the postal address of pharmacies identified as dispensing BCH 'FP10' prescriptions.
4. Telephone surveys of a large study cohort were deemed impractical.
5. Pharmaceutical needs assessments carried out by PCTs have successfully used postal surveys of community pharmacists.(88-90)
6. Sufficient responses after 2 reminders are likely to be harvested for this cohort.(85)
7. The survey pilot group considered that a postal survey with two reminders was an appropriate instrument for this type of cohort.

The following survey type was therefore selected:

Postal survey addressed to 'Pharmacist in Charge' with two reminders if necessary

The instrument was constructed in MS Word, with block questions designed in MS Excel. The survey was printed back to back on A5 green paper in an A5 sized booklet style. Each booklet was uniquely numbered to identify return and facilitate reminders.

3.3.5.3. Survey instrument development

The following process was followed:

1. Expert focus group to identify themes & issues
2. Question drafts within identified themes
3. First questionnaire drafted with support of study group
4. Pilot of draft with 6 community pharmacists
5. Refinement of survey instrument

3.3.5.4. Instrument pilot

The draft instrument with a covering letter was hand delivered on or near 25th July 2009 to 6 community pharmacists at their place of work who were previously identified as being willing to provide this service. All comments from participants were considered and where necessary the survey was modified. Changes included:
Minor typographical errors corrected
Emphasis enhanced (e.g. Question 5 … calendar month)
Question wording changed (e.g. Question 8, was … to dispense a prescription, changed to … to dispense a single item on a script?).

The final 48 point survey instrument is shown in Appendix 10

Survey instrument – issue, returns and reminders

The instrument was first sent by second class mail in A5 brown envelopes commencing 22nd

September 2009. The envelope included the following supplementary text to aid selection by the recipient

> 'Your opportunity to collaborate with Birmingham Children's Hospital & Aston University in important research'.

The date of posting and the date of return were recorded for each subject according to the unique identifier printed on the questionnaire. Reminders were managed using records held in MS Excel and sent at approx. + 3 weeks and + 6 weeks.

3.3.6. Survey analysis

3.3.6.1. Quality control

The following measures were taken to ensure the accuracy of the results entered into SPSS.

1. Each recipient was allocated a unique identification (ID) number and surveys were stamped with this number. Questionnaire management included recording ID numbers of surveys issued and returned.
2. Reminders were only sent to subjects where a return was not registered.
3. A small number of duplicate returned surveys were identified (ID occurring more than once, n=22). Where the demographic details were the same or substantially the same the survey with the earliest recorded return date was retained and any others discarded. Duplicates showing substantially different demographics were retained and recorded using a modified ID number since these indicted that a different pharmacist was completing the survey (n=9).
4. Each survey question or data point was defined in SPSS v16. Closed questions were defined so that codes were assigned to all answer options including codes for missing answers (unanswered questions) and, where applicable, codes for answers = not applicable. Missing answers were excluded from valid results during analysis.
5. Each survey question or data point was assigned as one of either nominal (n=11), ordinal (n=32) or scale (n=7) as appropriate according to the data type.
6. Frequency statistics were generated in SPSS for each question and results examined. Any identified un-coded answers for closed questions were examined and corrected as necessary.

3.3.6.2. Data entry

All data was entered by hand into the pre-defined SPSS dataset file using defined codes for answers to closed questions. Open question free text answers were entered into SPSS verbatim. NVivo and MS Excel were used to record codes assigned to free text answers and the production of descriptive statistics. Codes were assigned by the lead researcher in accordance

with the perceived meaning of the text. A maximum of two codes were assigned to each free text answer. Codes were defined and refined as the answers were systematically considered to ensure consistent and appropriate codes were assigned. See results in Chapter 12.

3.3.6.3. Data analysis

Data was analysed using SPSS statistical tools as appropriate, with the tools 'descriptive statistics - frequencies' and 'descriptive statistics - descriptives' used most often. Histograms of relevant data records were used to determine the general distribution of the results e.g. whether normalised data was obtained. Paired samples of non-nominal data (ordinal or scale) were analysed with non-parametric 2 pair-sample (Wilcoxon) tests.

3.4. Medication reconciliation

The aim of this study was to:
Determine the clinical significance of medication reconciliation on admission to hospital for paediatric patients taking long-term medication.

A secondary aim was to:
Determine the influence of caregiver described drug regimens on admission medication orders.

3.4.1. Statistical considerations for study power

The finding that at least 10% of children were at clinically significant risk in the absence of medication reconciliation was considered to be sufficient to support the introduction of medication reconciliation in this setting. With a sample size of 100, a two-sided 95% confidence interval for a single proportion using Wilson's method (91) would range from 13.3% to 28.9% for an expected proportion of 20%. That is, the power of the study would be sufficient to identify a change from 20% to below 13.3% or above 28.9%.

A study cohort of 100 was therefore targeted. Since the medication reconciliation could only be undertaken during pharmacy opening hours a proportionately larger population would be required to enroll 100 subjects. Hours of admission to the ward were approximately 3 times that of the Pharmacy opening hours. It was therefore estimated that a total population of some 300 admissions would be required to recruit 100 subjects.

One hundred consecutive patients (57 boys and 43 girls) who were admitted to the neurosurgery ward at Birmingham Children's Hospital between September 2006 and March 2007 were included in this study. This cohort was derived from a total population of 293 admissions. The study was confined to routine pharmacy operational hours – usually 9am to

5pm on weekdays only. Patients were excluded from the study if:

(i) their caregiver was not available for interview

(ii) the admission medication order (AMOs) information (e.g. medication chart) was not accessible

(iii) the medication reconciliation could not be completed for practical reasons (e.g. at weekends)

Patients admitted to this neurosurgical ward did not have a pharmacist-derived medication history taken nor routine medication reconciliation prior to the study period. On this ward, initial AMOs were expected to match prescribed pre-admission medication (PAMs) prior to clinical review. All medication orders were written on hospital-approved stationery by medical staff.

For the purposes of this study, four assessment stages in the medication pathway were considered as a patient moves from primary care to hospital-care.

- Stage 1: The patient's current pre-admission medication (PAM) – usually prescribed by the GP.
- Stage 2: The patient's own drugs as dispensed (PODs) – usually dispensed by a community pharmacy.
- Stage 3: Caregiver-administered or supervised drug regimens.
- Stage 4: Initial admission medication orders (AMO) – prescribed medication orders immediately after admission to hospital.

Medication reconciliation was conducted by the lead researcher which enabled the identification of medication at each of the four assessment stages. Each is described below. Information obtained was recorded in MS-Excel.

3.4.2. Determination of PAM – Stage 1

The prescribed PAM was determined by telephone contact with the patient's GP practice or, if prescribed by a hospital physician, from their referring information or hospital records. PAM details were provided by 38 GP practices. Two practices asked for confirmation of the request (confirmed by written [faxed] request on both occasions). Information was provided by the GP personally on one occasion; on all other occasions requested information was provided by reception/administrative staff. Two GP practices could not be contacted after two or more phone calls during office hours within the in-patient period of the patient concerned.

3.4.3. Examination of the Patient's Own Drugs (PODs) brought in on admission – Stage 2

Details of PODs brought in on admission were recorded on the ward by qualified pharmacy

technicians. PODs were used within the medication reconciliation process to support the identification of long-term medication and were compared with PAMs.

3.4.4. Identification of most recent medication regimens described as administered or supervised by caregiver(s) prior to admission – Stage 3

These data were determined using a brief semi-structured interview with the patient's supervising caregiver(s). This included:

1. Current prescribed medication being taken by the patient
2. Any OTC or purchased medicines being taken by the patient
3. Patient allergy status
4. Specific enquiry about the use of inhalers or topical products
5. Whether any PODs had been brought into hospital

This information was obtained from the caregiver(s) before discussing with them the intention of obtaining similar details from the relevant GP practice. The caregivers' agreement to approach the GP was requested after the interview and before contacting the GP; the caregivers agreed on each occasion. Caregiver identified drug regimens were used within the medication reconciliation process to support the identification of long-term medication and were compared with PAMs.

Stages 1–3 were used collectively to support identification of all long-term medication for each study patient.

3.4.5. Initial AMOs prescribed on admission to the Neurosurgical ward – Stage 4

Data for initial AMOs were sourced from the patient's medication treatment sheet, from their clinical notes, or both. AMOs were compared with PAMs and any disparities were identified.

3.4.6. Source sensitivity

The three medication information sources (PAM, PODs, and caregiver regimens) were considered by the lead researcher to determine in their opinion the most likely pre-admission long-term medication required by each patient at the time of admission. These are termed validated continuing medication (vCM). The sensitivity of each information source to identify the vCM was determined using the formula:

Sensitivity = nTrue Positives / Sum of nTrue Positives + nFalse Negatives

Where:

- True positive - source equals vCM
- False negative - source does not equal vCM, often dose mismatch or drug not mentioned (that is, the source is indicating a different regime and that is incorrect)
- False positive - source indicates a drug that is not a vCM

Source specificity could not be determined within these circumstances since the source information could not be considered to provide an accurate (true) negative result. That is, within the methodology a source could not provide a true negative result.

All data were ultimately recorded and manipulated using Microsoft Office Excel® 2003. Ethical approval for this study was deemed to be unnecessary since the Central Office for Research Ethics Committees advised that the investigation was considered to be a service evaluation. Patient anonymity was maintained throughout the study by removing patient identifiers from study records (MS-Excel) after all results were collected.

3.4.7. Expert clinical panel

An expert clinical panel was convened on the 7th July 2008 to consider the clinical significance of identified prescribing disparities within the medication reconciliation study. The multidisciplinary panel consisted of:

Consultant paediatric neurosurgeon
Two junior paediatric surgeons
Clinical nurse specialist
Two hospital clinical pharmacists

A prescribing disparity was defined as a difference between the PAM and the initial AMOs. The panel were presented with the following information:

1. Patient's age
2. Pre-admission medication (usually most recent GP regimen)
3. Corresponding AMO (or 'not prescribed' if omitted)
4. The defined categories of disparities.

Using the method established by Cornish et al., (73) the panel determined the clinical significance of each disparity identified in the study. The panel considered the likely outcome as

if the change in medication were to be maintained for an indefinite length of time during the in-patient episode and for a minimum of 7 days.

Each disparity was ranked to one of the following three classifications
Class 1: Unlikely to cause patient discomfort or clinical deterioration.
Class 2: Potential to cause moderate discomfort or clinical deterioration.
Class 3: Potential to result in severe discomfort or clinical deterioration.

Each disparity was assessed individually, and the clinical significance of the findings was considered by the panel in open discussion until a consensus was reached. Thereby, each disparity was allocated an integer score of 1, 2, or 3. A consensus was reached in all cases.

4. Statistics

Statistical analysis was conducted using SPSS v16 (Statistical Package for Social Services) or PASW Statistics v18 software – both copyright IBM Corporation.

The following data tables were created during the course of this programme of study:

1. Medicines management strategies in West Midlands (prevalence of codes)
2. Advice provided by PCTs to GPs concerning medication on admission to hospital
3. Medical staff survey
4. Nursing staff survey
5. Rescue-medication survey (caregivers)
6. Community pharmacists survey

Variables were defined according to their measures and assigned as one of the following: nominal, ordinal or scale. Where appropriate missing responses were defined for variables to enable appropriate statistical handling of the data.

Descriptive statistics were created for all variables to facilitate the production of summary results and as a quality control measure for data. All variables within a table were examined and any identified data anomalies corrected before the production of statistical values.

Data distribution (e.g. Normal distribution) was considered before selection of the appropriate statistical test for significance. The following tests for significance were used during this programme of study:

1. Wilcoxon – 2-paired samples of ordinal or scale data
2. Pearson Chi squared – for cross-tabulation data
3. Fisher's exact test – for cross-tabulation data where cell values are small (e.g. < 5)
4. Jonckheere -Terpstra test – for trends in medians across categorical data.

Significance testing between variables was undertaken after a hypothesis of a relationship was determined.

4.1. Calculated mid-points

The total frequency of responses to closed numerical values was estimated based on the mid-point of the range. For example, the table below shows the frequency of response by hospital nurses to organize repeat prescriptions for home-patients. See Table 21

Rxs in 3/12	Frequency	Valid Percent
Never	57	26.6
1 to 5	80	37.4
6 to 10	29	13.6
11 to 30	29	13.6
> 30	19	8.9
Total	214	100.0
No answer	5	
Grand total	219	

The estimated frequency of response to requests to organise repeat prescriptions for home-patients, total frequency of response, was calculated by using the mid-points of each range and multiplying by the frequency of occurrence. Where the range was open-ended (e.g. > 30) the band width was considered to be in the same ratio as the percentage of cases in the previous highest band, then rounded to nearest integer.

Worked example:

To determine the band-width of > 30 category.

Using 11 to 30 band, the band-width = 19 (30 -11) and the percentage of cases = 13.6% (29/214). The ratio of band-width to percentage of cases = 140 (19 / 0.136).

For the > 30 band, the ratio of the band-width to the percentage of cases is assumed to be the same, 140. Therefore the assumed band-width of the > 30 category is 12 since the percentage of cases in this category is 8.9% (12.46 / 0.089 = 140 and the nearest integer is 12).

5. LITERATURE SEARCHES

A total of 9 major literature searches were conducted within this study programme. These were conducted often utilizing the following terms:

- PHARMACISTS
- PHARMACIES
- OUTPATIENTS
- MEDICINES-MANAGEMENT
- CLINICAL PHARMACY
- PHARMACEUTICAL CARE
- INTERFACE
- MEDICINES RECONCILIATION
- PRIMARY CARE
- SECONDARY CARE
- HEALTH SERVICES ACCESSIBILITY
- INTERPROFESSIONAL RELATIONS
- PRESCRIPTIONS DRUG
- PHARMACY
- HOSPITAL PHARMACY
- PHARMACY RETAIL
- PHARMACY SERVICE
- PATIENT CARE TEAM
- COMMUNITY PHARMACY SERVICES
- PHARMACY SERVICE HOSPITAL
- PRESCRIPTIONS DRUG
- DRUG THERAPY COMPUTER ASSISTED
- CLINICAL PHARMACY INFORMATION SYSTEMS
- HOME CARE SERVICES HOSPITAL BASED
- CONTINUITY OF PATIENT CARE
- DELIVERY OF HEALTH CARE INTEGRATED
- AFTERCARE
- PATIENT ADMISSION
- PATIENT DISCHARGE
- PRIMARY HEALTH CARE
- CO-OPERATIVE BEHAVIOUR
- MEDICATION ERRORS
- REPEAT PRESCRIBING

- SEAMLESS CARE
- INTEGRATED HEALTH CARE

In addition to these terms search strategies were tailored to the individual studies described within this thesis.

The following databases were used:

- Cinahl
- Embase (1974 to date)
- King's Fund
- Medline (1950 to date)
- DH Data

Access was via Dialog Data-star using Athens accounts.

Usually abstracts of references were reviewed to identify suitable publications for full review.

Copies of articles and reports were either downloaded via internet library facilities or hard copies have been obtained from The Royal Pharmaceutical Society of GB library, Birmingham Children's Hospital Library or Aston University Library upon completion of copyright declaration forms. References were managed using EndNote software (version 10).

Zetoc alerts were requested for key terms including medicines management.

6. Medicines management strategies in the West Midlands Health Economy: the inclusion of interface issues

6.1. Introduction

In July 2004 the Department of Health published a revised set of overarching standards for all NHS healthcare organisations. The standards reflected the direction set by the NHS Improvement Plan (92) and provide a framework for continuous improvement in the quality of care patients receive. The then Healthcare Commission (HCC) held responsibility for assessing performance of all NHS Trusts against these standards.

These standards are organised within seven domains. Each domain contains compulsory 'core standards' and 'developmental standards' against which progress is measured. Within the Safety domain there is a Core Standard requiring NHS organisations to have systems in place to ensure that medicines are handled safely & securely (C4).(93) To be compliant with this core standard NHS bodies must show that they

"… keep patients, staff and visitors safe by having systems to ensure that medicines are handled safely and securely."

The national results of the audit for 2006-2007 (standard C4d) are shown below. Nationwide 84% of Trusts were declared to be compliant with 87% compliance within the West Midlands region.

Table 1 National results of HCC Annual Health Check 2006-2007 for standard C4d

Standard C4d * classification	Frequency
C = The trust is **compliant** against this standard	332
IA = The trust has **insufficient assurance** to fully determine whether it is compliant against this standard	14
NM = The trust has **not met** this standard	41
DA = The trust has had its **declaration** of compliance **adjusted**. This means that we found that other evidence (gathered, for example, during an inspection visit) did not adequately support this trust's declaration of compliance	7
N/A = This standard is **not applicable** to this type of trust	0

** Standard C4d states: 'Healthcare organisations keep patients, staff and visitors safe by having systems to ensure that medicines are handled safely and securely.'*

Possibly the most common method to satisfy this standard is to have in place a medicines management policy or strategy. These documents, ratified by the Boards of the organisations,

set out the key medicines management issues for each organisation and how they will deliver their obligations for safe, effective and efficient use of medicines.

This study aimed to identify healthcare interface themes within the medicines management strategies of NHS organisations within the West Midlands and to compare and contrast these across the healthcare sectors (primary care and acute/hospital services). By definition interface issues require the collaboration of organisations in both sectors. Where both sectors place emphasis on an interface issue then collaboration and service delivery may be supported. Where sectors place different importance on any interface themes then collaboration and service delivery may be impaired.

A preliminary study was conducted during 2007. Objectives of this study were:

1. To obtain suitable documents from NHS organisations in the West Midlands
2. To compare and contrast interface issues across the sectors
3. To support the identification of changes to interface issues over time (The 2007 study may provide sufficient background to identify changes in strategies obtained in 2009).

An in depth knowledge of the medicines management interface issues, as described by NHS organisations in the West Midlands, also directs identification of issues for further investigation and provides a basis for this programme of studies.

PCTs commission services from acute Trusts and so key medicines management issues for PCTs are likely to be included in SLAs agreed with PCTs. Therefore medicines management issues important in the view of PCTs, but needing delivery by their commissioned acute Trusts are expected to be included in PCT medicines management documents.

6.2. Results

By following the described methods a total of 16 medicines management interface themes were identified and coded. These are:

1. Patient's own drugs (PODs) – where the documentation indicates the use of PODs in the organisation (or commissioned organisations).
2. Discharge summaries - where the documentation indicates transfer of information to primary care (hospital to GP).
3. FP10HP(s) – or equivalent prescription forms, written in the organisation concerned but dispensed by CPs.
4. Pre-packs. Pre-packed medication, that allows supply by non-pharmacy staff, in use in the organisation (or commissioned organisations).

5. Improve cost effectiveness. Where the documentation indicates interface working to improve the cost effective use of medicines.
6. Unlicensed medicines. Where the documentation indicates the use of medication unlicensed in the UK within the organisation (or commissioned organisations).
7. Out-patient prescriptions. Where the documentation indicates the arrangements for issuing out-patient prescriptions within the organisation (or commissioned organisations).
8. Joint formularies. Where the documentation indicates cross-sector collaboration to agree and use defined drug formularies.
9. Admission medication. Where the documentation describes the arrangements for confirming admission medication, usually by using medication reconciliation.
10. High cost drugs / PbR (Payment by results). Where documentation describes the arrangements for managing high cost drugs, usually in relation to Payment by Results, within the organisation (or commissioned organisations) and across the health economy.
11. NICE – National Institute for Health and Clinical Excellence. Where documentation describes the arrangements for managing NICE guidance within the organisation (or commissioned organisations).
12. ESCA – Essential Shared Care Agreement. Where documentation describes the development and / or use of shared care agreements across the primary – hospital healthcare interface.
13. Seamless care. Where documentation describes the processes for promoting medicines related seamless care as a patient transfers from one healthcare sector to another.
14. Access to medicines. Where documentation demonstrates the organisation's processes to support access to medicines by patients e.g. such that where prescriptions are received by patients they have acceptable access to the required medicines; or working with out-of-hours providers and LPCs & community services to ensure medicines availability.
15. Safer use of medicines (across the primary – hospital healthcare interface). Where documentation supports this aspect of medicines management e.g. arrangements for methadone administration transfer between organisations; safe use of medicines within commissioning; committees with a remit to promote this aspect of care (e.g. Area prescribing committees).
16. One-stop dispensing. Where documentation describes the use of one-stop dispensing within the organisation (or commissioned organisations).

A total of seven strategies/policies were obtained (41%) during the preliminary study. Reasons for declining to provide a strategy/policy were: existing documents were out of date or being revised (8 cases) or due to a recent merger policies needed to be coalesced (1 case).

Documents were received from one further organisation but these were deemed to not be equivalent to a medicines management strategy/policy and were excluded from the results. The 7 documents (4 from PCTs, 3 from hospital trusts) were examined for aspects relating to interface (medicines management) issues.(59, 74-79)

The following documents were collected and analysed during the preliminary study.

Table 2 Medicines management documents analysed during the preliminary study

ID	Organisation	Category	Sub-category	Document	Implement-ation Date
1.BUR	Burton Hospitals NHS Trust	Hospital	General Hospital	Medicines Management Policy	24.08.2006
1.HER	Hereford Hospitals NHS Trust	Hospital	General Hospital	Medicines Management Strategy	25.07.2005
1.GHH	Good Hope Hospital NHS Trust	Hospital	General Hospital	Medicines Management Strategy	26.05.2004
1.HOB	Heart of Birmingham PCT	PCT	PCT	Medicines Management Strategy	01.04.2005
1.SW-PCT	Sandwell PCTs	PCT	PCT	A strategy for medicines management and pharmacy development in Sandwell Primary Care Trusts 2005-2008	24.11.2005
1.SB-PCT	South Birmingham PCT	PCT	PCT	Prescribing and Medicines Management Strategy 2005 - 2008	09.11.2005
1.W-PCT	Walsall PCT	PCT	PCT	Medicines Management Strategy	01.03.2005

Each of these documents was analysed to identify the Interface themes described above. The frequency of occurrence of each theme within the preliminary documents is shown below. Where statistical significance between the organisation categories is determined the p value is also shown.

Table 3 Coding frequency of medicines management documents (preliminary study, hospital & PCT significance testing)

	Category		
Code	**Hospital (n=3)**	**PCT (n=4)**	**Fisher's Exact Test (p value)**
PODs	3	2	
Discharge summaries	0	2	
FP10(HP)s	1	0	
Pre-packs	1	0	
Improve cost effectiveness	2	3	
Unlicensed medicines	3	0	0.03
Out-Patient Rxs	0	0	
Joint formularies	2	4	
Admission medication	0	0	
High cost drugs / PbR	2	3	
NICE	3	4	
ESCA	1	3	
Seamless care	1	1	
Access to medicines	0	2	
Safer use of meds across the interface	0	3	0.14
One-stop dispensing	1	1	

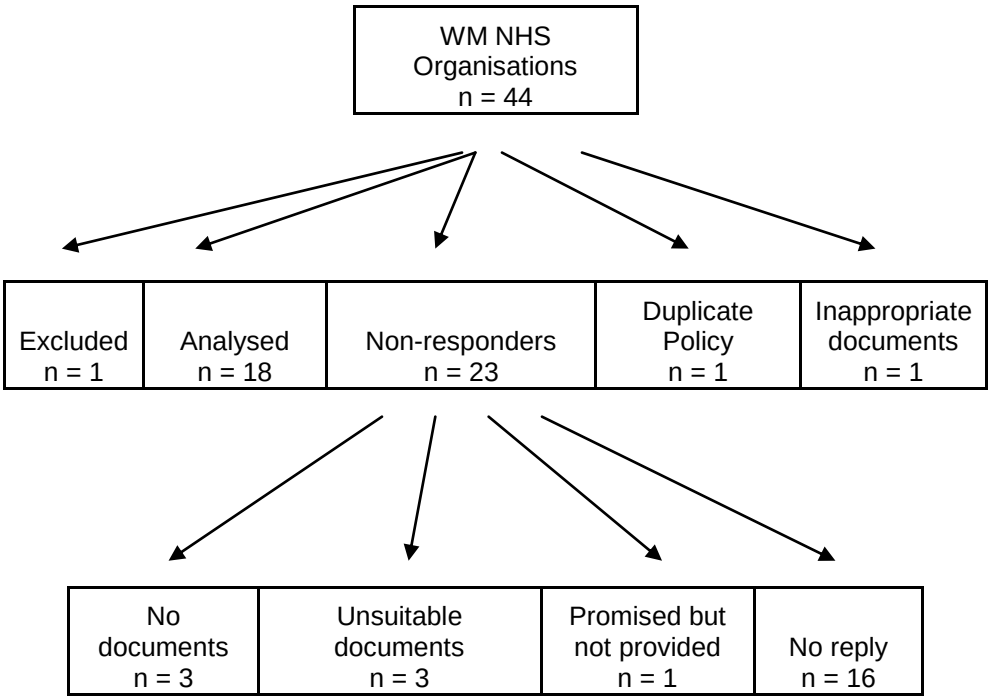
6.2.1. Main study 2009

Of the 44 NHS organisations in the West Midlands a total of 21 organisations provided documents (48%). Of these 3 were not analysed: 1 organisation had their pharmacy services provided by another WM NHS Trust and used their policies and procedures; one was from the WM Ambulance Service and was not considered appropriate for this study; and another was from a Mental Health partnership Trust where the documentation did not relate to medicines management policy or strategy. Therefore 18 documents (42%) were analysed. The WM Ambulance Service was excluded from the study cohort (n = 43).

Of the 23 non-responders:

- 3 did not have a document of this description
- 3 stated their documentation was not suitable for consideration
- 1 promised to provide the document but none was received
- 16 no replies

Figure 5. 2009 WM medicines management strategies study. Response schematic



The documents shown in Table 4 were obtained and analyzed.

At the time of the analysis (01.11.2010) 4 of the documents were past their declared review date and another 6 did not show a review date. Eight documents were therefore confirmed as current.

Table 4 Medicines management documents analyzed (main study)

ID	Organisation	Category	Sub-category	Document	Date
BSM	Birmingham & Solihull Mental Health NHS Trust	Hospital	Mental Health	Medicines Code	Nov-07
BCH	Birmingham Children's Hospital NHS Trust	Hospital	Paediatrics	Medicines Policy	Oct-08
BUR	Burton Hospitals NHS Trust	Hospital	General Hospital	Medicines Management Policy	Sep-07
GEH	George Elliott Hospital NHS Trust	Hospital	General Hospital	Medicines Management Strategy	2008
HEF	Heart of England NHS Foundation Trust	Hospital	General Hospital	Pharmacy and Medicines Management Strategy	2007
HER	Hereford Hospitals NHS Trust	Hospital	General Hospital	Medicines Management Annual Report 2008/9	10/07/2009
H-PCT	Herefordshire PCT	PCT	PCT	Prescribing & Pharmacy LDP 2004/05 - Medicines Management Strategy	Spring 2004
W-PCT	NHS Walsall	PCT	PCT	Medicines Management Strategy	Oct-08
NSCT	North Staffordshire Combined Healthcare NHS Trust	Hospital	Mental Health	North staff combined Medicines Management Policy	15/01/2009
SWB	Sandwell & West Birmingham Hospitals NHS Trust	Hospital	General Hospital	Medicines Management Policy	Dec-07
SMH	Sandwell Mental Health & Social Care Trust	Hospital	Mental Health	Medicines Management Policy	12/11/2008
SW-PCT	Sandwell PCT	PCT	PCT	Medicines Management Strategy	Oct-09
SCT	Solihull NHS Care Trust	PCT	Care Trust	Policy For The Handling Of Medicines Within Healthcare Services	Dec-08
SB-PCT	South Birmingham PCT	PCT	PCT	Prescribing and Medicines Management Strategy	2008
SSS	South Staffordshire and Shropshire Healthcare NHS Foundation Trust	Hospital	Mental Health	Medicines Management and Pharmacy Strategy	2007
T-PCT	Telford & Wrekin PCT	PCT	PCT	Medicines Management Strategy	2009
UHB	University Hospitals Birmingham NHS Foundation Trust	Hospital	General Hospital	Medicines Policy	27/11/2008
UHC	University Hospitals Coventry & Warwickshire NHS Trust	Hospital	General Hospital	Medicines Policy	Mar-05

The frequency of coding is shown in Table 5 together with Fisher's Exact Test estimates where significance is indicated or approached.

Table 5 Coding frequency of medicines management documents (main study, hospital & PCT significance testing)

	Category		
Aspect	**Hospital (n=12)**	**PCT (n=6)**	**Fisher's Exact Test (p value)**
PODs	10	2	0.11
Discharge summaries	3	4	
FP10(HP)s	5	1	
Pre-packs	5	0	
Improve cost effectiveness	3	4	
Unlicensed medicines	11	2	0.02
Out-Patient Rxs	4	2	
Joint formularies	6	6	0.05
Admission medication	7	5	
High cost drugs / PbR	2	5	0.01
NICE	5	6	0.04
ESCA	6	3	
Seamless care	3	3	
Access to medicines	2	1	
Safer use of meds across the interface	5	5	
One-stop dispensing	5	2	

Statistical analysis of results at the sub-category level of NHS organisations is inappropriate since there are too few results within each grouping to provide meaningful results when using Fisher's Exact Test.

Preliminary (2007) verses main study (2009)

When taken as a whole (all categories of organisations), there is one statistically significant difference between the preliminary study results and those from the main study concerning 'medication on admission' which was not found in any of the preliminary documents (n = 0) but was found in the main study (n = 12) (p = 0.003, Pearson's Chi-squared).

PCT changes between preliminary (2007) and main study (2009)

One statistically significant difference was found between PCT documents in the preliminary study and in the main study: 'medication on admission' (preliminary n = 0, main n = 5, p = 0.048 Fisher's exact test).

Hospital changes between preliminary (2007) and main study (2009)

No statistically significant changes were found for hospital documents in the preliminary study and those in the main study using Fisher's exact test. However, 5 themes were not found in the 2007 documents (n = 0) but were in the 2009 documents. These are; discharge summaries (n = 3), medication on admission (n = 7), access to medicines (n = 2), safer use of medicines across the interface (n = 5) and out-patient prescriptions (n = 4).

6.3. Discussion

6.3.1. Main findings

Table 3 shows the frequencies of interface issues found within the documents in 2007 and separated into the two sectors. At this point in time there was statistical significance between the sectors for unlicensed medicines (hospital n=3, PCT n=0, p=0.03) and the issue safer use of medicine across the interface approaches significance (hospital n=0, PCT n=3, p=0.14). However, both may be considered important findings.

Arrangements for the prescribing of unlicensed medicines are an important issue across the healthcare sectors for paediatrics. Many children needing long-term medicines will require unlicensed medicines, (63, 68, 94) since there are difficulties in the development and provision of age-related formulations. There may be uncertainty over which sector will prescribe on-going unlicensed medicines for children: hospital or GP. Clarity of arrangements for prescribing such items post discharge from hospital is a prerequisite for seamless care. In 2007 unlicensed medicines appear to be an important issue for hospitals (n=3) but less so for PCTs (n=0). The 2007 study pre-dates the recent rise in interest in unlicensed medicines by PCTs as evidenced by letters on the subject to their GPs, (95) and the media (96) and through guidance provided by the NPC in 2009.(57) In contrast hospital pharmacy departments are likely to have to manage unlicensed drugs used in their institutions and the additional risks they pose, and this may account for the inclusion of this issue in hospital documents in 2007. This difference between the two sectors is also seen in 2009 (hospital n=11, PCT n=2, p=0.02). In fact only one PCT includes comments about monitoring the prescribing of unlicensed medicines in the 2009 study. Maintaining access to both licensed and unlicensed medicines for children outside hospital is essential for their clinical management and is a requirement within the NSF for children.(62) The lack of cross-sector arrangements to ensure access to long-term medicines for children has prompted a major line of enquiry within this study programme and conclusions and recommendations are described elsewhere.

This study indicates a change in the inclusion of ‘safer use of medicines across the interface’ issues within the documents analysed. In 2007 this issue was only identified within the PCT documents (hospital n=0, PCT n=3, p=0.14). By 2009 some hospital Trusts had included this issue in their documents (hospital n=5, PCT n=5, p=0.15). In some measure hospitals appear to be catching up with PCTs over this issue. The NPC describes Area Prescribing Committees (APCs) as having an important role in this aspect of cross-sector collaboration.(97) Traditionally APCs were managed and run by PCTs and as commissioners they are predictably concerned with medicines safety across the interface. The greater inclusion of this issue within hospital Trust’s documents by 2009 is welcome and may reflect an increasing level of collaboration

between the sectors, with hospital Trusts adopting a more integrated approach to medicines management. One of the four programme aims of the Commissioning for integrated Medicines Management initiative by the NPC was: *To enable the safer use of medicines* (98) which was reported in 2009.

This study also demonstrates some important changes over time in respect to admission medication, and the exchange of medication related information from primary care to hospital on admission. In 2007 no documents were found to address this issue (hospital n=0, PCT n=0) and this observation prompted a survey of PCT provided guidance to GPs (Chapter 8) within this study programme. By 2009 this issue was appearing in documents (hospital n=7, PCT n=5) and is the only statistically significant change between 2007 and 2009 when both sectors are included in the analysis (p=0.003). Two national guidelines were produced in the interim period 2007 to 2009. In December 2007 NICE-NPSA published guidance regarding medication reconciliation for adults on admission to hospital, (17) and in March 2008 the NPC published a guide to the implementation of medication reconciliation.(70) Before either of these guidelines was published PCTs were surveyed in May 2007 as part of this programme of study (see Chapter 8). Perhaps as a consequence of this work the lead researcher (DT) was appointed to the NPC focus group that provided support to the NPC publication. This publication provided for the first time a minimum dataset for medication information on admission to hospital. The change for PCTs (2007 n=0, 2009 n=5 from 6) is statistically significant using Fisher's exact test, but not so for hospital Trusts although there is a large increase (2007 n=0, 2009 n=7 from 12). The lack of cross-sector arrangements for transfer of medication information on admission to hospital for paediatrics has prompted a major line of enquiry within this study programme and conclusions and recommendations are described elsewhere.

The preliminary study in 2007 has provided an invaluable insight into cross-sector medicines management issues for paediatrics. In particular it confirmed concerns relating to:

1. Information transfer on admission to hospital
2. Access to long-term medication for children outside hospital, since there were important issues relating to both 'access to medicines' (of minor importance for hospitals, n=0) and 'unlicensed medicines' (of minor importance for PCTs, n=0).

The preliminary study generated too few results to provide in itself conclusive evidence for interface problems relating to paediatrics. However it consolidated identified problems during field work at the beginning of this research programme and confirmed the importance and potential usefulness of the studies reported in this thesis.

The 2009 study demonstrates some changes in the medicines management documents of the organisations concerned over a two year period and current differences between the sectors.

In addition to the issue of unlicensed medicines discussed above, the sectors show a statistically important difference in 2009 for 4 other identified themes. These are:

1. Patients' own drugs PODs (hospital n=10, PCT n=2, p = 0.11, approaching but not reaching usual interpretations of significance at the 5% level). The importance to hospitals of managing PODs appears to be more important than for PCTs. This is as expected since using PODs for in-patient episodes, pending their individual examination and approval, is now widespread in hospital practice. Interestingly the NMC has recently confirmed that under certain circumstances trained registered nurses may approve PODs for use (by their owners) when in-patients.(99) This use of primary care supplied medicines within a secondary care setting breaches usual understandings of funding pathways for drugs. Since the hospital is funded by the commissioner (PCT) to provide care for the in-patient, including for all medication within the terms of PbR (81) arrangements, the use of PODs may be a sensitive issue. PCTs may be reluctant to openly support such schemes even though this is expected practice and linked closely with one-stop dispensing endorsed by government policy.(23, 59)

2. Joint formularies (hospital n=6, PCT n=6, p=0.05). All PCT documents focus on joint cross-sector formularies, whereas only half of hospital documents describe joint formularies. Perhaps as much as 40% of primary care prescribing is known to be influenced by secondary care recommendations.(59) PCTs may therefore see joint formularies as a measure to control primary care as well as secondary care prescribing.(97) In practice PCT organised Area Prescribing Committees may take the lead in developing joint formularies whereas hospital Trusts' formularies may be managed by their Drugs & Therapeutics Committees (DTC). These committees may have representation from primary care but are arguably less focused on cross-sector issues than APCs.

3. High cost drugs / payment by results (hospitals n=2, PCT n=5, p=0.01). The text of PCT documents focuses on the management and control of high cost drugs and especially those outside of tariff within PbR; with the expected outcome of managing drug related financial risks. Only two hospital documents comment on this issue. Both of these state that agreement to use high cost drugs not included in PbR funding arrangements need the approval of the relevant PCT. Hospitals that use these non-tariff drugs may incur the financial burden of their use without reimbursement from PCTs unless and until the PCT has agreed that they may be used. Such requests, often submitted as an 'Individual Funding Requests' (IFRs) usually require prior agreement from the patient's PCT if the funding is to be recovered. Hospitals that do not follow this process are likely to be at financial risk, which can amount to quite large

sums of money. BCH claimed over £400,000 for one month December 2010 via this mechanism. [Information on file, provided 28th January 2011, used with permission.] It is therefore surprising that such important financial processes are not usually found in greater numbers of hospital policies.

4. NICE (hospital n=5, PCT n=6, p=0.04). Appropriate consideration and adoption of NICE guidance is found in all PCT documents but in less than half of those for hospitals. All NHS organisations in England are obliged to **consider** NICE guidance within 3 months of publication. Adherence is not strictly required but a reasoned management plan for the organisation is required. Funding of NICE guidance must be made available for a technology appraisal within three months of final guidance being issued by NICE. Other types of NICE guidance, such as clinical guidelines, are not covered by the funding directive, which is confirmed within the NHS Constitution. (100) PCTs may expect '… robust implementation … ' (79) , ' … prescribing … in line with NICE … guidance …', (59) and may require provider units to '… demonstrate implementation …' of NICE guidance.(101) PCTs may see implementation of NICE guidance as evidence of good clinical practice and of patient management that is independently and nationally considered to be appropriate for funding. Adopting NICE guidance may therefore be seen as a safe option for PCTs. Hospitals are seemingly less concerned to describe NICE management within their medicines management documents. Is local consideration of NICE guidance of less importance to hospital Trusts than for PCTs? This seems unlikely since they have a clear responsibility to respond to NICE guidance. Other explanations for this difference between sectors include:
    - specialist hospital Trusts may expect that a proportion of NICE guidance does not apply to them and there are 3 specialist Trusts amongst the 12 hospital Trusts in this study cohort;
    - the local adoption of NICE guidance across the health economy may be considered to be driven by PCTs in collaboration with hospital Trusts;
    - the study sample is not representative of the population it is purported to represent.

6.3.2. Strengths of this study

As far as can be determined this study identifies for the first time the similarities and differences concerning medication interface issues expressed in medicines management documents of NHS organisations.

This unique study has successfully identified important differences in the strategies of NHS organisations in the different sectors relating to medicines management interface issues. Conclusions can be attributed to board endorsed policies and can be readily verified. The

documents were relatively accessible and it is possible to track changes over time as the documents are revised and updated by the organisations. The effect of NHS re-organisations on these issues can also be tracked by this method.

The methodology uses standard qualitative techniques to identify themes within the documents obtained.

6.3.3. Limitations of this study

It is acknowledged that the responding organisations may also have other written policies on medicines management interface themes even if not included within their Medicines Management Strategy or Policy. However it may be argued that these documents demonstrate the major medicines management considerations of the organisations since all of these documents are endorsed by their Trust Boards, as their strategy / policy, and were provided for this study in the full knowledge of its purpose.

Only 7 documents were obtained during the 2007 preliminary study and results may not be representative of WM NHS organisations at the time. Comparisons of this data across the sectors and between this data and that obtained in 2009 are therefore limited. However, it should be noted that the study cohort were all regularly represented at regional medicines management meetings convened around the time of the study to consider cross-sector issues and that these 7 organisations represent 41% of this group.

6.3.4. Comparisons with other studies

In 2003 the BMJ published an article titled; “Continuity of care: a multidisciplinary review”.(102) This paper describes the findings of a literature review relating to continuity of care, and the emphases placed by different healthcare domains. This work focused on the meaning of continuity of care in the different settings as found in the existing literature at the time. The authors conclude that continuity of care has two attributes. These are care over time and a focus on individual patients. By this definition the present study does not consider continuity of care but rather describes elements of service processes that contribute to cross-sector co-ordination of care.

No other studies could be identified that compares medicines management policies or documents between NHS organisations.

6.4. Conclusions

A number of medicines management interface themes were successfully identified within the documents obtained and comparisons drawn between the sectors (hospital and primary care).

This study has:

1. provided background on interface issues within medicines management policy across NHS Trusts in the West Midlands
2. prompted two major lines of enquiry within this study programme. These are:
    a. information transfer following paediatric admission to hospital
    b. the involvement of hospital services to support access to medicines for children in the community
3. demonstrated important differences between the sectors for key interface issues
4. indicates change in managing interface issues over a two year period

7. Medication reconciliation for paediatric patients on admission to hospital

7.1. Introduction

Current guidance from the Department of Health in the UK describing the responsibility for prescribing between hospital prescribers and general practitioners (GPs) is more than 19 years old,(3) but it continues to provide the basis for professional guidance.(56) In general, published guidance by UK national healthcare organisations, relating to this issue, focuses on the transfer of care and associated essential medication information during discharge (9, 13-16) with little emphasis on the admission process. The National Service Framework for Children, Young People and Maternity Services emphasizes the need for good communication between prescribers in secondary and primary care.(62) However, this guidance is also primarily directed at the transfer of patients from secondary care to primary care (discharge). As a consequence, the quality of medication information during admission to hospital has been studied less extensively than that for discharge, especially in the paediatric setting. The National Institute for Health and Clinical Excellence (NICE) in collaboration with the National Patient Safety Agency (NPSA) issued guidance in December 2007 concerning medication reconciliation (MR) at hospital admission.(17) Medication reconciliation uses the principles of taking a drug history and expands on them. Rather than relying on patient or caregiver descriptions of the medication they take, MR involves collecting essential medication information from a number of different sources and using these to conclude what a patient should be currently taking.(70) This process has been shown to give clinical benefits by reducing risk from unintentional changes to drugs in the general hospital population, (103-107) and in recent studies in paediatrics.(108-110) The full MR process involves performing this assessment at admission and then notifying the next healthcare sector of changes made to the admitting medication during the course of the patient's therapy in the current sector. NICE-NPSA guidance specifically requires MR to be conducted on admission to hospital and they have also provided a costing and reporting tool indicating that a resource requirement of £12.9 million for England per year would be needed to fulfill this requirement each year.(111) However, both the NICE guidance and the costing tool specifically exclude patients aged younger than 16 years. Prior to this present study the literature demonstrated the clinical importance of MR in adults on admission to hospital but did not provide sufficient evidence for paediatrics as reflected in the NICE-NPSA guidance of 2007.

Medication-related problems on admission frequently result from inadequate essential information transfer between healthcare professionals and also between healthcare providers and patients. (2, 43, 73, 112) The National Prescribing Centre commented that "… systems and communication often break down at the interface between healthcare settings (e.g. between primary and secondary care), leading to poor patient care".(34) The National Patient Safety

Agency confirms that the transfer of medication information across the healthcare interface is a research priority for NICE.(2)

Evidence indicates that pharmacist-derived medication histories augment those taken by medical colleagues, (51, 52, 113) and pharmacists may be ideally suited to performing MR.(114) NICE-NPSA guidance also suggests that MR on admission should be undertaken by a pharmacist. (17)

In 2003, the Royal Pharmaceutical Society of Great Britain (RPSGB) published guidelines for medication history-taking by pharmacists on admission to hospital (114) and guidance for conducting patient discharge in relation to medication.(7) More recently, the RPSGB, along with other organisations, has published a workbook for discharge and transfer planning.(9) According to the Hospital Pharmacists' Group of the RPSGB,(114) a full patient medication history should include determination of the current medication regimens as prescribed by the patient's GP. However, obtaining details of GP-prescribed medication at source may not always be practical, and hospital prescribers may rely on other sources of information. Prescribing decisions may therefore be based on information provided by a patient or caregiver, and this may become even more commonplace with the move towards greater patient/caregiver autonomy. The accuracy of information provided by this method is largely unknown although one recent study suggests this is a reliable source.(110) However this paper reports on a cohort of medically complex children and it may be expected that in this population caregivers will be familiar with the medication their children are receiving regularly, usually under their own supervision.

The primary objective of the present study was to determine the clinical significance of MR in children on admission to hospital. Supplementary objectives include: determining the influence of caregiver provided information on Admission Medication Orders (AMOs, the initial hospital prescriptions following admission) and identifying the sensitivity of available information sources to prescribed validated continuing medication. The principle reference point (gold standard) was taken as the current primary care prescriptions for long-term medication immediately prior to admission. This study considered activity in a paediatric neurosurgical unit, but is likely to reflect practice in other paediatric specialties where medication reconciliation is not conducted for children taking long-term medication.

The present study, conducted under the audit programme of Birmingham Children's Hospital, considered the prescribing pathway for paediatric patients as they transferred across the primary–secondary healthcare interface. The study identifies any 'continuing prescribed medication' (CPM) for the study cohort. The definition of CPM within this study is shown below.

Definition of Continuing Prescribed Medication (CPMs)

Medication identified by at least one source during the medication reconciliation process

as being taken or seemingly being taken by the subject on transfer across the primary-hospital healthcare interface and likely to continue to be required.

For the purposes of this study, four assessment stages in the medication pathway for CPMs as a patient moves from primary care to hospital care were considered. These were:

- Stage 1: The patient's current pre-admission medication (PAM) – usually prescribed by the GP.
- Stage 2: The patient's own dispensed drugs (PODs) – usually dispensed by a community pharmacy.
- Stage 3: Caregiver administered/described drug regimens.
- Stage 4: Initial admission medication orders (AMO) – prescribed medication orders immediately after admission to hospital

Analysis of medication policy documents described in Chapter 6 identified two major lines of enquiry within this programme of study. These were:

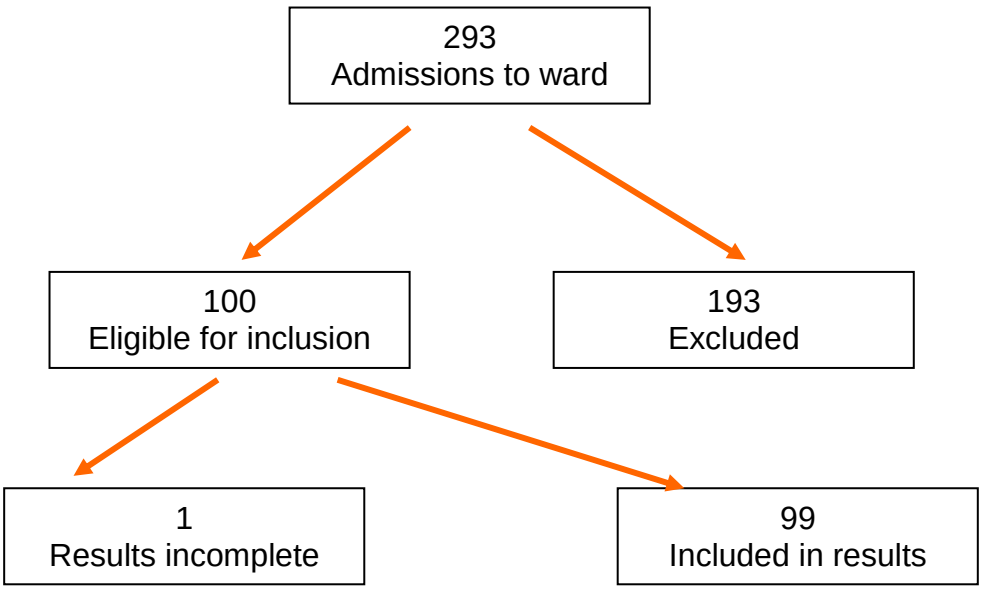
a. information transfer following paediatric admission to hospital
b. the involvement of hospital services to support access to medicines for children in the community

This is the first of two studies described within this thesis investigating medication information transfer following paediatric admission to hospital.

7.2. Results

Subjects were recruited to the medication reconciliation study during the period September 2006 to March 2007. Figure 6 below shows recruitment of patients into this study. Exclusion criteria are described in section 3.4.1.

Figure 6 Recruitment of patients to medication reconciliation study



The ages of the patients included in the study ranged from 4 months to 16 years, with a median age of 7 years and 4 months. Forty percent of study patients (n = 40) had identifiable CPMs at the time of admission.

Information concerning one patient was incomplete and was excluded from the remainder of the study. The number of CPMs identified at the time of admission ranged from zero to eight per patient. The median number of CPMs prescribed for those children taking CPMs was 2. In addition to CPMs some patients were also taking short term medication for acute clinical problems, most notably antibiotics.

Table 6. Frequency of prescribed CPMs following admission to the medication reconciliation study site during the study period

No. of CPMs at time of admission	No. of patients	Total no. of CPMs
0	60	0
1	11	11
2	10	20
3	7	21
4	4	16
5	3	15
6	2	12
7	1	7
8	1	8
Total	99	110

A total of 110 individual CPMs were recorded on admission, of which 75% (n = 83) were for oral administration. Seventy-nine percent (n = 87) of CPMs were confirmed as prescribed by the patient's GP and a further 9% (n = 10) by the patient's hospital physician. Therefore, the total number of identified prescribed PAM orders was 97. The remaining 12% (n = 13) are accounted for as follows: an inability to identify or contact the GP practice (n = 5); the patient was taking a prescription-only medication that was not prescribed for them (n = 2); the prescription could not be confidently attributed to either the GP or hospital physician (n = 4); a lack of clarity as to whether the prescription was current (n = 1); and an inability to confirm details within the timeframe of the study (n = 1).

Of the 39 patients receiving a CPM, four had medication prescribed exclusively by their hospital physician (hospital-issued prescriptions), although for one patient (subject 3) the origin of prescriptions for 4 items was unconfirmed. Five subjects had CPMs prescribed by both the GP and the hospital physician. Five subjects had CPMs prescribed from an unconfirmed source although there is some evidence that these were prescribed by the patient's GP. The remainder of patients (n = 25) had CPMs prescribed exclusively by their GP. Details of CPMs identified can be found in Appendix 4.

7.2.1. Comparison of Patient's own drugs (PODs) with prescribed Pre-admission Medication (PAM)

Of the 97 prescribed PAM orders identified, 62 were presented as PODs and were physically examined on admission, however 3 were excluded from consideration since these related to PAMs where prescribed doses could not be confirmed. Of these, 75% (n = 44) matched the intended PAM orders (stage 1 = stage 2). However, 25% (n = 15) did not match the PAM orders, including 19% (n = 11) which did not have a dispensing label and 5% (n = 3) which were labelled with a different dose from that currently prescribed (stage 1 ≠ stage 2). One medicine presented as a POD was medication prescribed for the patient's mother.

Details of PODs compared with PAMs can be found in Appendix 4.

7.2.2. Comparison of Caregiver-Described Regimens with PAM

Of the PAM orders, there was an unequivocal match with the caregiver-described regimen in 56% (n = 54) of cases (stage 1 = stage 3). Of the remaining 44% (n = 43), there were differences between the caregiver-described regimen and the PAM orders, including 2% (n = 2) which were considered minor differences (e.g. Viscotears® eye drops to be administered to both eyes when required [PAM] versus four times daily [caregiver description]). Nine percent (n = 9) of PAM orders were not mentioned by the caregiver at the interview. Other mismatches between caregiver-described regimens and PAM orders consisted of a difference in dose (11% [n = 11]), dose frequency (5% [n = 5]), or both (5% [n = 5]); lack of administration of the prescribed medicine by the caregiver on ten (10%) occasions; and a description by the caregiver of a drug regimen prescribed by the GP which subsequently proved not to be the case (and therefore is not included as a prescribed PAM). See table in Appendix 4.

7.2.3. Comparison of Initial AMOs with PAM

The initial AMOs matched the PAM orders in 54% (n = 52) of cases (stage 4 = stage 1). Of the remaining 46% (n = 45) of cases, there was a difference between the initial AMOs and the PAM orders, of which 7% (n = 7) were not considered disparities and were not appropriate for clinical assessment. The 7% consisted of 'when required' doses of inhalers (e.g. two puffs when required) to defined doses (e.g. two puffs four times daily) [n = 2]; urgent dose adjustments on admission, e.g. for asthma (n = 2); PAM-described doses as 'advised by hospital' (n = 2); and the caregiver-described regimen not actually prescribed by the GP (n = 1). The remaining 39% (n = 38) of CPMs were identified as disparities and were considered by the expert clinical panel for clinical significance. See Table 7 below.

Table 7 Medication reconciliation study. Disparites between PAM and AMOs and clinical assessment

PATIENT NO.	Rx'er	route	CPM	PAM	AMO (BCH)	PAM = AMO	DIS-PARITY	ASSESSED	LEVEL
31	GP	ORAL	PIZOTIFEN	0.5MG BD	0.5MG TDS	NO	YES	YES	1
10	GP	ORAL	CARBAMAZEPINE	80MG OM, 120MG ON	100MG BD	NO	YES	YES	1
29	GP	ORAL	HYDROCORTISONE	10MG AM, 5MG PM	10MG AM, 7.5MG PM	NO	YES	YES	1
38	GP	NASAL	NASONEX	2P OD	1P BD	NO	YES	YES	1
18	GP	INH	SALBUTAMOL INH	2P QDS PRN	1p QDS	NO	YES	YES	1
25	CONS	ORAL	CLOBAZAM	2.1ML BD	2.1ML TDS	NO	YES	YES	1
13	GP	ORAL	TRIMETHOPRIM	10MG ON	20MG ON	NO	YES	YES	1
27	GP	ORAL	TRIMETHOPRIM	20MG ON	22MG ON	NO	YES	YES	1
23	GP	ORAL	CLOBAZAM	2MG TDS	2MG, 3MG, 4MG	NO	YES	YES	1
3	UNK	ORAL	OMEPRAZOLE	4MG OM	3MG OD	NO	YES	YES	1
15	GP	ORAL	DOMPERIDONE	SUSP 3MG TDS	4MG TDS	NO	YES	YES	1
6	GP	ORAL	ATENOLOL	100MG OD	50MG BD	NO	YES	YES	1
11	GP	ORAL	RANITIDINE	150MG BD	50MG BD	NO	YES	YES	1
30	GP	ORAL	CLOBAZAM	5MG BD	5MG TDS	NO	YES	YES	1
35	GP	ORAL	GABAPENTIN	300-600MG TDS	600MG BD	NO	YES	YES	1
4	GP	ORAL	SOD VALPROATE	7ML TDS	8ML, 7ML, 8ML	NO	YES	YES	1
15	GP	ORAL	FEREDETATE	2.5MLS TDS	NO RX	NO	YES	YES	1
3	UNK	ORAL	CALOGEN	3ML QDS	NO RX	NO	YES	YES	1
21	GP	ORAL	MOVICOL PAED	1 ON	NO RX	NO	YES	YES	1
4	GP	INH	BECLOMETASONE INH	200MCG BD	100MCG BD	NO	YES	YES	2
4	GP	ORAL	SENNA	SENNOKOT 10ML ON	18ML ON	NO	YES	YES	2
16	GP	ORAL	DESMOPRESSIN	50MCG QDS	300MCG DAILY	NO	YES	YES	2
1	GP	ORAL	HYDROCORTISONE	7.5MG AM 5MG PM	7.5MG OM	NO	YES	YES	2
16	GP	ORAL	MOVICOL PAED	2 OD	NO RX	NO	YES	YES	2

PATIENT NO.	Rx'er	route	CPM	PAM	AMO (BCH)	PAM = AMO	DIS-PARITY	ASSESSED	LEVEL
20	GP	INH	BECLOMETASONE INH	50 2P BD	NO RX	NO	YES	YES	2
2	GP	INH	SALBUTAMOL INH	2P MDU	NO RX	NO	YES	YES	2
31	GP	ORAL	OMEPRAZOLE	40mg od 4/7	NO RX	NO	YES	YES	2
38	GP	INH	BECLOMETASONE INH	50MCG BD	NO RX	NO	YES	YES	2
21	GP	INH	SALBUTAMOL INH	1P MDU	NO RX	NO	YES	YES	2
21	GP	ORAL	SENNA	15MG ON	NO RX	NO	YES	YES	2
26	CONS	ORAL	CICLOSPORIN	31MG BD	150MG BD	NO	YES	YES	3
6	GP	ORAL	DESMOTABS	100MCG TDS	200MCG TDS	NO	YES	YES	3
23	GP	ORAL	VIGABATRIN	750MG BD	500MG BD	NO	YES	YES	3
16	GP	ORAL	PREDNISOLONE SOL	5MG ALT DIE	NO RX	NO	YES	YES	3
19	GP	INH	TERBUTALINE TURBO INH	1p q2h-q4h prn	NO RX	NO	YES	YES	3
2	GP	INH	BUDESONIDE INH 50MCG	8P OD	NO RX	NO	YES	YES	3
21	GP	ORAL	DESMOPRESSIN	400MCG ON	NO RX	NO	YES	YES	3
23	GP	ORAL	NITRAZEPAM	2.5MG BD	NOT GIVING	NO	YES	YES	3

7.2.4. Clinical Significance

The method used to determine the clinical significance of disparities is described in section 3.4.7 on page 56. The classifications determined by the expert panel were as follows:

- 50% (n = 19) of disparities were classified as class 1 (e.g. oral atenolol 100 mg once daily compared with 50 mg twice daily);
- 29% (n = 11) as class 2 (e.g. beclometasone inhaler 200 µg twice daily compared with 100 µg twice daily);
- 21% (n = 8) as class 3 (e.g. budesonide inhaler 50 µg eight puffs daily compared with not prescribed).

Of the 39 subjects admitted taking CPMs:

- ten (26%) had class 1 disparities
- five (13%) had class 2 disparities
- seven (18%) had class 3 disparities
- 17 (43%) did not have a disparity.

On 5% (n=2) of occasions, the panel concluded that the unintentional change to the PAM on admission, prompted by the caregiver-described regimen, was likely to lead to a clinical benefit. These were oral ranitidine 150 mg twice daily (PAM) changed to 50 mg twice daily (AMO) for a patient aged 15 months, and oral trimethoprim 10 mg at night (PAM) changed to 20 mg at night (AMO) for a patient aged 23 months. On both occasions, the change led to AMOs in keeping with accepted regimens for the size of the patient.

7.2.5. Sensitivity of source data

The sensitivity of the three sources of data (PAMs, PODs and Carer information) has been estimated against the validated continuing medication (vCM), as described within the methods (see page 55). The following results were determined:

PAM sensitivity = 0.83
POD sensitivity = 0.45
Carer sensitivity = 0.66
See Table 9 below where:

TP is True positive e.g. source equals vCM

FN is False negative e.g. source does not equal vCM, often dose mismatch or drug not mentioned

FP is False positive e.g. source indicates a drug that is not a vCM

Table 8. Medication reconciliation study. Sensitivity of data sources against validated continuing medication (vCM)

	PAM	POD	CARER
TOTAL TP	77	42	62
TOTAL FN	16	51	32
TOTAL FP	2	1	0
UNCLASSIFIED	15	16	16
TOTAL VALID	95	94	94
% TP	81%	45%	66%
% FN	17%	54%	34%
% FP	2%	1%	0%
Sensitivity	0.83	0.45	0.66

7.3. Discussion

7.3.1. Main findings

This study found that in the absence of medication reconciliation, there was a disparity between the initial AMOs and the PAM orders in 39% of cases (CPMs), and that 50% of these changes had the potential to lead to moderate (class 2) or severe (class 3) discomfort or clinical deterioration. Of the 39 children included in this study taking CPMs, 12 (31%) were found to be at risk of class 2 or class 3 changes.

Knowledge of the patient's current medication regimen as presented by the patient or their caregiver is a prerequisite for determining the AMOs. However, the hospital prescriber also needs to know the most recent medication regimen as prescribed by the patient's usual healthcare professional. Clearly, identification of differences between these sources of information is of clinical importance. This present study demonstrates the clinical significance of lay modifications to

prescribed medication and that the changes can be endorsed unintentionally as a patient moves from one healthcare setting to another. Further studies will be needed to determine if such unintentional changes are perpetuated on discharge from hospital but this seems likely if the disparity is not corrected during the in-patient episode.

In this study approximately 12.5% of children were receiving medication from both their GP and hospital consultant. Accommodating both these sources of CPMs will be necessary when constructing medication reconciliation processes for children admitted to hospital.

Interestingly, this study concluded that approximately 1 in 20 unintentional prescribing changes prompted by the parents/caregivers are likely to result in some clinical benefit to the patient. Of course the caregivers may be acting on advice from a healthcare professional, but this was not identified during the study.

From personal experience, hospital pharmacy staff often place reliance on the information taken from PODs brought in by patients and their families. However, with nearly 20% of drugs brought into hospital being unlabelled and a further 5% labelled differently from the CPM, as reported in the present study, this assumed reliance has to be questioned.

Based on these findings, the current NICE-NPSA guidance concerning medication reconciliation in hospitals (17, 111) does not appear to be justified in omitting children. The NICE-NPSA guidance uses adult studies, showing the clinical significance of MR, to provide the supporting evidence for their conclusions and recommendations. This study finds comparable results for children. See section 7.3.4 below. Denying children the benefit of MR on admission to hospital not only exposes them to additional risk during the inpatient episode but also following discharge from hospital. Uncorrected unintentional medication disparities on admission may be perpetuated as a patient is discharged, with possible increased risk.(115)

While the present study considered activity in a paediatric neurosurgical unit, it is likely to reflect practice in other paediatric specialties where medication reconciliation is not conducted for children taking long-term medication. Whilst the extent of disparities in the absence of medication reconciliation is in keeping with other adult studies generalisability remains unconfirmed. A research grant has been received (DT as project co-lead) to undertake similar studies at other sites in England with the aim of determining an optimal medication reconciliation process for paediatrics.

7.3.2. Strengths of this study

One hundred patients were admitted to this study from a total available cohort of 293 during the study period. This level of recruitment has been reported by others (73) and was accommodated within the length of the study period to recruit target numbers. Pharmaceutical services required to conduct the study were limited to pharmacy operational hours, usually 8 hours per week-day, approximately one-third of the operational period of the ward.

Standard medication reconciliation processes were used to obtain results within this study and therefore the study methods does not add significantly to workload / resource requirements for organisations undertaking medication reconciliation.

This study used NICE-NPSA approved methods to determine clinical significance of identified disparities.(17, 116)

7.3.3. Limitations of this study

Generalisability of this study is limited since the study cohort was taken from one institution and from one specialty. Numbers of patients taking long-term medicines recruited into the study is also limited. Further studies are required to provide a reliable basis for conclusions and practice recommendations.

In determining the clinical significance of the disparities detected, the expert panel considered the likely outcome as if the change in medication were to be maintained for an indefinite length of time. However, it is acknowledged that in the hospital setting, any errors in a patient's medication regimen that have the potential to cause clinical deterioration are likely to be identified and remedied. Conversely, there is a large body of evidence that demonstrates that medication errors in hospital can harm patients, including paediatric patients. (11, 33, 43, 48, 62, 72, 107, 116-127)

Children will often require dosage adjustments as they develop. It is therefore likely that any source of information concerning CPM for children could be out of date with the patient's clinical needs. However, the present study was designed to minimize these effects by identifying the most up-to-date information from both the GP practice and caregiver(s) as soon after admission as possible.

Using the most recent GP medication records (PAMs) as the baseline (gold standard) for disparities

may seem incongruent with expected clinical practice and the validated continuing medication (vCM) as determined by the ward clinical pharmacist may seem preferable. Both of these baselines have been examined within this study. From a study perspective the GP PAMs are identifiable and demonstrable where as the vCMs are subjective measures and may be variable. The PAMs are the most up-to-date records from the preceding healthcare professional and therefore the study focuses on PAMs as the standard for identifying disparities with the AMOs. Not all researchers agree with this conclusion.(110) Interestingly the PAM is more sensitive for identifying vCMs than any other source.

This study identifies disparities in medication soon after admission to hospital and therefore prompts their resolution during the in-patient episode. What is less clear is what would happen if the intervention were not made. Would other healthcare professionals act to resolve the disparity? Non-interventional studies should be considered to identify the expected outcomes in the absence of medication reconciliation.

7.3.4. Comparisons with other studies

Table 54 (Appendix 7) describes the validated continuing medication (vCM) as determined by a single experienced clinical pharmacist (DT) and enables comparison to sources of information recorded during this study. The vCM is in effect a subjective view of what the patient should be taking and may be described as the ward pharmacist's recommended therapy at the point of admission and prior to clinical review. The subjective nature of this parameter makes this measure less suitable than the PAMs as the primary reference point for this study, although Stone et. al. used it as their main reference point.(110) Estimations of test sensitivity for vCM are also shown in Table 12 using methodology similar to Stone. This present study shows highest sensitivity for PAMs (0.83) and least for PODs (0.45), with caregiver information (0.66) in between. Stone obtained very different results with caregiver most sensitive (0.75), then PODs (0.64) and PAMs (0.25), and made the observation that: "… *Parents provide accurate and only minimally incomplete information when available;".* Methodology between the two studies varies (e.g. Stone used 5 information sources) and cohort types were also different (Stone = medically complex children, this present study = neuro-paediatrics). However these cohort differences seem unlikely to fully explain the differences in results. This present study shows that prescribers of AMOs place considerable reliance on caregiver information but that this is not a reliable indicator of PAMs nor of vCMs. Indeed this present work concludes that clinically useful medication reconciliation requires obtaining PAMs from

the GP. Further work is required to examine these issues in more detail and across other cohorts for paediatrics.

NICE-NPSA guidance confirms the need for medication reconciliation in adult patients and quotes studies that demonstrate the benefits in this population.(17) One of these studies, by Gleason et al., (116) considered medication reconciliation in 204 direct admissions to an adult medical-surgical unit. This study classified the clinical significance of discrepancies between pre-admission medications and AMOs into multiple categories, and reported these in three groupings. Similar results to the present study were reported for the potential for harm during the hospitalisation period; 23% of discrepancies could have necessitated patient monitoring or intervention to preclude harm (middle-risk grouping) and 22% could have resulted in patient harm (high-risk grouping). While the classification groupings differ in definition between the study by Gleason and this present study, the percentages of patients in the middle and high-risk categories in the Gleason et al. study of adult patients are similar to those in this study in paediatric patients. NICE-NPSA quote Gleason in their guidance and so should consider the findings in this present study as evidence for medication reconciliation in patients less than 16 years of age.

7.4. Conclusions

In the absence of medication reconciliation, initial AMOs may be based on inadequate information and may lead to unintentional changes to a patient's existing prescribed medication. The practice, by hospital pharmacy staff and possibly others, of using PODs as a reliable information source of pre-admission prescribed medication is not supported by this present study. This finding has implications for routine ward pharmacy practice and SoPs for MR should reflect the limitation of PODs as an information source.

This study provides evidence of the clinical importance of medication reconciliation for children taking long-term medication on admission to hospital and promotes the adoption of this process, although not currently recommended by NICE-NPSA. The absence of medication reconciliation on admission to hospital for children increases their exposure to risks from inappropriate prescribing changes. National guidance should reflect such risks and include children within the categories of patients for whom medication reconciliation on admission to hospital is required. Performing medication reconciliation has the potential to reduce patient harm for children admitted to hospital.

Publications relating to this study are listed within the references.(128-132)

8. Medicines management on admission to hospital: advice provided by PCTs to GPs.

8.1. Introduction

Chapter 7 of this thesis demonstrates evidence of the clinical importance of medication reconciliation for children on admission to hospital. Central to conducting this service is obtaining essential medication information from the referring healthcare organisation, usually the GP. Analysis of medicines management strategies or policies described in Chapter 6 show a significant difference over time between primary care and hospital Trusts in respect to admission medication. Hospitals place greater importance on this issue than PCTs within the documents analysed. To ensure that medication reconciliation for children is facilitated it is important that the two sectors collaborate together to ensure transfer of essential information.

The NICE-NPSA published guidance in 2007 concerning medicines reconciliation on admission for adults has been described in the previous chapter.(17) However it is noteworthy that this guidance requires admitting organisations to identify all medication being taken on admission rather than requiring the referring organisation to provide the details. More recently in March 2008 a minimum dataset for the transfer of essential medication information between healthcare sectors was defined by the National Prescribing Centre.(70) This guidance recommends that the dataset is made available to admitting organisations. Furthermore, in 2009 the NPSA published guidance (2) requiring Primary Care Organisations to review the processes used to transfer medication information across the healthcare interface, stating

> *"Actions in relation to specific areas of medication-related risk should include: a review of processes for the accurate and timely transfer of medication-related information across all interfaces, but in particular in conjunction with the acute sector."*

Prior to publication of these documents the role of GPs in providing prospective advice about medication on admission of a patient to hospital lacked national guidance. Furthermore it was unknown if PCTs provided local guidance on this matter to their contractor GPs.

This study seeks to identify the provision of local guidance by PCTs to GPs to support medication information transfer for patients on admission to hospital: and does so at two points in time. Firstly in 2007 prior to the publication of national guidance and again in 2009 after the guidance from NICE-NPSA and the NPC was published.

Aim: To identify guidance provided by English Primary Care Trusts to General Medical Practitioners concerning essential medication information transfer (e.g. minimum data sets) on admission of patients to hospital.

Objectives: To develop a suitable survey instrument to identify guidance provided by PCTs within this study area.
To complete a two point longitudinal survey of all English PCTs in 2007 and 2009.
To identify the frequency of guidance provided by PCTs for GPs within this study area and how has this changed during the period 2007-2009.

Research Questions: What is the frequency of guidance provided by PCTs for GPs within this study area and how has this changed during the period 2007-2009?

The 2007 survey instrument was designed to determine if PCTs provide advice to GPs concerning the provision of prescribed medication when a patient is admitted to hospital. Where PCTs provide advice the questionnaire requested details of the provision of that guidance and permission to share that advice with others. The 2009 survey instrument was a follow up study designed to harvest similar information as in 2007 and thereby identify changes during the intervening period.

Analysis of medicines management policy documents described in Chapter 6 identified two major lines of enquiry within this programme of study. These were:

c. information transfer following paediatric admission to hospital
d. the involvement of hospital services to support access to medicines for children in the community

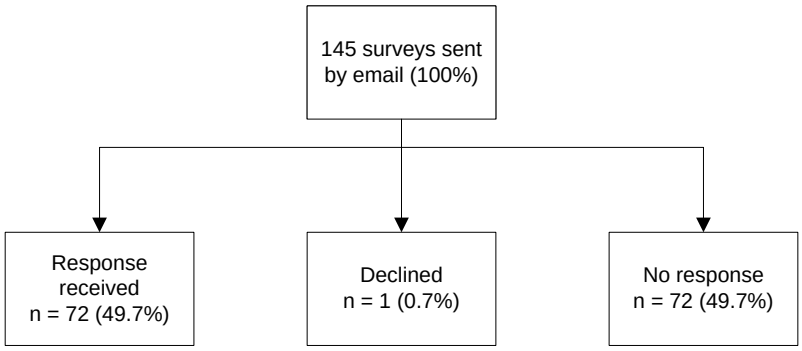
This is the second of two studies described within this thesis investigating medication information transfer following paediatric admission to hospital.

8.2. Results

8.2.1. 2007 survey

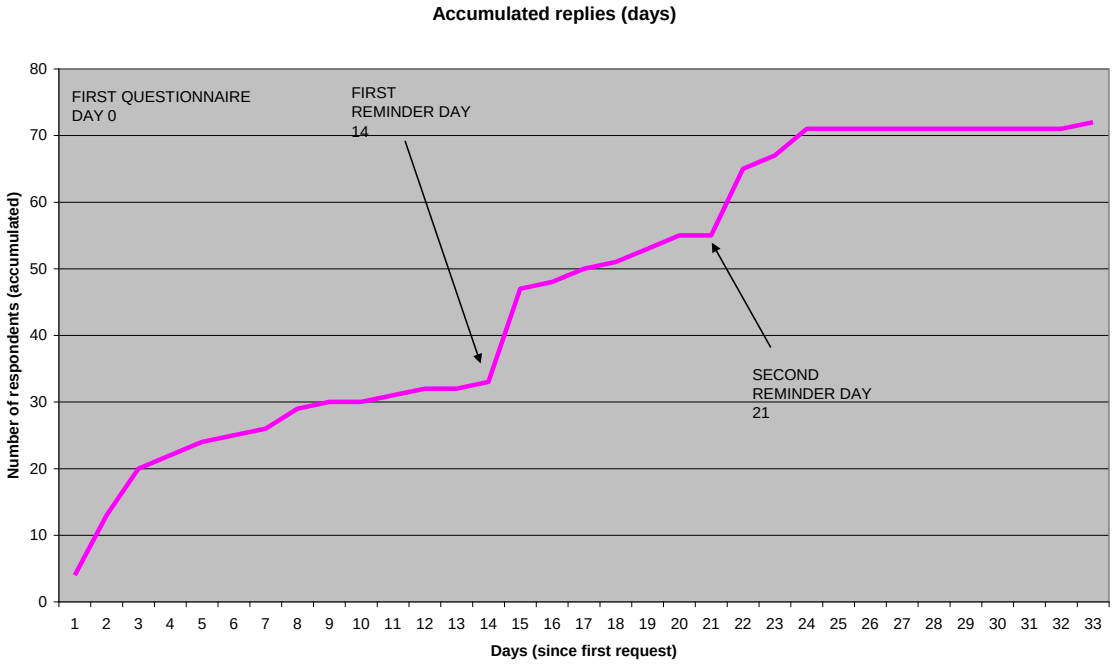
A total of 72 questionnaires (49.7%) were completed and returned. See figure below. One recipient declined to respond.

Figure 7 PCT study. Response to 2007 survey



Responses were received from day 0 to day 24 after the first email was (successfully) delivered. See figure below.

Figure 8 PCT survey. Time response to 2007 survey



This survey asked 4 questions. The questions and summary responses are described below.

Question 1

Does your PCT provide operating guidelines to GPs in respect to prescribing information to be provided to the hospital when a patient is referred or admitted to hospital?

Summary of results:

No	n = 54 (75.0%)
Yes	n = 7 (9.7%)
Unclassified	n = 11 (15.3%)
Total	n = 72 (100%)

Unclassified responses were received from 11 respondents and 12 comments were coded as:

- GP computer system changes (n=1)
- Take all meds into hospital (e.g. green bag scheme) (n=5)
- Determining secondary care requirements (n=1)
- Provide general advice regarding good practice (n=1)
- Guidance is being drafted (n=2)
- Guidance is provided but not by PCT (n=1)
- Uncoded (n=1)

Question 2 (if Q1 = No)

If answer to Q.1 is no are you aware of any plans for your PCT to provide such guidance?

Summary of results (responses where Q1 = No):

No	n = 37 (68.5%)
Yes	n = 10 (18.5%)
Unclassified	n = 4 (7.4%)
No answer	n = 3 (5.6%)
Total	n = 54 (100%)

In addition to the above responses a further 2 respondents confirmed that they have plans to provide guidance. These are not included in the summary above since they provided an unclassified answer to question 1. Therefore a total of 12 PCTs indicated that they had plans to provide such guidance in the future.

Unclassified responses to this question were received from 4 respondents and were coded as:

- Currently under review (n=1)
- Possible preparation in the future (n=3)

Question 2 (if Q1 = Yes)

If answer to Q.1 is yes would you be willing to provide a copy of that guidance?

Summary of results:

No	n = 0 (0%)
Yes	n = 3 (42.9%)
Unclassified	n = 4 (57.1%)
Total	n = 7 (100%)

A total of 3 documents were provided by PCTs in response to the survey and were shared with those who requested them. These documents were:

1. A draft document with the caveat: “Can say we have a form but don’t share form yet as it is still in development stage” (n=1)
2. Transfer of Care document (n=1)
3. Full guidance (n=1)

The survey elicited a number of free text comments. These were coded and are summarised below:

- If the referral is through Choose & Book (all relevant information is automatically sent through to the hospital electronically) (n=3)
- providing PCT guidance is a good idea (n=4)
- expect to provide guidance in the future (n=6)
- patients take PODs into hospital (which provides sufficient information) (n=1)
- need standard discharge information (n=1)
- issue not raised by local hospital (n=1)
- transfer of care report has been developed (GP computer system) and provided to local hospital (n=2)
- guidance can be found incorporated within a number of documents (=1)
- guidance is provided by the acute trust (n=2)

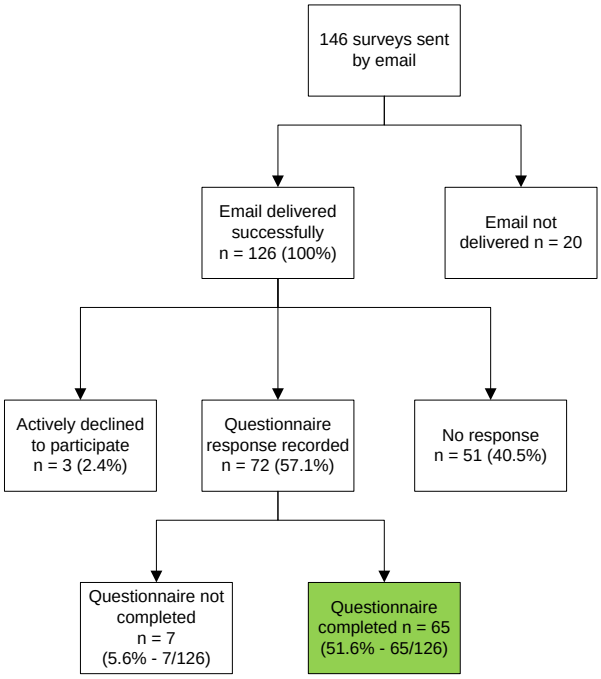
Question 3 asked "***If you send guidance are you willing for your PCT to be identified within any report?"*** A total of 11 respondents answered this question, with 8 (72.7%) answering the question with Yes.

Question 4 was an invitation to request aggregated data obtained during the study, which was requested by 44 respondents (61%).

8.2.2. 2009 survey

A total of 65 electronic questionnaires (51.6% of those successfully delivered) were completed on-line. Dates of completion of the survey were not recorded. Figure 9 shows the response statistics.

Figure 9 PCT survey. Response to 2009 survey



The questionnaire was considered to be not completed if there was no response to both questions 1 and 2. Responses to the 2009 survey (5 questions) are shown below, together with equivalent responses in 2007 for questions 1, 2 and 5, for ease of comparison. Modifications to the wording of the 2007 survey are underlined in the question text. Appendices 2 and 3 show details of the surveys.

This study found that in 2007, 9.7% (n = 7) of PCTs provided operating guidelines to GPs in respect to medication information on admission to hospital. The study in 2009 found that this figure had risen to 23.1% (n = 15). See question 1 below. In 2007 a total of 12 (22%) PCTs confirmed they had plans to develop guidance (see section 8.2.1 above), rising to 22 (44%) in 2009. Of those PCTs who confirmed they had written guidance in 2009 (n =15) more than half (n = 8, 53%) stated that national guidance was a major or full influence to do so. This same sub-group of 15 PCTs was asked to rate the expected impact on patient care of their guidance. Nine PCTs (60% of this sub-group) stated that the guidance was expected to provide a major or full impact on patient care. Detailed responses are shown for questions 1 to 5 below.

Question 1

Does your PCT provide <u>written</u> operating guidelines to GPs in respect to prescribing information to be provided to the hospital when a patient is referred or admitted to hospital?

Q1 response	**2009**	**2007**
No	n = 50 (76.9%)	n = 54 (75.0%)
Yes	n = 15 (23.1%)	n = 7 (9.7%)
Unclassified	Not applicable	n = 11 (15.3%)
Total	n = 65 (100%)	n = 72 (100%)

Question 2 (offered where Q1 = No)

Are you aware of any plans for your PCT to provide such guidance?

Q2 response	**2009**	**2007**
No	n = 28 (56.0%)	n = 37 (68.5%)
Yes	n = 22 (44.0%)	n = 10 (18.5%)
Unclassified	Not applicable	n = 4 (7.4%)
No answer	Not applicable	n = 3 (5.6%)
Total	n = 50 (100%)	n = 54 (100%)

Question 3 (offered where Q1 = Yes)

How influential was national guidance in the preparation or revision of your guidance?

Summary of results:

No influence	n = 1 (6.7%)
Little influence	n = 0 (0%)
Moderate influence	n = 6 (40.0%)
Major influence	n = 6 (40.0%)
Full influence	n = 2 (13.3%)
Total	n = 15 (100%)

Question 4 (offered where Q1 = Yes)

How would you describe the expected impact of your guidance on patient care?

Summary of results:

No impact	n = 0 (0%)
Little impact	n = 2 (13.3%)
Moderate impact	n = 3 (20.0%)
Major impact	n = 7 (46.7%)
Full impact	n = 2 (13.3%)
No answer	n = 1 (6.7%)
Total	n = 15 (100%)

Question 5 (offered where Q1 = Yes)

Are you willing to provide a copy of <u>your current</u> guidance?

Q5 response	**2009**	**2007**
No	n = 2 (13.3%)	n = 0 (0%)
Yes	n = 8 (53.3%)	n = 3 (42.9%)
Uncertain / Unclassified	n = 3 (20.0%)	n = 4 (57.1%)
No answer	n = 2 (13.3%)	n = 0 (0%)
Total	n = 15 (100%)	n = 7 (100%)

Five respondents made free text comments within question 5. In summary, these were: current guidance is being developed or updated (n=3); GPs are expected to write their own guidance (n=1); an appropriate audit is under development (n=1).

The survey offered to provide aggregate results if a recipient's email address was provided. 27 respondents provided an email address [in 2007 44 respondents requested aggregate results].

An opportunity to add further free text comments was also made available at the end of the survey and 13 respondents did so. These comments are summarised in themes below:

- Audit of information provided on transfer (n=4)
- MUR pre-admission (n=1)
- MUR post-discharge (n=1)
- Cross-sector collaboration on guidance (n=5)
- Acute Trust defined minimum dataset for admission (n=1)
- Elective admission information template in use (n=1)
- Information on admission is not part of GP contract (n=1)
- Monitoring of information on admission added to acute trust contract (n=1)
- Existing policy needs major revision (n=1)
- Need electronic exchange of information (n=1)
- Admission letter to patients includes take in repeat medication details (n=1)
- PCT requests GP to fax information to hospital on admission – with little success (n=1)

8.3. Discussion

8.3.1. Main findings

The two surveys have identified the provision of PCT guidance to GPs concerning medication information transfer at two points in time, 2007 and 2009. Prior to these studies the frequency of the provision of advice by PCTs to GPs in this subject area was unreported. This study demonstrates that there has been an increase in the provision of guidance during the two years between the surveys, rising from approximately 1 in 10 PCTs in 2007 to almost 1 in 4 by 2009. Even so, by 2009, a large majority of PCTs failed to provide clear direction in this matter to their GP contractors.

During the two year period between the surveys three major national documents were published. These publications were designed to encourage the development of medicines management seamless care processes between the healthcare sectors. Two of these, NICE-NPSA and NPC guidance, both concern the introduction of medication reconciliation and primarily focus on admission processes.(17, 70) The third document, a report by the Care Quality Commission, has a wider brief and considers both admission and discharge processes. The influence of national guidance on respondents was explored in this study. Over 50% of respondents who provided their own guidance to GPs stated that national guidance was a major or full influence. However, these national documents failed to prompt over 75% of PCTs to provide any substantial guidance to their GPs. Why would over three quarters of PCTs fail to provide such guidance in the light of national recommendations? It may be suggested that at the time of this present study PCTs believed no action was required of them or their medical contractors. Anecdotal evidence suggests that primary care organisations expected secondary care Trusts to obtain admission medication information from GPs, rather than the GPs to actively provide it themselves. Further studies will be required to test this hypothesis.

The Care Quality Commission report was published in October 2009 and is probably too late to have influenced respondents in this present study. However, the responsibility of PCTs to promote appropriate transfer of essential medication information on admission to hospital is implicit within this document. A key recommendation of this report is that:

> *" … PCTs need to ensure that better information is sent to hospitals on admission, particularly in emergency cases." (14)*

This present study may also have stimulated the development of PCT guidance to GPs. The

documents provided by respondents and made available for sharing with other PCTs in the 2007 study were sent to those who requested such feedback and this may have contributed to the change. Further provision of documents in 2009 may also stimulate PCT action.

Reporting the baseline of PCT provided guidance in 2009 as less than 1 in 4 of respondent PCTs (15 of 65), in the context of national recommendations from the CQC, may further promote local action by NHS organisations.

The absence of appropriate data on admission to hospital may contribute to the unintentional changes to medication on admission described elsewhere in this thesis. However, at present it may be accepted by acute Trusts that it is necessary for them to obtain the medication information from the patient's primary care providers since this process is noted within the West Midlands Medication Reconciliation operating policy approved by the West Midlands (acute Trusts) Clinical Pharmacy Network.(133) Interestingly, primary care organisations clearly expect details of discharge information to be sent to them, rather than obtain it or request it themselves. (9, 11, 12, 16, 134)

As described in Chapter 6, it is noteworthy that advice on the provision of medication information transfer was not found within the Medicines Management Strategies of the NHS organisations in either sector in 2007 and at that time, appears to be at best of low importance for both the primary care and secondary care sectors. By 2009 this had changed significantly for PCTs when 5 (83%) included admission medication in their medicines management documents, and was found in a further 7 (58%) documents from hospital Trusts.

The preliminary study (2007 data only) was accepted as an abstract and poster at the British Pharmaceutical Conference 2009 under the heading:

Guidance provided by English Primary Care Trusts to General Practitioners concerning medication information on admission to hospital.(135)

8.3.2. Strengths of this study

The methods used elicited useful response rates in both surveys and at a frequency reported by others for this type of research within this field of practice. (136) The survey was sent to the whole population (all PCT medicines management leads in England) and obtaining results from approximately half of the total population may be considered useful.

8.3.3. Limitations of this study

Whilst the response rates (49.7% in 2007 and 51.6% in 2009) are in keeping with other studies of this cohort some consideration of bias due to the absence of data from the non-responders should be made. Direct enquiry with the non-responders was considered inappropriate since the most acceptable route of communication (email) did not in itself bring about a response after 3 attempts and other modalities of enquiry were seen as too aggressive and possibly abrasive. Across the two surveys a total of 4 subjects declined to take part, commonly citing work pressures as the reason for their non-participation. It may be argued that if reporting bias has been introduced due to non-response that this would most likely be in the positive direction, since respondents with guidance available may be more likely to share their good practice by participation within the surveys. Maximising response is desirable and options to modify the methods used for this study may need consideration. In total both surveys used 3 email invitations to participates if necessary, which may be considered standard practice within this type of survey for this subject group.(136) In both surveys the third and final request led to additional responses (n=17 in both 2007 & 2009). A fourth invitation may therefore have produced a greater response. However, whilst this may seem attractive it was decided not to do so since the third emailing was described as the final reminder and another after this may have led to discontent by the subjects of the study. Furthermore the declaration that the third emailing was the last reminder may in itself have prompted a response from the late participants. Stating that less than 1 in 10 PCTs in 2007 and less than 1 in 4 PCTs in 2009 had provide guidance to their GPs may best be qualified in stand alone statements by including the relative response rates of the surveys.

Cognitive testing of the survey questions was not undertaken. The response to pilot questionnaires indicated that the wording of the questions was acceptable for this class of healthcare professional.

8.3.4. Comparison with other studies

Literature searches failed to identify any similar published works in this subject area.

8.4. Conclusions

This study had three objectives, all of which have been met within the limitations of the methods employed in that:

1. Suitable survey instruments were developed and were used to identify guidance provided by PCTs within this study area.
2. Two cross-sectional surveys of all English PCTs during both 2007 and 2009 were completed.
3. The frequency of guidance provided by PCTs for GPs within this study area and how this changed during the period 2007-2009 was determined.

This study confirms that advice from PCTs to GPs concerning medication information transfer on admission is not usually provided, although this has increased during the period 2007 from 1 in 10 to almost 1 in 4 by 2009 and that a number of other PCTs are developing such guidance.

At the close of the study in 2009 a large majority of PCTs failed to provide guidance to GPs concerning the provision of medication information on admission to hospital. This failure prompts acute Trusts to collect this information themselves within the medication reconciliation process following admission. Responsibility to provide this data would enhance the provision of medication reconciliation and embed the clinical benefits that this process brings to patient care. Defining responsibilities within the transfer of care process may be beneficial. For example if the transferring organisation were mandated to provide information to the next healthcare organisation then this could be audited and delivery enhanced. In the absence of electronic transfer of information it may be useful to ensure that the patient or their caregiver also receives information describing their current regular medication. Benefits may be realised if patients taking long-term medicines were given a card highlighting the details that they could pass on to their next healthcare professionals. Providing such information in lay terms for the patient, including the purpose of each prescribed drug may enhance patient understanding and compliance with prescribed medication regimens. Further studies considering the provision of long-term medication information to patients or their carers are recommended.

9. Hospital medical staff involvement in provision of medication for paediatric home-patients

9.1. Introduction

As described in section 1.3.2 on page 27 paediatric patients needing long-term medication may experience particular problems in obtaining their medicines. There are some published reports that clinical units in hospitals may provide support for patients in primary care who need help to obtain the medicines they require. Support is typically provided via telephone helplines, where patients or their caregivers can request help to obtain their medicines.(137, 138) This support may include providing hospital written prescriptions, including those that can be dispensed in the community usually described as FP10HPs. This study focuses on paediatric patients and their caregivers who request urgent help from hospital staff, to obtain the medicines they need when at home (home-patients).

This study aims to identify the involvement of paediatric hospital medical staff in supporting home-patients to obtain the medicines they need, usually by providing prescriptions and / or arranging for the hospital pharmacy to provide the medication. Where prescribing responsibility has been transferred from the GP to the hospital (this patient cohort would then be defined as continuing-care patients) then the patient ceases to be classified as a home-patient and is excluded from this study. Patients receiving hospital prescriptions as either out-patient or Emergency Department attendees are also excluded from this study. Definitions of these two groups are shown below:

> ***Continuing-care Patients.*** *Patients where some or all of their long-term medications are provided by hospital services. Prescribing responsibility rests with hospital staff.*
>
> ***Home-patients.*** *Patients located outside hospital, usually at home and for whom prescribing responsibility rests with their GP.*

The study also explores the opinions and costs of hospital medical staff in prescribing for paediatric home-patients: an activity known locally as providing rescue-medication.

Analysis of medication policy documents described in Chapter 6 identified two major lines of enquiry within this programme of study. These were:

a. information transfer following paediatric admission to hospital

b. the involvement of hospital services to support access to medicines for children in the community

This is the first of four studies described within this thesis investigating the involvement of hospital services to support access to medicines for children in the community.

9.2. Results

The electronic survey was successfully delivered to 340 medical staff at BCH. Thirteen confirmed that they did not wish to take part. A total of 167 surveys (49.1%) were returned although two included only demographic details and therefore descriptive statistics are based where appropriate on a cohort of 165 (48.5%).

9.2.1. Demographics

The number of years experience in paediatrics of the respondents ranged from 0 years to 30 years with over 83% having more than 2 years experience (mode = 9 years). See table below.

Table 9 Medical staff survey. Years experience in paediatrics of respondents

Paed years	Frequency	Valid Percent
0 < 2	28	16.8
2 < 6	27	16.2
6 < 11	39	23.4
11 < 16	35	21.0
16 < 21	23	13.8
21 < 26	10	6.0
26 < 31	5	3.0
TOTAL	167	100.0

Responses were received from 24 different specialties with frequency range from n=1 to 19. Responses were received from all the major medical specialties and sub-specialties at Birmingham Children's Hospital and included: psychiatry (n=19); general-surgery (n=15), anaesthetics (n=14); emergency medicine (n=12). Respondents included 89 consultants (53.6%) and 77 junior doctors

(46.4%). Designations are shown in Table 10 below.

Table 10 Medical staff survey. Designation of respondents

DESIGNATION	Frequency	Valid Percent
Consultant	89	53.6
Other	15	9.0
Registrar	39	23.5
SHO	20	12.0
Staff Grade	3	1.8
Total	166	100.0
Missing	1	
Grand total	167	

9.2.2. Prescribing data and risk

The majority of respondents (n=126, 76.4%) confirmed that they signed so called FP10HP NHS hospital prescriptions each month (all reasons) at a median frequency of 11 per month. The total, determined using the calculated mid-points method (see page 58), combined for all respondents per month = 1,742. Table 11 shows the frequency with which respondents signed prescriptions in one month.

Table 11 Medical staff survey. Frequency of signing FP10HP prescriptions in one month

FP10HPs in 1 month	Frequency	Valid Percent
None	39	23.6
1-5	56	33.9
6-15	46	27.9
15-30	14	8.5
31-100	8	4.8
> 100	2	1.2
Total	165	100.0
Missing	2	
Grand total	167	

[Estimated total frequency = Sum(56x3, 46x11, 14x23, 8x66, 2x109) = 1,742 per month]

Nearly half of respondents (49.1%, n=81) provided urgent prescriptions (rescue-medication) for home-patients in the preceding 3 months. The total frequency of writing rescue-medication

prescriptions for home-patients during a three month period is calculated as 714 prescriptions for an estimated 600 patients. The responses are shown in Table 12 below.

Table 12 Medical staff survey. Frequency of writing rescue-medication prescriptions in a 3 month period

Rescue-med prescriptions	Frequency	Valid Percent
None	81	50.0
1-5	46	28.4
6-10	18	11.1
11-30	14	8.6
31-60	3	1.9
Total	162	100.0
Missing	5	
Grand total	167	

[Estimated total frequency = Sum(46x3, 18x8, 14x21, 3x46) = 714 (3 month period)]

A majority 65.7% (n=84) of respondents stated they often or always knew who held prescribing responsibility for the patient (GP or hospital). These respondents are confirming that they were able to discern when they were prescribing for home-patients or continuing-care patients. Prescriptions provided for home-patients are described as rescue-medication.

Nearly half (44.7% n=34) of those who wrote prescriptions for home-patients described the risk to patients if they did not provide this service as “high” or “very high”. (consultants n = 22, 50%; junior doctors n = 12, 37.5%).

9.2.3. Causation

Respondents were given 5 possible options to express their opinion of the cause of medication access problems, summarised as: carer issue, pharmacy issue, formulation issue, communication issue or GP issue. The option selected with the highest frequency 44.5% (n = 65) was “GP Issue”. See Table 13 below.

Table 13 Medical staff survey. Reason for problems

Reason	Frequency	Valid Percent
Carer Issue	19	13.0
Pharmacy Issue	9	6.2
Formulation Issue	2	1.4
Communication Issue	25	17.1
GP Issue	65	44.5
Don't know	25	17.1
Other	1	0.7
Total	146	100.0
Missing	12	
Not applicable	9	
Grand total	167	

Respondents were ambivalent when asked to consider their agreement with the statement: *GP's are reluctant to prescribe continuing medication for children.* With:

- 23.8% (n=37) disagree or strongly disagree
- 37.4% (n=58) neither agree nor disagree
- 38.7% (n=60) agree or strongly agree.

Respondents were given a list of seven possible reasons to express their opinions why GPs might decline to provide repeat prescriptions for children. The response scale was: very unlikely – quite unlikely – sometimes – quite likely – very likely. Responses are summarised below in order of the frequency of respondents selecting either quite likely or very likely:

- Clinical concerns about the drug or regimen required – 56% (n=84) quite likely or very likely
- Communication issues – 52% (n=78) quite likely or very likely
- PCT influence or instruction – 47.4% (n=71) quite likely or very likely
- Money / finances – 44.7% (n=67) quite likely or very likely
- Inadequate supporting information – 44.7% (n=67) quite likely or very likely
- Drug(s) not on GP computer system – 26.6% (n=40) quite likely or very likely
- Workload – 19.4% (n=29) quite likely or very likely

9.2.4. Interaction with community pharmacists

Respondents were asked: *In the last 12 months approximately how often have you been contacted by a community pharmacist concerning a hospital prescription you or a BCH colleague has written?* Responses are shown in the table below.

Table 14 Medical staff survey. Contact with CPs in last 12 months

CP contact in 12 months	Frequency	Valid Percent
Never	72	48.0
1-12	68	45.3
13-24	7	4.7
25-52	3	2.0
Total	150	100.0
Missing	17	
Grand total	167	

The two variables (1) CP contact in 12 months and (2) the frequency of signing FP10HPs were plotted as a cross-tabulation. See table below. The frequency of CPs contacting hospital prescribers can therefore be determined. As expected these two parameters show a statistically significant relationship ($p < 0.001$).

Table 15 Medical staff survey. Contact with CPs in last 12 months against numbers of FP10HPs signed.

FP10s per month	CP contact in 12 months				Total
	Never	1-12	13-24	25-52	
None	33	2	0	0	35
1-5	28	24	0	0	52
6-15	11	25	3	2	41
15-30	0	11	2	0	13
31-100	0	5	1	1	7
> 100	0	1	1	0	2
	72	68	7	3	150

A group of four questions examined actions prescribers might take to support CPs dispensing their prescriptions. Responses are summarised below, in order of the frequency of respondents selecting that they would be prepared to take that action:

- Would you be prepared to use a pre-inked stamp to show your name clearly on FP10HPs you sign? – Yes = 94.8% (n=127)
- If you prescribe dose regimens on FP10HPs which are not included in standard texts would you be prepared to acknowledge that you have done so knowingly on the prescription (e.g. endorse: NOT-BNF)? – Yes = 89.8% (n=114)
- Would you be prepared to indicate the dose calculation as well as the final dose on FP10HP prescriptions you sign (where applicable)? e.g. state mg per kg as well as calculated dose. – Yes = 84.7% (n=111)
- Would you be prepared to always add YOUR hospital telephone number to FP10HPs you sign? – Yes = 82.3% (n=107)

9.2.5. Service changes

Respondents were given three possible service changes and were asked to indicate in their opinion how beneficial the proposed change to national guidance would be in reducing the problems associated with prescribing for paediatric patients in primary care. These proposals were:

A. Require GPs to prescribe all continuing medicines
B. Require hospitals to prescribe & dispense unlicensed / uncommon medicines
C. Enable hospital pharmacies to dispense GP prescriptions

Responses are shown in the table below.

In summary, the numbers of respondents indicating the benefit of each option to be either “high” or “very high” (scale no benefit – small benefit – moderate benefit – high benefit – very high benefit) were:

1. Require GPs to prescribe all continuing medicines 63.2% (n=79)
2. Require hospitals to prescribe & dispense unlicensed / uncommon medicines 37.9% (n=50)
3. Enable hospital pharmacies to dispense GP prescriptions 34.5% (n=44)

Table 16 Medical staff survey. Response to proposed service changes

Response	A. GPs to prescribe all	B. Hosp to prescribe ULMs	C. Hosp Pharm disp GP Rxs
No benefit	n=8 (6.4%)	n=21 (15.9%)	n=20 (15.7%)
Small benefit	n=8 (6.4%)	n=26 (19.7%)	n=30 (23.6%)
Moderate benefit	n=30 (24%)	n=35 (26.5%)	n=33 (26%)
High benefit	n=43 (34.4%)	n=35 (26.5%)	n=36 (28.3%)
Very high benefit	n=36 (28.8%)	n=15 (11.4%)	n=8 (6.3%)
Total	n= 125 (100%)	n=132 (100%)	n=127 (100%)
Missing	n=19	n=20	n=20
Don't know	n=23	n=15	n=20
Grand total	n=167	n=167	n=167

Respondents were invited to give their opinion of which single achievable change would bring about the most benefit for patients concerning problems associated with interface (primary care - hospital) prescribing. 114 free text responses were provided and coded. Each response was assigned a maximum of 2 codes. The two codes with the highest frequency were:

- Improve communication n=42
- GP to prescribe all n=10

The 42 'improve communication' responses were further sub-coded. Of this cohort the two sub-codes with the highest frequency were:

- Improve hospital to GP communication n=14
- Improve communication in general (non-specific) n=9

9.2.6. Dispensing arrangements

Respondents were asked: Please indicate your opinion about the statement below:

> *In my opinion hospitals should ensure that all out-patient prescriptions are dispensed by the hospital pharmacy (i.e. FP10HPs are not required).*

Table 17 shows responses to this question. 42.2% (n=62) of respondents disagree or strongly disagree with this statement.

Table 17 Medical staff survey. All out-patient prescriptions should be dispensed by the hospital pharmacy

HP disp all OP Rxs	Frequency	Valid Percent
Strongly disagree	19	12.9
Disagree	43	29.3
Neither	38	25.9
Agree	33	22.4
Strongly agree	14	9.5
Total	147	100.0
Missing	20	
Grand total	167	

9.2.7. Prescriber training

Respondents were asked: Please indicate your opinion about the statement below.

I would benefit from further training concerning the writing of prescriptions.

Responses are shown in the table below, indicating that the respondents were ambivalent about this issue.

Table 18 Medical staff survey. Benefit from further training

Training	Frequency	Valid Percent
Strongly disagree	15	10.2
Disagree	39	26.5
Neither	48	32.7
Agree	39	26.5
Strongly agree	6	4.1
Total	147	100.0
Missing	20	
Grand total	167	

9.3. Discussion

9.3.1. Main findings

To the best of my knowledge this study identifies for the first time the frequency of provision of prescriptions by hospital prescribers for home-patients. The total number of prescriptions prescribed annually for home-patients by the respondents was estimated to be 2,856. Similarly the study allows an estimate of the total number of FP10HPs to be calculated, when prescribed for all purposes by the respondents annually. The annual total equals 20,904. The proportion of FP10HPs used by the respondents for home-patients is therefore estimated to be 13.7%. In this setting prescribers often use FP10HPs for routine hospital purposes including for out-patients, emergency department attendees and occasionally as discharge medication, in addition to providing rescue-medication. According to the Prescription Pricing Authority, BCH issues some 36,000 FP10HPs (items) per year at a cost of approximately 2 million pounds (GBP). Using the same proportions the total number of items provided for home-patients by all BCH prescribers may therefore be estimated to be 4,918.

In order to estimate the number of prescriptions supplied to home-patients the respondents must know who holds prescribing responsibility for any individual patient. Almost two-thirds of respondents state they often or always know who holds prescribing responsibility, and this cohort of respondents may be expected to make the most accurate estimation of prescriptions supplied to home-patients. The percentage of prescriptions provided by this specific cohort can be estimated by filtering results where responsibility equals often or always. The result for this cohort is found to be 13.8%, a modest increase from the 13.7% for the whole study cohort, supporting the validity of the result of the study.

The cost of dispensing the medicines provided to home-patients was not determined in this study, however based on proportions the value may be in the order of £300,000. Total annual drug expenditure for FP10s in this institution was £2.2M and 13.7% of this figure equals £301,400. Further studies will be required to obtain a more reliable estimate. Similarly the service costs of responding to urgent requests for support may be estimated since such activity may attract a possible service fee of £26 per event: a figure currently endorsed by the DH for telephone consultations. (Personal communication Commissioning Department Birmingham Children's Hospital to D Terry 1st February 2010: Used with permission). Annual service fees may therefore be in the region of £125,000 calculated by 13.7% of 36,000 each at £26. The combined total cost of providing these items to home-patients is therefore £425,000 per annum. Since this activity is supporting primary care service delivery these costs may be recovered from the PCTs concerned. In order to claim the costs incurred, patient details must be identified and details supplied to their

PCT. There are practical problems in identifying the patient for whom FP10HPs have been written. The PPA provides access to a database of dispensed FP10s known as ePACT. The ePACT database is designed to manage costs incurred by CPs so that they may be paid for the work they have done. This database does not include patient details and therefore hospital Trusts are disadvantaged when seeking to recover costs of drugs supplied via FP10HPs dispensed by CPs. One method to overcome this problem is to request copies of dispensed FP10HPs from the PPA and thereby identify the patient concerned. However this creates significant resource issues for the PPA and the hospital Trust will then have to manually extract the required information from the forms. Since November 2010 the PPA have automatically provided details of dispensed FP10HPs where the net ingredient cost (NIC) exceeds £1,000.(139) If the estimate of rescue-medications in this study is correct (4,918 items costing £301,400), then average costs per item is estimated to be £61 each. Therefore very few prescriptions will exceed the £1,000 threshold.

44.7% (n=34) of those who write prescriptions for home-patients describe the risk to patients if they did not provide this service as “high” or “very high”. Interestingly 42.9% (n=27) of consultants assess the risk as “high” or “very high” compared with 26.3% (n=16) of junior doctors: a statistically significant difference ($p < 0.05\%$). There are two obvious explanations for this difference between the groups. These are: 1. Junior doctors may not have sufficient experience to appreciate the problems of getting long-term medicines, and especially unlicensed medicines, in primary care and 2. Junior doctors may not see themselves as the last line of support for such patients where as senior medical staff may more readily assume this responsibility.

This present study asked the respondents to assess five possible causes for home-patients seeking urgent hospital support to obtain their medicines (see section 9.2.3). Examples of these reasons may include: **carer issue** e.g. the caregiver not obtaining a prescription in time or not giving the community pharmacist adequate time to source and dispense the medicines before they run out; **pharmacy issue** e.g. the pharmacy cannot obtain and provide the item within the required time frame; **formulation issue** e.g. the prescriber or pharmacy have not prescribed or dispensed a formulation suitable for the patient to take; **communication issue** e.g. GP has not received details of hospital recommended treatment; **GP issue** e.g. GP declines to prescribe an unlicensed medicine. In this study respondents selected ‘GP issue’ with the highest frequency and indicate that this may be because of clinical concerns. Further studies are required to identify the opinions of other stakeholders, including those of GPs.

The options for improving services offered within the survey were chosen to reflect perceived

problems identified within field work, including the medical focus group, and are not necessarily practical solutions. Not surprisingly the option selected with highest frequency in this study is *require GPs to prescribe all continuing medicines*. The option *require hospitals to prescribe & dispense unlicensed / uncommon medicines* is the opposite solution and attracted much less support by the respondents. The final option *enable hospital pharmacies to dispense GP prescriptions* was included to accommodate the view that access to paediatric medicines is hindered by inadequate community pharmacy arrangements and therefore the patient not having access to suitable medicines. This option attracted the least support. These three options were also used in the survey of hospital nursing staff and the implications of the findings are discussed further in the discussion relating to that study (see page 135). When asked which single achievable change would bring about the most benefit for patients the most frequent response was improve communications. More detailed analysis of these responses, using sub-codes, reveals that hospital to GP communications is the most popular aspect of communications to be improved. Which facets of hospital to GP communications are important has not been explored within this current programme of studies. However, timeliness of communications may be an issue, since the medical focus group discussed the problems of discharge letters taking 6 weeks to be issued.

The interaction between hospital prescribers and CPs is important when considering options for service changes. For example, it may be argued that primary care services fail to provide suitable access to medicines for children requiring long-term medicines. A possible service change to address this observation is to mandate hospitals to provide the medicines children require. Any evaluation of this proposal must consider the dispensing of hospital generated prescriptions by CPs since children and their caregivers may have problems in attending a hospital to collect their medication. The need to have prescriptions dispensed locally to the patient and therefore by CPs is endorsed, at least in part, by respondents in this present study: 42.2% of respondents disagree or strongly disagree that the hospital pharmacy should dispense all out-patient prescriptions.

The survey enables an estimation of the average number of FP10HPs signed per BCH prescriber per year. This figure is calculated as 126 (20,900 prescriptions by 165 prescribers). Such substantial numbers of hospital prescriptions may be expected to generate a number of queries from CPs dispensing these prescriptions (see Chapter 12). This present study estimates the number of prescriptions signed per call from a CP as approximately 13, which is in keeping with the survey of CPs which estimates the figure to be 9.7 items per call. The respondents confirm they are willing to support CPs by modifying the information they provide on the prescriptions they write. Over 80% of respondents confirmed they were willing to adopt each of the four suggested changes.

See page 108.

The respondents are ambivalent about the benefits of further prescribing training. In this respect there is also no statistical difference between consultants and junior doctors.

9.3.2. Strengths of the study

A questionnaire was chosen as the study tool on the basis of the type of questions to be asked, their ease of completion, practicalities of data handling and availability of email addresses. The study cohort were all medical staff employed at the time of the study by BCH. All doctors surveyed had Trust email addresses and internet access. The response rate was in keeping with expectations and the opinions of over 165 hospital paediatricians were harvested. A large majority of respondents had significant experience in paediatrics. The survey successfully canvassed the opinion of all major clinical specialties and sub-specialties provided by the Trust.

The results obtained are in keeping with known prescribing statistics for this institution provided by the Prescription Pricing Authority.

9.3.3. Limitations of this study

This single site study may not be generalisable to other paediatric hospitals and further studies are required to determine if this is a national problem or a local phenomenon. An explanation for this problem as a local issue can be put forward. For example, if BCH fails to provide a sufficient supply of medicines post-discharge then patients may need to return to the hospital during the early post-discharge period. At best, patients are provided with 3 weeks supply of medicines on discharge from BCH. There are anecdotal reports, identified within the medical focus group relating to this study that discharge letters to GPs post-discharge may take 6 weeks to process. If this is the case then patients may have up to a three week period when their GP does not have appropriate medication details when their TTO medication has run out. Patients and their caregivers will have TTO copies that they can present to the GP but details may be unclear and GPs may be reluctant to prescribe without full details from the hospital. However other studies reported in this thesis indicate that this phenomenon is found elsewhere and supports the view that this is a national issue (see Chapters 10 and 11).

The survey asked respondents to express their level of agreement or disagreement with the

statement: *GP's are reluctant to prescribe continuing medication for children.* Results were ambivalent and this may reflect the ambiguity of the question.

9.3.4. Comparisons with other studies

Literature searches failed to identify any other similar published studies.

9.4. Conclusions

This study demonstrates the high activity rates undertaken by BCH medical staff to support paediatric patients to obtain the medicines they need but cannot easily obtain, through primary care services. This unfunded and previously unreported service may cost in excess of a third-million pounds per annum at the study institution and adds considerably to the workload of this important staff group. Based on this evidence the suitability of primary care services to provide long-term medicines for children has to be questioned. When presented with a list of possible causes 44.5% (n=65) selected “GP issue” with 55% (n=84) stating that “clinical concerns” were quite likely or very likely to be the reason for GPs not providing prescriptions. However respondents indicate that the single achievable service change which would bring about the most benefit for patients is to improve communication. In particular improving communication between hospitals and GPs is highlighted by the respondents.

A preliminary report of this study has been published.(140)

10. Hospital nursing staff involvement in provision of medication for paediatric home-patients

10.1. Introduction

NHS patients treated outside hospital are by default the clinical responsibility of their GP.(3) When a patient is referred to a hospital consultant this may be considered an advisory service with the hospital physician advising the GP on how to manage their patient.(141) Should a GP wish the hospital staff to assume prescribing responsibility for any long-term medication this can often be arranged through local negotiation. Where responsibility is accepted by the hospital staff, the patient may be considered as a 'continuing-care' patient, which is an exemption under Payment by Results funding pathways.(81) Under these arrangements the hospital may claim costs of the medication and service fees from the patient's PCT. As described in the previous chapter, two categories of NHS patients are identifiable: patients for whom the GP retains prescribing responsibility (home-patients); and those for whom the hospital takes prescribing responsibility (continuing-care patients). Home-patients receive their prescribed medication supplies via prescription from their GP dispensed by their CP. Continuing-care patients will receive their prescriptions from their hospital physician or prescriber. These may be dispensed by the hospital pharmacy. However, because of the practical difficulties for patients or their caregivers returning to the hospital for repeat supplies the hospital may issue FP10HP prescriptions that can be dispensed by CPs. Over 5.5 million hospital generated FP10s are dispensed by CPs in England each year [personal communication NHSBSA to D Terry used with permission. Copyright NHSBSA. 23rd July 2009].

Home-patients may encounter two types of problems when trying to obtain repeat supplies of medication: 1. the GP may be reluctant or unwilling to write a prescription and 2. the CP may be unable to dispense the prescription.(68) The later problem may also be encountered by continuing-care patients trying to get hospital generated FP10s dispensed by a CP. Both types of problems may be considered a failure of primary care services to provide care for the patient. This study seeks to identify the involvement of hospital nurses in supporting patients encountering either of these types of problems. Clinical units in hospitals may provide support for patients in primary care, often via telephone helplines (137, 138) and it is known that nurses are involved in such services.(137)

This study targeted hospital Clinical Nurse Specialists and Advanced Nurse Practitioners.

According to one careers website (142):

> *A specialist nurse (SN), also known as a clinical nurse specialist specialises in a particular area of nursing, caring for patients suffering from diseases such as cancer, diabetes or Parkinson's, viruses such as HIV/AIDS, or other conditions such as chronic heart failure. An SN provides direct patient care and support and can play a vital role in helping improve quality of life by educating the patient on the management and control of symptoms and offering support following diagnosis. In many cases, the involvement and intervention of an SN can prevent patient re-hospitalisation. The role varies from trust to trust. Some clinical nurse specialists also have a teaching and advisory role. They may be involved in advising medical and nursing staff about caring for patients with particular conditions and/or in teaching nurses and other professionals.*

The RCN (143) defines an advanced nurse practitioner as:

- *a registered nurse who has undertaken a specific course of study of at least first degree (Honours) level and who:*
- *makes professionally autonomous decisions, for which he or she is accountable*
- *receives patients with undifferentiated and undiagnosed problems and makes an assessment of their health care needs, based on highly developed nursing knowledge and skills, including skills not usually exercised by nurses, such as physical examination*
- *screens patients for disease risk factors and early signs of illness*
- *makes differential diagnosis using decision-making and problem-solving skills*
- *develops with the patient an ongoing nursing care plan for health, with an emphasis on preventative measures*
- *orders necessary investigations, and provides treatment and care both individually, as part of a team, and through referral to other agencies*
- *has a supportive role in helping people to manage and live with illness*
- *provides counselling and health education*
- *has the authority to admit or discharge patients from their caseload, and refer patients to other health care providers as appropriate*
- *works collaboratively with other health care professionals and disciplines*
- *provides a leadership and consultancy function as required.*

Both Clinical Nurse Specialists (CNS) and Advanced Nurse Practitioners (ANP) are senior hospital nurses who provided clinical or psycho-social support for patients usually within a clinical specialty or sub-specialty and may manage direct patient requests for support. Within their role they are clinical decision makers.

At total of 338 paediatric CNS and ANPs were invited to participate in this study from 6 sites across the UK:

Birmingham Children's Hospital
Sheffield Children's Hospital
Leeds Teaching Hospitals NHS Trust
Royal Belfast Hospital for Sick Children
University Hospital of Wales-Cardiff
Greater Glasgow NHS Board

The objectives of this study were:

1. to identify the involvement of paediatric hospital nursing staff in supporting home-patients to obtain the medicines they need when they are out of hospital, where prescribing responsibility rests with the GP.
2. to quantify their involvement and estimate resource costs
3. to establish if this is a national issue
4. to determine why these issues occur in the view of the study cohort
5. to identify process changes that may reduce such problems.

10.2. Results

An overall response rate of 64.8% (n=219) was obtained after 2 reminders, usually at weekly intervals. Site specific response rates ranged from 47.7% to 78.0%. See Table 19.

Table 19 Nursing staff survey. Responses by site & survey start date

SITE	Respondents	Valid Percent	Cohort	Response rate	Survey start date
BCH	78	35.6	100	78.0%	29th September 2008
SCH	39	17.8	64	60.9%	17th February 2009
LEEDS	28	12.8	49	57.1%	23rd June 2009
BELFAST	19	8.7	27	70.4%	2nd December 2009
CARDIFF	24	11.0	33	72.7%	18th November 2009
GLASGOW	31	14.2	65	47.7%	18th November 2009
Total	219	100.0	338	64.8%	

10.2.1. Demographics

Respondents were drawn from 32 different clinical paediatric specialties and sub-specialties (excluding 'educator', 'other' and 'management'). Specialties and numbers of respondents from

each site are shown in Table 20.

Table 20 Nursing staff survey. Specialties of respondents

Specialty	Site						Total
	BCH	SCH	LEEDS	BELFAST	CARDIFF	GLASGOW	
Cardiology	7	0	2	1	6	2	18
Dermatology	4	1	0	0	0	1	6
Diabetology	3	1	2	2	0	1	9
Endocrinology	2	0	2	1	0	0	5
Gastroenterology	3	1	2	1	1	1	9
Haematology	4	2	1	2	0	1	10
IMD	2	2	0	0	0	0	4
Liver	5	0	0	0	0	0	5
Neurology	1	4	1	0	0	1	7
Oncology	13	3	3	2	3	1	25
Plastics	8	0	1	0	0	0	9
Renal	3	0	2	1	0	4	10
Respiratory	4	5	3	1	4	4	21
Other	4	2	2	2	3	2	15
Educator	1	0	0	0	0	2	3
Stoma care	0	1	0	0	0	1	2
Pain	2	2	2	1	0	2	9
General Paeds	1	1	0	0	1	1	4
Management	1	0	0	0	0	1	2
Rheumatology	2	0	2	0	0	1	5
Control Of Infection	1	1	0	0	0	0	2
Ophthalmology	1	0	0	0	0	0	1
Intensive care	3	1	0	1	0	2	7
Nutrition	1	0	0	0	0	0	1
Burns	1	0	0	0	0	1	2
Gen Surg & Ortho	0	4	2	0	2	0	8
Immunology	0	2	1	0	0	0	3
Continence	0	2	0	0	1	0	3
ADHD	0	1	0	0	0	0	1
Child Protection	0	1	0	2	0	0	3
Community nursing	0	1	0	0	0	0	1
Audiology	0	1	0	0	0	0	1
Emergency	0	0	0	1	0	0	1
Neurosurgery	0	0	0	0	2	0	2
Psychotherapy	1	0	0	0	1	0	2
Missing	0	0	0	1	0	2	3
Total	78	39	28	18	24	29	219

A majority (63%, n=138) of respondents worked more than 30.1 hours per week (0.8 whole time equivalent) with19.2% (n=42) stating they are independent or supplementary prescribers, or both. In total across all study sites:

- 43% (n=94) provided domiciliary visits
- 77.6% (n=170) worked with inpatients
- 77.6% (n=170) worked with outpatients
- 71% (n=155) provided advice concerning medication
- 67% (n=143) confirmed that their role was mainly clinical and 13% (n=28) mainly psychosocial

10.2.2. Supporting prescriptions and risk estimation

Respondents were asked:

> *In the last 3 months how many times have you been called upon to organise repeat prescriptions for your patients?*

The responses are summarised in the table below. A majority of respondents (73.4%, n=157) had organized repeat prescriptions during the preceding 3 months. The estimated total number of prescriptions organized over the same period equals 1765. Mid-points, where necessary, were estimated using the method described on page 58.

Table 21 Nursing staff survey. Frequency of organising repeat prescriptions

Prescriptions in 3 months	Frequency	Valid Percent
Never	57	26.6
1 to 5	80	37.4
6 to 10	29	13.6
11 to 30	29	13.6
> 30 mid-point = 36	19	8.9
Total	214	100.0
No answer	5	
Grand total	219	

Service costs were estimated using a value of £26 per event. Estimated service costs per site were calculated and varied from £15,184 to £58,240 per annum. Combined annual service costs (all sites) were estimated to be £183,560. Site specific responses are summarised in the table below.

Table 22 Nursing staff survey. Frequency of prescriptions organised by site (3 months) and estimated annual service costs

	Site						
	BCH	SCH	Leeds	Belfast	Cardiff	Glasgow	**Total**
Never	22	11	4	7	4	9	**57**
1 to 5	29	6	15	6	12	12	**80**
6 to 10	13	7	3	0	4	2	**29**
11 to 30	9	9	3	3	2	3	**29**
> 30 (Mid-point is 36)	5	6	3	2	1	2	**19**
Total respondents	78	39	28	18	23	28	**214**
Total prescriptions	560	479	240	153	146	187	**1765**
Median freq	3	8	3	3	3	3	**3**
% with freq >10	17.90%	38.50%	21.40%	27.80%	13.00%	17.90%	**22.40%**
Annual Service Costs	**£58,240**	**£49,816**	**£24,960**	**£15,912**	**£15,184**	**£19,448**	**£183,560**

A hypothesis was constructed that some sites will experience different levels of problems compared with others i.e. there is variation across the nation of medication access problems as evidenced by the frequency of organizing repeat prescriptions. However, the Pearson Chi-squared test shows no significant difference between the sites (p = 0.234). Similarly no significant difference was found between the two Celtic and England regions (p = 0.465). See table below. That is, analysis of the data confirms that there is no statistically significant difference between the sites or regions in the frequency with which they organize repeat prescriptions. The hypothesis is rejected.

Table 23 Nursing staff survey. Frequency of organizing repeat prescriptions verses region

FREQ	Region		Total
	English	Celtic	
Never	37	20	57
1 to 5	50	30	80
6 to 10	23	6	29
11 to 30	21	8	29
> 30	14	5	19
Total	145	69	214

Respondents were asked:

> *In the last 3 months for how many patients have you been asked to organise repeat prescriptions?*

The estimated number of home-patients attended to by the respondents in a 3 month period was

determined using the calculated mid-points method and was found to equal 1637. The responses are summarised in the table below.

Table 24 Nursing staff survey. Number of patients attended to by the respondents in a 3 month period and estimated total number of patients (n(total))

	BCH	SCH	Leeds	Belfast	Cardiff	Glasgow	**Total**
None	23	11	5	7	3	9	**58**
1 to 5	31	7	15	5	13	12	**83**
6 to 10	11	8	3	0	4	2	**28**
11 to 30	7	9	3	3	3	3	**28**
> 30 (Mid-point = 36)	6	4	2	2	0	2	**16**
Total respondents	**78**	**39**	**28**	**17**	**23**	**28**	**213**
Total patients	**544**	**418**	**204**	**150**	**134**	**187**	**1637**

A total of 13.6% (n=29) respondents confirmed that supporting medication access to home-patients was included in their job description (JD), with range across the sites of 0% (Cardiff) to 23.1% (SCH).

Table 25 shows summary responses to the question: ‘How would you describe the risk to patients if you did not help patients access their medicines?’ A clear majority of respondents in 4 sites considered the risk to be significant or highly significant. In contrast only 31.8% of respondents in one site (Cardiff) described the risk as either significant or highly significant.

Table 25 Nursing staff survey. Response to the question: 'How would you describe the risk to patients if you did not help patients access their medicines?'

	Site						
	BCH	SCH	LEEDS	BELFAST	CARDIFF	GLASGOW	Total
Not Applicable	13	6	2	3	3	4	31
Insignificant	1	1	2	2	0	2	8
Moderately significant	13	10	5	2	12	8	50
Significant	28	16	15	4	5	7	75
Highly significant	23	6	4	6	2	7	48
Total	78	39	28	17	22	28	212
Significant or highly significant	51	22	19	10	7	14	123
% significant or highly significant	65.4%	56.4%	67.9%	58.8%	31.8%	50.0%	58.0%

A hypothesis was constructed that respondents from some sites perceive risks differently to other sites (e.g. some areas may not experience such problems to the same degree as other sites and therefore the perceived risks may be less). The table below shows the distribution of responses by site for 'risk'.

Table 26 Nursing staff survey. Risk category frequency verses site (abridged results)

			RISK			
			Moderately significant	Significant	Highly significant	Total
Site	BCH	Count	13	28	23	64
		% within Site	20.30%	43.80%	35.90%	100.00%
	SCH	Count	10	16	6	32
		% within Site	31.30%	50.00%	18.80%	100.00%
	LEEDS	Count	5	15	4	24
		% within Site	20.80%	62.50%	16.70%	100.00%
	BELFAST	Count	2	4	6	12
		% within Site	16.70%	33.30%	50.00%	100.00%
	CARDIFF	Count	12	5	2	19
		% within Site	63.20%	26.30%	10.50%	100.00%
	GLASGOW	Count	8	7	7	22
		% within Site	36.40%	31.80%	31.80%	100.00%
	Total	Count	50	75	48	173
		% within Site	28.90%	43.40%	27.70%	100.00%

Note: The categories of ‘not applicable’ and ‘insignificant’ have been removed from the statistical considerations of this relationship and others below, since ‘not applicable’ is akin to missing values and ‘insignificant’ returned relatively low numbers.

The Pearson Chi-squared test confirms statistically significant variation in the data set ($p = 0.009$). Similarly significance was tested for a regional split of the data (English and Celtic (non-English) sites). See figure and table below. Fisher’s exact test confirms statistical significance between the regions ($p = 0.029$). That is, the respondents from the English regions perceive the risks to be greater than their colleagues in the non-English regions. The hypothesis is proved.

Figure 10 Nursing staff survey. Bar chart of frequency of risk category verses region (abridged results)

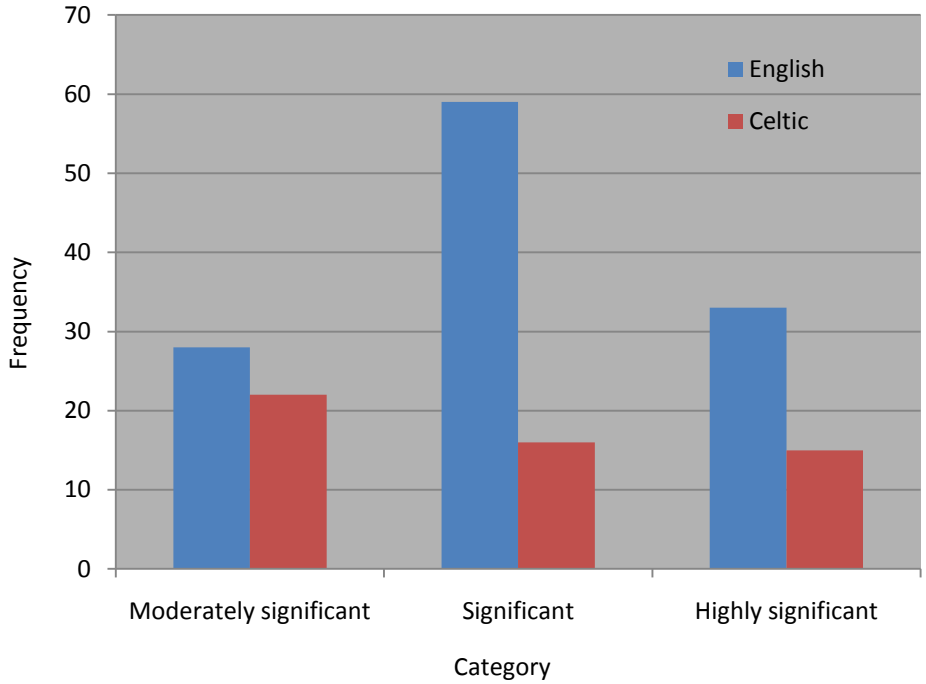


Table 27 Nursing staff survey. Risk category frequency verses region (abridged results)

			RISK			
			Moderately significant	Significant	Highly significant	Total
region	English	Count	28	59	33	120
		% within region	23.30%	49.20%	27.50%	100.00%
	Celtic	Count	22	16	15	53
		% within region	41.50%	30.20%	28.30%	100.00%
	Total	Count	50	75	48	173
		% within region	28.90%	43.40%	27.70%	100.00%

A hypothesis was constructed that the more frequently the need to organize repeat prescriptions the greater the perceived risk to respondents. The table below shows cross-tabulated results for these two variables (combined results from all sites).

Table 28 Nursing staff survey. Frequency of organizing repeat prescriptions verses risk (abridged results)

RISK	FREQUENCY					Total
	Never	1 to 5	6 to 10	11 to 30	> 30	
Moderately significant	4	28	5	7	6	50
Significant	9	30	17	11	8	75
Highly significant	9	16	7	11	5	48
Total	22	74	29	29	19	173

However, the Pearson Chi-squared test shows no significant difference ($p = 0.258$). That is, there is not a statistically significant relationship between these two variables and therefore the hypothesis is rejected.

10.2.3. Causation

The table below shows responses to the question: 'In your opinion what is the most common reason why carers experience problems in obtaining suitable medications (one that the child can use or take)?' Five defined options were provided for selection by the respondents and these are ranked according to frequency within the table. The option selected with the highest frequency when all sites' responses were combined was 'communication issue' (25%, n=53). Four sites ranked this option in first or joint first place.

Table 29 Nursing staff survey. Opinions why carers experience problems in obtaining suitable medication and ranking

	BCH	SCH	LEEDS	B'FAST	C'DIFF	G'GOW	TOTAL	RANKING
Communication issue	16	7	7	5	8	10	**53**	**1**
Prescriber issue	25	14	7	1	4	0	**51**	**2**
Other	15	6	3	5	2	7	**38**	**3**
Pharmacy issue	13	5	5	1	5	5	**34**	**4**
Carer issue	5	5	4	3	2	1	**20**	**5**
Formulation issue	4	2	2	2	1	5	**16**	**6**
Total	**78**	**39**	**28**	**17**	**22**	**28**	**212**	

A hypothesis was constructed that there may be regional differences in the perceived reasons for the problems. The table below shows cross-tabulated results for these two parameters. For this data, Pearson's Chi-squared test shows that there is significant difference ($p = 0.003$) at regional level, but not at site level ($p = 0.119$). Fisher's exact test was calculated for the regional level data ($p = 0.001$), confirming a significant difference between these regions. That is, the English regions perceive the reasons for medication access problems for children to be different to their colleagues in other UK home countries. The hypothesis is proved.

Table 30 Nursing staff survey. Opinions why carers experience problems in obtaining suitable medication and ranking by region

Region	Carer issue	Pharmacy issue	Formulation issue	Communication issue	Prescriber issue	Other	TOTAL
England	14	23	8	30	46	24	145
Non-England	6	11	8	23	5	14	67
Total	20	34	16	53	51	38	212

Table 31 Nursing staff survey. Specialty verses reason for problems

	Reason						Total
	Carer issue	Pharmacy issue	Formulation issue	Communication issue	Prescriber issue	Other	
Cardiology	3	** 7 **	0	1	3	2	16
Dermatology	0	2	0	2	2	0	6
Diabetology	2	0	0	3	0	4	9
Endocrinology	0	2	0	1	0	2	5
Gastroenterology	1	1	0	2	** 4 **	1	9
Haematology	2	2	1	1	2	2	10
IMD	0	1	0	1	2	0	4
Liver	1	1	0	0	3	0	5
Neurology	0	0	1	3	3	0	7
Oncology	4	4	3	2	** 8 **	4	25
Plastics	0	2	0	3	2	2	9
Renal	1	0	1	3	2	1	8
Respiratory	0	1	1	** 14 **	3	2	21
Other	1	5	1	1	4	3	15
Educator	0	1	0	1	0	1	3
Stoma care	0	0	0	1	1	0	2
Pain	1	2	1	1	3	1	9
General Paeds	0	0	1	2	1	0	4
Management	0	0	0	1	0	1	2
Rheumatology	0	1	2	0	2	0	5
Control Of Infection	0	0	0	0	0	2	2
Ophthalmology	0	0	0	1	0	0	1
Intensive care	0	0	1	1	0	** 5 **	7
Nutrician	0	0	0	0	0	1	1
Burns	0	0	1	1	0	0	2
Gen Surg & Ortho	1	0	1	3	2	1	8
Immunology	1	0	0	0	2	0	3
Continence	0	0	0	1	1	1	3
ADHD	1	0	0	0	0	0	1
Child Protection	1	0	0	1	0	0	2
Community nursing	0	1	0	0	0	0	1
Audiology	0	0	0	0	0	1	1
Emergency	0	0	0	1	0	0	1
Neurosurgery	0	1	0	0	1	0	2
Psychotherapy	0	0	0	1	0	1	2
Total	**20**	**34**	**15**	**53**	**51**	**38**	**211**

A hypothesis can be constructed that some specialties may have specific reasons for problems (e.g. some specialties may have particular problems with paediatric formulations of commonly used drugs). This hypothesis was tested. Table 31 shows descriptive statistics concerning specialty and reason.

Numbers are too few within any individual specialty to support statistical analysis. However cells are highlighted and marked with a double asterix (**) where frequencies of a defined problem stand-out for individual specialties. These are: cardiology with ‘pharmacy issue’; gastroenterology and oncology with ‘prescriber issue’; respiratory with ‘communication issue’; and intensive care with ‘other’.

10.2.4. Service changes

The survey gave opportunity for the respondents to indicate how services could be better organised to minimise disruption to the patient’s therapy. The respondents were provided with three options and their responses are shown in the table below. Options were not mutually exclusive: respondents could respond to each individual option. When results were combined from all sites the option selected with the highest frequency was ‘Require GPs to prescribe all continuing medicines’ (66.2%, n=145).

Table 32 Nursing staff survey. Responses to the question: 'In what ways can services be better organized to minimize disruption to the child's therapy'.

		Site							
		BCH	SCH	LEEDS	B'FAST	C'DIFF	G'GOW	Total	Rank
Require GPs to prescribe all continuing medicines	No	30	10	7	9	7	11	74	1
	Yes	48	29	21	10	17	20	145	
	Total	78	39	28	19	24	31	219	
Percentage (Yes)		**61.5%**	**74.4%**	**75.0%**	**52.6%**	**70.8%**	**64.5%**	**66.2%**	
Require hospitals to prescribe and dispense unlicensed / uncommon medicines	No	41	26	20	12	18	23	140	2
	Yes	37	13	8	7	6	8	79	
	Total	78	39	28	19	24	31	219	
Percentage (Yes)		**47.4%**	**33.3%**	**28.6%**	**36.8%**	**25.0%**	**25.8%**	**36.1%**	
Enable hospital pharmacy to dispense GP prescriptions	No	54	33	21	14	15	26	163	3
	Yes	24	6	7	5	9	5	56	
	Total	78	39	28	19	24	31	219	
Percentage (Yes)		**30.8%**	**15.4%**	**25.0%**	**26.3%**	**37.5%**	**16.1%**	**25.6%**	
Other	Un-selected	69	29	23	15	16	28	180	4
	Selected	9	10	5	4	8	3	39	
	Total	78	39	28	19	24	31	219	
Percentage (Yes)		**11.5%**	**25.6%**	**17.9%**	**21.1%**	**33.3%**	**9.7%**	**17.8%**	
Don't know	Un-selected	70	36	24	17	22	27	196	5
	Selected	8	3	4	2	2	4	23	
	Total	78	39	28	19	24	31	219	
Percentage (Yes)		**10.3%**	**7.7%**	**14.3%**	**10.5%**	**8.3%**	**12.9%**	**10.5%**	

Since there is a difference between the regions for perceived reasons for the problems there may also be differences between the regions relating to how systems can be improved. This hypothesis was tested. The Pearson's Chi-squared test was run for results from each region for each of the three options given in the survey to improve services. The following results were obtained:

- Require GPs to prescribe all continuing medicines p = 0.547
- Require hospitals to prescribe and dispense unlicensed / uncommon medicines p = 0.09
- Enable hospital pharmacy to dispense GP prescriptions p = 0.98

Therefore statistical significance was not found between the regions for the proposed improvement options, although the second option (Require hospitals to prescribe and dispense unlicensed / uncommon medicines) approaches significance.

Table 33 Nursing staff survey. Summary of codes assigned to free text comments recorded in 'improve services' section and in 'additional comments'

CODE	BCH	SCH	LEEDS	BELFAST	CARDIFF	GLASGOW	TOTAL
Care pathways			1				**1**
Caregiver training		3	1			1	**5**
Clinic letter system	1	2					**3**
CP helpline	1						**1**
CP training	1						**1**
ESCAs			1				**1**
Funding (of drugs)		1					**1**
GP Rx all		1				1	**2**
GP Rx disp by HP				1			**1**
GP training	1			2			**3**
Homecare	1					1	**2**
Hosp Rx - CP dispense	1			2	1		**4**
Hosp Rx all		1					**1**
HP dispense all	1						**1**
Improve communication (see below)	**9**	**4**	**4**	**1**	**0**	**3**	**21**
More admin support		2					**2**
NICE guidance		1					**1**
No change?			1				**1**
Nurse prescribing	1						**1**
Nurse training		1					**1**
Pharmacy interface team	3						**3**
Postal Rxs		1					**1**
Reduce GP Rx time		1					**1**
Sector collaboration	1	2	2	1		1	**7**
Unassigned	18	6	6	2	7	7	**46**
TOTAL	**39**	**26**	**16**	**9**	**8**	**14**	**112**

Improve communication sub-code	BCH	SCH	LEEDS	BELFAST	CARDIFF	GLASGOW	TOTAL
Clinic letters	1	1					**2**
Electronic						1	**1**
General	3		2			1	**6**
Hosp - GP	2	2	2	1		1	**8**
Hosp hotline	1						**1**
HP - CP		1					**1**
HP - HP	1						**1**
Rx details	1						**1**
TOTAL	**9**	**4**	**4**	**1**	**0**	**3**	**21**

Free text responses relating to service changes were recorded and coded, and a summary is shown above. Codes were assigned to free text comments obtained in both the 'improve services' section (In what ways can services be better organized to minimize disruption to the child's therapy) and in the final comments section, where comments were considered to be promoting a service development.

Free text comments coded as 'improve communications' were returned with the highest frequency (n=21, 18.8%). These comments were further sub-coded. The improve communications sub-code returned with the highest frequency (n=8) was 'hospital to GP' communications. See Table above.

10.3. Discussion

10.3.1. Main findings

In terms of demographics, most of the study cohort were either working full-time or approaching full-time (0.8 whole time equivalent or more, 64.5%), few were prescribers themselves (16%), most worked with in-patients and / or out-patients (78%) and most were clinical (65%). This group may therefore provide a useful insight into supporting home-patients with medication access problems, without (usually) being prescribers themselves.

A majority of respondents had organized repeat prescriptions for their home-patients over a 3 month period (n=157, 74%): at an average frequency of approx. 7.8 occasions each and an average number of patients per nurse of 7.3. The cost of this activity has been calculated for each site based on a possible service fee of £26 per event. This fee is based on the lowest fee for a

healthcare intervention and may not reflect the true cost of delivering this service and a higher figure may be sought through negotiation. One site (BCH) is considering claiming a service fee of £126 for each time a medication is provided in this way. (Personal communication Commissioning Department Birmingham Children's Hospital to D Terry 1st February 2010: Used with permission). However commissioners may have a different view. If a fee per supply is to be agreed it needs to be recognized that multiple agencies within the hospital will be involved in providing the medication including nurses, doctors, pharmacy and finance staff. The frequency of actions taken by each group cannot simply be summed to identify the total activity and therefore costs.

Clearly for the large majority of participants this activity is not included in their job descriptions (86.4% across all sites), which may raise the question of whether this activity is recognised and funded.

The clinical benefit of this activity is indicated by responses to the question "How would you describe the risk to patients if you did not help patients access their medicines?" This question elicited a range of responses from 31.8% (Cardiff) to 67.9% (Leeds) replying that this activity is 'significant' or 'highly significant'. This wide range of results is unexpected and if an accurate reflection of the respondents' views requires further investigation. However, the wording of the response scale may be being interpreted differently by the respondents in the two sites with the most extreme responses. Table 25 shows the results. In Cardiff most respondents chose 'moderately significant' where as in Leeds the majority chose 'significant'. Whilst the question makes the scale clear the difference between 'moderately significant' and 'significant' may be open to misinterpretation. The result may not be fully reliable, however if these two extremes are excluded a clear majority of respondents still consider the risk to be either significant or highly significant. Interestingly the lowest response is from the same site (Cardiff) where this activity is not found at all in their job descriptions.

Respondents were asked to choose one of 5 possible options that in their view was the most likely cause of these problems. The options were:

1. Cannot obtain a prescription (in time) ... **carer issue**
2. Cannot get medication dispensed ... **pharmacy issue**
3. Child cannot use the formulation provided … **formulation issue**
4. GP has not received communication (eg. clinic/discharge letter) … **communication issue**
5. GP will not prescribe (eg because it is an unlicensed medication) … **prescriber issue**

6. Other

Combined results for all sites indicated that, in the opinion of the respondents, the most common reasons for home-patients access to medicines problems is ‘GP has not received communication (e.g. clinic/discharge letter) … communication issue’ at a frequency of 25% (n=53) although 2 sites (BCH and SCH) ranked the response ‘GP will not prescribe (e.g. because it is an unlicensed medication) … prescriber issue’ higher. Both of these causes focus on GPs although the former is not directly within their control. The benefit of ensuring timely communication across the healthcare interface and especially the sending out of discharge letters promptly is implicit within these observations and supports similar conclusions by the Care Quality Commission.(14) Combined responses from the English sites (Birmingham, Leeds and Sheffield) are significantly different to those from the non-English (Celtic) sites (Belfast, Cardiff and Glasgow) ($p = 0.001$, Fisher’s exact test). The English sites indicate that ‘GP will not prescribe (e.g. because it is an unlicensed medication) … prescriber issue’ is the leading reason and this agrees with the medical staff survey undertaken in Birmingham. Non-English sites conclude that the leading reason is ‘GP has not received communication (e.g. clinic/discharge letter) … communication issue’. Whilst this difference is drawn across geographical areas it is not clear if this observation is related to site location alone since there is also a time differential between the two groupings with English sites surveyed before non-English sites. It is known that seamless care arrangements vary between the countries of the UK. For example patients leaving hospital in Northern Ireland do not receive take-home (TTO) medication, where as in England this is a fundamental service and an important part of the discharge process. Further work should explore these differences and their effect on service outcomes related to medicines management.

There is evidence that some PCTs have provided advice to GPs concerning prescribing of unlicensed drugs.(59) Professional advice to GPs reminds them that they are not obliged to prescribe such items and that hospital provision of some items may be more appropriate. There is also concern about the cost of unlicensed drugs provide through primary care (144) prompting the DH with the PSNC to develop new arrangements for the pricing of specials. GP’s may have increasing reasons to decline to prescribe unlicensed drugs, commonly used in paediatrics.

Additional free-text comments concerning reasons for the problems were provided by 27 respondents. However, these free-text comments have not been coded since they offer little additional information and largely support the options provided in the questionnaire.

The respondents were given 3 possible service changes to respond to the question: 'In what ways can services be better organized to minimize disruption to the child's therapy?' The response attracting the highest selection was: 'Require GPs to prescribe all continuing medicines' ranked in highest (1st) position for each site. This option was selected almost twice as often as any of the other options, and in this respect there is concordance between nurses & medical staff (see page 112). This result is perhaps unremarkable since there was general opinion from the respondents that GP related issues were the cause of the problems. Whilst this option may seem attractive it may not be practical nor appropriate to adopt this measure since GPs have already received confirmation from the Department of Health that they do not NEED to prescribe (including hospital recommended prescriptions).(3) The self-selection options for this question were based on preliminary field work but may not cover a wide enough range of service changes to improve perceived problems and not all the reasons for problems offered in the survey have corresponding options for improvement. For example the improvement option 'Require GPs to prescribe all continuing medicines' may align with the reason 'prescriber issue', but none of the improvement options adequately covers the 'communication issue' reason. The questionnaire was designed to allow free-text responses for improving services and 30 were provided by respondents. The questionnaire concluded with another opportunity to express additional free-text comments and 77 were provided. Both of these sets of free-text answers were coded. In total 21 responses (32% of comments assigned to codes) were coded as 'Improve communications'. Because of the high response rate these responses were further divided into sub-codes. The sub-code recorded with the highest frequency was (improve communication between) 'hospital and GP'. Poor communication between primary care and secondary care seems to be a leading cause of patients needing hospital intervention to obtain long-term medication, and improving communication is understandably a way forward. What is less clear is how communication can be improved and even if clear timely communication is achieved whether this will alleviate the problems in accessing medication.

This present study has not attempted to identify total activity for any individual organisation. Neither has the drug costs relating to this activity been estimated in this study. An audit of neurology patients in BCH during 23 days in December 2006 showed that this department provided 21 prescriptions for rescue-medications to 16 different patients.(145) An estimate of rescue-medication drug costs per annum for this specialty at BCH was estimated to be approximately £22,300. Such drug costs are recoverable using current funding streams from the patients' PCTs since by definition these are covered under continuing-care exemptions from existing acute Trust contracts. Drug costs for BCH were estimated within the medical staff survey and are described on page 111.

10.3.2. Strengths of this study

A questionnaire was chosen as the study tool on the basis of the type of questions to be asked, their ease of completion, practicalities of data handling and availability of email addresses. The study cohort were all CNS and ANPs employed at the time of the study by the 6 participating NHS Trusts. All nurses surveyed had Trust email addresses and internet access. Whilst the mean response rate was 64.8% (n=219) (after a maximum of two reminders) this varied across the sites (range 47.7% Glasgow – 78.0% Birmingham). The reason for this variation is unclear but seems unlikely to be linked to perceived risk within each organisation since one site (Cardiff) returned the lowest risk (31% stating risk was significant or very significant) with a high return rate of 72.7%.

This multisite study provides strong evidence that these problems are widely experienced across the UK. The sites not only cover a range of geographical areas but also include a number of different hospital types including: specialist children's hospitals in England (BCH, SCH) and Northern Ireland (Belfast), large general hospitals with paediatric units (Leeds, Cardiff), and a paediatric unit within a Scottish health board.

10.3.3. Limitations of this study

A limitation of this study is that options provided in the survey to enable respondents to identify reasons for the problems do not align directly with options for improvement. See main findings above. A 1 to 1 relationship between reason codes and improve codes would provide more comprehensive options for the respondents. This limitation has been offset in part by the coding of free text answers provide by respondents to these issues.

10.3.4. Comparisons with other studies

Extensive literature searches failed to identify similar reported studies.

10.4. Conclusions

This present study demonstrates the extent to which CNS and ANPs act to support home-patients to obtain the long-term medicines they require. This activity was identified at each of the 6 sites from across the UK and therefore appears to be a national issue. The study has enabled an estimate of this activity at each site and facilitated the calculation of a resource cost based on DH funding arrangements ranging from £15,000 to almost £60,000 per annum at the study sites. According to advice received from professional NHS commissioning staff these costs are recoverable from local commissioners, usually PCTs.

The reasons most commonly cited for these problems are communication issues or prescriber issues. The most frequently selected option concerning improving services was 'require GP to prescribe all continuing medicines' although improving communication, especially from hospital to GP staff, is also recommended.

In summary this study:

- Has identify the involvement of paediatric hospital nursing staff in supporting home-patients to obtain the medicines they need when they are out of hospital, where prescribing responsibility rests with the GP.
- Has quantified their involvement and estimate resource costs.
- Has provided some evidence that indicates that this is a national issue.
- Has determined why these issues occur (reasons) in the view of this cohort.
- Supports the identification of process changes that may reduce such problems (see programme conclusions).

11. The provision of rescue-medication at the request of caregivers of paediatric home-patients

11.1. Introduction

Chapters 9 and 10 describe investigations into the role of hospital medical staff and hospital nurses in supporting paediatric home-patients to access prescribed long-term medicines. The aim of this study was to identify the circumstances in which parents or carers find themselves needing to request paediatric rescue-medication from the Pharmacy at BCH. Pharmacy staff at BCH are often called on by caregivers of children to provide 'rescue-medication'. Rescue-medication is the local term used when medication is provided urgently by secondary care because of a failure or expected failure of primary care services to provide the medication.

Published studies relating to medication access problems for children requiring long-term medicines outside hospital tend to focus on unlicensed and off-label medicines (146, 147) but these may not be the only issues and there is little empirical evidence as to the type and frequency of other factors. Around 1 in 4 prescribed medicines in paediatric wards in UK hospitals are unlicensed or used off-label.(148) Forty-six per cent of hospital prescriptions for children across Europe are either unlicensed or used off label with 67% of this population receiving at least one unlicensed or off label medication.(149) Wong et. al. (68) has shown that 12% of medicines prescribed at the point of discharge from a London paediatric hospital (GOSH) were either unlicensed medicines or used off-label. This same study has shown that a third of caregivers faced some difficulties in primary care when trying to obtain these medicines after discharge. Reported issues include the reluctance by GPs to prescribe off-label or unlicensed medicines and difficulties in obtaining these items from community pharmacies.

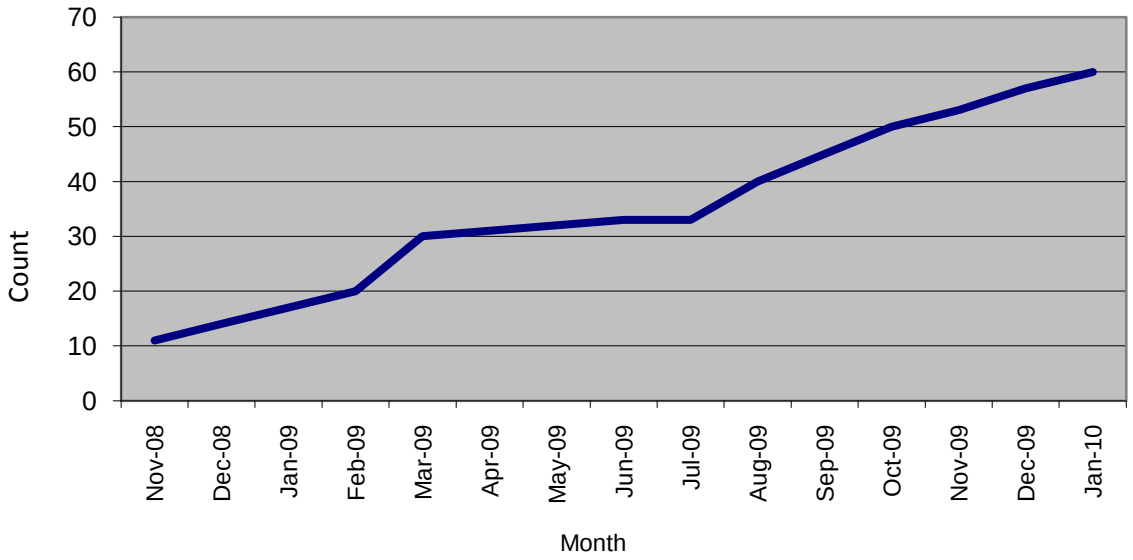
The survey instrument is shown in Appendix 9.

11.2. Results

A total of 88 caregivers were invited to complete the survey during the period 21st November 2008 to 14th January 2010. All of this cohort requested rescue-medicines from the Pharmacy at BCH. However 28 respondents did not fully complete the survey. The survey provided the opportunity to

indicate why the respondent did not wish to complete the remainder of the survey. Of this cohort, 25 selected the option: Did not complete survey- not a good time/insufficient time to complete; and 3 gave 'other' reasons for not completing the survey. No further details were provided by these respondents to survey questions. Therefore 60 completed surveys were obtained and analyzed. The figure below shows the accumulated responses during the study data gathering period.

Figure 11 Accumulated completion of Rescue-Medication survey



11.2.1. Demographics

The patient's home postcode was recorded on 59 occasions. The approximate distance by road from the patient's postcode to BCH (B4 6NH), one way, was determined using: http://www.postcode.org.uk/free-postcode-distance-calculator/

accessed 15/3/10. Distances ranged from 1.9 miles to 112.3 miles (mean average = 14.7 miles). One postcode could not be accessed directly by road (Belfast) and was excluded from the results. Identical patient postcodes were recorded twice on two occasions: which may represent the same patient or possibly siblings: patient identifiers were not requested.

Respondents recorded GP practice details on 56 occasions (93.3%). 52 different GP practices were recorded: 49 practices occurred once, two practices occurred twice and one practice occurred three times. All practices recorded more than once are all local to BCH.

Respondents were asked to record details of their usual community pharmacy. From the 54

responses received a total of 46 different CPs were identified. One pharmacy was recorded 3 times. All other pharmacies were recorded once only. There were 6 occasions when the description of the pharmacy was non-specific (e.g. Boots).

Respondents were cared for by 19 different PCTs (see methods page 49) and details are shown in the table below. Five PCTs are from outside the West Midlands.

Table 34 Patient's PCT and frequency

Patient's PCT	Frequency	Patient's PCT	Frequency
BEN-PCT	11	NORTHAMPTONSHIRE PCT	1
SOUTH B'HAM-PCT	11	DERBY CITY PCT	1
HEART OF B'HAM-PCT	9	HEREFORD PCT	1
DUDLEY PCT	5	NORTH STAFFS PCT	1
SANDWELL PCT	4	SHROPSHIRE PCT	1
SOUTH STAFFS PCT	3	WARWICKSHIRE PCT	1
SOLIHULL PCT	3	WEST BERKSHIRE PCT	1
WORCESTERSHIRE PCT	2	WOLVERHAMPTON PCT	1
WALSALL PCT	2	NORTHERN HEALTH SCB – NI	1
NORTH SOMERSET PCT	1	**Total specific responses**	**60**

11.2.2. Attendance by respondents

The number of days since the last attendance at BCH by the respondents was determined. Where exact dates were specified for both the date of completion of the survey and the date of any previous attendance (n = 47) the number of days ranged from 0 to 98. Mean = 19.3 days. Mode = 0 days (n = 11).

The number of days since the patient last consulted their GP was similarly determined. Where exact dates were specified (n = 31) the number of days ranged from 0 to 252 days. Mean = 39.4 days. Mode = 1 day (n = 4).

Over two-thirds of respondents (67.8%, n=40) confirmed that they made a special trip to BCH Pharmacy to obtain the medicines they need. The total round trip distance (if coming from patient's home) for these 40 occurrences = 1070 miles (mean = 26.8 miles).
Respondents were asked if they obtained advice from a healthcare professional before their attendance. 60% (n=36) confirmed that they did so, consulting a range of sources summarised

below:

- PHARMACY / PHARMACIST n = 9 (15%)
- GP n = 9 (15%)
- HOSPITAL DOCTOR n = 9 (15%)
- NURSE n = 5 (8.3%)
- A+E n = 1 (1.7%)
- NONSPECIFIC n = 3 (8.3%)

A total of 25 (43%) of the respondents confirmed they had used the rescue-medicines service before. Of the 24 patients who did not get advice before coming to BCH, 14 had obtained rescue-medicines from BCH previously.

11.2.3. Usual medication supply arrangements

Almost half of the respondents confirmed that the patient's prescriptions were normally issued by their GP (46.3%, n=25) and exactly the same number had prescriptions normal issued by the hospital. A small number (7.4%, n=4) had prescriptions issued by both sectors. As expected for this study of home-patients, a large majority confirmed that their prescriptions were dispensed by their CP (80.9%, n=38) although 6 respondents stated that the hospital usually dispensed their medicines.

Over 30% of respondents confirmed that they had problems getting their medicines either often or very often. The table below shows a summary of responses to the question: 'How often do you have problems getting medicines for this patient?'

Table 35 Recurrence of problems and frequency

	Frequency	Valid Percent
Never	18	32.7
Very rarely	8	14.5
Sometimes	12	21.8
Often	6	10.9
Very Often	11	20.0
Total specific responses	55	100.0
Missing responses	5	

58% of respondents (n=35) recorded the medicine(s) that they had difficulty in obtaining, naming 39 different medicines, with captopril being named five times and sodium chloride, potassium chloride and sodium bicarbonate each being named twice. See table below. Of these 39 medicines, one was unidentified in clinical practice (triazapan). BCH routinely uses unlicensed products for 25 (66%) of the 38 identified drugs.

Table 36 Medicines named by respondents requesting urgent supplies (rescue-medicines)

Acetazolamide	DNAse	Nitrazepam
Acidophilus Extra 4 Caps	Electrolyte solution G	Oxandralone
Amiodarone	Sodium resonium	Oxybutinin
Azathioprine liquid	Fucidin (Fucidic Acid)	Phosphate sandoz
Betadine solution	Joulies phosphate solution	Promixin
Captopril	Loperamide	Amphoterin
Potassium chloride	Sodium bicarbonate	Rifampacin
Domperidone	Omeprazole	Pyridoxal phosphate
Chlorothiazide	Madopar 62.5	Sildenafil Suspension
Clobazam	Magnesium Oral Solution	Minoxodil
Chloral hydrate	Mycophenolate	Sodium chloride
Colecalciferol	Neorecormon	Atrovit
Desmospray	Enalapril	Triazapan

Forty-nine of the respondents answered the question: Has the patient missed any doses as a consequence of not getting the medicine(s)? Of this cohort 13 (26.5%) confirmed that the patient had missed dose(s).

11.2.4. Causation

Respondents were asked to express their opinion as to why they had difficulty in obtaining their medicines. Free text answers (n=42) were coded and a summary of the results is shown below.

Codes were:

CARER – Carer-Parent issue

COMMUNICATION - Information transfer issue
COST – cost of item / dispensing
CP – Community Pharmacy issue
GP – General practitioner issue
SUPPLY – problem with the CP obtaining the medicine
UNCLASSIFIED – Answer is not included in other codes
UNK – Don't know

The code most frequently assigned to answers was 'Supply – problem with the CP obtaining the medicine'. Over half of respondents (54.8%) expressed the opinion that the cause of the problem was either supply, or community pharmacy, or both. Further details of free text answers and assigned codes can be found in Appendix 9, Table 55.

Table 37 Summary of 'reason' codes assigned to free text comments

	Frequency	Valid Percent
Supply	11	26.2
Unclassified	7	16.7
Community pharmacy	6	14.3
Supply / comm pharm	6	14.3
GP	4	9.5
Unknown	3	7.1
Carer	1	2.4
Communication	1	2.4
Cost / GP	1	2.4
Cost / supply	1	2.4
GP / comm pharm	1	2.4
Total specific responses	42	100.0
Missing responses	18	

11.2.5. Service changes

Respondents were asked to express their opinion as to how existing arrangements could be improved. Free text answers (n=29) were coded and a summary of the results is shown below.

Codes were:

PROCUREMENT – improve procurement of medicines for CP

COMMUNICATION – improve communication

CP – community pharmacy improvement

PLANNING – improve planning

GP – general practice improvement

HOSP – hospital improvement

The codes most frequently assigned to answers were 'communication – improve communication' and 'procurement – improve procurement of medicines for CPs'. Further details of free text answers and assigned codes can be found in Appendix 9, Table 56.

Table 38 Summary of 'improve' codes assigned to free text comments

	Frequency	Valid Percent
Communication	6	20.7
Procurement	6	20.7
Unknown	6	20.7
Community Pharmacy	4	13.8
GP	2	6.9
Hospital	2	6.9
Planning	2	6.9
Communication / planning	1	3.4
Total specific responses	29	100.0
Missing responses	31	

11.3. Discussion

11.3.1. Main findings

This study demonstrates that access to medicines for children treated by the NHS in their domestic setting is not always assured and that caregivers may seek urgent help from hospitals to obtain medicines. Caregivers used this hospital service even when the expected route of supply is through primary care. Almost 1 in 3 respondents, who came to BCH Pharmacy for help, reported that they

had experienced problems getting medicines for the patient either often or very often. This has potential consequences for poor medicines adherence, which is contrary to recent national initiatives.(84)

Most respondents (68%) confirmed that they made a special (specific) trip to the hospital in order to obtain rescue-medication. The mean road distance between the patient's home and BCH for these patients was 13.4 miles (one way). Of the 24 respondents who did not request advice from a healthcare professional before coming to BCH, 58% had used this service previously. It seems likely that having used this service before they were sufficiently confident to do so again without the need for further advice. This large return rate, without taking further professional advice, indicates that this service provided adequately for the needs of this cohort. The data obtained also suggests that caregivers used the rescue-medication service whatever the origin of the FP10 prescription (i.e. either a GP prescription or hospital prescription).

Six respondents recorded that they would normally get their medicines dispensed by BCH. If this were the confirmed route of supply then this episode of care would not actually be part of the rescue-medication service and would therefore be ineligible for entry into this study. However, in these instances, experienced hospital pharmacy staff, familiar with medicines' supply arrangements, had confirmed their expectation of a primary care supply. One of the respondents confirmed that they had not used this service before and that the medicines were 'hospital medicines' and therefore this patient may be a new continuing-care patient and may not be a home-patient needing urgent rescue-medication. It seems likely that the remaining five respondents found it necessary to come to the hospital sufficiently frequently for them to now consider BCH as the primary source of supply for the medicines needed. Four of these five respondents confirmed that they use the rescue-medication service often or very often.

This study adds to the work of others (68, 146, 147) in demonstrating that obtaining unlicensed medicines from community pharmacies can be problematic. However, 34% of the medicines mentioned by respondents were licensed in the UK, indicating that problems are not limited to unlicensed medicines. This is an important finding since this is not found in any previously published work. If confirmed by larger, multisite studies, this has implications for identifying suitable service changes. In this present study a total of 16 respondents attended BCH for rescue-medication supplies of UK licensed drugs. This cohort is more than 1 in 4 of all respondents and almost 1 in 2 of those who named identifiable drugs. There is no statistical difference between the licensed-drug cohort and the unlicensed-drug cohort in respect to the distance they travelled to

BCH. This finding suggests that those needing licensed drugs did not simply attend BCH for convenience. Use of the rescue-medication service for licensed drugs was an unexpected finding. Further work will be required to understand the reasons that prompt this action by caregivers and whether this is found only in the paediatric population or in other patient groups. The difficulties associated with different institutions using different formulations of unlicensed captopril for children have been described by other researchers.(67)

More than a quarter of respondents (26.5%, n=13) reported that the patient had missed doses of their medicine(s) as a consequence of not being able to obtain the medicine(s) required. Further work will be needed to determine the clinical significance of this finding, although it is likely that some clinical risk to the patient would result from missed doses (e.g. electrolyte solution G can be life saving for children with a predisposition for hyperkalaemia).

More than half of respondents (55%, n=23) indicated that the reason for their difficulties in obtaining medicines was either a supply issue (at their community pharmacy) or a community pharmacy issue or both. Suggestions for improvement focused on improving 'procurement' (21%) and 'communication' (21%). By indicating a need to improve procurement it seems likely that the respondents believe that the medication concerned should be more readily available (on the shelf) in community pharmacies. However, there are practical issues in trying to make some paediatric medicines immediately available at community pharmacies, especially if they are 'specials', which are manufactured to order and may have short expiry dates.

Communication between healthcare professionals and communication between healthcare professionals and caregivers may be improved in a number of ways, including: removing delays in providing hospital discharge letters or clinic letters to GPs; including nominated community pharmacists within the communication arrangements; and electronic or personal transmission of patient medication details. The delivery of improved communication about medication has been recently called for by the Care Quality Commission.(14) Until 19th August 2010 (150) 'specials' manufacturers were not permitted to advertise their products and could only describe the drugs they make and their costs when specifically asked to do so. This arrangement may have added to communication difficulties for community pharmacists trying to identify a manufacturer of a suitable unlicensed medicine. Relaxing advertising of unlicensed medicines may be beneficial in supporting the supply of these items.

By definition the provision of rescue-medication to home-patients by secondary care can be

described as a support to primary care services. Any Acute Trust providing this service is likely to do so outside of existing contractual arrangements and would be out-of-pocket unless costs were claimed. BCH claims the costs of this service on an individual patient basis by adding both drug and service costs to section E monthly claims to PCTs. Section E includes all claims outside of agreed tariff costs. All PCTs have reimbursed BCH for the costs claimed of all rescue-medication provided to patients to date (February 2011). By definition all recipients were home-patients who would usually expect to obtain continuing medication via primary care services.

11.3.2. Strengths of this study

As far as can be determined this study identifies for the first time the reasons caregivers of children treated at home turn to hospitals to support access to medicines.

The study methodology involves non-healthcare professionals (caregivers), completing a self-completion study instrument unaided. The questionnaire requires mostly free-text (un-coded) answers to the survey questions. See Appendix 9. The development of this instrument included piloting the questionnaire with three caregivers. All three indicated that the instrument questions were suitable and no changes or improvements were suggested. Cognitive testing of the questions for this type of survey may be expected. However this was not undertaken and therefore the reliability of the questions may be a concern and whether the survey provides internally consistent results challenged. Whilst cognitive testing would have been useful and would support the reliability of results, answers to the survey questions appear to be sufficiently consistent to provide a usable output. Validity, the extent to which the questions are answered accurately, is of less concern since few of the questions require quantitative answers.

11.3.3. Limitations of this study

The study methods did not identify the total number of caregivers requesting rescue-medication during the data collection period. In practice up to 60 members of the Pharmacy staff may deal with carers making these requests. In particular, staff working at weekends may be expected to provide core services (e.g. dispensary duties) that are not within their usual job roles. Consistent recording of requests for rescue-medications was considered unobtainable in this setting. In this respect the study cohort may be considered a convenience sample. Therefore the proportion of caregivers completing the survey from within the total population making such requests has not been estimated.

This study was conducted at one single study site and repeating this study in other areas is necessary to identify with confidence which aspects are generalisable. However this present study indicates that supply issues of this type are widespread, since 53 different GP practices were identified from 19 different PCTs, with dispensing provided by at least 46 different community pharmacies, including branches of large multiples, small chains and independent pharmacies. Caregivers of children needing continuing medication may turn to other paediatric hospital pharmacy departments for similar support to obtain urgent medication. [Personal communication S. Conroy to D Terry, September 2010. Used with permission] A multisite extension of this study will be needed to determine if these issues are reflected nationally.

On average respondents reported that they last attended BCH approximately 19 days prior to completing the study. The questionnaire does not distinguish whether this was as an out-patient or as an in-patient. Since BCH provides 3 weeks supply of unlicensed medicines on discharge these patients may be running out of their TTO supply. Six respondents (10%) used the rescue-medicines service between 14 and 28 days after last attending BCH. Of these patients who recorded the name of their medicine(s) (n=4) all were using unlicensed medicines and one comments about information on discharge. It seems likely that between one and four respondents were returning to BCH and using the rescue-medicines service because their TTO unlicensed medicines were running out and further supplies had not been arranged via primary care. There appears to be evidence that this problem of inadequate supply of unlicensed medicines on discharge occurs, but only for a small percentage of patients using the rescue-medicines service, less than 7%.

11.3.4. Comparisons with other studies

Literature searches were undertaken to identify relevant published studies but none were identified.

11.4. Conclusions

In conclusion, caregivers of children who are expected to get their medicines from a primary care source can find it necessary to use the Pharmacy Department at BCH to maintain their medication supply. They do so for both licensed and unlicensed drugs and regardless of the origin of the prescription. Respondents indicate that they believe problems could be reduced by improved

procurement strategies by community pharmacies and by better communication between the parties involved.

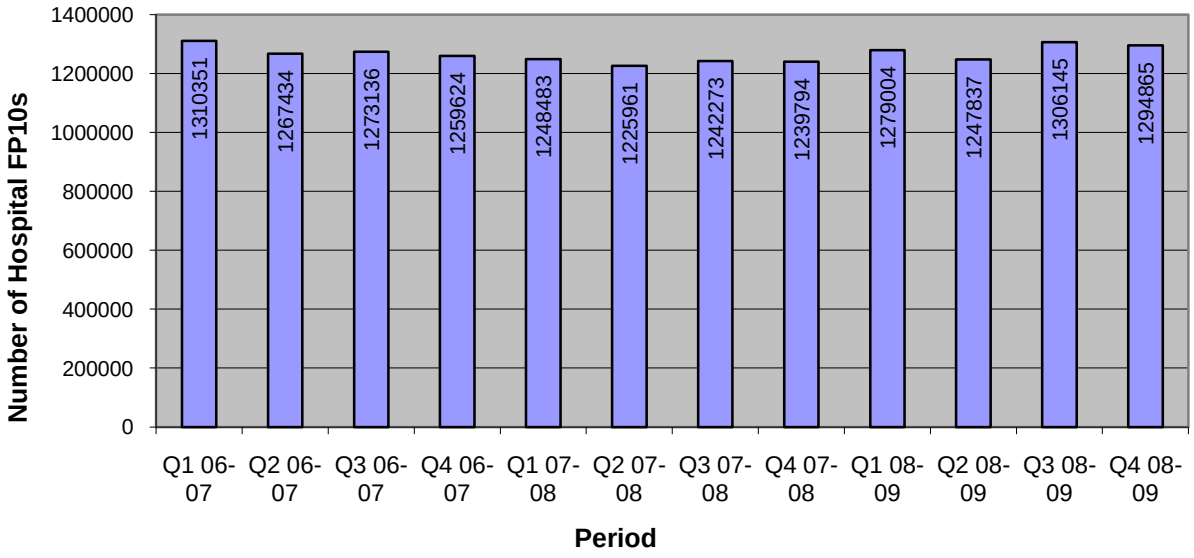
Preliminary reports of this study have been published.(151, 152)

12. Hospital prescriptions dispensed by UK community pharmacists: problems & solutions

12.1. Introduction

Over 5.5 million hospital generated FP10s are dispensed in community pharmacies in England each year [personal communication NHSBSA to D Terry used with permission. Copyright NHSBSA. 23rd July 2009]. The figure below shows the number of hospital generated FP10s dispensed by community pharmacies in England each quarter since quarter 1 (Apr-Jun) 2006.

Figure 12 Number of hospital generated FP10s dispensed by community pharmacies in England by quarter Copyright NHSBSA.



On average these represent only 0.6% of all prescriptions dispensed by community pharmacies with the vast majority being GP prescribed FP10s. During the period April 2008 to March 2009 a total of 852,482,281 prescription items were dispensed in England (all prescribers) at a cost of £8.37 billion; an average cost of £9.83 per item (net ingredient cost). The average cost of a hospital generated item dispensed in the community during the same period is more than three times greater at £33.57.

Computer printed prescription forms were introduced in England in 1998 when the form FP10C was made available.(153) Accredited hospitals with approved computer systems can use the current

computer printed form FP10SS, but this is not the norm with only 41 hospitals authorised to do so in 2010. In an audit conducted by the NHSBSA approximately 2% of hospital generated prescriptions dispensed in the community were on computer generated forms. [Personal communication NHSBSA to D Terry used with permission. Copyright NHSBSA. 23rd July 2009].

It is clear that hospital generated prescriptions are therefore different from the much more familiar GP prescription in at least two respects. Firstly most GP prescriptions are computer generated and printed, where as hospital prescriptions are mostly hand-written. Since community pharmacists and their staff now have a 12 year history of mostly dispensing printed prescriptions, having to process an occasional hand-written script may present additional problems of both legibility and completeness. Secondly, on average, a hospital prescription is more than 3 times as costly as a GP prescription, implying that items on hospital prescriptions differ from GP prescriptions in terms of what is prescribed or the quantity requested, or both. In paediatrics these differences are compounded by the number of unlicensed medicines used, and licensed medicines used off-label. A hypothesis that community pharmacists have additional problems when dispensing hospital generated prescriptions is readily identified and is supported by anecdotal feedback from CPs. However, these concerns have generated few published reports. A literature search of community pharmacy surveys since 2003 identified over 200 papers but only one citation has been found relating to community pharmacy dispensing hospital prescriptions.(154) This report of an audit conducted in 2008 within a single PCT concludes that 16.4% of hospital prescriptions required action to be taken by the dispensing pharmacist to resolve issues. The survey of caregivers, described in Chapter 11, provides evidence that community pharmacy / supply was the main area of difficulty for patients and their carers (see page 146).

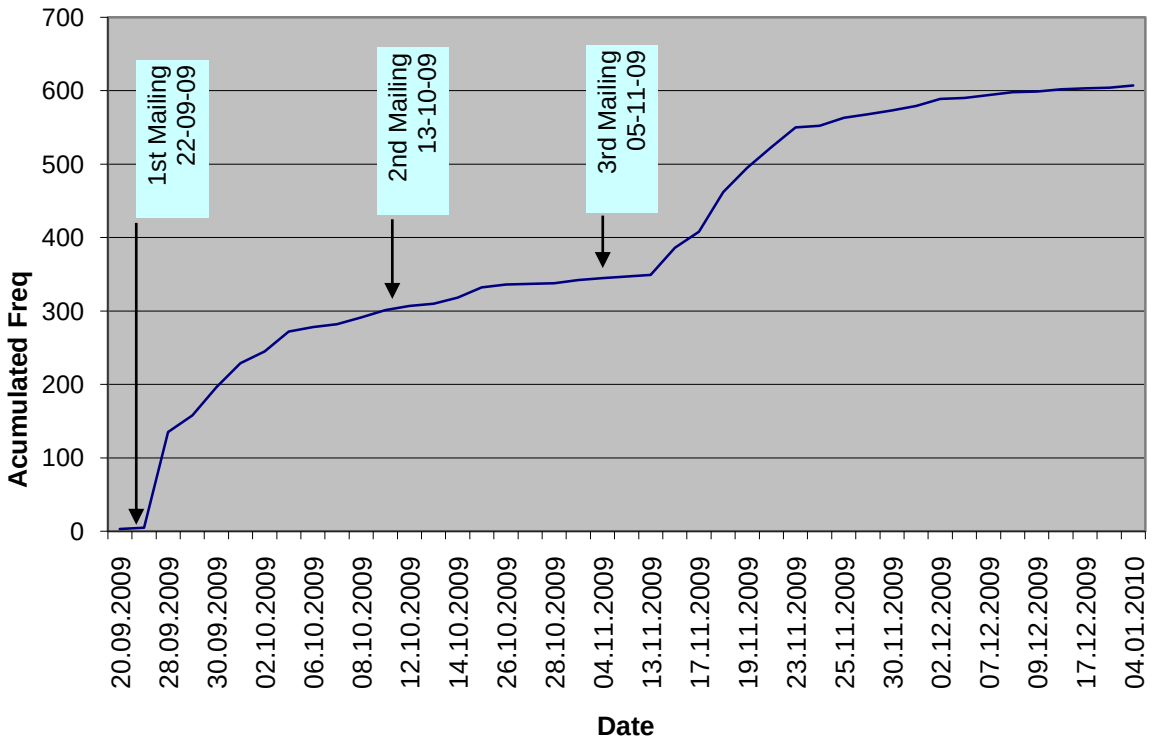
Other chapters of this study programme highlight problems in maintaining the supply of long-term medication for children and the role hospital staff play in supporting this process. Possible solutions to accessing long-term medication for children may include making greater use of community pharmacies to dispense hospital generated prescriptions. If this solution is to be considered then an in depth understanding of the issues CPs may have in dispensing hospital prescriptions is required.

This study aims to identify the experiences and opinions of CPs when dispensing hospital prescriptions. This blended study includes both quantitative and qualitative aspects and seeks to identify CP recommended actions to minimize any problems identified.

12.2. Results

A total of 1,282 surveys were sent to community pharmacies known to have dispensed hospital generated FP10s within a 12 month period. 607 were completed (47.3%) and returned for analysis. One respondent declined to return a completed questionnaire. The first mailing (second class post) was sent on 22nd September 2010. If necessary reminders were sent at + 3 weeks (13th October 2010) and + 6 weeks (5th November 2010). The figure below shows the pattern of returned questionnaires during the data collection period.

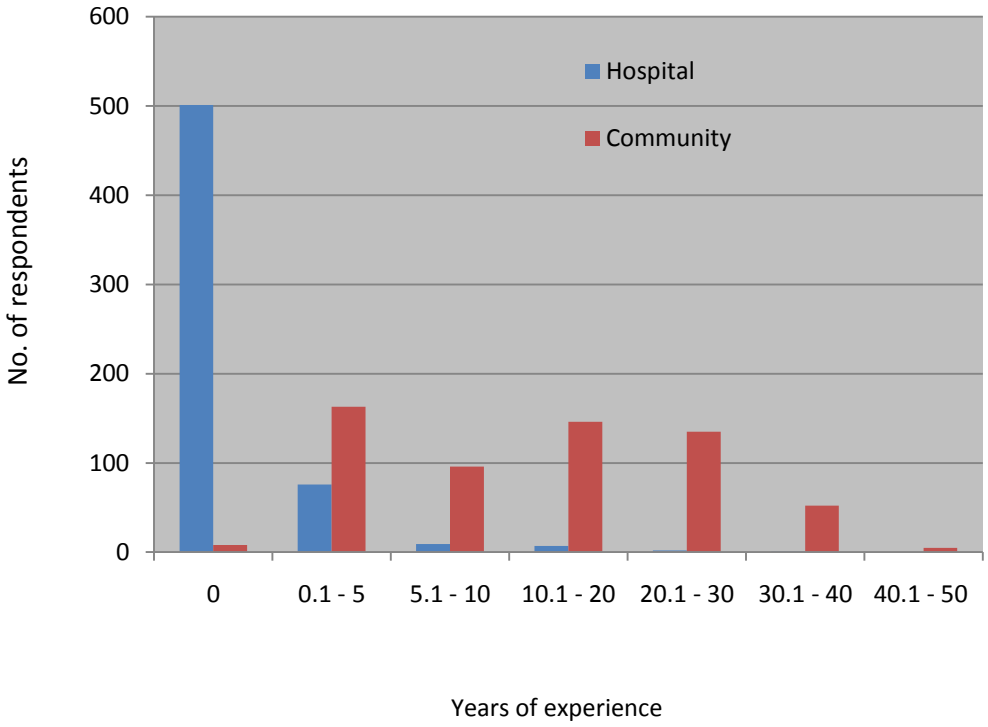
Figure 13 Accumulated frequency of returned community pharmacy surveys by date returned



12.2.1. Demographics

The respondents had typically many years post registration experience as a pharmacist (median = 13 years, range 0 to 50 years). A large majority completed their pre-registration experience in community pharmacy (81.1%, n=490), although some did so in hospital (15.2%, n=92). The figure below shows the number of years experience the respondents had in hospital and community pharmacy. A large majority had no hospital experience (84%, n=501). In contrast most respondents had more than 5 years experience in community pharmacy (71.7%, n=434).

Figure 14 Community Pharmacy Survey. Years experience of respondents in hospital and community pharmacy



Respondents were asked to express the extent of their own personal experience of dispensing hospital prescriptions in the community, using the scale: very little; little; moderate; high; very high. Responses are shown in Table 39. A majority of respondents (n=347, 58%) considered their own experience to be moderate, although almost a quarter (n=147, 24%) considered their experience to be high.

Table 39 Community Pharmacy Survey. Response to: To what extent have you personal experience of dispensing hospital prescriptions in the community?

	Frequency	Valid Percent
Very little	9	1.5%
Little	50	8.3%
Moderate	347	57.5%
High	147	24.4%
Very high	50	8.3%
Total specific responses	603	100.0%
Missing responses	4	

12.2.2. Prescription handling

The respondents were asked to estimate the number of prescription items that they personally dispense or supervise, from all sources, in one calendar month. The pattern of results is shown in Figure 15 below. 75% of respondents dispensed between 3,000 and 12,000 items per month. In contrast the respondents dispensed relatively few hospital generated prescription items.

Figure 15. Community pharmacy survey. Number of prescription items dispensed in 1 calendar month by respondents

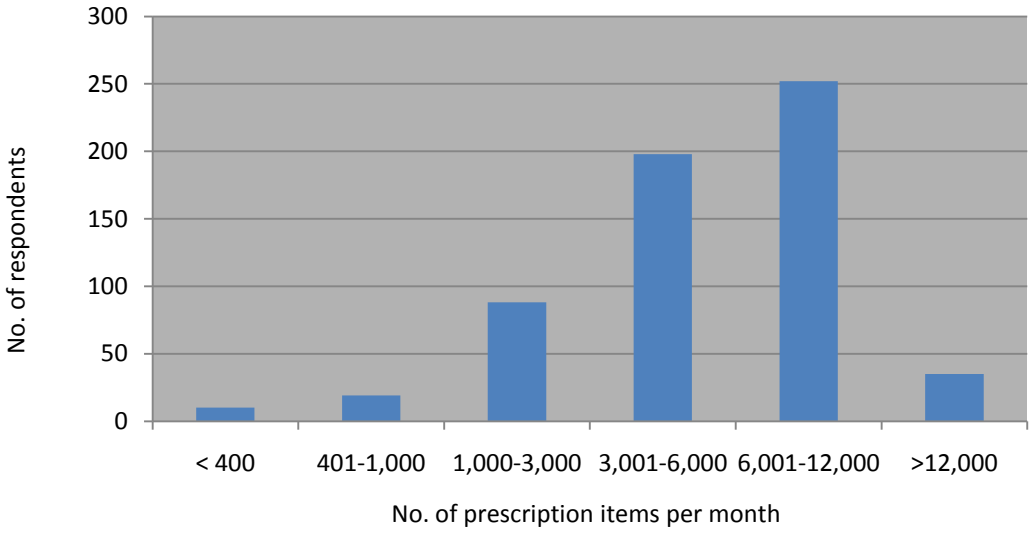


Table 40 shows the number of hospital prescription items dispensed by respondents in 1 year. The

most frequent response selected (36.1%) was the range 101 to 500: approximately between 2 and 10 hospital prescriptions per week. A cross-tabulation of the number of hospital items dispensed with the total number of prescription items dispensed was undertaken. Analysis of this comparison using the Pearson Chi-squared test shows a linear relationship between these two variables ($p < 0.001$). In general terms, the number of hospital prescriptions dispensed is in proportion to the overall dispensing workload of the CP.

Table 40 Number of hospital items dispensed per YEAR by respondents

	Frequency	Valid Percent
None	49	8.3%
1-25	64	10.8%
26-100	197	33.2%
101-500	214	36.1%
501-1,000	46	7.8%
>1,000	23	3.9%
Total specific responses	593	100.0%
Missing responses	14	

The respondents were asked to estimate the average time it takes to dispense a single item on: a) a hospital prescription and b) a GP prescription.

Figure 16 shows the pattern of results. The mean time to dispense a hospital prescription is calculated as 8.15 minutes, compared with 3.37 minutes for a GP prescription. These results indicate that hospital prescriptions take more than twice as long to dispense in comparison with GP prescriptions.

Figure 16 The time respondents take on average to dispense a single item on hospital and GP prescriptions

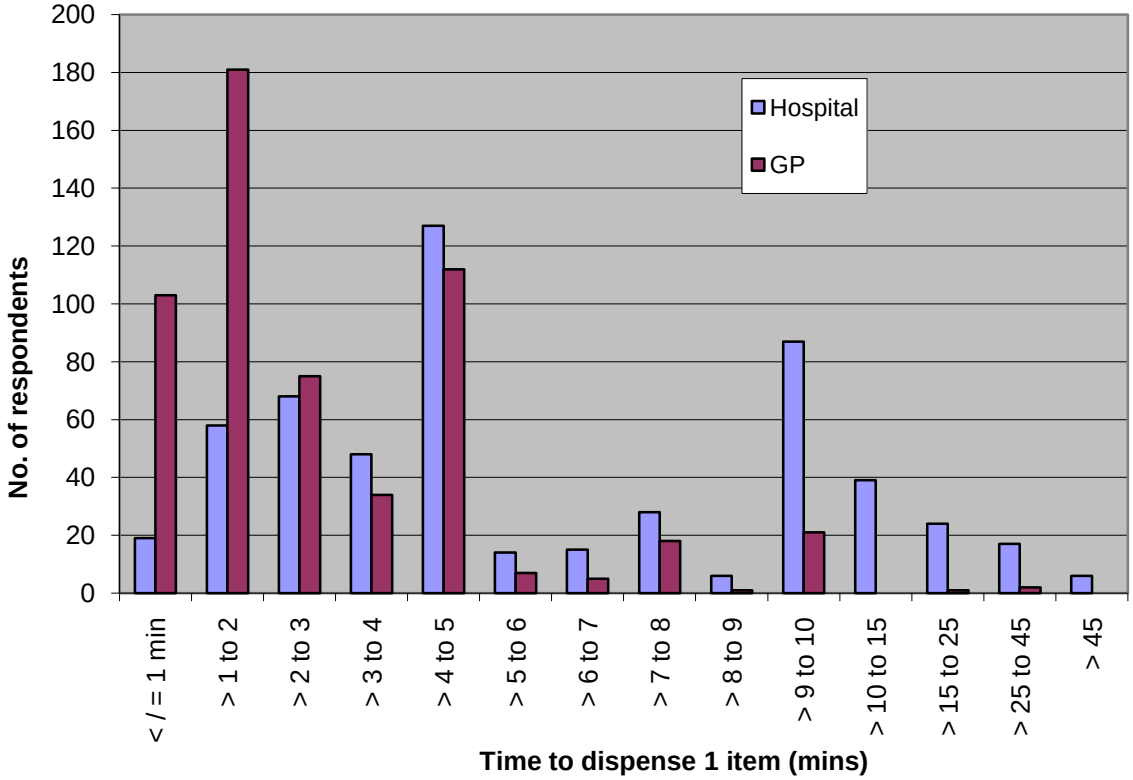


Table 41 below shows the comparative statistics for the time reported by the respondents to dispense hospital and GP prescriptions. Analysis confirms that there is a statistically significant difference between these two variables (paired samples, $p < 0.001$).

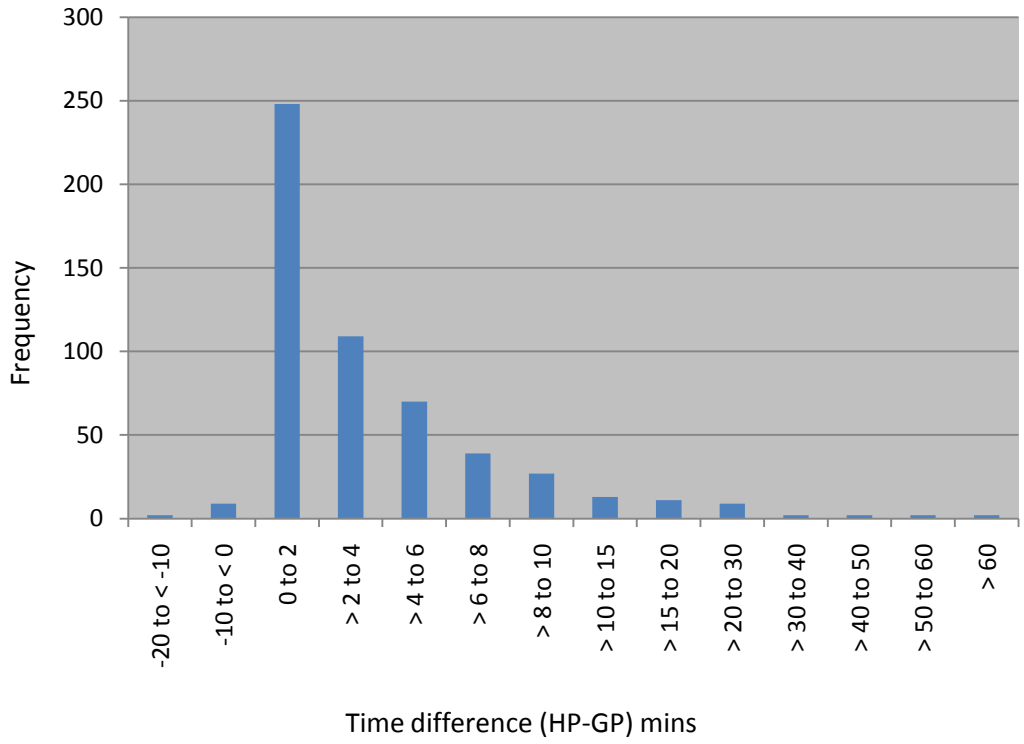
Table 41 Time to dispense hospital or GP prescriptions (mins). Comparative statistics

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Hosp Rx time	556	1.0	120.0	8.150	9.8648
GP Rx time	560	0.5	30.0	3.367	2.8553

Differences in time (paired samples) reported by respondents between hospital and GP prescriptions are shown in Figure 17 below. Two-thirds of respondents (n=357) report that on average hospital prescriptions take between 0 and 4 minutes longer to dispense. Interestingly 2% of respondents (n=11) report that hospital prescriptions take less time to dispense than GP prescriptions.

Figure 17 Community Pharmacy Survey. Histogram of differences in time reported by respondents (paired samples) between HP and GP prescriptions (HP minus GP)



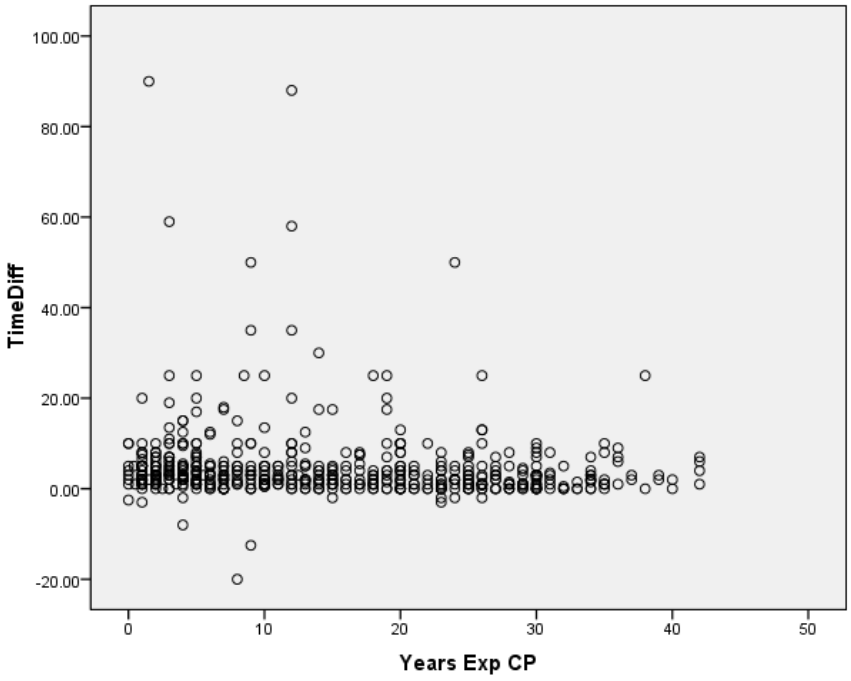
The relationships between the time difference it takes to dispense hospital prescriptions in comparison with GP prescriptions ($\mathbf{T_{h-g}}$) and a number of other variables has been examined. These are:

- $\mathbf{T_{h-g}}$ vs community pharmacy experience Figure 18
- $\mathbf{T_{h-g}}$ vs hospital pharmacy experience Figure 19
- $\mathbf{T_{h-g}}$ vs number of hospital prescriptions dispensed Figure 20
- $\mathbf{T_{h-g}}$ vs personal experience of hospital prescriptions Figure 21
- $\mathbf{T_{h-g}}$ vs confidence in identifying problems on hospital prescriptions Figure 24 & Figure 25
- $\mathbf{T_{h-g}}$ vs relative likelihood of problems on hospital prescriptions Figure 26
- $\mathbf{T_{h-g}}$ vs relative complexity of hospital prescriptions Figure 27

The relationship between the number of years community pharmacy experience of the respondents, with $\mathbf{T_{h-g}}$, has been analysed. A scatter plot of these two variables is shown in

Figure 18.

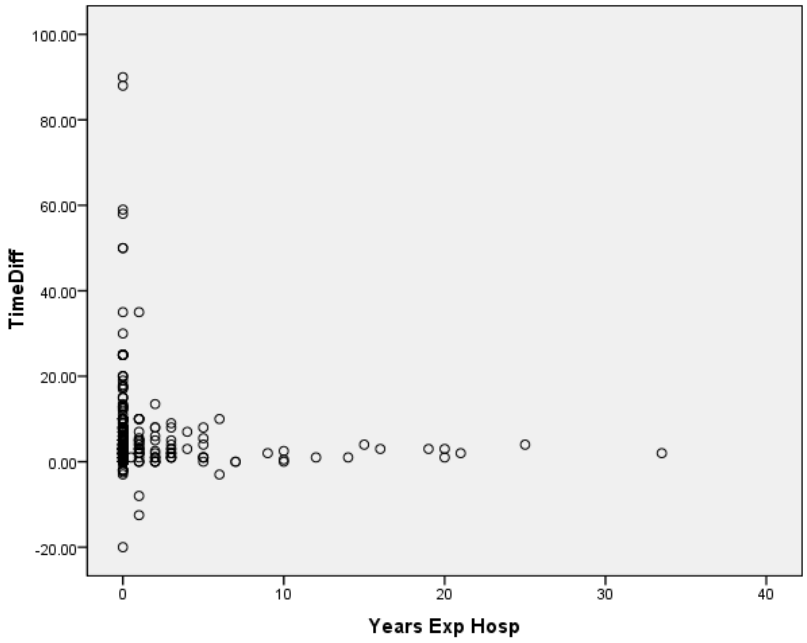
Figure 18 Scatter plot of years experience as a community pharmacist verses difference between the time to dispense hospital prescriptions and GP prescriptions (minutes).



Selecting two sub-cohorts based on community pharmacy experience of less than 10 years and more than 10 years and applying the Mann-Whitney statistical test confirms a highly significant difference ($p < 0.001$) for $\mathbf{T_{h\text{-}g}}$ between the two groups. The median $\mathbf{T_{h\text{-}g}}$ in the less than (or equal to) 10 years experience group was found to be 3 minutes; $\mathbf{T_{h\text{-}g}}$ in the more than 10 years experience group was found to be 2 minutes.

Similarly, the relationship between the number of years hospital pharmacy experience of the respondents, with $\mathbf{T_{h\text{-}g}}$, was also analysed. A scatter plot of these two variables is shown in Figure 19.

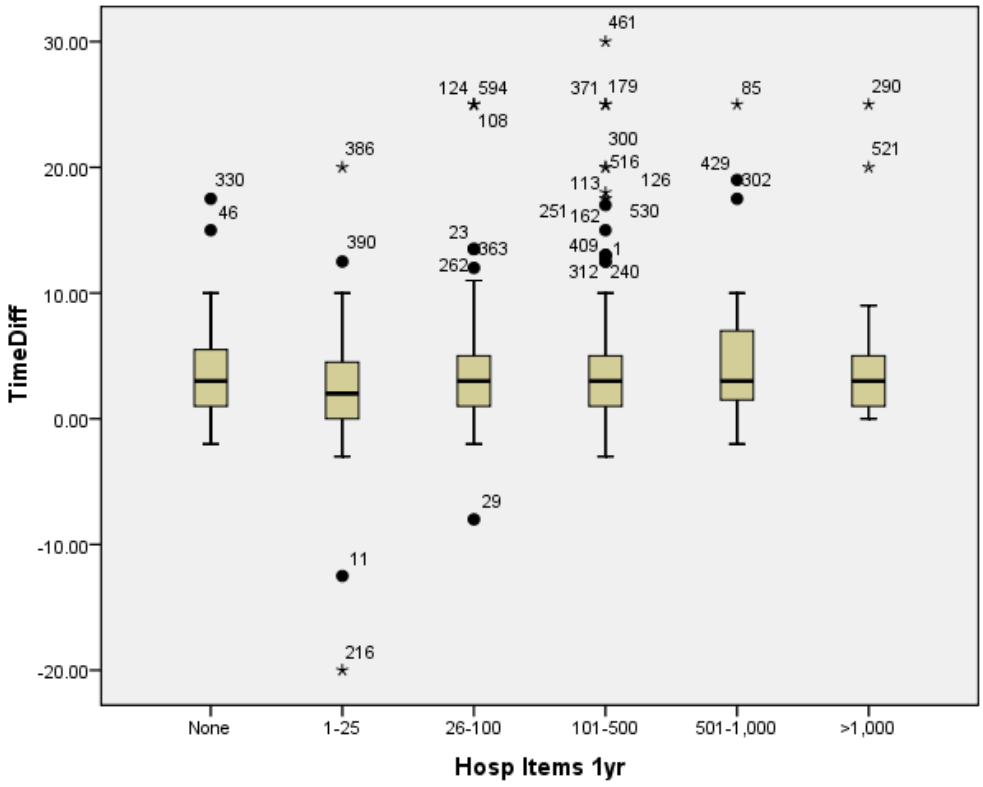
Figure 19 Scatter plot of years experience as a hospital pharmacist verses difference between the time to dispense hospital prescriptions and GP prescriptions (minutes).



Dividing the respondents into two groups according to hospital experience of less than or equal to 10 years and greater than 10 years and applying the Mann-Whitney statistical test confirms that there is no significant difference ($p > 0.05$) for $\mathbf{T_{h\text{-}g}}$ between the two groups. Since this lack of significance may be due to too few cases in the greater than 10 years hospital pharmacy sub-cohort the variable was re-grouped into less than or equal to 5 years hospital pharmacy experience and greater than 5 years hospital experience. Again no significance is identified between the groups ($p = 0.068$).

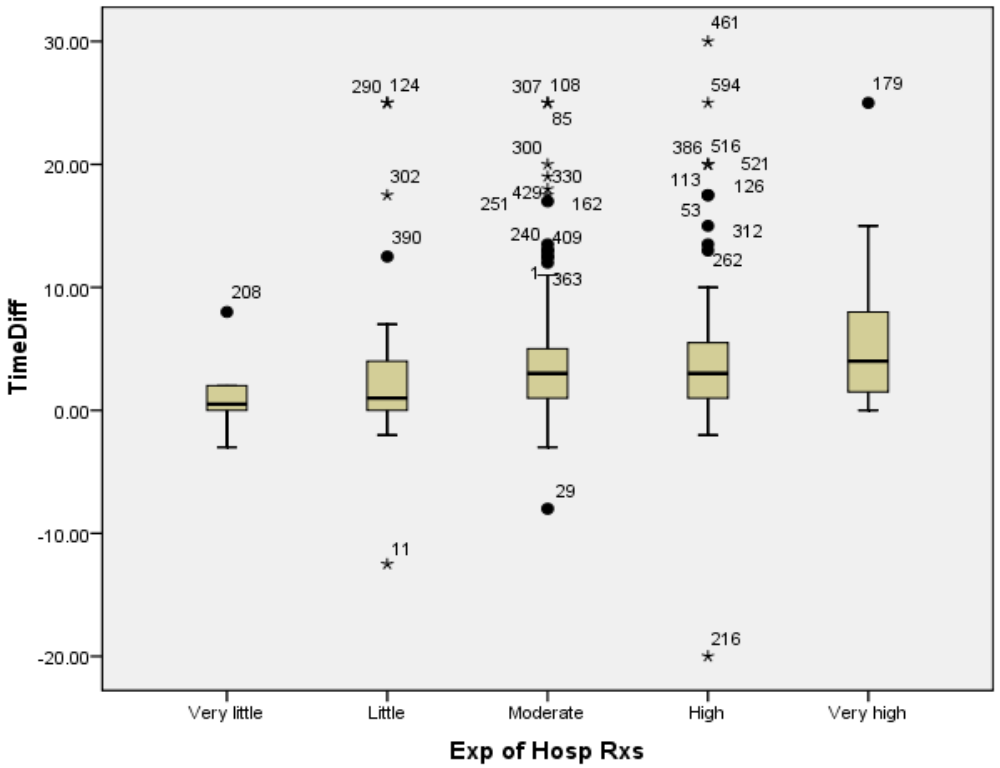
Other relationships between variables indicating experience of the respondents and $\mathbf{T_{h\text{-}g}}$ were analysed. For example it may be supposed that respondents dispensing more hospital prescriptions may report a reduced time difference. A box plot of these two variables failed to identify any trends and no further exploration of this relationship was undertaken. See Figure 20.

Figure 20 Box plot of number of HP prescriptions dispensed in 1 year verses difference between the time to dispense hospital prescriptions and GP prescriptions.



The relationship between the variables, personal experience of dispensing hospital prescriptions in community pharmacy with $\mathbf{T_{h\text{-}g}}$ was analysed. A box plot of this relationship was created to identify any trends. See Figure 21. The box plot shows a mostly linear relationship between these two variables.

Figure 21 Box plot of personal experience of dispensing hospital prescriptions in community pharmacy with time difference to dispense hospital and GP prescriptions

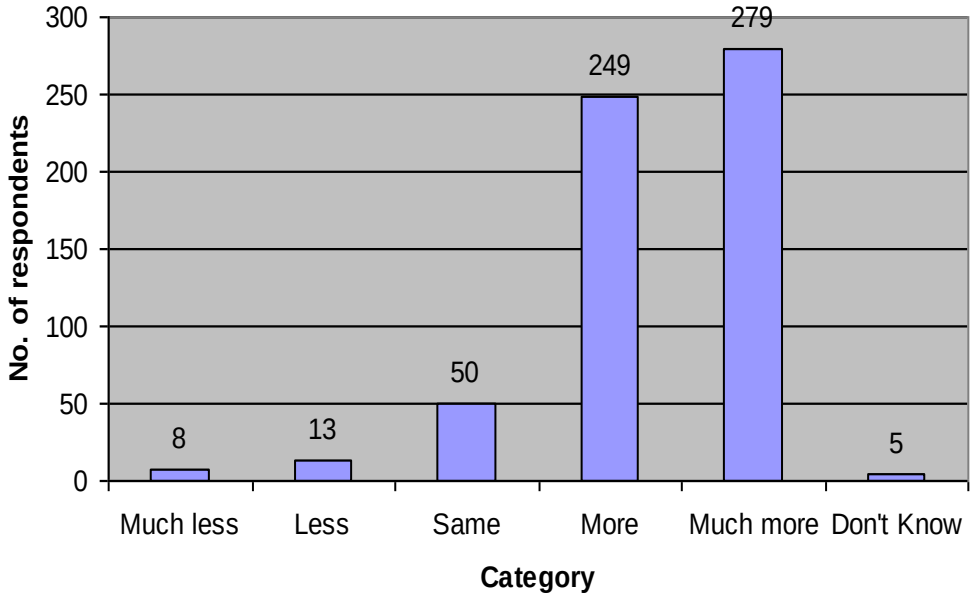


Analysis of the data with the Jonckheere-Terpstra test shows a highly significant trend across the groups ($p = 0.002$). That is, the more personal experience the respondents have in dispensing hospital prescriptions the longer they take to dispense them relative to GP prescriptions (increasing $\mathbf{T_{h\text{-}g}}$).

12.2.3. Hospital prescriptions - general

Respondents were asked: In comparison to an average GP (FP10) prescription what is the likelihood of problems when dispensing a HP (FP10HP) prescription in a community pharmacy. Responses are shown in Figure 22 below. A large majority (87%, n=528) stated that problems were either more or much more likely on hospital prescriptions.

Figure 22 In comparison to an average GP (FP10) prescription what is the likelihood of problems when dispensing a HP (FP10HP) prescription in a community pharmacy.



Respondents were given four statements and asked to indicate the extent to which they agreed or disagreed. Tabulated results are shown in Table 42. In summary:

- 75.4% agreed or strongly agreed that hospital prescriptions were generally more complex than GP prescriptions.
- 52.8% disagreed or strongly disagreed that they were less likely to challenge an unfamiliar dose on a hospital prescription compared with a GP prescription.
- 70.1% disagreed or strongly disagreed that hospitals should NOT be allowed to issue prescriptions to be dispensed by community pharmacies.
- Respondents were equivocal as to whether hospitals should ensure that all out-patient prescriptions are issued to patients so that they can be dispensed by community pharmacies (40% neutral).

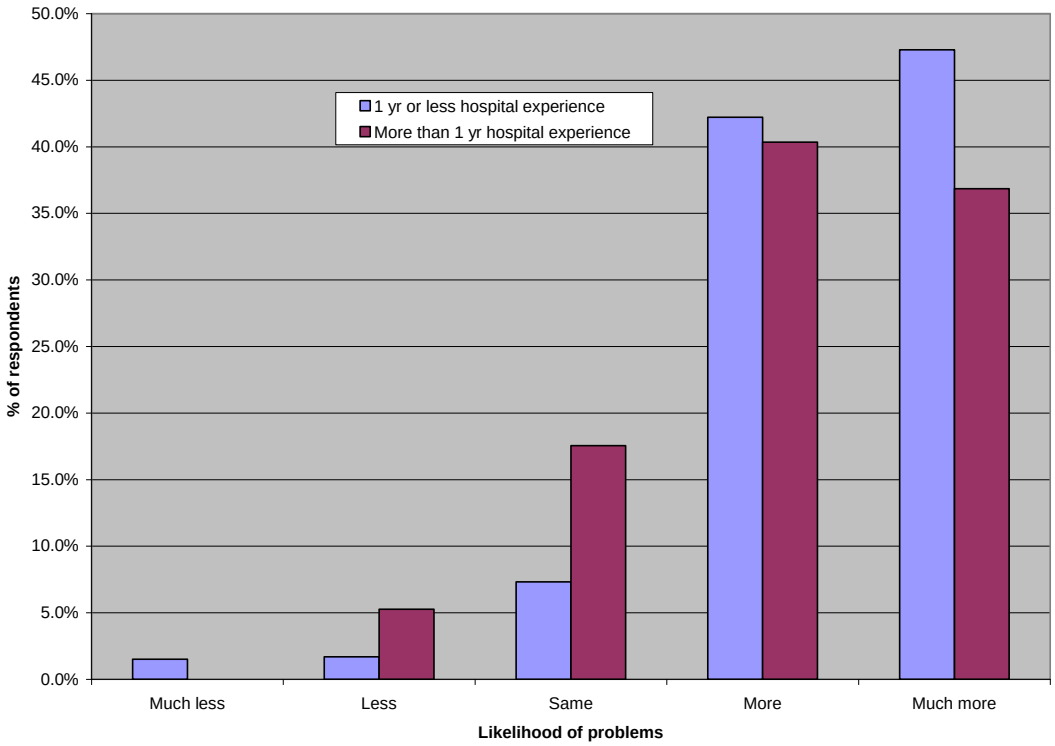
Table 42 Statements relating to hospital prescriptions. Extent of agreement or disagreement by respondents

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
HP prescriptions are generally more complex to dispense than GP prescriptions	14 (2%)	31 (5%)	103 (17%)	346 (58%)	108 (18%)	602
I am less likely to challenge an unfamiliar dose on a hospital prescription compared with a GP prescription	87 (14%)	232 (38%)	142 (24%)	127 (21%)	16 (3%)	604
Hospitals should NOT be allowed to issue prescriptions to be dispensed by community pharmacies	159 (26%)	265 (44%)	110 (18%)	49 (8%)	22 (4%)	605
Hospitals should ensure that all out-patient prescriptions are issued to patients so that they can be dispensed by community pharmacies	25 (4%)	102 (17%)	244 (40%)	162 (27%)	71 (12%)	604

The relationship between a) the likelihood of problems on hospital prescriptions in the opinion of respondents and b) their own hospital pharmacy experience was analysed. Responses to this latter variable were split into two groups; those with 1 year or less hospital experience and those with more than 1 year experience. The pattern of results is shown in Figure 23.

There is a statistically significant difference between these two groups (p=0.002, Pearson Chi-squared). Those with more than 1 year hospital experience believe that the relative problems with hospital prescriptions are less than their colleagues with less hospital experience.

Figure 23 Respondents opinion of the relative likelihood of problems on hospital prescriptions according to their own experience of hospital pharmacy



12.2.4. Hospital prescriptions - problems

Respondents were given a list of five possible problems on prescriptions. They were asked to indicate the likely occurrence of these problems on hospital prescriptions in comparison with GP prescriptions. Responses are shown in Table 43. In summary:

- 89.1% considered it more or much more likely that they cannot read hospital prescriptions
- 67% considered it more or much more likely that the hospital prescription will request an unfamiliar drug
- 84.7% considered it more or much more likely that the hospital prescription will request an unfamiliar drug regimen
- 89.1% considered it more or much more likely that there will be information missing on the hospital prescription
- 52% considered that there were no additional problems in obtaining items on hospital prescriptions, although 1 in 3 respondents expressed the view that there were more

problems obtaining hospital prescription items

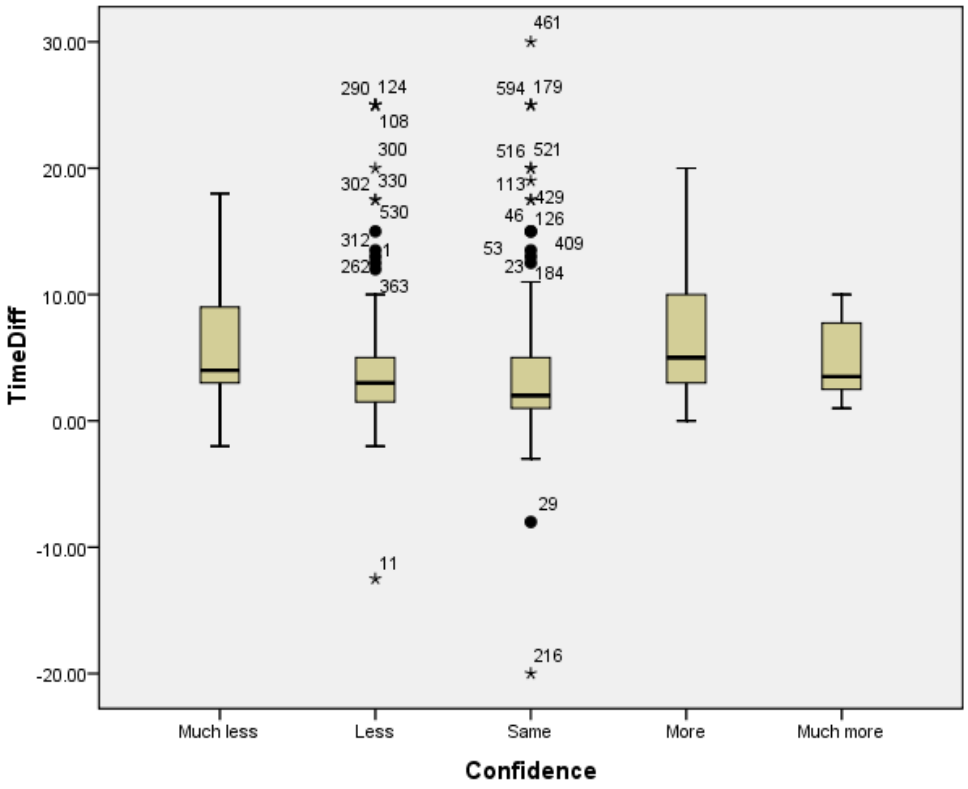
Table 43 Problems on prescriptions - the likely occurrence on hospital prescriptions in comparison with GP prescriptions.

	Much more	More	Same	Less	Much less	TOTAL
Cannot read the prescription	264 (44%)	273 (45%)	63 (10%)	2 (0%)	1 (0%)	603
Unfamiliar drug	74 (12%)	330 (55%)	191 (32%)	5 (1%)	3 (1%)	603
Unfamiliar dose regimen	118 (20%)	393 (65%)	89 (15%)	2 (0%)	1 (0%)	603
Information on Rx is missing	361 (60%)	177 (29%)	58 (10%)	7 (1%)	1 (0%)	604
Problems with obtaining the product	66 (11%)	216 (36%)	310 (52%)	7 (1%)	2 (0%)	601

Respondents were given the opportunity to provide free text comments relating to problems on hospital prescriptions. Responses were received from 418 respondents and were coded. The codes assigned with the highest frequency were: poor legibility (21.8%); quantity (missing) (19.1%); missing information – general (17.2%); communication issues (9.1%); and missing contact details (6.7%).

Respondents were asked: *In comparison to an average GP (FP10) prescription how confident are YOU that you will be able to identify any prescribing errors when dispensing a hospital (FP10HP) prescription in a community pharmacy?* (scale: much less – less – same – more – much more). Two-thirds of respondents (n=398, 66%) expressed the view that they had the same confidence when dispensing hospital or GP prescriptions, although a quarter of respondents (n=150, 24.9%) stated they had less confidence when dispensing hospital prescriptions. The relationship between the relative confidence of respondents in identifying prescribing errors on hospital prescriptions and $\mathbf{T_{h\text{-}g}}$ was analysed. A box plot of this relationship was created to identify any trends. See Figure 24. This v shaped graph shows that respondents who have the “same confidence” (the middle option in the scale) in identifying problems on hospital prescriptions as on GP prescriptions report the least time difference in dispensing the prescriptions.

Figure 24 Relative confidence of respondents in identifying prescribing errors on hospital prescriptions with time difference required to dispense hospital and GP prescriptions.



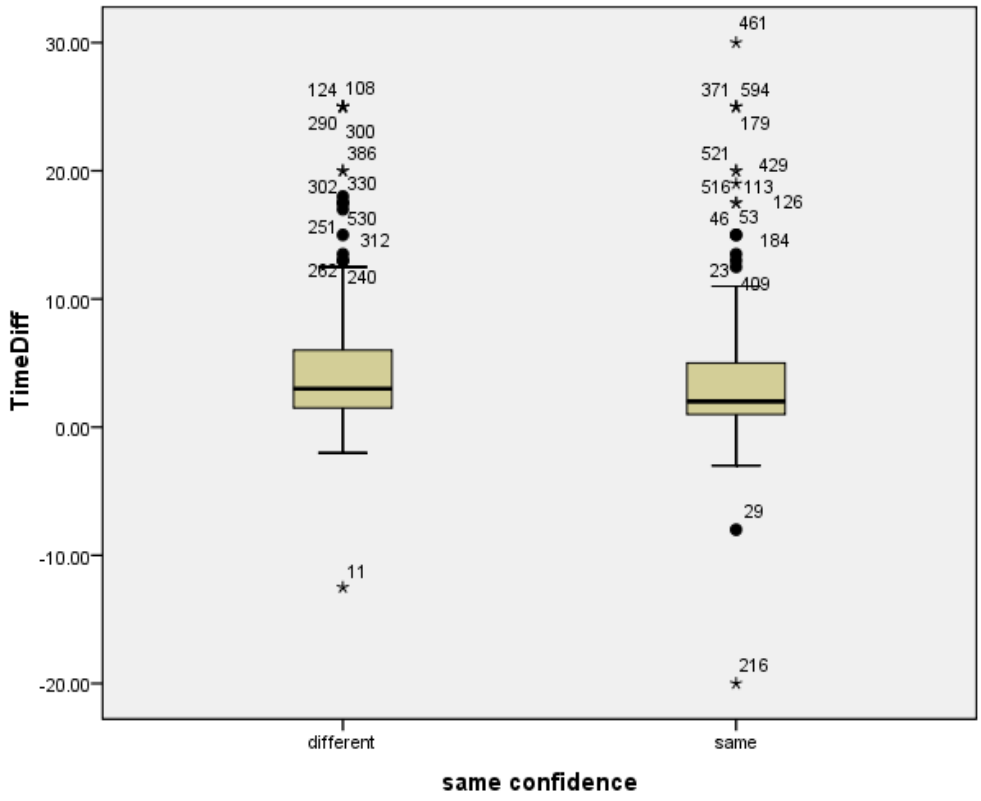
Responses relating to confidence were assigned to two groups for further analysis:

Group 1 Same confidence: where “confidence” = same

Group 2 Different confidence: where “confidence” does not equal same (includes groups much-less, less, more and much-more).

These groups were plotted against time difference.

Figure 25 Box plot of groups with same or different confidence in identifying prescribing errors with time difference to dispense prescriptions



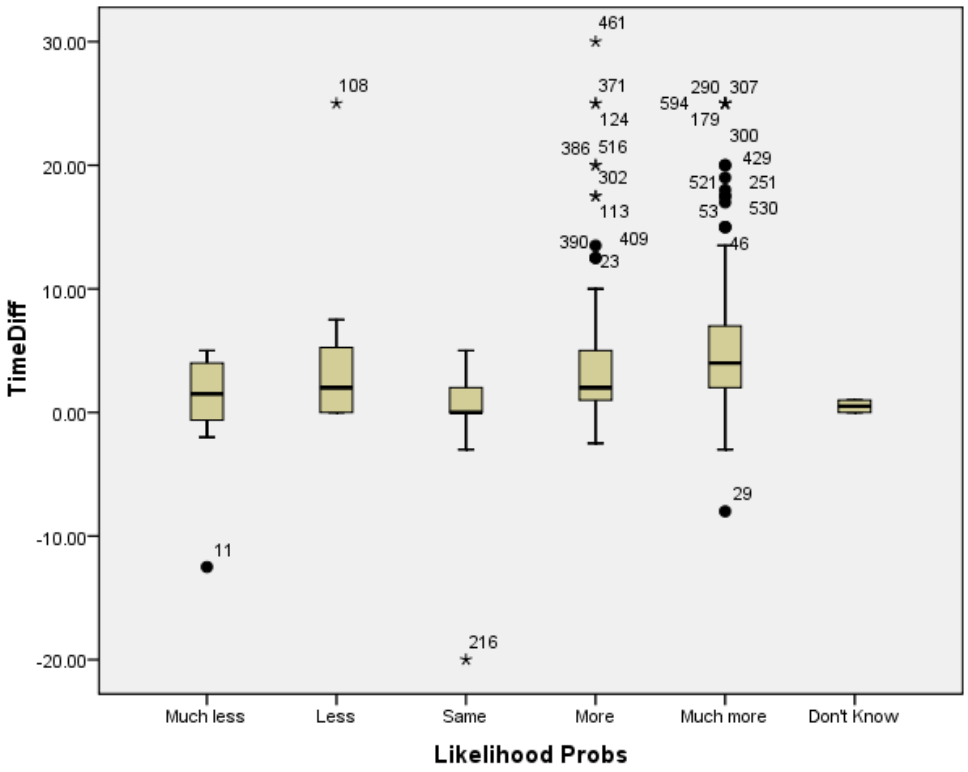
The Mann-Whitney non-parametric test for two independent samples demonstrates that there is a highly significant difference between these two groups ($p < 0.001$). Respondents with “confidence” = same having a smaller $\mathbf{T_{h\text{-}g}}$ than those where “confidence” is not equal to same.

Respondents were asked: As a community pharmacist do you believe that there is more risk of error when dispensing a hospital prescription compared to a GP prescription? – in answer to which 61% (n=368) replied yes. Respondents were also given the opportunity to provide free text comments in relation to this question. 268 comments were provided and coded. The codes assigned with the highest frequency were: poor legibility (37%); communication issues (10.1%); and missing information – general (7.5%).

The relationship between the opinion of respondents on the extent of problems on hospital

prescriptions and T_{h-g} was analysed. A box plot of this relationship was created to identify any trends. See Figure 26.

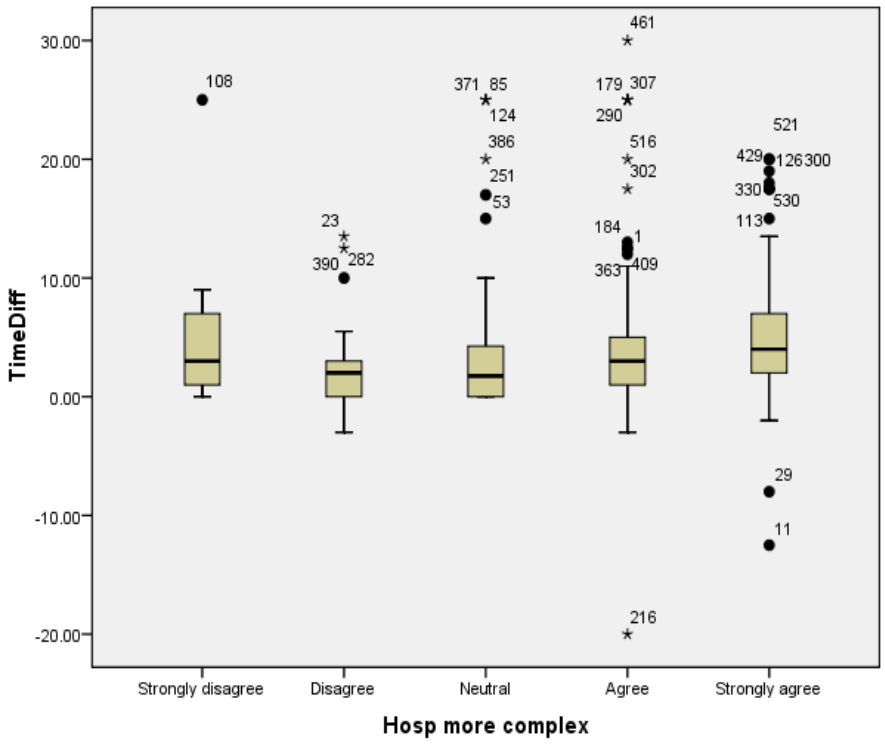
Figure 26 Likelihood of problems on HP prescriptions verses difference in the time to dispense hospital prescriptions and GP prescriptions.



The relationship between these two variable was analysed using the Jonckheere-Terpstra test, and a significant trend across the groups was found ($p<0.001$). The results indicate that as the likelihood of problems on HP prescriptions rises (in the opinion of respondents) the more likely are the respondents to take a significantly longer time to dispense HP prescriptions.

Similarly, the relationship between the relative complexity of hospital prescriptions in the opinion of the respondents, and T_{h-g} was analysed. A box plot of this relationship was created to identify any trends. See Figure 27.

Figure 27 Relative complexity of HP prescriptions verses difference between the time to dispense hospital prescriptions and GP prescriptions.



Analysis with the Jonckheere-Terpstra test shows a highly significant trend ($p<0.001$) across the groups. That is, respondents who strongly agree that hospital prescriptions are more complex take a significantly longer time to dispense HP prescriptions in comparison to GP prescriptions.

12.2.5. Hospital prescriptions – getting advice

The respondents were asked: *If you require further advice / information when dispensing a HOSPITAL PRESCRIPTION what or whom will you consult? Please indicate how likely you are to use the following sources of information?* Seven different information sources were provided in the survey. The responses to these options are shown in Table 44. In order of frequency, respondents were either very likely or quite likely to consult: standard texts – e.g. BNF (84.7%); hospital prescriber (84%); hospital prescriber's support staff (67.3%); the patient or carer (65.7%); hospital pharmacy (39.4%); medicines information department (31.3%); GP, or their staff (19.4%).

Table 44 How likely respondents will use 7 different information sources when dispensing hospital prescriptions.

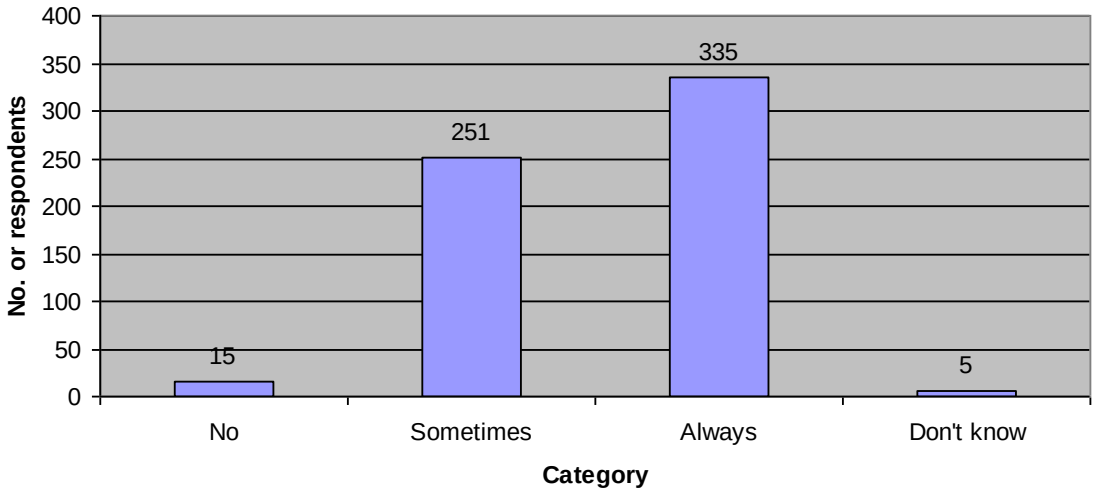
	Very likely	Quite likely	Sometimes	Quite unlikely	Very unlikely	Total
The patient or carer	231 (38%)	165 (27%)	177 (29%)	20 (3%)	10 (2%)	603
Standard text (eg BNF)	318 (53%)	191 (32%)	84 (14%)	5 (1%)	3 (1%)	601
GP (or their staff)	45 (8%)	67 (12%)	166 (29%)	215 (37%)	85 (15%)	578
Hospital Pharmacy	90 (15%)	145 (24%)	173 (29%)	132 (22%)	56 (9%)	596
Medicines information	67 (11%)	118 (20%)	209 (35%)	142 (24%)	56 (10%)	592
Hospital Prescriber	325 (54%)	179 (30%)	65 (11%)	18 (3%)	13 (2%)	600
Hosp prescriber's support staff eg registrar	205 (34%)	198 (33%)	110 (18%)	53 (9%)	33 (6%)	599

The respondents were also given the opportunity to provide free text descriptions of any other information sources they were likely to use. The 63 responses were coded. The codes assigned with the highest frequency to identifiable sources were: NPA (n=9, 14.3%); consultant's secretary (n=7, 11.1%) and internet (n=6, 9.5%).

12.2.6. Resolving problems

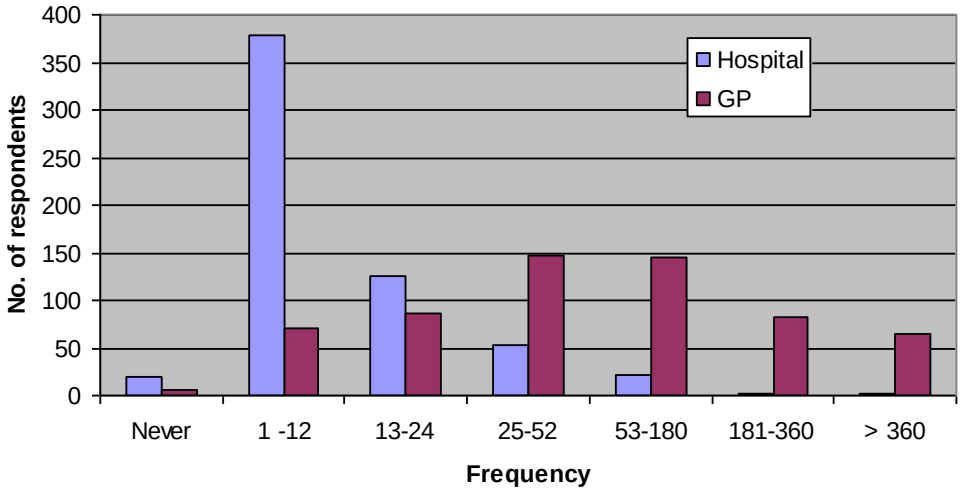
A large majority of respondents (n=471, 78.2%) confirmed that they had SoPs that provided guidance in resolving prescription problems. When a pharmacist acts to modify a prescription, often in consultation with the prescriber, it is usually described as an intervention. Respondents were asked how often they record details of when they intervene on prescriptions. Responses are shown in Figure 28. A majority of respondents (n=335, 55.3%) stated that they always recorded intervention details.

Figure 28 How often respondents record prescription intervention details



Respondents were asked: *In the last 12 months approximately how often have you or the staff under your supervision contacted a) a hospital for advice concerning a hospital prescription and b) a GP practice for advice concerning a GP prescription?* Responses are shown in Figure 29. A large majority of respondents (n=378, 62.8%) made contact concerning hospital prescriptions between 1 and 12 times per annum. In contrast, there is a more Normal distribution of results for GP prescriptions.

Figure 29 Frequency respondents contacted the primary information source for hospital and GP prescriptions



12.2.7. Beneficial changes

The survey provided respondents with 9 options which may be beneficial in reducing the problems associated with dispensing hospital prescriptions in community pharmacy. Respondents were asked to assess the benefit of each proposed change using the scale: no benefit; little benefit; medium benefit; high benefit; very high benefit. Table 45 shows the responses. A summary of the results, in order of popularity for the combined categories high benefit or very high benefit, is provided below:

- Ensure all hospital prescriptions include direct contact details for the prescriber (98.5%)
- Ensure all hospital prescriptions are computer printed (94.1%)
- If prescribed dose regimens are not included in standard texts ensure the prescriber acknowledges that they have done so knowingly on the prescription (eg endorse as BNF crossed-through (72.6%)
- Ensure prescribers indicate the dose calculation as well as the final dose on hospital prescriptions for children (eg state mg per kg as well as calculated dose) (67.3%)
- Ensure all hospital prescriptions are clinically screened by a hospital clinical pharmacist before being issued to the patient. (63.8%)
- Create an internet site to enable access to the hospital's usual formulations and source of unlicensed medicines and provide web address on the prescription (51%)
- Provide a prescription fax back system to the hospital– so that the prescription can be faxed to the Pharmacy of the hospital for comment. Provide the fax number on the prescription. (46.9%)
- Create an internet site to enable access to the hospital's formulary and provide web address on the prescription (45.8%)
- Create an internet site to enable access to the hospital's clinical protocols and provide web address on the prescription (37.1%)

Table 45 Proposed changes to support dispensing hospital prescriptions by CPs. Assessment of benefits

	No benefit	Little benefit	Medium benefit	High benefit	Very high benefit	TOTAL
Ensure all hospital prescriptions are computer printed	0 (0%)	2 (0%)	34 (6%)	205 (34%)	366 (60%)	607
Ensure all hospital prescriptions include direct contact details for the prescriber	0 (0%)	0 (0%)	9 (2%)	126 (21%)	471 (78%)	606
Create an internet site to enable access to the hospital's formulary and provide web address on the prescription	20 (3%)	111 (18%)	198 (33%)	178 (29%)	100 (17%)	607
Create an internet site to enable access to the hospital's clinical protocols and provide web address on the prescription	31 (5%)	144 (24%)	207 (34%)	157 (26%)	68 (11%)	607
Create an internet site to enable access to the hospital's usual formulations and source of unlicensed medicines and provide web address on the prescription	15 (3%)	91 (15%)	191 (32%)	206 (34%)	103 (17%)	606
If prescribed dose regimens are not included in standard texts ensure the prescriber acknowledges that they have done so knowingly on the prescription (eg endorse as	7 (1%)	18 (3%)	141 (23%)	241 (40%)	198 (33%)	605
Provide a prescription fax back system to the hospital– so that the prescription can be faxed to the Pharmacy of the hospital for comment. Provide the fax number on the prescription.	13 (2%)	95 (16%)	213 (35%)	176 (29%)	107 (18%)	604
Ensure all hospital prescriptions are clinically screened by a hospital clinical pharmacist before being issued to the patient.	11 (2%)	50 (8%)	158 (26%)	227 (38%)	159 (26%)	605
Ensure prescribers indicate the dose calculation as well as the final dose on hospital prescriptions for children (eg state mg per kg as well as calculated dose)	5 (1%)	35 (6%)	158 (26%)	218 (36%)	189 (31%)	605

Respondents were asked to give their opinion as to which single achievable change would bring about the most benefit in relation to dispensing hospital prescriptions in community pharmacy. Free text answers were provided by 504 respondents. The codes assigned with the highest frequency

were: printed / computer generated prescriptions (n=204, 41%); prescriber contact details (n=140, 28%); multiple changes suggested by respondents (n=52, 10%); unassigned / undefined change (n=38, 7.5%); clinically screened (n=25, 5%).

The survey invited respondents to provide any further comments concerning hospital prescriptions dispensed in the community. 151 comments were made and coded. All codes that were assigned more than once are shown in Table 46. Up to two codes were assigned to each response. Problems relating to legibility were most frequently found in these free text answers.

Table 46 Further comments concerning hospital prescriptions dispensed in the community by respondents (frequency of coding).

CODE	Frequency	Valid Percentage
Contact details illegible / missing	24	15.9%
Legibility issues (eg. Handwriting)	15	9.9%
Missing quantity	12	7.9%
Training – prescriber	10	6.6%
Unassigned	9	6.0%
Computer generated Rx beneficial	8	5.3%
Hospital Rx only - communication issue	8	5.3%
Communication problems	3	2.0%
Contact problems	3	2.0%
Hosp letter beneficial	3	2.0%
Missing details	3	2.0%
Not in BNF useful	3	2.0%
Website beneficial	3	2.0%
CD errors	2	1.3%
Excessive quantities	2	1.3%
Hospital Rx dispense in CP beneficial	2	1.3%
Patient address omitted	2	1.3%
Quantity of eye drops	2	1.3%
Replacement Rx problems	2	1.3%
Training – secretary	2	1.3%

12.3. Discussion

12.3.1. Main findings

A return rate of 47.3% was in keeping with expectations and provided over 600 useful replies to this survey. This large number of respondents facilitated statistical analysis of the results. A fourth posting (third reminder) may have provided further replies but this was not undertaken. The large response to the third mailing may have occurred as a consequence of making it clear to recipients that this was the final reminder and sending another reminder may be considered disingenuous.

588 respondents provided the postcode of the pharmacy in which they completed the questionnaire, although 73 of these were incomplete. Of the full postcodes provided (n=515) only 15 were duplicated. A total of 263 postal districts (as represented by the first part of the UK code) were represented by the respondents and demonstrates the geographical diversity of the study cohort and adds to the confidence that the main findings may be generalisable in England.

At the time of the survey over 80% of respondents had more than 3 years experience as a pharmacist since first registration. This level of experience adds to confidence in the validity of results, with little concern from possible bias or invalid views or opinions due to inexperience. Most respondents (80%) completed their pre-registration year in community pharmacy, with a small minority (15.2%) doing so in hospital. As expected, the study cohort had, on average, many years experience as community pharmacists, with over 70% having more than 5 years experience. Few however had any hospital pharmacy experience with 84% having no experience once registered. Only 1 in 10 of respondents had more than one year experience in hospital. It is clear that few respondents were neither trained in nor had suitable experience of the hospital sector to support their dispensing of hospital prescriptions. Those with 1 year or more hospital experience believe that the likelihood of problems on hospital prescriptions (relative to GP prescriptions) is less than their colleagues. See Figure 23. However their greater hospital experience does not influence their views on the complexity of hospital prescriptions, their likelihood to challenge hospital prescriptions nor their assessment of the relative risk of hospital prescriptions. These results may indicate that community pharmacists with more than 1 year experience in hospital pharmacy may consider themselves better equipped to manage the problems that dispensing hospital prescriptions in community pharmacy presents. Whilst results from this present study points to this conclusion, this study is far from conclusive in this respect and further consideration of the training needs of CPs to

manage hospital prescriptions is necessary. The opportunity to gain experience of hospital prescriptions in community pharmacy is limited and most respondents describe their own experience of hospital prescriptions as moderate.

Almost half of respondents report that they dispense or supervise over 6000 prescription items per month (all sources of prescriptions); over 200 items on average each working day. In contrast over a third of respondents (36.1%, n=214) only dispense between 8 and 40 hospital prescriptions each month. Overall approximately 0.3% of prescriptions dispensed or supervised by respondents were hospital prescriptions, marginly lower than the national average of 0.6% at the time of the study. [NHS Business Services Authority. Hospital prescriptions dispensed in Community Pharmacies in England. Personal communication, Used with permission. Received July 23rd 2009.] Whilst the estimate of 0.3% is half the expected result relatively small errors in estimations of the number of hospital prescriptions may account for this difference and the result may be considered similar in magnitude to the accepted national figure.

The mean time to dispense a hospital prescription was found to be twice as long as that for a GP prescription; a statistically significant difference. This present study may quantify this difference for the first time and indicates the additional work that a CP must do when dispensing hospital prescriptions. There is strong agreement by the respondents that hospital prescriptions are either more likely or much more likely to have problems than GP prescriptions (87.4%). They also consider hospital prescriptions more complex than those issued by GPs. These two factors are both likely to influence the time required to dispense hospital prescriptions and both were found to have a statistically significant relationship with the (relative) time taken to dispense hospital prescriptions. A majority of respondents confirm that they are just as likely to challenge an unfamiliar dose on hospital prescriptions as they are GP prescriptions. The respondents' professionalism in managing the risk to their patients is supported by this finding and they do so even when problems are more likely and contacting the prescriber is hindered. They believe that hospitals should continue to be allowed to issue prescriptions for CPs to dispense, indicating, in part at least, that the problems are manageable. They are less sure however whether all out-patient prescriptions should be dispensed in the community and this may reflect their relative lack of experience with hospital prescriptions. They may also be unsure of the prescriptions that hospital pharmacies dispense that they may not see in community pharmacy.

This present study suggests that the major problems community pharmacists have when dispensing hospital prescriptions relate to legibility of the written prescriptions and missing information on the prescriptions, often quantity. Lack of familiarity with drugs used by hospital prescribers may

contribute to these problems. The survey explores these issues using direct questions in accordance with findings from the focus group. These views are strongly supported by free text comments made by the respondents which confirm the reliability and validity of these conclusions. The respondents' answers frequently draw attention to the poor legibility of hospital prescriptions' and this may be considered the leading cause of the increased risk relating to hospital prescriptions.

The respondents were equivocal concerning problems in obtaining the products with approx. half stating there are more problems with hospital prescribed items and the other half disagreeing. Only 3.6% (n=13) of respondents mention specialist ('specials') drugs within their free text answers. The relationship between these views and whether the respondent is in an independent chemist or working for a pharmacy chain is yet to be determined.

Two-thirds of respondents have the same confidence that they will be able to identify any prescribing errors when dispensing a hospital prescription as with a GP prescription, yet 61.1% (n=368) believe that there is more risk of error when dispensing a hospital prescription compared to a GP prescription. It is difficult to interpret these two opposing finding although it is possible the former may be considered to be a personal expression of the individual's ability and the later as a group effect. Or in summary these results may imply … I have confidence personally to identify errors but I'm less confident my community pharmacy colleagues can do likewise.

CPs may consult a number of sources when needing advice concerning hospital prescriptions. The likelihood of using 7 possible sources is shown in the results section on page 169. A large majority of respondents confirm that they are likely or very likely to consult a standard text (e.g. BNF) or the hospital prescriber and this approach is in keeping with expectations. Two-thirds also confirm that they are likely or very likely to consult the patient. This may be of practical help when managing poor legibility of prescriptions and confirming the required item. However, the reliability of descriptions of medication regimens provided by caregivers on admission to hospital has been questioned in other studies reported in this thesis. Community pharmacists should be cautious when acting on lay descriptions of medication regimens without corroborating information. Fewer respondents contact the hospital pharmacy or medicines information when needing advice than other key sources of information. This may be an unexpected finding since the medicines information service is designed to accommodate these enquiries. Anecdotal comments indicate that the speed of reply may not be in keeping with the requirements of the CPs. These options are, of course, not mutually exclusive and when seeking advice a pharmacist may consult a number of

sources.

A majority of respondents (78.2%) confirm that they have standard operating procedures to resolve queries on prescriptions. Solving queries on prescriptions may be considered a core task of a CP and therefore this figure may be lower than expected. Organisations monitoring the work of CPs should expect operating procedures of this kind to be in place and in use.

Respondents were asked to report the frequency that they, or their staff, call hospital prescribers for advice on a prescription. 62.8% (n=378, largest group) stated they did so between 1 to 12 times in 12 months. Similarly, respondents were asked to report the annual frequency that they, or their staff, call GPs. 24.5% (n=147, largest group) did so between 25 to 52 times. By comparing the frequency of calls with the estimate number of prescriptions processed by each respondent the calls per prescription can be estimated:

- Calls to GPs – range from 1 call per 31 prescriptions to 1 call per 18,000. Using the calculated mid-point method the average is estimated to be 1 in 939

- Calls to hospital prescribers – range from 1 call per 0.1 prescriptions to 1 call per 166. Using the calculated mid-point method the average is estimated to be 1 in 9.7. The highest frequency of 10 calls per single hospital prescriptions seems unlikely and the reliability of the response from this respondent should be questioned.

This 100 fold difference illustrates the additional problems CPs have when dispensing hospital prescriptions.

The respondents were asked to consider the benefit of a list of possible service options to reduce the problems associated with dispensing hospital prescriptions in community pharmacy. Almost all (98.5%) indicted that it would be a high or very high benefit to include the prescriber's direct contact details on the prescription. A similar number (94.1%) of respondents consider printing hospital prescriptions as a high or very high benefit. Respondents support these views within their free text answers. Increasing numbers of hospital acute Trusts have been accredited to issue computer generated prescriptions since their introduction in 2005 [personal communication NHSBSA to D Terry used with permission. Copyright NHSBSA. 23rd July 2009] rising from 32 in 2005 to 41 in 2010. Whilst GP prescriptions are expected to be stamped with the GP practice address and contact details of the individual doctor using that prescription pad, this may not be the case for hospital generated prescriptions. Each organisation (e.g. GP practice or acute Trust) has a unique code assigned by the PPA: and each unique code can be assigned a maximum of 99 prescriber

sub-codes. GP practices are unlikely to exceed this number, however even small acute Trusts will have more than 99 prescribers. For example, BCH, a small Trust with 240 beds, has 366 prescribers (see Chapter 9). As a consequence hospitals assign prescriber sub-codes to clinical specialties and all prescribers within that specialty are issued with prescription pads with the same printed ID code. Many hospital prescriptions will carry the main hospital switch-board telephone number. So when faced with a problem on a hospital prescription, CPs will be able to ring the institution that issued the prescription but may not be able to identify the prescriber concerned from amongst hundreds of possible prescribers. Respondents clearly find this a problem as evidenced by their responses in this present study. Service changes should be considered to address these communication issues.

Two proposed beneficial changes involve actions to be taken by the hospital prescriber. These were i) indicate that a regimen outside standard texts is intended (e.g. cross through the letters BNF) and ii) include the dosage calculation on the script if relevant for children (e.g. state mg per kg as well as calculated dose). Both these proposed changes were considered by more than two-thirds of respondents to be a high or very high benefit. These options were included in the study of medical staff and on each occasion over 80% of respondents confirmed that they would be prepared to take these actions. See page 108. Introducing these service changes appears to be achievable and beneficial.

The benefit of hospital pharmacists' clinically screening the hospital prescriptions before they are issued was included in the survey and over 60% of respondents considered this to be a high or very high benefit. Clearly there will be practical problems in effecting this change and this may be inappropriate in some settings. However, this may be beneficial where paediatric hospitals are using homecare suppliers to provide long-term medicines for continuing-care patients. It is unclear why more than a third of respondents do not consider this to be a high benefit. They may consider that they are equally capable of clinically screening the prescriptions or that they will need to satisfy themselves anyway as to the suitability of the prescription regardless of the opinion of a hospital colleague.

In general using the internet to gain access to supporting information was less favoured by the respondents although a small majority considered gaining access to the hospital's unlicensed drugs database as a high or very high benefit. Providing a faxback option whereby hospital staff could give an opinion of a prescription was also less favoured by the respondents. All of these options may seem a little time consuming and this may explain the respondents' reticence for these options.

Personal experience of dispensing hospital prescriptions in community pharmacy was measured in the survey instrument by a 5 point ordinal scale: very-little; little; moderate; high; or very-high experience. See Table 39 . Results obtained show that as personal experience increases so does the dispensing time difference reported by respondents between hospital prescriptions and GP prescriptions ($\mathbf{T_{h\text{-}g}}$). See Figure 21 Analysis with the Jonckheere-Terpstra test shows a highly significant trend across the groups ($p = 0.002$). The respondents who report **greater experience** of dispensing hospital prescriptions also report that they **take longer** to process them in comparison to a GP prescription. That is, the more experience they have of hospital prescriptions the longer they take (relatively) to dispense them. This is an important finding since it implies that inexperienced pharmacists do not take sufficient time when dispensing a hospital prescription. Training and education arrangements may need to be considered to reduce this implied risk.

12.3.2. Strengths of this study

This study harvests data from a large number of community pharmacists who have personal experience of dispensing hospital prescriptions in community pharmacy. Whilst the study population was identified through dispensing prescriptions issued from BCH the respondents are widely spread geographically throughout England and therefore reflect experience across the country. The large number of respondents facilitates analysis of sub-groups often enabling statistical significance to be identified where groups differ. The validity of the results is supported by the large response and the consistency between closed (pre-coded) and open (free-text) answers.

Response rates for surveys of community pharmacists in the UK vary in published work, e.g. 56.4% (87), 32.1% (86), 22.4% (155). The response rate for this present study of 47.3% seems in keeping, sometimes higher, than similar studies. All of the study population was targeted because of their recent experience of dispensing hospital prescriptions for paediatric patients.

Almost 1 in 5 respondents provided an email address to facilitate follow-up and summary results will be sent directly to them. This resource will be useful to explore related issues via email discussion.

12.3.3. Limitations of this study

Whilst the methodology elicited a large response, manual handling of over 29,000 data points introduces practical problems of both time / resources and of data quality control. The use of a self-

completion computer readable survey instrument would therefore have some advantages. However this was an unfunded study and a computerised survey was beyond the resources available. A number of actions were taken to ensure the quality of the data from this self-completion manually recorded survey – see Methods.

Whilst this study generated over 600 responses it should be recognised that this is less than 5% of the total number of community pharmacists registered with the RPSGB.

The study instrument did not focus specifically on paediatric prescriptions nor any differences there may be between dispensing hospital prescriptions for adults and those for children, with the exception of one question:

> *'Please indicate in your opinion how beneficial the following changes would be in reducing the problems associated with dispensing hospital prescriptions in community pharmacy: Ensure prescribers indicate the dose calculation as well as the final dose on hospital prescriptions for children (eg state mg per kg as well as calculated dose).'*

Interestingly 67.2% of respondents consider this potential service change to be a high or very high benefit. Four respondents made free text comments in response to this question concerning children, in reference to unlicensed medicines (specials), dosages and prescription interpretation. Further work may be usefully focused on hospital prescriptions for unlicensed medicines and methods whereby community pharmacists can obtain confirmation of prescribed regimens that are not covered in standard texts.

12.3.4. Comparison with other studies

An extensive literature search identified only one other published study looking at the issue of hospital prescriptions dispensed by community pharmacists, in the UK. This is:

Community Pharmacy Audit. Report of hospital prescription audit: Gloucester Local Pharmaceutical Committee; 2009.

This audit focused on the interventions taken by Gloucester community pharmacists in response to hospital prescriptions dispensed during the months October and November 2008. A total of 2129 prescriptions were audited and prompted interventions in 16.4% of occasions. They found that 23.3% of hospital prescriptions did not have quantity (19%) or dose (4.3%) information and confirm

that CPs take considerable time to resolve such issues with the prescriber. They also found that 143 (6.7%) prescriptions had no prescriber's name and 365 (17.2%) prescriptions had no contact details to enable the pharmacist to contact the prescriber to clarify the issues. Information was received from 68 pharmacies. This audit records some occasions where the prescribers' name is illegible but does not identify other legibility issues. The audit provides hospital specific reports of problems encountered on the prescriptions but does not make any recommendations for improving services.

This present study did not audit prescriptions but rather obtained the opinions of a much larger group of CPs (607) when dispensing hospital prescriptions covering a much larger geographical area. This work found the CPs call the prescriber in 10.3% of occasions but doesn't quantify other types of intervention that were included in the Gloucester audit total of 16.4%. These findings seem congruent. This present study builds on the work of Gloucester LPC and:

- Confirms problems CPs encounter when dispensing hospital prescriptions
- Identifies legibility as a major problem
- Quantifies the additional time taken to dispense hospital prescriptions
- Identifies training issues for CPs
- Identifies practical solutions to these problems in the view of CPs

12.4. Conclusions

Other chapters within this report describe the frequency with which paediatric caregivers have difficulty in obtaining on-going medication through primary care supply arrangements including from community pharmacists. If these problems are to be minimised then support must be provided for community pharmacists to dispense with confidence hospital generated prescriptions for paediatric patients. This presents a challenge since only 0.6% of prescriptions dispensed by CPs are from hospitals and therefore maintaining appropriate skills after training may be problematic. Acute Trusts that issue FP10s for dispensing by CPs can support this process by adopting computer programs that will print prescriptions. The NHSBSA should also consider the unique identifier limitations on current prescription forms. Adding a single digit to the ID would change the maximum number of unique codes for each organisation from 99 to 999 and this would facilitate prescription pads for individual prescribers in many acute hospital Trusts.

The present level of concern by CPs in dispensing hospital prescriptions casts doubt on whether this is an appropriate route for obtaining hospital prescribed items. If hospitals continue to prescribe long-term medicines for children then other routes of supply may need to be considered. Hospital dispensing is the obvious alternative but this may also be less than ideal. Hospital departments may not have the physical resources to provide such services. Even where dispensing facilities can be provided, either by a hospital pharmacy or an on-site contracted community pharmacy, there may be problems in the caregiver collecting the medication from the acute Trust. This may be particularly an issue for tertiary care centres where patients my come from far afield. Supplying long-term medicines via homecare providers offers some advantages. In this arrangement hospital prescribers can write prescriptions and have them dispensed by approved homecare providers from registered pharmacies. Collection difficulties can be overcome by posting medicines to caregivers or by direct delivery. Additional costs of such services may be balanced by reduced access problems, improved compliance and managed costs of unlicensed medicines.

13. General discussion and programme conclusions

The work presented in this thesis can support process changes that will lead to important patient benefits for children whether they are in hospital or being cared for at home. These benefits cover key aspects of medicines management essential for children needing long-term medication and focuses on the processes that ensure their medicines are accessible, safe and appropriately managed as they move from one healthcare sector to the next. These service improvements will only be realised if the findings of this research are applied appropriately to the development of healthcare services delivered by the NHS, in whichever sector the individual patient is receiving their care. The findings and recommendations may therefore be best described within the context of NHS service delivery and policy changes. Accessibility of the work is essential if benefits are to be realised and this section includes short descriptions of the use and dissemination of the programme conclusions so far.

The study comparing medicines management policies or strategies in use and ratified by NHS organisations in both major healthcare sectors, primary care and hospital care, reveals important differences between these domains. Continuity of patient care is compromised by these differences mostly as a consequence of poor communication and information transfer or because of poor coordination of medicines management processes. Furthermore there is little evidence that the sectors recognise these differences and are seeking to address the consequential issues directly. The progress made between the preliminary study in 2007 and the main study in 2009 may be explained in the context of national guidance and responses by the sectors to meet their obligations directed in these documents. In particular the change concerning medicines management on admission to hospital can be traced to binding national guidance during this period. National guidance itself, of course, encourages cross-sector collaboration relating to medicines management and pre-dates studies reported in this thesis. For example, the development of Area Prescribing Committees evolved following the publication of guidance provided by the Department of Health in 1994 concerning the entry of new drugs into the NHS,(156) although functions of this important cross-sector group continued to develop over a number of years as the NHS itself changed.(97) Responding to national initiatives is an important driver for change but this may be seen as inadequate to ensure joined up services that deliver without interruption or corruption the medicines patients' need. The harmonisation of medicines management policies of organisations within a health economy is a pre-requisite for seamless care. Partnership collaboration when developing such policies appears to be lacking as evidenced by the differences identified in this programme of

work and needs addressing. The opportunity to present the finding of the present study to regional groups of pharmacy managers has been offered and accepted and this may influence the development of medicines management policies in the future. This may be particularly timely as NHS primary care services moves from PCTs to GP clusters. The research on the actions PCTs take to support the provision of essential medication information on admission has led to the opportunity to directly influence the development of national policy documents produced by the NPC (70) and the CQC.(14) The CQC confirmed that the responsibilities of GPs include providing information concerning medicines on admission to hospitals, and also described the monitoring role that PCTs must play to ensure this service change is delivered. At the time of the CQC publication in October 2009 work described in chapter 8 demonstrated that less than 1 in 4 PCTs were actively providing guidance to their GPs to support this process. The CQC guidance was provided on the basis of an audit of only 12 PCTs. The study reported in this thesis targeted all English PCTs and received responses from 65 PCTs. Clearly PCTs and their successor organisations must ensure that these responsibilities are accepted by GPs and leads to the appropriate outcomes for information continuity. National and local policies should provide clear guidance to healthcare providers who are responsible for patients at the point of transfer to another sector. The 'sending' organisation should be required to pass on essential medication information in a timely and accurate manner and include all information within the defined critical data set. The 'receiving' organisation should not have to fetch it. Ensuring that a named individual is identifiable and accountable for this function at the point of transfer may support delivery of this process e.g. the GP for admission (from home) to hospital, the nurse in charge of the ward for discharge (to home), etc.

NICE-NPSA guidance concerning medication reconciliation has prompted the delivery of this important service to adults when admitted to hospital in the UK. Their advice was evidence based and excluded children on the grounds of lack of evidence for this patient group. The study reported in this thesis (Chapter 7) concerning medication reconciliation in children was published in full in October 2010. This work provides evidence that the clinical benefits evidenced for adults are the same for children. This study has been presented at a number of forums including 3 national or international conferences and has led to opportunities to input into national bodies, regional policies and computer aided learning programs. This work indicates that medication reconciliation is essential for children on admission to hospital and it is hoped that this will be reflected in a change to national guidance. Service agreements, approved by commissioners of healthcare, should include the delivery and monitoring of medication reconciliation for children. Medicines policies in use by acute Trust should reflect the importance of this service. However, the most efficient way of delivering a medication reconciliation service for children, as well as adults, needs to be

determined. The service process needs to confirm when medication reconciliation should be performed and determine if a set of criteria can be defined when medication reconciliation is not likely to be beneficial. Further work also needs to define who should conduct each aspect of the process and which sources of information are the most reliable, accessible and useful to support appropriate prescribing on or soon after admission. These issues are being addressed following a grant awarded by the Neonatal and Paediatric Pharmacists' Group where the study design reported in this thesis forms the basis of a national multisite study.

The multisite study of hospital nurses supporting the provision of rescue-medication for paediatric home-patients demonstrates for the first time the extent of problems that hinder medication access to children needing long-term medicines. This work confirms that this is a national problem and indicates a failure of current primary healthcare processes to provide, with suitable reliability, essential medication for children. It is noteworthy that the NPSA has recently issued guidance to ensure that critical medicines are administered to patients in hospital within a suitable time frame.(157) The application of this approach to paediatric home-patients would provide an equity of service for patients in primary care. Further studies may usefully identify the frequency with which children in primary care do not receive medicines considered to be time critical and the clinical outcomes of these delays or omissions should be determined. Managing long-term medicines for patients is challenging however they are provided. Difficulties will arise whether medicines are provided by primary care (GP-CP), hospitals or via homecare providers. Coordinating supplies must take into account, dose and formulation changes, medication expiry dates, lead times for acquisition and delivery, and must be able to respond to breakages, errors and unplanned changes in the delivery of care. Current repeat medication arrangements may be unsuitable for the provision of urgent supplies. In particular this may apply to novel preparations including unlicensed drugs often required by children with long-term conditions. There is evidence to suggest this holds true for other patient groups e.g. ophthalmology patients needing bespoke eye preparations [Personal communication. L Titcombe to D Terry dated 2nd March 2011. Used with permission]. Supporting patients and their carers to take more personal responsibility will be beneficial. In particular ensuring appropriate contingency supplies, requesting repeat prescriptions in good time and expecting some medicines to take up to a week to obtain will help ensure that medicine supplies do not run out. Patient and carer training may be necessary in addition to providing essential information.

The survey of medical staff confirms their role in the provision of rescue-medicines. All specialties caring for children with long-term conditions appear to need to provide prescriptions for rescue-medicines. In the study setting these responses to requests for urgent help appear uncoordinated,

un-resourced and unplanned, yet happen on a regular basis and at a high frequency. Similarly only a small proportion of nurses involved in this service have this acknowledged in their job descriptions. Work described in this thesis reveals for the first time the extent of this problem and the resources needed to minimise the clinical risk to patients. Paediatric hospitals should acknowledge this activity and its clinical importance, should make coordinated provision to help patients who are at home and should ensure that commissioning arrangements provide the resources to deliver these services. Healthcare professionals involved in dealing with these urgent requests should have this activity reflected in their working arrangements. How this support is provided outside normal working hours should be identified. The study of caregivers attending the hospital pharmacy at BCH to access rescue-medicines adds to the understanding of this phenomenon. Many make unplanned trips of significant distance to get urgent help. That they do so not only for unlicensed drugs but also for licensed medicines is an important finding and cannot be predicted from existing published work. If this finding is confirmed, then why children cannot be provided with timely supplies of licensed medicines needs further investigation and has implications for other patient populations. Acute Trusts must also consider the time it takes to inform GPs of medication changes at discharge and how this matches the length of supply of medicines provided as the patient leaves hospital.

The studies concerning rescue-medicines for home-patients demonstrate the inadequacies of the current system in providing long-term medicines for children. The current system is primary care based. Prescribing and dispensing arrangements default to GPs and CPs. The findings in this thesis confirm that when the system breaks down, or the carer has sufficient concerns about medication access, they turn to hospitals to resolve the immediate problems. If hospital processes can respond successfully to these problems then perhaps they should become the default process instead of primary care? This would present both practical and financial challenges. If these difficulties can be overcome then it is likely that community pharmacies would need to play a role in this process because of the geographical distances between the prescriber (hospital) and the patient (at home). It seems unrealistic for patients or carers to travel long distances to either collect prescriptions or dispensed medicines from their paediatric hospital. Furthermore, dispensing for large numbers of home-patients may be beyond the resources of some hospital pharmacy departments, at least at present. Homecare ‘dispense and deliver’ services may be appropriate for some patients, but this may be unnecessary, impractical and too costly for others. CPs may therefore be required to dispense hospital generated prescriptions. This line of reasoning led to the survey of CPs and their experiences and opinions of dispensing hospital prescriptions. The findings confirm that the CPs want prescriptions to be printed and include prescriber contact details. Both

these requests seem deliverable. Printing hospital prescribed FP10HPs could be undertaken by the hospital electronic prescribing system, where they exist. If these are not available hospitals could potentially use the hospital pharmacy system (e.g. Ascribe or JAC) or if necessary install stand alone prescribing systems (e.g. EZ e-Script). All these solutions will be able to be configured to meet NHSBSA requirements. Direct prescriber contact details should be accommodated within PPA arrangements for the allocation of prescriber codes. Moving from a 2 digit prescriber identifier to either 3 or 4 digits will increase the number available for each organisation from 99 to 999 or even 9999. This policy change should be considered by NHSBSA. The changes favoured by CPs in respect to prescription writing also seem readily achievable. In the survey of CPs respondents wanted prescribers to indicate when the dose regimen was outside BNF recommendations and for prescribers to provide dose calculations for children's regimens. The respondents to the medical survey confirmed that they would be prepared to make both these changes to their prescriptions. Of course, if prescriptions are to be printed then these changes could conveniently be added to the electronic generation of the script to be printed on the prescription. These changes should be made regardless of whether or not there are changes made to the supply arrangements for long-term medicines for children.

Many of the studies described in this thesis are linked by a common thread of poor communication between healthcare professionals working in different sectors. At the present time a universal patient medical or medication record is not usually available or accessible. GP electronic prescribing systems are a useful source of essential medication information, but are not generally accessible to healthcare workers outside that practice. Similarly many hospital systems are not accessible to primary care professionals. The high profile, high cost efforts to provide a common electronic communication system for the NHS is outside the scope of this research programme. A paper based, patient held record of their current long-term medication may provide a useful interim solution. As a patient moves from one healthcare sector to another, either planned or unplanned, or when needing emergency care, a list of their long-term medication would be useful to support clinical decision making. Providing patients with information about their drugs is nationally encouraged (14) and may be supported by a national programme to give patients a record of their drugs and include name, dose, its intended purpose and a review date. Ensuring that this is provided in lay language, updated (or reprinted) whenever long-term medication is changed and including details of who to contact if further information is required, would support information continuity.

A summary of the conclusions of this study are shown below in relation to the study aims.

Aims and conclusions:

1. Aim: To identify circumstances where medicines management systems across the interface are variable between the healthcare sectors and may compromise patient care. Conclusions are:
    a. There are important differences between the healthcare sectors in relation to medicines management issues as evidenced by their current and approved documents identified in both 2007 and 2009.
    b. There is some evidence that medicines management interface issues for the two sectors are changing over time and that these changes are mostly converging.
    c. There are important differences between the sectors in particular regarding i. transfer of essential medication information on admission to hospital and ii. access to long-term medicines when outside hospital.

2. Aim: To investigate key aspects of medicines management systems across the interface, where there are identifiable concerns.
    a. Transfer of essential medication information on admission to hospital for paediatrics is not currently supported by NICE-NPSA guidance for medication reconciliation, nor do PCTs generally provide guidance to their contractors concerning this issue. However, findings described in this thesis indicate the clinical importance of medication reconciliation for children admitted to hospital raising concerns that this is not formally supported by either national or local guidance.
    b. Access to long-term medication for paediatric home-patients is frequently supported by hospital services in response to failures in the current system provided by primary care. These problems are often associated with unlicensed medicines or licensed medicines used off-label, but not exclusively.

3. Aim: Based on the programme of investigation to make recommendations for changes to medicines management systems across the interface. Recommendations include:
    a. Local health economies should work together to ensure the harmonisation of medicines policies in use by NHS organisations.
    b. Recognise in national and local guidance the clinical importance of medication reconciliation for children on admission to hospital.
    c. Support medication reconciliation for children by modifying estimated resources to deliver this service to include paediatric patients.

d. Ensure the continuity of information transfer by conferring this responsibility on the 'sending' organisation.
e. Review access systems for children requiring long-term medication. Consider providing these drugs via hospital based systems including the prescribing by hospital staff. Dispensing and supply arrangements should be convenient for the recipient and may include homecare services, direct delivery or supply via approved community pharmacies.
f. Ensure hospital prescriptions to be dispensed in community are printed and include prescriber contact details. Support CPs by indicating when regimens are outside of standard texts and include dose calculations for paediatric drug regimens.

14. Future studies

Further studies are required to support informed and appropriate service changes. The following research questions have been identified during this study programme:

1. Are unintentional changes to medication on admission perpetuated on discharge?
2. What are the beliefs and opinions of GPs concerning the provision of medication information on admission of their patients to hospital?
3. What are the drug costs of medicines provided by hospital prescribers for home-patients?
4. What are the beliefs and opinions of GPs concerning why home-patients use hospital services to access medicines?
5. Why do the risk perceptions of nurses providing rescue-medication services in different geographical locations in the UK differ?
6. What are the clinical risks relating to missed doses of long-term medication for paediatric home-patients?

The following future studies are planned or under consideration:

1. National, multisite study of MR for children on admission to hospital to identify the optimal service required for children including benefits, costs and service design. [Commenced November 2010].

2. Provision of discharge medication (TTOs) for children requiring long-term medication and how this relates to medication access failures post-discharge.

3. National, multisite study of hospital led provision of long-term medication for paediatric home-patients.

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Appendices

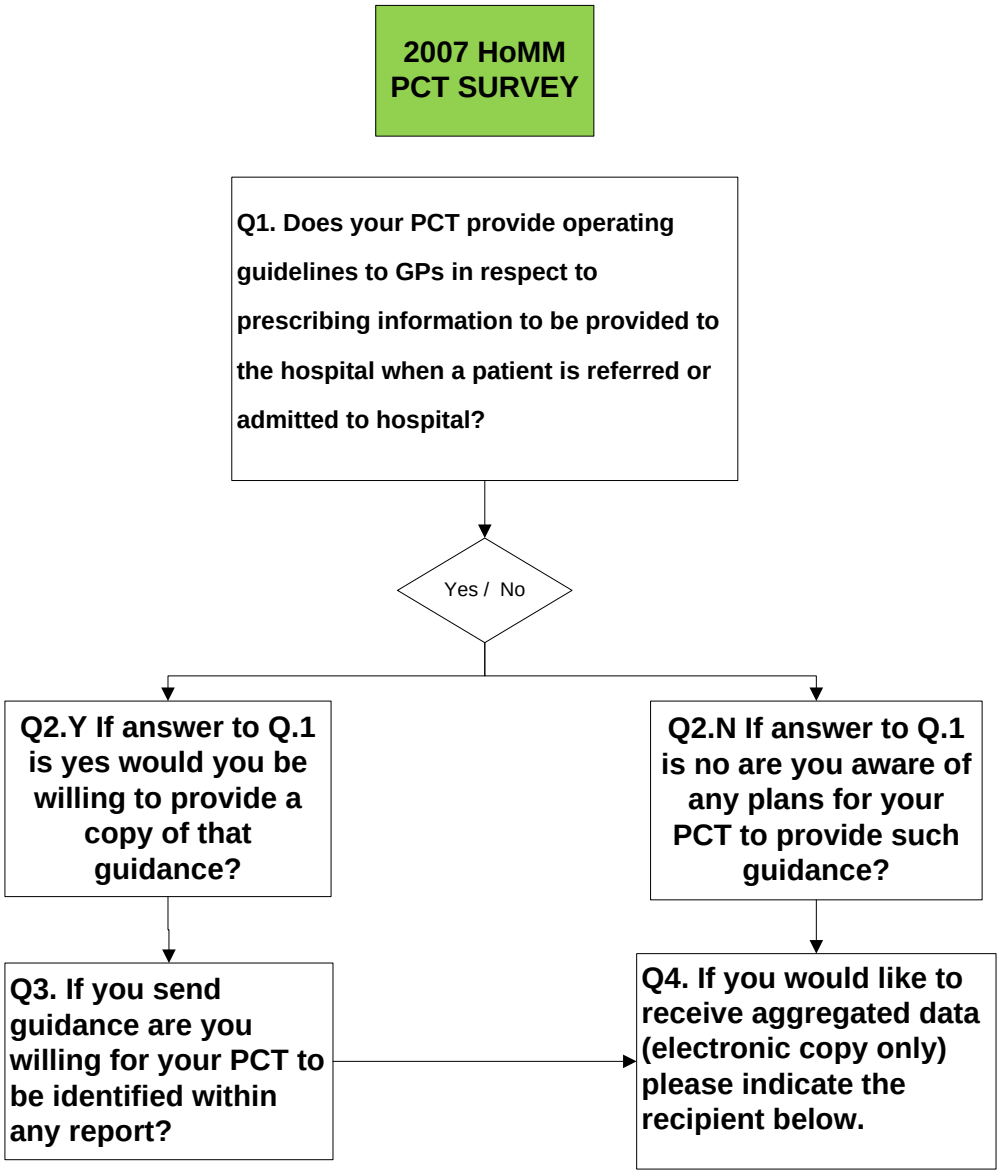
Appendix 1 Medicines management documents study 2009

Email sent to recipients:

> *Dear Colleague*
> *I would be very grateful if you would forward to me an electronic copy of your Medicines Management Strategy and / or Medicines Management Policy or other ratified Medicines Management document. I'm hoping to obtain all current documents of this kind from all NHS organisations within the West Midlands region.*
>
> *The intention is to identify medicines management interface issues described within them using qualitative research methodology via NVivo. Two years ago I was able to obtained Medicines Management Strategies or Policies from 17 NHS organisations across the West Midlands. Now, 2 years on, I want to do the same to identify current themes and recent changes. This work is being done in conjunction with Aston University. If useful information is obtained anonymised data may be submitted for publication.*
>
> *I would be grateful for your current documents even if revisions or new documents are being prepared.*

Appendix 2 The PCT Survey 2007 (Email)

Figure 30 The PCT survey 2007 - questionnaire schematic



The introduction to the email is shown below.

To: Head of Medicines Management (or equivalent) in all PCTs in England

> *Our hospital receives children from many of the PCTs in the country. The information provided to us about their medication varies considerably and we would like to develop local policies to ensure that continuity of care is accurate and robust.*

In February 2007 the BMA published guidelines for GPs entitled Prescribing and the primary and secondary care interface. This document principally focused on prescribing arrangements after in-patient discharge or out-patient referral.

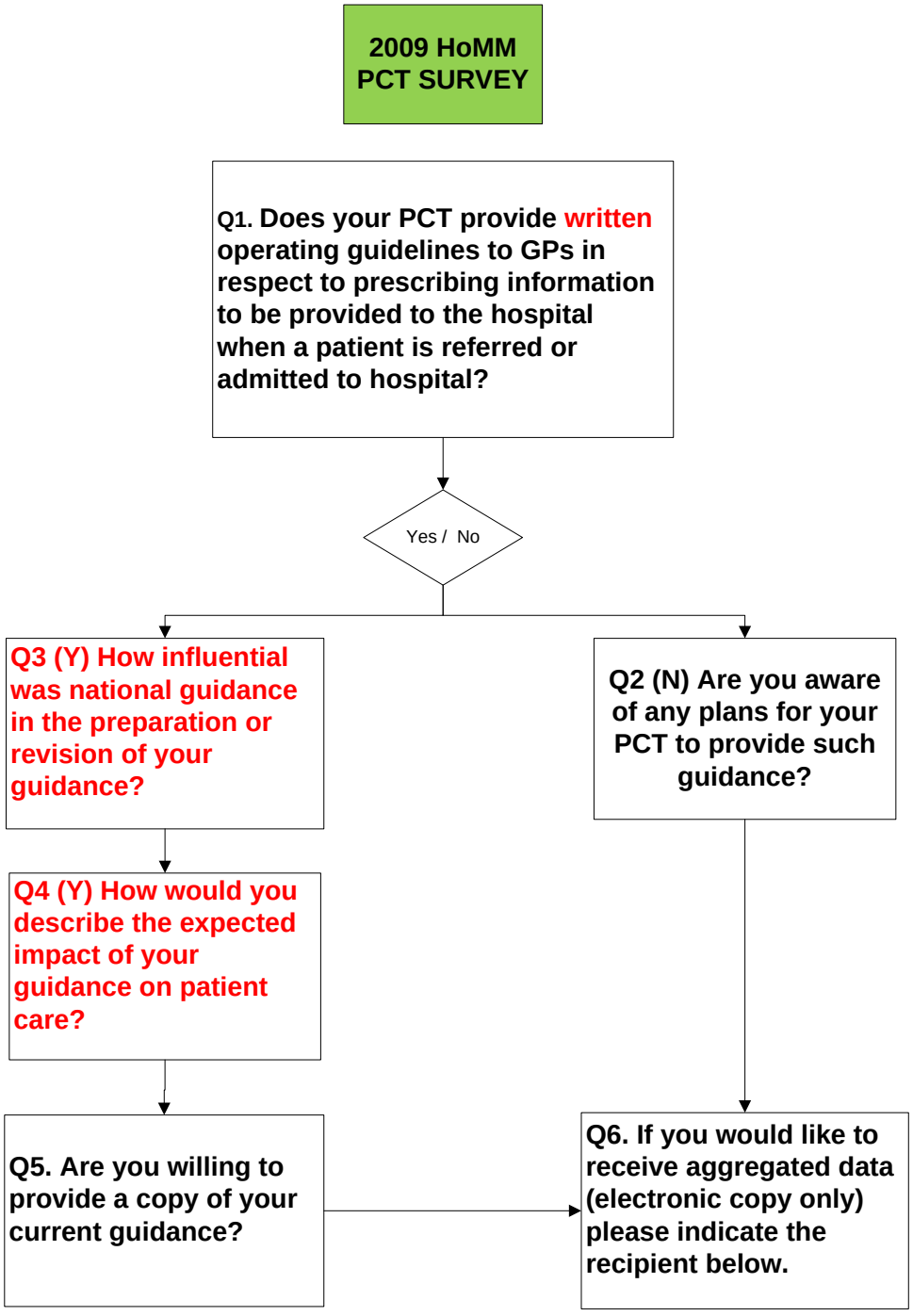
We are interested in guidance concerning information on admission - and especially in guidance provided to GPs to ensure that hospitals receive appropriate information concerning the medicines prescribed for a patient on referral / admission.

The questions below are designed to identify guidance provided by PCTs to GPs. We hope that you will be willing to answer the questions by return email.

The questions only require a yes or no answer, although longer answers are welcome. Please indicate your answer directly in the boxes and return to me by email.

Appendix 3 The PCT Survey 2009 (Electronic)

Figure 31 The 2009 PCT Study. Survey schematic. Substantial changes to the 2007 survey are shown in red



The invitation email text is shown below:

> *Two years ago we conducted a survey to identify guidance provided by PCTs to GPs in respect to medication information on admission to hospital. [1] This follow-up study is designed to identify further development of local guidance and the influence of recently published national guidance. [2,3] We are interested in guidance concerning information on admission – and especially in guidance provided by PCTs to GPs to ensure that hospitals receive appropriate information concerning the medicines prescribed for a patient on referral / admission. Should useful information be obtained anonymous aggregate results may be published. Thank you again for completing this questionnaire. If you require further information please contact: David Terry (Birmingham Children's Hospital) on 0121-333-9793 or by email on david.terry@bch.nhs.uk*
>
> *[1] Terry D, Sinclair A, Marriott J, et al. Guidance provided by English Primary Care Trusts to general practitioners concerning medication information on admission to hospital. International Journal of Pharmacy Practice. 2009 September;17, Supplement 2:B 39-40.*
> *[2] PSG001 Technical patient safety solutions for medicines reconciliation on admission of adults to hospital: Guidance: National Institute for Health and Clinical Excellence, National Patient Safety Agency; 2007 12 Dec 2007.*
> *[3] Medicines Reconciliation: A guide to implementation: National Prescribing Centre; 2008 March.*

Appendix 4 Medication reconciliation study

Table 47 CPMs identified during the medication reconciliation study

PATIENT NO.	Prescriber	Route	DRUG	PAM
1	GP	Oral	HYDROCORTISONE	7.5MG AM 5MG PM
1	GP	Oral	LEVOTHYROXINE	150MCG OM
1	CONS	SC	GENOTROPIN	1.6MG OD
2	GP	INH	BUDESONIDE INH 50MCG	8P OD
2	GP	INH	SALBUTAMOL INH	2P MDU
2	GP	Oral	SEPTRIN	PAED 2.5ML BD
3	UNK	Oral	SYTRON	2.5ML OM
3	UNK	Oral	OMEPRAZOLE	4MG OM
3	UNK	Oral	CALOGEN	3ML QDS
3	CONS	Oral	DOMPERIDONE	1.6MG QDS
3	UNK	EYE	HYPROMELLOSE 0.3% ED	QDS BE
4	GP	INH	BECLOMETASONE INH	200MCG BD
4	GP	Oral	SENNA	SENNOKOT 10ML ON
4	GP	Oral	SOD VALPROATE	7ML TDS
5	GP	Oral	PHENYTOIN SUSP	20ML BD
5	GP	Oral	RITALIN	20MG BD
5	GP	Oral	TOPIRAMATE	30MG BD
6	GP	Oral	LEVOTHYROXINE	125MCG OD
6	GP	Oral	HYDRALAZINE	50MG BD
6	GP	Oral	ATENOLOL	100MG OD
6	GP	Oral	DESMOTABS	100MCG TDS
6	GP	Oral	HYDROCORTISONE	10MG AM, 5MG PM
7	GP	Oral	CARBAMAZEPINE	300MG BD
7	GP	Oral	TOPIRAMATE	30MG BD
7	GP	Oral	LEVETIRACETAM	600MG BD
8	NONE	INH	SALBUTAMOL INH	NOT RX'ED SINCE 2004
8	GP	INH	FLIXOTIDE INH	EVOHALER 50, 2P BD
9	GP	Oral	THYROXINE	75 MCG OD
10	GP	Oral	CARBAMAZEPINE	80MG OM, 120MG ON
11	GP	Oral	RANITIDINE	150MG BD
11	GP	Oral	TRIMETHOPRIM	15MG OD
11	GP	EYE	LACRILUBE	BE ON
11	GP	EYE	VISCOTEARS	BE PRN
12	GP	Oral	PHENYTOIN	150MG BD
13	GP	Oral	TRIMETHOPRIM	10MG ON
14	UNK	Oral	NITROFURANTOIN	
15	GP	Oral	OMEPRAZOLE	10MG OD

PATIENT NO.	Prescriber	Route	DRUG	PAM
15	GP	Oral	DOMPERIDONE	SUSP 3MG TDS
15	GP	Oral	FEREDETATE	2.5MLS TDS
15	GP	Oral	CO-TRIMOXAZOLE	PAED 2.5ML ON
15	GP	EYE	LACRILUBE	BE ON
15	GP	NEB	COLISTIMETHATE	NEB BD MDU
16	GP	Oral	DESMOPRESSIN	50MCG QDS
16	GP	Oral	PREDNISOLONE SOL	5MG ALT DIE
16	GP	Oral	COTRIMOXAZOLE PAED	240MG BD SAT + SUN
16	GP	Oral	MOVICOL PAED	2 OD
17	GP	Oral	EPILIM	CHRONO 1.5G ON
17	GP	Oral	KEPPRA	750MG BD
18	GP	INH	SALBUTAMOL INH	2P QDS PRN
18	GP	INH	BECLOMETASONE INH	50MCG BD
18	GP	Oral	PIZOTIFEN	500MCG ON
18	GP	Oral	PROPRANOLOL	10MG OD
19	GP	INH	SALBUTAMOL INH	4P q2-q4h prn
19	GP	INH	TERBUTALINE TURBO INH	1p q2h-q4h prn
19	GP	INH	SYMBICORT 100/6 TURBO	1p od-bd
19	GP	Oral	PREDNISOLONE SOL	20mg od 5/7
20	GP	INH	SALBUTAMOL INH	2P Q4H PRN
20	GP	INH	BECLOMETASONE INH	50 2P BD
21	NONE	INH	BRICANYL INH	TAKING MUM'S
21	GP	INH	SALBUTAMOL INH	1P MDU
21	GP	INH	SYMBICORT 200/6 TURBO	2P BD
21	GP	Oral	CHLORPHENAMINE	4MG BD
21	GP	Oral	DESMOPRESSIN	400MCG ON
21	GP	Oral	MOVICOL PAED	1 ON
21	GP	Oral	SENNA	15MG ON
22	GP	Oral	LAMOTRIGINE	AS ADVISED BY HOSP
22	GP	Oral	TOPIRAMATE	AS ADVISED BY HOSP
23	GP	Oral	CLOBAZAM	2MG TDS
23	GP	Oral	GLYCOPYRROLATE	1MG MDU
23	GP	Oral	LACTULOSE	5-15ML BD
23	GP	Oral	SENNA	7.5 MG ON
23	GP	Oral	NITRAZEPAM	2.5MG BD
23	GP	Oral	OMEPRAZOLE	10MG BD
23	GP	Oral	VIGABATRIN	750MG BD
23	GP	Oral	COTRIMOXAZOLE PAED	240MG MDU
24	UNK	INH	SALBUTAMOL INH	UNK
24	UNK	INH	BECLOMETASONE INH	UNK
25	CONS	Oral	CLOBAZAM	2.1ML BD
25	CONS	Oral	SOD VALPROATE	300MG BD

PATIENT NO.	Prescriber	Route	DRUG	PAM
26	CONS	Oral	CICLOSPORIN	31MG BD
27	GP	Oral	TRIMETHOPRIM	20MG ON
28	CONS	Oral	SOD VALPROATE	100MG BD
29	GP	Oral	ETHINYLOESTRADIOL	10 MCG OD
29	GP	Oral	LEVOTHYROXINE	100 MCG OM
29	GP	Oral	HYDROCORTISONE	10MG AM, 5MG PM
29	GP	Oral	DESMOPRESSIN	100 MCG QDS
29	CONS	SC	GH - SAIZEN	1.75MG
30	CONS	Oral	STIRIPENTOL	750MG BD
30	GP	Oral	CLOBAZAM	5MG BD
30	GP	Oral	SOD VALPROATE	400MG BD
31	CONS	Oral	MELATONIN	No Rx by GP
31	GP	Oral	PIZOTIFEN	0.5MG BD
31	GP	Oral	OMEPRAZOLE	40mg od 4/7
32	UNK	Oral	NO RX	No Rx by GP
32	UNK	Oral	NO RX	No Rx by GP
33	GP	Oral	LAMOTRIGINE	15MG BD
33	GP	Oral	LEVETIRACETAM	300MG BD
34	UNK	Oral	CARBAMAZEPINE	UNK
35	GP	Oral	GABAPENTIN	300-600MG TDS
35	GP	Oral	TOPIRAMATE	25MG MDU
36	UNK	Oral	TRIMETHOPRIM	No Rx by GP
37	CONS	Oral	MELATONIN	No Rx by GP
37	GP	Oral	PHENOBARBITONE	MDU BD
38	GP	INH	BECLOMETASONE INH	50MCG BD
38	GP	INH	SALBUTAMOL INH	2P PRN
38	GP	NASAL	NASONEX	2P OD
38	GP	Oral	CARBAMAZEPINE	300MG BD
38	GP	Oral	LORATADINE	5MG ON
38	GP	Oral	TRIMETHOPRIM	100MG BD
39	GP	Oral	PHENYTOIN	87.6MG BD

Table 48 Medication reconciliation study. PAMs comparison with PODs

PATIENT NO.	Rx'er	ROUTE	DRUG (REGULAR MEDS)	PAM	POD	PAM = POD
1	CONS	SC	GENOTROPIN	1.6MG OD	1.6MG OD	YES
1	GP	ORAL	HYDROCORTISONE	7.5MG AM 5MG PM	15MG AM 5MG PM	NO
1	GP	ORAL	LEVOTHYROXINE	150MCG OM	150MCG OM	YES
3	CONS	ORAL	DOMPERIDONE	1.6MG QDS	1.6MG QDS	YES
5	GP	ORAL	PHENYTOIN SUSP	20ML BD	20ML BD	YES
5	GP	ORAL	RITALIN	20MG BD	NO LABEL	NO
5	GP	ORAL	TOPIRAMATE	30MG BD	NO LABEL	NO
6	GP	ORAL	ATENOLOL	100MG OD	100MG OM	YES
6	GP	ORAL	DESMOTABS	100MCG TDS	NO LABEL	NO
6	GP	ORAL	HYDRALAZINE	50MG BD	50MG BD	YES
6	GP	ORAL	HYDROCORTISONE	10MG AM, 5MG PM	NO LABEL	NO
6	GP	ORAL	LEVOTHYROXINE	125MCG OD	125MCG OD	YES
7	GP	ORAL	CARBAMAZEPINE	300MG BD	300MG BD	YES
7	GP	ORAL	TOPIRAMATE	30MG BD	NO LABEL	NO
10	GP	ORAL	CARBAMAZEPINE	80MG OM, 120MG ON	80MG OM, 120MG ON	YES
11	GP	EYE	LACRILUBE	BE ON	BE ON	YES
11	GP	ORAL	RANITIDINE	150MG BD	150MG BD	YES
11	GP	ORAL	TRIMETHOPRIM	15MG OD	15MG ON	YES
11	GP	EYE	VISCOTEARS	BE PRN	BE PRN	YES
13	GP	ORAL	TRIMETHOPRIM	10MG ON	10MG ON	YES
16	GP	ORAL	COTRIMOXAZOLE PAED	240MG BD SAT + SUN	240MG BD SAT + SUN	YES
17	GP	ORAL	EPILIM	CHRONO 1.5G ON	CHRONO 1.5G ON	YES
17	GP	ORAL	KEPPRA	750MG BD	750MG BD	YES
18	GP	INH	BECLOMETASONE INH	50MCG BD	50MCG BD	YES
18	GP	ORAL	PIZOTIFEN	500MCG ON	500MCG ON	YES
18	GP	ORAL	PROPRANOLOL	10MG OD	10MG OD	YES
18	GP	INH	SALBUTAMOL INH	2P QDS PRN	2P QDS PRN	YES
19	GP	ORAL	PREDNISOLONE SOL	20mg od 5/7	20MG OD 5/7	YES
19	GP	INH	SALBUTAMOL INH	4P q2-q4h prn	PRN	YES
19	GP	INH	SYMBICORT 100/6 TURBO	1p od-bd	NO LABEL	NO
19	GP	INH	TERBUTALINE TURBO INH	1p q2h-q4h prn	NO LABEL	NO

PATIENT NO.	Rx'er	ROUTE	DRUG (REGULAR MEDS)	PAM	POD	PAM = POD
20	GP	INH	BECLOMETASONE INH	50 2P BD	NO LABEL	NO
20	GP	INH	SALBUTAMOL INH	2P Q4H PRN	NO LABEL	NO
21	GP	ORAL	CHLORPHENAMINE	4MG BD	USING MUM'S	NO
21	GP	INH	SALBUTAMOL INH	1P MDU	PRN	YES
22	GP	ORAL	LAMOTRIGINE	UNK DOSE	100MG BD	EXCLUDED
22	GP	ORAL	TOPIRAMATE	UNK DOSE	100MG BD	EXCLUDED
23	GP	ORAL	CLOBAZAM	2MG TDS	2MG TDS	YES
23	GP	ORAL	COTRIMOXAZOLE PAED	240MG MDU	240MG MDU	YES
23	GP	ORAL	GLYCOPYRROLATE	1MG MDU	1MG MDU	YES
23	GP	ORAL	LACTULOSE	5-15ML BD	5-15ML TDS	NO
23	GP	ORAL	NITRAZEPAM	2.5MG BD	2.5MG BD	YES
23	GP	ORAL	OMEPRAZOLE	10MG BD	10MG BD	YES
23	GP	ORAL	SENNA	7.5 MG ON	7.5 MG ON	YES
23	GP	ORAL	VIGABATRIN	750MG BD	750MG BD	YES
26	CONS	ORAL	CICLOSPORIN	31MG BD	31MG BD	YES
27	GP	ORAL	TRIMETHOPRIM	20MG ON	20MG ON	YES
28	CONS	ORAL	SOD VALPROATE	100MG BD	100MG BD	YES
30	GP	ORAL	CLOBAZAM	5MG BD	5MG TDS	NO
30	GP	ORAL	SOD VALPROATE	400MG BD	400MG BD	YES
30	CONS	ORAL	STIRIPENTOL	750MG BD	750MG BD	YES
31	CONS	ORAL	MELATONIN	UNK DOSE	6MG ON	EXCLUDED
31	GP	ORAL	PIZOTIFEN	0.5MG BD	0.5MG BD	YES
33	GP	ORAL	LAMOTRIGINE	15MG BD	15MG BD	YES
33	GP	ORAL	LEVETIRACETAM	300MG BD	300MG BD	YES
35	GP	ORAL	TOPIRAMATE	25MG MDU	25MG ON	YES
37	GP	ORAL	PHENOBARBITONE	MDU BD	MDU BD	YES
38	GP	ORAL	CARBAMAZEPINE	300MG BD	100 BD	YES
38	GP	ORAL	LORATADINE	5MG ON	5MG OD	YES
38	GP	NASAL	NASONEX	2P OD	NO LABEL	NO
38	GP	ORAL	TRIMETHOPRIM	100MG BD	NO LABEL	NO
39	GP	ORAL	PHENYTOIN	87.6MG BD	87.6MG BD	YES

Table 49 Medication reconciliation study. Comparison of PAM and Caregiver regimens

PATIENT NO.	Rx'er	ROUTE	CPM	PAM	CARER	PAM = CARER	P-C CLASS
3	CONS	ORAL	DOMPERIDONE	1.6MG QDS	UNK	MISSING DATA	NO MENTION
16	GP	ORAL	MOVICOL PAED	2 OD	UNK	MISSING DATA	NO MENTION
18	GP	ORAL	PROPRANOLOL	10MG OD	UNK	MISSING DATA	NO MENTION
18	GP	INH	SALBUTAMOL INH	2P QDS PRN	UNK	MISSING DATA	NO MENTION
18	GP	ORAL	PIZOTIFEN	500MCG ON	UNK	MISSING DATA	NO MENTION
18	GP	INH	BECLOMETASONE INH	50MCG BD	UNK	MISSING DATA	NO MENTION
22	GP	ORAL	LAMOTRIGINE	UNK	UNK	MISSING DATA	NO MENTION
22	GP	ORAL	TOPIRAMATE	UNK	UNK	MISSING DATA	NO MENTION
26	CONS	ORAL	CICLOSPORIN	31MG BD	UNK	MISSING DATA	NO MENTION
2	GP	INH	BUDESONIDE INH 50MCG	8P OD	NOT GIVEN	NO	NOT GIVEN
4	GP	INH	BECLOMETASONE INH	200MCG BD	200MCG OD	NO	FREQ
4	GP	ORAL	SOD VALPROATE	7ML TDS	8ML, 7ML, 8ML	NO	DOSE
4	GP	ORAL	SENNA	SENNOKOT 10ML ON	18ML ON	NO	DOSE
6	GP	ORAL	DESMOTABS	100MCG TDS	200MCG TDS	NO	DOSE
6	GP	ORAL	ATENOLOL	100MG OD	50MG BD	NO	BOTH
10	GP	ORAL	CARBAMAZEPINE	80MG OM, 120MG ON	100MG BD	NO	DOSE
11	GP	EYE	VISCOTEARS	BE PRN	BE QDS	NO	MINOR
13	GP	ORAL	TRIMETHOPRIM	10MG ON	20MG ON	NO	DOSE
15	GP	ORAL	FEREDETATE	2.5MLS TDS	NOT GIVEN	NO	NOT GIVEN
15	GP	ORAL	DOMPERIDONE	SUSP 3MG TDS	4MG TDS	NO	DOSE
16	GP	ORAL	COTRIMOXAZOLE PAED	240MG BD SAT + SUN	480MG OD SAT + SUN	NO	BOTH
16	GP	ORAL	DESMOPRESSIN	50MCG QDS	300MCG DAILY	NO	BOTH

PATIENT NO.	Rx'er	ROUTE	CPM	PAM	CARER	PAM = CARER	P-C CLASS
16	GP	ORAL	PREDNISOLONE SOL	5MG ALT DIE	ORAL EVERY 3/52	NO	FREQ
20	GP	INH	SALBUTAMOL INH	2P Q4H PRN	4P BD	NO	BOTH
21	GP	ORAL	MOVICOL PAED	1 ON	NOT GIVEN	NO	NOT GIVEN
21	GP	ORAL	SENNA	15MG ON	NOT GIVEN	NO	NOT GIVEN
21	GP	INH	SALBUTAMOL INH	1P MDU	NOT GIVEN	NO	NOT GIVEN
21	GP	ORAL	DESMOPRESSIN	400MCG ON	NO MENTION	NO	NOT GIVEN
23	GP	ORAL	NITRAZEPAM	2.5MG BD	NOT GIVEN	NO	NOT GIVEN
23	GP	ORAL	CLOBAZAM	2MG TDS	2MG, 3MG, 4MG	NO	DOSE
23	GP	ORAL	VIGABATRIN	750MG BD	500MG BD	NO	DOSE
25	CONS	ORAL	CLOBAZAM	2.1ML BD	2.1ML TDS	NO	FREQ
27	GP	ORAL	TRIMETHOPRIM	20MG ON	22MG ON	NO	DOSE
29	GP	ORAL	HYDROCORTISONE	10MG AM, 5MG PM	10MG AM, 7.5MG PM	NO	DOSE
30	GP	ORAL	CLOBAZAM	5MG BD	5MG TDS	NO	FREQ
31	GP	ORAL	PIZOTIFEN	0.5MG BD	0.5MG TDS	NO	FREQ
31	GP	ORAL	OMEPRAZOLE	40mg od 4/7	NOT GIVEN	NO	NOT GIVEN
35	GP	ORAL	GABAPENTIN	300-600MG TDS	600MG BD	NO	BOTH
38	GP	NASAL	NASONEX	2P OD	1P ON	NO	DOSE
38	GP	INH	BECLOMETASONE INH	50MCG BD	NOT GIVEN	NO	NOT GIVEN
2	GP	INH	SALBUTAMOL INH	2P MDU	NOT GIVEN	UNK	MINOR / NOT GIVEN
21	UNK	INH	BRICANYL INH	USING PARENT'S	UNCERTAIN	UNK	NO Rx
31	CONS	ORAL	MELATONIN	UNK	6MG ON	UNK	UNCLASSIFIED
37	CONS	ORAL	MELATONIN	UNK	7.5MG ON	UNK	UNCLASSIFIED
1	CONS	SC	GENOTROPIN	1.6MG OD	1.6MG OD	YES	
1	GP	ORAL	HYDROCORTISONE	7.5MG AM 5MG PM	7.5MG AM 5MG PM	YES	

PATIENT NO.	Rx'er	ROUTE	CPM	PAM	CARER	PAM = CARER	P-C CLASS
1	GP	ORAL	LEVOTHYROXINE	150MCG OM	150MCG OM	YES	
2	GP	ORAL	SEPTRIN	PAED 2.5ML BD	PAED 2.5ML BD	YES	
5	GP	ORAL	PHENYTOIN SUSP	20ML BD	20ML BD	YES	
5	GP	ORAL	RITALIN	20MG BD	20MG BD	YES	
5	GP	ORAL	TOPIRAMATE	30MG BD	30MG BD	YES	
6	GP	ORAL	HYDRALAZINE	50MG BD	50MG BD	YES	
6	GP	ORAL	HYDROCORTISONE	10MG AM, 5MG PM	10MG AM, 5MG PM	YES	
6	GP	ORAL	LEVOTHYROXINE	125MCG OD	125MCG OD	YES	
7	GP	ORAL	LEVETIRACETAM	600MG BD	SAME BUT STOPPED 1/12 AGO	YES	
7	GP	ORAL	CARBAMAZEPINE	300MG BD	300MG BD	YES	
7	GP	ORAL	TOPIRAMATE	30MG BD	30MG BD	YES	
8	GP	INH	FLIXOTIDE INH	EVOHALER 50, 2P BD	100MCG BD	YES	
9	GP	ORAL	THYROXINE	75 MCG OD	75 MCG OD	YES	
11	GP	EYE	LACRILUBE	BE ON	BE ON	YES	
11	GP	ORAL	RANITIDINE	150MG BD	150MG BD	YES	
11	GP	ORAL	TRIMETHOPRIM	15MG OD	15MG ON	YES	
12	GP	ORAL	PHENYTOIN	150MG BD	150MG BD	YES	
15	GP	NEB	COLISTIMETHATE	NEB BD MDU	500,000 UNITS BD NEB	YES	
15	GP	ORAL	CO-TRIMOXAZOLE	PAED 2.5ML ON	PAED 2.5ML OD	YES	
15	GP	EYE	LACRILUBE	BE ON	BE ON	YES	
15	GP	ORAL	OMEPRAZOLE	10MG OD	10MG OD	YES	
17	GP	ORAL	EPILIM	CHRONO 1.5G ON	3 OD	YES	
17	GP	ORAL	KEPPRA	750MG BD	3 BD	YES	

PATIENT NO.	Rx'er	ROUTE	CPM	PAM	CARER	PAM = CARER	P-C CLASS
19	GP	ORAL	PREDNISOLONE SOL	20mg od 5/7	20MG OD	YES	
19	GP	INH	SALBUTAMOL INH	4P q2-q4h prn	3-5 PUFFS PRN	YES	
19	GP	INH	SYMBICORT 100/6 TURBO	1p od-bd	1P OD	YES	
19	GP	INH	TERBUTALINE TURBO INH	1p q2h-q4h prn	1P PRN	YES	
20	GP	INH	BECLOMETASONE INH	50 2P BD	2P BD	YES	
21	GP	ORAL	CHLORPHENAMINE	4MG BD	4MG OD-BD	YES	
21	GP	INH	SYMBICORT 200/6 TURBO	2P BD	2P BD	YES	
23	GP	ORAL	COTRIMOXAZOLE PAED	240MG MDU	240MG BD	YES	
23	GP	ORAL	GLYCOPYRROLATE	1MG MDU	2MG TDS	YES	
23	GP	ORAL	LACTULOSE	5-15ML BD	6ML BD	YES	
23	GP	ORAL	OMEPRAZOLE	10MG BD	10MG BD	YES	
23	GP	ORAL	SENNA	7.5 MG ON	7.5MG ON	YES	
25	CONS	ORAL	SOD VALPROATE	300MG BD	300MG BD	YES	
28	CONS	ORAL	SOD VALPROATE	100MG BD	100MG BD	YES	
29	GP	ORAL	DESMOPRESSIN	100 MCG QDS	100 MCG QDS	YES	
29	GP	ORAL	ETHINYLOESTRADIOL	10 MCG OD	10 MCG OD	YES	
29	CONS	SC	GH - SAIZEN	1.75MG	1.75MG	YES	
29	GP	ORAL	LEVOTHYROXINE	100 MCG OM	100 MCG OM	YES	
30	GP	ORAL	SOD VALPROATE	400MG BD	400MG BD	YES	
30	CONS	ORAL	STIRIPENTOL	750MG BD	750MG BD	YES	
33	GP	ORAL	LAMOTRIGINE	15MG BD	15MG BD	YES	
33	GP	ORAL	LEVETIRACETAM	300MG BD	300MG BD	YES	
35	GP	ORAL	TOPIRAMATE	25MG MDU	25MG ON	YES	
37	GP	ORAL	PHENOBARBITONE	MDU BD	140MG BD	YES	
38	GP	ORAL	CARBAMAZEPINE	300MG BD	300MG BD	YES	
38	GP	ORAL	LORATADINE	5MG ON	5MG ON	YES	
38	GP	INH	SALBUTAMOL INH	2P PRN	PRN	YES	

PATIENT NO.	Rx'er	ROUTE	CPM	PAM	CARER	PAM = CARER	P-C CLASS
38	GP	ORAL	TRIMETHOPRIM	100MG BD	100MG BD	YES	

Appendix 5 Focus group free-nodes (codes)

	Free nodes – Community Pharmacy focus group
1	Ask the patient
2	Availability of drug
3	Competency
4	Confidence (CPs)
5	Confirmation of dose
6	Co-operation between CP and Hosp P
7	CP Time
8	Dose calculations or interpretation
9	Fax back
10	Force hospital to dispense
11	Frequency of problems
12	GP
13	Hosp Rx more complex
14	Hosp Rxs are hand-written
15	Hosp Rxs look different to community
16	Hospital support for CP
17	Is there an error on the Rx
18	IT solutions
19	Locum community pharmacists
20	Off-label use
21	Paediatric Prescribing issues
22	Patient choice
23	Patient confidentiality
24	Patient expectations
25	Patient relationship
26	PMRs community
27	Poor hospital prescribing
28	Prescriber identity
29	Prescriber known but cannot contact them
30	Pressure (extra) because the patient is a child
31	Quantity on Rx
32	Reluctance to ask Hospital
33	Returning Rx to Hosp

	Free nodes – Community Pharmacy focus group
34	Risk
35	SoPs
36	[Specials OR ULM text serach
37	Specials (products)
38	Strength missing on Rx
39	Teaching or training prescribers
40	Telephone contact with hospitals can be difficult
41	Travel
42	Waiting

	Free nodes - medical focus group
1	Communication - poor
2	Competence
3	CP or GP difficulties in providing paed dose
4	CP supply problems
5	Dear GP … if you agree please prescribe … letter
6	Duration of supply
7	Electronic communication
8	Electronic prescribing
9	Financial implications of problem
10	Follow ups
11	Formularies
12	Formulation problems (e.g. MTX tab strength)
13	Frequency of occurrence
14	GP must see patient before prescribing as advised by hospital
15	GP receptionists
16	GP refuses to prescribe
17	GP repeat prescriptions
18	GP supply too short
19	Hospital doctors refusals (e.g. other paediatricians)
20	Inadequate supply from hospital
21	Instructions to families e.g. don't run out
22	Interface 'rules' unclear
23	Interface system failure
24	Junior (hosp) doctors
25	Letter to GP
26	Nurse involvement

	Free nodes - medical focus group
27	Nurse prescribing
28	OOH access to information
29	Patient hot line
30	Patients use us as primary care (not secondary care)
31	Pharmacists changing prescriptions
32	Posting out prescriptions
33	Prescribing responsibility
34	Prescribing unlicensed medicines
35	Problem resolution
36	Problems getting correct prep e.g. oint or cream
37	Support for CPs (e.g. where to get drug)
38	Teaching students paediatric prescribing
39	Urgent requests from patient (run out)
40	Workload

Appendix 6 Medical Staff Survey (Electronic)

Medical Staff BCH - Access to Medicines for patients in Primary Care (electronic survey)

Medical Staff
- BCH

All medical staff at BCH

S-A SECTION A - DEMOGRAPHICS

The following questions are about you. The questions are designed to be completed by hospital MEDICAL STAFF

Q1 In which year did you graduate in medicine? (YYYY)

Please write your answer here: _____

Q2 How many years experience do you have as a PAEDIATRICIAN (all sub-specialities)?

If you have worked part-time or as a locum count the years you have worked for at least 3 hours per week on average in hospital paediatrics. If you have worked for less than 1 year put
0.

Please write your answer here: _____

Q3 In which specialty do you work mostly at present?
Select one option from the drop-down box

Please choose *only one* of the following:
Anaesthetics
Cardiology
Dermatology Diabetology
Emergency (ED)
Endocrinology
ENT
Gastroenterology
General paediatrics
Haematology

IMD
ITU (Intensivist)
Liver
Nephrology
Neurology
Neurosurgery
Oncology
Ophthalmology
Plastics
Psychiatry
Renal
Respiratory
Rheumatology
Surgery - General
Trauma & Orthopaedics
Other - please specifiy in box below
Make a comment on your choice here:

Make a comment on your choice here:
_____ _____ _____

Q4 What is your designation?

Please choose *only one* of the following:
SHO
Registrar
Staff Grade
Consultant
Other - please specify
Make a comment on your choice here:
_____ _____ _____

S-B SECTION B: FREQUENCY of prescribing for PATIENTS IN PRIMARY CARE

We are interested in your experiences and / or opinions in relation to any problems or difficulties that may exist when providing prescriptions for patients who are largely managed in PRIMARY CARE but may receive some prescriptions from BCH.

Q5 On average approximately how many FP10HP (community pharmacy) prescriptions do

you personally sign in ONE CALENDAR MONTH (Total - all circumstances)?

An FP10HP is similar to a GP prescription but written by hospital prescribers. These prescriptions are usually given to the patient to take to a community
pharmacy.

Please choose *only one* of the following:
- o NONE
- o 1-5 PER MONTH
- o 6-15 PER MONTH
- o 15-30 PER MONTH
- o 31-100 PER MONTH
- o More than 100 per MONTH

Q6 In the last THREE MONTHS approximately how many prescriptions have you personally signed for patients outside the hospital (e.g. at home) requesting an urgent prescription - perhaps via a help line or an unplanned attendance.

For example: A patient at home has run out of their medication and you have been asked to provide an urgent prescription

Please choose *only one* of the following:
- o None
- o 1 to 5
- o 6 to 10
- o 11 to 30
- o 31 to 60
- o 61 to 100
- o More than 100

Q8 In the last THREE MONTHS for approximately HOW MANY PATIENTS have YOU personally prescribed prescriptions for patients outside the hospital (e.g. at home) requesting an urgent prescription - perhaps via a help line or an unplanned attendance?

For example: A patient at home has run out of their medication and you have been asked to provide an urgent prescription

Please choose *only one* of the following:
- o NONE
- o 1 to 5 patients
- o 6 to 10 patients

- o 11 to 30 patients
- o 31 to 60 patients
- o 61 to 100 patients
- o More than 100 patients

Q7 Providing prescriptions for continuing medicines may be the responsibility of either the GP or BCH depending on what arrangements have been agreed for that patient.

When writing FP10 HPs: (Tick one option)

An FP10HP is similar to a GP prescription but written by hospital prescribers. These prescriptions are usually given to the patient to take to a community pharmacy.

Please choose *only one* of the following:
I never know who holds prescribing responsibility
I occasionally know who holds prescribing responsibility
I often know who holds prescribing responsibility
I always know who holds prescribing responsibility
Not applicable
Make a comment on your choice here:
_____ _____ _____

Q9 How would you describe the clinical risk to patients if you did NOT prescribe medicines for patients outside the hospital (e.g. at home) requesting an urgent prescription - perhaps via a help line or an unplanned attendance?

Please choose *only one* of the following:
- o No risk
- o Small risk
- o Moderate risk
- o High risk
- o Very high risk
- o Not applicable

S-C SECTION C: PROBLEMS relating to prescriptions for PATIENTS IN PRIMARY CARE.

Q10 In your opinion what is the most common reason why paediatric patients and their carers in primary care experience problems in obtaining suitable medication from their GP?

Please choose *only one* of the following:
Carer did not obtain a prescription in good time ... CARER issue
Cannot get medication dispensed ... PHARMACY issue
Child cannot use the formulation provided ... FORMULATION issue
GP has not received communication (e.g. clinic / discharge letter) ... COMMUNICATION issue
GP will not prescribe (e.g. because it is an unlicensed medicine) ... GP issue
Not applicable
Don't know
Other - please specify
Make a comment on your choice here:
_____ _____ _____

Q11 For the statement below please indicate the extent to which you agree or disagree:

GP's ARE RELUCTANT TO PRESCRIBE CONTINUING MEDICATION FOR CHILDREN.

Please choose *only one* of the following:
- o Strongly disagree
- o Disagree
- o Neither agree nor disagree
- o Agree
- o Strongly agree

Q12 This question shows a list of possible reasons why GPs may decline to provide repeat prescriptions for children. For each reason please indicate how likely you believe it to be.

Tick ONE option per line

1 = VERY UNLIKELY

2 = QUITE UNLIKELY

3 = SOMETIMES

4 = QUITE LIKELY

5 = VERY LIKELY

Please choose the appropriate response for each item:
Money / finances
Clinical concerns about the drug or regimen required
Communication issues
Drug not on their computer system

Workload
PCT influence / instruction
Inadequate supporting information

S-D SECTION D: INTERACTION WITH COMMUNITY PHARMACISTS (CPs)

Q13 In the last 12 months approximately how often have you been contacted by a community pharmacist concerning a hospital prescription you or a BCH colleague has written?

Please choose *only one* of the following:
- o Never
- o 1 - 12
- o 13 - 24
- o 25 - 52
- o 53 - 180
- o 181 - 360
- o More than 360

Q14 Would you be prepared to always add YOUR hospital telephone number to FP10HPs you sign?

Please choose *only one* of the following:
- o Yes
- o No
- o Don't know
- o Not applicable

Q15 Would you be prepared to use a pre-inked stamp to show your name clearly on FP10HPs you sign?

Please choose *only one* of the following:
- o Yes
- o No
- o Don't know
- o Not applicable

Q16 If you prescribe dose regimens on FP10HPs which are not included in standard texts would you be prepared to acknowledge that you have done so knowingly on the prescription (e.g. endorse: NOT-BNF)?

Please choose *only one* of the following:
o Yes
o No
o Don't know
o Not applicable

Q17 Would you be prepared to indicate the dose calculation as well as the final dose on FP10HP prescriptions you sign (where applicable)? e.g. state mg per kg as well as calculated dose

Please choose *only one* of the following:
o Yes
o No
o Don't know
o Not applicable

S-E SECTION E: IMPROVING CURRENT ARRANGEMENTS

Q18 Please indicate in your opinion how beneficial the following changes to national guidance would be in reducing the problems associated with prescribing for paediatric patients in primary care.

REQUIRE GPs TO PRESCRIBE ALL CONTINUING MEDICINES

Please choose *only one* of the following:
No benefit
Small benefit
Moderate benefit
High benefit
Very high benefit
Don't know
Make a comment on your choice here:
_____ _____ _____

Q19 Please indicate in your opinion how beneficial the following changes to national guidance would be in reducing the problems associated with prescribing for paediatric patients in primary care.

REQUIRE HOSPITALS TO PRESCRIBE & DISPENSE UNLICENSED / UNCOMMON MEDICINES

Please choose *only one* of the following:

No benefit
Small benefit
Moderate benefit
High benefit
Very high benefit
Don't know
Make a comment on your choice here:

_____
_____

Q20 Please indicate in your opinion how beneficial the following changes to national guidance would be in reducing the problems associated with prescribing for paediatric patients in primary care.

ENABLE HOSPITAL PHARMACIES TO DISPENSE GP PRESCRIPTIONS

Please choose *only one* of the following:
No benefit
Small benefit
Moderate benefit
High benefit
Very high benefit
Don't know
Make a comment on your choice here:

_____ _____ _____

Q21 Please indicate your opinion about the statement below.

In my opinion hospitals should ensure that all out-patient prescriptions are dispensed by the hospital pharmacy (i.e. FP10HPs are not required)

If you would like to add any comments please do so in the text box
Please choose *only one* of the following:
Strongly disagree
Disagree
Neither agree nor disagree
Agree
Strongly agree
Make a comment on your choice here:

_____
_____

Q22
Please indicate your opinion about the statement below.

I would benefit from further training concerning the writing of prescriptions
Please choose *only one* of the following:
- o Strongly disagree
- o Disagree
- o Neither agree nor disagree
- o Agree
- o Strongly agree

Q23 In your opinion which single achievable change would bring about the most benefit for patients concerning problems associated with interface (primary care - hospital) prescribing

Please write your answer here:

_____ _____

Q24 Are you aware that patients in primary care with on-going drug access issues can be referred to the BCH Access to Medicines Clinic?

Please choose *only one* of the following:
- o Yes
- o No

Q25 We welcome any further comments concerning access to medicines across the primary-hospital healthcare interface.

Please write your answer here:

_____ _____ _____

Thanks

THANK YOU
VERY MUCH

We know how busy you are and we much appreciate your time.

Please see the study website (www.access2medicines.co.uk) for summary information concerning this study: available March 2010.

Submit Your Survey.

Thank you for completing this survey.

Appendix 7 Medical staff survey. Results

Table 50 Medical staff survey. Frequency of writing rescue-medication prescriptions in a 3 month period

Rescue-med prescriptions	Frequency	Valid Percent
None	81	50.0
1-5	46	28.4
6-10	18	11.1
11-30	14	8.6
31-60	3	1.9
Total	162	100.0
Missing	5	
Grand total	167	

[Estimated total frequency, using the calculated mid-point method = Sum(46x3, 18x8, 14x21, 3x46) = 714 (3 month period)]

Table 51 Medical staff survey. Numbers of patients provided with rescue-medication in a 3 month period

Patients receiving rescue-meds	Frequency	Valid Percent
None	85	52.5
1-5	47	29.0
6-10	17	10.5
11-30	11	6.8
31-60	2	1.2
Total	162	100.0
Missing	5	
Grand total	167	

[Estimated number of patients, using the calculated mid-point method, provided with rescue-medication prescriptions within the 3 month period = Sum(3x47, 8x17, 21x11, 46x2, = 600)]

Table 52 Medical staff survey. Knowledge of prescribing responsibility by respondents

Prescribing responsibility	Frequency	Valid Percent
Never	21	16.4
Occasionally	23	18.0
Often	55	43.0
Always	29	22.7
Total	128	100.0
Missing	5	
Not applicable	34	
Grand total	167	

Table 53 Medical staff survey. Risk to patients if the rescue-medication service was not provided

RISK	Frequency	Valid Percent
No risk	5	4.0
Small risk	20	16.1
Moderate risk	56	45.2
High risk	35	28.2
Very High risk	8	6.5
Total	124	100.0
Missing	9	
Not applicable	34	
Grand total	167	

Table 54 Medication reconciliation study. Sensitivity of data sources against validated continuing medication (vCM)

PATIENT NO.	route	CPM	PAM	PAM SPEC	POD	POD SPEC	CARER	CARER SPEC	vCM
1	ORAL	HYDROCORTISONE	7.5MG AM 5MG PM	TP	15MG AM 5MG PM	FN	7.5MG AM 5MG PM	TP	7.5MG AM 5MG PM
1	SC	GENOTROPIN	1.6MG OD	TP	1.6MG OD	TP	1.6MG OD	TP	1.6MG OD
1	ORAL	LEVOTHYROXINE	150MCG OM	TP	150MCG OM	TP	150MCG OM	TP	150MCG OM
2	ORAL	SEPTRIN	PAED 2.5ML BD	TP	99	FN	PAED 2.5ML BD	TP	PAED 2.5ML BD
2	INH	BUDESONIDE INH 50MCG	8P OD	U	99	U	NO MENTION	U	UNCERTAIN
2	INH	SALBUTAMOL INH	2P MDU	TP	99	FN	NOT GIVEN	FN	2P PRN
3	ORAL	DOMPERIDONE	1.6MG QDS	U	1.6MG QDS	U	UNK	U	UNCERTAIN
3	ORAL	SYTRON	2.5ML OM	TP	99	FN	UNK	FN	2.5ML OM
3	ORAL	OMEPRAZOLE	4MG OM	TP	99	FN	UNK	FN	4MG OM
3	ORAL	CALOGEN	3ML QDS	TP	99	FN	UNK	FN	3ML QDS
3	EYE	HYPROMELLOSE 0.3% ED	QDS BE	TP	99	FN	UNK	FN	QDS BE
4	INH	BECLOMETASONE INH	200MCG BD	TP	99	FN	200MCG OD	FN	200MCG BD
4	ORAL	SENNA	SENNOKOT 10ML ON	TP	99	FN	18ML ON	FN	SENNOKOT 10ML ON
4	ORAL	SOD VALPROATE	7ML TDS	TP	99	FN	8ML, 7ML, 8ML	FN	7ML TDS
5	ORAL	PHENYTOIN SUSP	20ML BD	TP	20ML BD	TP	20ML BD	TP	20ML BD
5	ORAL	RITALIN	20MG BD	TP	NO LABEL	FN	20MG BD	TP	20MG BD
5	ORAL	TOPIRAMATE	30MG BD	TP	NO LABEL	FN	30MG BD	TP	30MG BD
6	ORAL	LEVOTHYROXINE	125MCG OD	TP	125MCG OD	TP	125MCG OD	TP	125MCG OD
6	ORAL	HYDRALAZINE	50MG BD	TP	50MG BD	TP	50MG BD	TP	50MG BD
6	ORAL	ATENOLOL	100MG OD	TP	100MG OM	TP	50MG BD	FN	100MG OD

PATIENT NO.	route	CPM	PAM	PAM SPEC	POD	POD SPEC	CARER	CARER SPEC	vCM
6	ORAL	DESMOTABS	100MCG TDS	FN	NO LABEL	FN	200MCG TDS	TP	200MCG TDS
6	ORAL	HYDROCORTISONE	10MG AM, 5MG PM	TP	NO LABEL	FN	10MG AM, 5MG PM	TP	10MG AM, 5MG PM
7	ORAL	CARBAMAZEPINE	300MG BD	TP	300MG BD	TP	300MG BD	TP	300MG BD
7	ORAL	TOPIRAMATE	30MG BD	TP	NO LABEL	FN	30MG BD	TP	30MG BD
7	ORAL	LEVETIRACETAM	600MG BD	FP	99	FP	STOPPED 1/12 AGO	TP	STOP
8	INH	FLIXOTIDE INH	EVOHALER 50, 2P BD	TP	99	FN	100MCG BD	TP	EVOHALER 50, 2P BD
8	INH	SALBUTAMOL INH	99	FN	99	FN	PRN	TP	PRN
9	ORAL	THYROXINE	75 MCG OD	TP	99	FN	75 MCG OD	TP	75 MCG OD
10	ORAL	CARBAMAZEPINE	80MG OM, 120MG ON	TP	80MG OM, 120MG ON	FN	100MG BD	TP	100MG BD
11	ORAL	RANITIDINE	150MG BD	FN	150MG BD	TP	150MG BD	TP	150MG BD
11	ORAL	TRIMETHOPRIM	15MG OD	TP	15MG ON	TP	15MG ON	TP	15MG OD
11	EYE	LACRILUBE	BE ON	TP	BE ON	TP	BE ON	TP	BE ON
11	EYE	VISCOTEARS	BE PRN	TP	BE PRN	TP	BE QDS	FN	BE PRN
12	ORAL	PHENYTOIN	150MG BD	TP	99	FN	150MG BD	TP	150MG BD
13	ORAL	TRIMETHOPRIM	10MG ON	FN	10MG ON	FN	20MG ON	TP	20MG ON
14	ORAL	NITROFURANTOIN	0	FN	5MG ON	TP	5MG ON	TP	5MG ON
15	ORAL	OMEPRAZOLE	10MG OD	TP	99	FN	10MG OD	TP	10MG OD
15	ORAL	DOMPERIDONE	SUSP 3MG TDS	FN	99	FN	4MG TDS	TP	4MG TDS
15	ORAL	FEREDETATE	2.5MLS TDS	FP	99	U	NOT GIVEN	U	UNCERTAIN
15	ORAL	CO-TRIMOXAZOLE	PAED 2.5ML ON	TP	99	FN	PAED 2.5ML OD	TP	PAED 2.5ML ON
15	EYE	LACRILUBE	BE ON	TP	99	FN	BE ON	TP	BE ON
15	NEB	COLISTIMETHATE	NEB BD MDU	TP	99	FN	500,000 UNITS BD NEB	FN	NEB BD MDU
16	ORAL	DESMOPRESSIN	50MCG QDS	TP	99	FN	300MCG DAILY	FN	50MCG QDS

PATIENT NO.	route	CPM	PAM	PAM SPEC	POD	POD SPEC	CARER	CARER SPEC	vCM
16	ORAL	PREDNISOLONE SOL	5MG ALT DIE	TP	99	FN	ORAL EVERY 3/52	FN	5MG ALT DIE
16	ORAL	COTRIMOXAZOLE PAED	240MG BD SAT + SUN	TP	240MG BD SAT + SUN	TP	480MG OD SAT + SUN	FN	240MG BD SAT + SUN
16	ORAL	MOVICOL PAED	2 OD	U	99	FN	NO MENTION	U	UNCERTAIN
17	ORAL	EPILIM	CHRONO 1.5G ON	TP	CHRONO 1.5G ON	TP	3 OD	TP	CHRONO 1.5G ON
17	ORAL	KEPPRA	750MG BD	TP	750MG BD	TP	3 BD	TP	750MG BD
18	INH	SALBUTAMOL INH	2P QDS PRN	TP	2P QDS PRN	TP	NO MENTION	FN	2P QDS PRN
18	INH	BECLOMETASONE INH	50MCG BD	TP	50MCG BD	TP	NO MENTION	FN	50MCG BD
18	ORAL	PIZOTIFEN	500MCG ON	TP	500MCG ON	TP	UNK	FN	500MCG ON
18	ORAL	PROPRANOLOL	10MG OD	TP	10MG OD	TP	UNK	FN	10MG OD
19	INH	SALBUTAMOL INH	4P q2-q4h prn	TP	PRN	TP	3-5 PUFFS PRN	TP	4P q2-q4h prn
19	INH	TERBUTALINE TURBO INH	1p q2h-q4h prn	TP	NO LABEL	FN	1P PRN	TP	1p q2h-q4h prn
19	INH	SYMBICORT 100/6 TURBO	1p od-bd	TP	NO LABEL	FN	1P OD	TP	1P OD
19	ORAL	PREDNISOLONE SOL	20mg od 5/7	TP	20MG OD 5/7	TP	20MG OD	FN	20mg od 5/7
20	INH	SALBUTAMOL INH	2P Q4H PRN	TP	NO LABEL	FN	4P BD	FN	2P Q4H PRN
20	INH	BECLOMETASONE INH	50 2P BD	TP	NO LABEL	FN	2P BD	TP	50 2P BD
21	ORAL	CHLORPHENAMINE	4MG BD	TP	98	FN	4MG OD-BD	TP	4MG BD
21	ORAL	DESMOPRESSIN	400MCG ON	U	99	U	NO MENTION	U	UNCERTAIN
21	ORAL	MOVICOL PAED	1 ON	U	99	U	NOT GIVEN	U	UNCERTAIN
21	INH	SALBUTAMOL INH	1P MDU	TP	PRN	TP	NOT GIVEN	FN	1P MDU
21	ORAL	SENNA	15MG ON	U	99	U	NOT GIVEN	U	UNCERTAIN
21	INH	SYMBICORT 200/6 TURBO	2P BD	TP	99	FN	2P BD	TP	2P BD

PATIENT NO.	route	CPM	PAM	PAM SPEC	POD	POD SPEC	CARER	CARER SPEC	vCM
21	INH	BRICANYL INH	98	U	99	U	UNCERTAIN	U	NOT APPLICABLE
22	ORAL	LAMOTRIGINE	0	FN	100MG BD	TP	UNK	FN	100MG BD
22	ORAL	TOPIRAMATE	0	FN	100MG BD	TP	UNK	FN	100MG BD
23	ORAL	CLOBAZAM	2MG TDS	TP	2MG TDS	TP	2MG, 3MG, 4MG	TP	2MG TDS
23	ORAL	GLYCOPYRROLATE	1MG MDU	U	1MG MDU	U	2MG TDS	U	UNCERTAIN
23	ORAL	LACTULOSE	5-15ML BD	TP	5-15ML TDS	TP	6ML BD	FN	5-15ML BD
23	ORAL	SENNA	7.5 MG ON	TP	7.5 MG ON	TP	7.5MG ON	TP	7.5 MG ON
23	ORAL	NITRAZEPAM	2.5MG BD	TP	2.5MG BD	TP	NO MENTION	FN	2.5MG BD
23	ORAL	OMEPRAZOLE	10MG BD	TP	10MG BD	TP	10MG BD	TP	10MG BD
23	ORAL	VIGABATRIN	750MG BD	U	750MG BD	U	500MG BD	U	UNCERTAIN
23	ORAL	COTRIMOXAZOLE PAED	240MG MDU	TP	240MG MDU	TP	240MG BD	TP	240MG MDU
24	INH	SALBUTAMOL INH	99	FN	99	FN	PRN	TP	PRN
24	INH	BECLOMETASONE INH	99	FN	99	FN	PRN	FN	REG DOSE
25	ORAL	CLOBAZAM	2.1ML BD	TP	99	FN	2.1ML TDS	FN	2.1ML BD
25	ORAL	SOD VALPROATE	300MG BD	TP	99	FN	300MG BD	TP	300MG BD
26	ORAL	CICLOSPORIN	31MG BD	TP	31MG BD	TP	NO MENTION	FN	31MG BD
27	ORAL	TRIMETHOPRIM	20MG ON	TP	20MG ON	TP	22MG ON	FN	20MG ON
28	ORAL	SOD VALPROATE	100MG BD	TP	100MG BD	TP	100MG BD	TP	100MG BD
29	ORAL	ETHINYLOESTRADIOL	10 MCG OD	TP	99	FN	10 MCG OD	TP	10 MCG OD
29	ORAL	LEVOTHYROXINE	100 MCG OM	TP	99	FN	100 MCG OM	TP	100 MCG OM
29	ORAL	HYDROCORTISONE	10MG AM, 5MG PM	U	99	U	10MG AM, 7.5MG PM	U	UNCERTAIN
29	SC	GH - SAIZEN	1.75MG	TP	99	FN	1.75MG	TP	1.75MG
29	ORAL	DESMOPRESSIN	100 MCG QDS	TP	99	FN	100 MCG QDS	TP	100 MCG QDS
30	ORAL	CLOBAZAM	5MG BD	FN	5MG TDS	TP	5MG TDS	TP	5MG TDS
30	ORAL	STIRIPENTOL	750MG BD	TP	750MG BD	TP	750MG BD	TP	750MG BD

PATIENT NO.	route	CPM	PAM	PAM SPEC	POD	POD SPEC	CARER	CARER SPEC	vCM
30	ORAL	SOD VALPROATE	400MG BD	TP	400MG BD	TP	400MG BD	TP	400MG BD
31	ORAL	PIZOTIFEN	0.5MG BD	U	0.5MG BD	U	0.5MG TDS	U	UNCERTAIN
31	ORAL	MELATONIN	0	FN	6MG ON	TP	6MG ON	TP	6MG ON
31	ORAL	OMEPRAZOLE	40mg od 4/7	TP	n/a	U	NOT GIVEN	FN	40mg od 4/7
32	ORAL	NO RX	99	U	99	U	CLARITHROMYCIN 3ML OD	U	UNCERTAIN
32	ORAL	NO RX	99	FN	99	FN	FOLIC ACID 10ML OD	TP	FOLIC ACID 5MG OD
33	ORAL	LAMOTRIGINE	15MG BD	TP	15MG BD	TP	15MG BD	TP	15MG BD
33	ORAL	LEVETIRACETAM	300MG BD	TP	300MG BD	TP	300MG BD	TP	300MG BD
34	ORAL	CARBAMAZEPINE	99	U	99	U	210MG BD	U	UNCERTAIN
35	ORAL	GABAPENTIN	300-600MG TDS	FN	99	FN	600MG BD	TP	600MG BD
35	ORAL	TOPIRAMATE	25MG MDU	FN	25MG ON	TP	25MG ON	TP	25MG ON
36	ORAL	TRIMETHOPRIM	99	U	99	U	5ML ON	U	UNCERTAIN
37	ORAL	PHENOBARBITONE	MDU BD	FN	MDU BD	FN	140MG BD	TP	140MG BD
37	ORAL	MELATONIN	0	U	99	U	7.5MG ON	U	UNCERTAIN
38	INH	BECLOMETASONE INH	50MCG BD	TP	99	FN	NOT GIVEN	FN	50MCG BD
38	ORAL	CARBAMAZEPINE	300MG BD	TP	100 BD	FN	300MG BD	TP	300MG BD
38	ORAL	LORATADINE	5MG ON	TP	5MG OD	TP	5MG ON	TP	5MG ON
38	NASAL	NASONEX	2P OD	TP	NO LABEL	FN	1P ON	FN	2P OD
38	INH	SALBUTAMOL INH	2P PRN	TP	99	FN	PRN	TP	2P PRN
38	ORAL	TRIMETHOPRIM	100MG BD	TP	NO LABEL	FN	100MG BD	TP	100MG BD
39	ORAL	PHENYTOIN	87.6MG BD	TP	87.6MG BD	TP	87.6MG BD	TP	87.6MG BD

Category - PAM	Freq	Category - POD	Freq	Category - CARER	Freq
TOTAL TP	77	TOTAL TP	42	TOTAL TP	62
TOTAL FN	16	TOTAL FN	51	TOTAL FN	32
TOTAL FP	2	TOTAL FP	1	TOTAL FP	0
UNCLASSIFIED	15	UNCLASSIFIED	16	UNCLASSIFIED	16
TOTAL VALID	95	TOTAL VALID	94	TOTAL VALID	94
% TP	81%	% TP	45%	% TP	66%
% FN	17%	% FN	54%	% FN	34%
% FP	2%	% FP	1%	% FP	0%
Sensitivity	0.83	Sensitivity	0.45	Sensitivity	0.66

Appendix 8 Nursing staff questionnaire (electronic)

ACCESS TO MEDICINES:THE EXPERIENCE OF BCH CLINICAL NURSE SPECIALISTS AND ADVANCED NURSEPRACTIONERS

This questionnaire is part of a series of studies at BCH looking at the problems children and their carers experience in obtaining continuing medicines when they are not in hospital (Access to Medicines). Accessing continuing medicines can be problematic for paediatric patients for a number of reasons, including:

- GP may be reluctant to prescribe
- Community pharmacies may have difficulties in obtaining specialist medicines before existing supplies run out
- Variation in the formulation of unlicensed medicines

The results of this survey may be used to identify beneficial changes to existing processes. If useful information is obtained a summary of anonymised results and their significance may be published.

* Q1: In which specialty do you work mostly at [hospital / Trust]?
Please choose *only one* of the following:
Cardiology
Dermatology
Diabetology
Endocrinology
Gastroenterology
Haematology
IMD
Liver
Neurology
Oncology
Plastics
Renal
Respiratory
Other

* Q2: On average how many hours per week are you contracted to work at [hospital / Trust]?
Please choose *only one* of the following:
Less than 5 hours
Between 5.1 and 8 hours
Between 8.1 and 16 hours
Between 16.1 and 22 hours
Between 22.1 and 30 hours
More than 30.1 hours
Don't know

* Q3: What is your job title?
Please write your answer here:

* Q4: Please tick all that apply to your job or role:

Please choose *all* that apply:
Independent prescriber
Supplementary prescriber
Domicillary Visits
Work with In-patients
Work with Out-patients
Provide advice concerning medication
Other:

* Q5: Do you consider your role mainly clinical or psychosocial?
Please choose *only one* of the following:
Mainly Clinical
Mainly psychosocial
Other

Section B: SECTION B: SUPPORTING PATIENTS GET THEIR MEDICINES

We are interested in your involvement in ensuring patients get the medicines they need. You might facilitate getting prescriptions written, or advise on how to get a prescription for an uncommon medicine dispensed. You may advise patients on how to take a medicine. Please complete the following questions.

* Q6: In the last 3 months how many times have you been called upon to organise repeat prescriptions for your patients?

Please choose *only one* of the following:
Never
1 to 5 times
6 to 10 times
11 to 30 times
More than 30 times

* Q7: In the last 3 months for how many patients have you been asked to organise repeat prescriptions?

Please choose *only one* of the following:

None
1 to 5
6 to 10
11 to 30
More than 30

* Q8: Is it in your Job Description to resolve drug access problems?

Please choose *only one* of the following:

Yes
No
Do not know
* Q9: How would you describe the risk to patients if you did not help patients access their medicines?

Please choose *only one* of the following:
Not Applicable
Insignificant (no risk)
Moderately significant
Significant
Highly significant (greatest risk

* Q10: In your opinion what is the most common reason why carers experience problems in obtaining suitable medications (one that the child can use or take)?

Please choose *only one* of the following:
Cannot obtain a prescription (in time) ... carer issue
Cannot get medication dispensed ... pharmacy issue
Child cannot use the formulation provided … formulation issue
GP has not received communication (eg. clinic/discharge letter) … communication issue
GP will not prescribe (eg because it is an unlicensed medication) … prescriber issue
Other

* Q11: In what ways can services be better organised to minimise disruption to the child's therapy?

Please choose *all* that apply:
Require GPs to prescribe
Require hospitals to prescribe and dispense unlicensed / uncommon/medicines
Enable hospital pharmacy to dispense GP prescriptions
Don't know
Other:

Thank you for your time and cooperation. If you have any other comments that you would like to make about children getting the medicines the need please enter them below.

Additional Comments:

Please write your answer here:

Appendix 9 Rescue-Medication Survey (paper)

Birmingham Children's Hospital NHS
NHS Foundation Trust

2009#5

URGENT MEDICINE REQUEST: PARENT / CARER SURVEY

About this survey

This questionnaire is designed to determine the circumstances that lead parents and carers to request urgent medication supplies from the Pharmacy, Birmingham Children's Hospital. The survey also asks your views on how things can improve which may help us identify service changes.

Completing the questionnaire is entirely voluntary If you decide not to participate it will not affect the service we provide to you. Please note that we may publish summary data and use the survey within some studies we are conducting with Aston University. Any published data will be anonymised. A member of our staff is available to help you complete the questionnaire.

What to do

Most of the questions require a simple answer in the box provided. The whole questionnaire can be completed in 10 minutes and we hope that you will help us with this important research.

We respect your right to decline to complete this survey.

However if you do decide not to complete the survey it would be very helpful for us to understand why you made this decision. Please tick all that apply:

☐ *This is not a good time / insufficient time, to complete the survey*
☐ *Concerns about confidentiality*
☐ *I am not the usual carer of the patient*
☐ *other … please describe below.*

In the event of queries contact David Terry in the Pharmacy, Birmingham Children's Hospital on 0121-333-9786.

SECTION A: ABOUT THE PATIENT AND WHICH HEALTHCARE PROFESSIONALS YOU USE.

The following questions are about the patient and which GP, community pharmacy and PCT provides their care.

Q1) What is the patient's home postcode?

Q2) Which GP practice does the patient attend (include address if possible)?

Q3) Which is your usual community pharmacy (chemist) – name and address if possible?

Q4) Which Primary Care Trust (PCT) does the patient belong to? (If in doubt we can look up this information for you).

SECTION B: CIRCUMSTANCES OF COMING TO THE PHARMACY TODAY

We are interested in the details of why you had to come to us to get urgent medicines.

Q5) When did the patient last attend Birmingham Children's Hospital (date if possible)?

Q6) When did the patient last consult their GP (date if possible)?

Q7) Have you made a special trip to come to us today?

(tick ONE box)

a. *YES* ☐

b. *NO* ☐

Q8) Did you get advice from a healthcare professional before you came to us (e.g. GP or community pharmacist)?

(tick ONE box)

a. *YES* ☐ - *if so who*

b. *NO* ☐

Q9) Have you had to come to us before to obtain medicines urgently?

(tick ONE box)

a. *YES* ☐ - *if so when*

b. *NO* ☐

Q10) Who normally prescribes the medicine(s)?

(tick ONE box)

a. *GP* ☐

b. *HOSPITAL* ☐

Q11) Where do you normally get the medicines dispensed (name & address if possible)?

Q12) *How often do you have problems getting medicines for this patient?*

TICK ONE ONLY

Never before	Very rarely	Sometimes	Often	Very often
☐	☐	☐	☐	☐

Q13) Which medicines do you have difficulty obtaining (please provide the names of the medicines concerned?

Q14) Has the patient missed any doses as a consequence of not getting the medicine(s)?

SECTION C: YOUR OPINIONS

This section explores your opinions on why these problems occur and how the current systems can be improved.

Q15) What do you think are the reasons why you have had difficulty in obtaining the medicines?

Q16) How can existing arrangements be improved?

If you have any additional comments please write in the box below.

Date completed

Do Not Write Below this line – for administrative use only.

UrgentMedsSurveyJan2009#5

Table 55 Free text responses for reasons for problems and assigned codes

ID	*MEDICINES*	*REASONS*	*REASON CODES*
1	Acetazolamide	Unusual to get liquid form in this particular strength	SUPPLY
3	Electrolyte solution G & Sodium resonium	Not available at community pharmacy, takes time to be delivered	SUPPLY
4	Joulies phosphate solution	The community pharmacy have to order supplies in from hospital	SUPPLY
5	0	Manufacturers delay	SUPPLY
7	Azathioprine liquid 50mg/5ml	G.P Refusal	GP
9	0	They are dispensed to pre-order to named users in the community pharmacists only and takes 28 days to arrive.	SUPPLY
11	Phosphate sandoz	Not stocked at pharmacy's	SUPPLY / CP
12	0	Because they didn't know the dose	UNCLASSIFIED
13	Captopril & potassium chloride	G.p won't prescribe and pharmacy cannot get hold of the unlicensed medication	GP / CP
14	0	Reffered from A&E	UNCLASSIFIED
15	0	had difficulties receiving the medicine because the chemist wouldn't dispense because it wasn't available.	CP
16	Clobazam chloral hydrate	Not kept in stock in community pharmacy	SUPPLY / CP
17	Triazapan	Pharmacy does not have the medicine	SUPPLY / CP
18	Nitrazepam	The pharmacy said there was a strength to the medication but there is not.	CP
20	loperamide, sodium bicarbonate, Omeprazole	Boots pharmacy have problems getting meds and are very unhelpful	CP
21	0	Problems with manufacturers	SUPPLY
23	Captopril	I wasn't aware that the pharmacy would need so much notice to obtain the medicine and a prescription in place before ordering. Even though they had the discharge papers.	CARER
24	Betadine solution	Local pharmacy's have discontinued this medicine	SUPPLY

ID	*MEDICINES*	*REASONS*	*REASON CODES*
25	Neorecormon & enalapril	Cost of dispensing, availability	COST / SUPPLY
26	The ones that are prescribed now	Really don't know	UNK
27	0	Because they are specialised drugs	SUPPLY
28	Captopril	Medicine has a short expiry date and the chemist have to put it through as a specail order which in this case will take a week.	SUPPLY
34	Sodium Bicarbonate tablets Minoxodil	Community pharmacy access to specialist drugs	SUPPLY / CP
39	0	Not in stock, have to order	SUPPLY / CP
43	Madopar 62.5	The doctors would not prescribe it	GP
44	Loperamide and 1 other	GP said he hasn't received any info from hospital	Communication
47	0	Manufacturers	UNCLASSIFIED
48	MMF	Pharmacy told us that medicine is out of stock with us please buy from other pharmacy. But could not find any where	CP
51	Promixin	GP refused to prescribe, money being the issue here	COST / GP
54	Catopril	We were told that it has a short shelf life and it had to be ordered in advance	SUPPLY / CP
60	0	Unlicenced drug	UNCLASSIFIED
61	0	Hospital medicines	UNCLASSIFIED
62	Desmospray	We have been told it is due to dosage	UNCLASSIFIED
69	Chlorothiazide	Don't Know	UNK
70	Acidophilus Extra 4 Capsules	I have been told by the chemist they do not prescribe this drug. I have tried a few pharmacies	CP
75	Fucidin (Fucidic Acid)	No, Knowing it would take upto !0 days to obtain, not getting enough to see through the week. Gp unaware that hospital discharge included regular top-ups.	UNCLASSIFIED
76	0	No, not yet	UNK
79	Potassium, Magnesium,Amphoterin, Rifampacin etc	I have been told that they are special medicines and have to be made up. Not all staff know how to order them. I have to take bottles to show them in order for them to order the right medicine.	CP
81	Magnesium Oral Solution sometimes	Supplier to our local pharmacist sometimes doesn't have supply	SUPPLY

ID	*MEDICINES*	*REASONS*	*REASON CODES*
82	Pyridoxal phosphate	GP cannot presribe as he had no communication from consultant	GP
84	Sildenafil Suspension	Because they have to be orderd in and sometimes takes longer	SUPPLY
88	DNAse	Dr Unwilling to supply	GP

Table 56 Free text answers to how things can be improved and assigned codes

ID	*HOW CAN EXISTING ARRANGEMENTS BE IMPROVED?*	*IMPROVE CODES*
1	For the chemist to be able to get them without questioning myself, GP and the manufacturers	COMMUNICATION
3	For medication to be available monthly when required	PLANNING
9	To be made aware of the delay when first given the prescription, and to be issued with a 28 day supply	COMMUNICATION / PLANNING
11	Pharmacy could stock wider variety of medicines or get them urgently the same day	PROCUREMENT
13	If the G.P would prescribe and I was able to get hold of all medicines from local pharmacy	GP
15	Being able to get from the chemist with correct information being given to the parents	COMMUNICATION
16	For pharmacy to have names of where to obtain specific medication from	PROCUREMENT
17	Pharmacy stock the medicine you need to have	PROCUREMENT
18	That other pharmacy's read up on all medication so there wont be an issue again	CP
20	Boots pharmacy need to improve and staff need to be more helpful	CP
23	Better explanation on discharge to parents and the pharmacy anticipating when the next prescription would be due	COMMUNICATION
25	Make more widely available	PROCUREMENT
26	The hospital faxing information to the doctor urgently	COMMUNICATION
27	Maybe if we could be sent straight to the hospital to get them	HOSP
28	Special orders abtained quicker or longer expiry dates	PROCUREMENT
43	They should provide all medicine	UNK
44	Communicate with GP about where to get medicine from	COMMUNICATION
47	Stock	PROCUREMENT
48	I have no idea	UNK
51	break the link between cost and need	GP
62	By our own pharmacy liasing with BCH more	CP
69	There hasn't been any	UNK
74	MCS	UNK

ID	*HOW CAN EXISTING ARRANGEMENTS BE IMPROVED?*	*IMPROVE CODES*
75	Hospital to give required medication (if only to last a few weeks on discharge). Parents to be made aware that it could take upto a few days for pharmacy to get medication.	HOSP
76	Information not being passed on from healthcare departments.	COMMUNICATION
79	Chemist to find the manufacturer and make sure they put it in their system. Not all the staff know how to order them, they ask me. There is lack of communication between the staff.	CP
81	Our Pharmacist does try hard to get all medicines requireed	PLANNING
84	Not sure	UNK
88	So I don't have to phone and fetch every month	UNK

Appendix 10 Community Pharmacy Survey (Paper)

Birmingham Children's Hospital NHS
NHS Foundation Trust

CP_2009#5

COMMUNITY PHARMACY SURVEY – Dispensing Hospital Prescriptions in Community Pharmacies

TO THE PHARMACIST IN CHARGE

What to do

Most of the questions require a simple answer in the box provided. The whole questionnaire can be completed in 10 minutes and we very much hope that you will help us with this important research. Once complete please return the questionnaire using the pre-paid envelope provided to:
Prof Keith Wilson, Pharmacy Department, Aston University, Birmingham. B4 7ET.

If you have any questions please send them via email to the study lead David Terry at david.terry@nhs.net

About this survey

Over 30,000 prescriptions are written by prescribers at Birmingham Children's Hospital and dispensed by community pharmacists each year. This survey has been sent to you since PPA data shows that your Pharmacy has dispensed at least one of these prescriptions in recent months.

The questionnaire is designed to identify your experiences and opinions concerning the dispensing of hospital prescriptions (FP10HPs) by community pharmacies, and also asks your views on how things can improve which may help us identify service changes locally and nationally.

The survey has been developed by hospital and community pharmacists: and by pharmacists with experience in dealing with medicines management interface issues and academic pharmacists from Aston University.

The survey results will be fully anonymous: no community pharmacy or pharmacist will be identified in any report. However if useful information is obtained we will publish summary data and use the survey within a series of studies we are conducting with Aston University.

If you are willing to be contacted to provide follow up information please enter your email address here:

SECTION A: DEMOGRAPHICS. ABOUT YOU AND YOUR PHARMACY.

The following questions are about you and the community pharmacy to which the survey was delivered. The questions are designed to be completed by a community PHARMACIST.

Q1) Which year did you register as a pharmacist with the RPSGB?(yyyy)

Q2) In which sector did you complete your pre-registration experience? (Tick ONE box only)

[ ] 2.1 Community

[ ] 2.2 Hospital

[ ] 2.3 Community / Hospital split year

[ ] 2.4 Industry or academia with community or hospital

[ ] 2.5 Other … Please state

Q3) How many years experience do you have as a COMMUNITY pharmacist? (if you have worked part-time or as a locum, count the years you have worked for at least 3 hours per week on average in community pharmacy)

Q4) How many years experience do you have as a HOSPITAL pharmacist? (if you have worked part-time or as a locum, count the years you have worked for at least 3 hours per week on average in hospital pharmacy)

Questions 5 and 6 relate to <u>Your Personal Dispensing & Supervisory Role</u> in community pharmacy: NOT the Pharmacy you work in.

Q5) On average approximately how many prescription items (all sources) do you personally dispense or directly supervise in 1 calendar month?

TICK ONE ONLY

Less than 400 per MONTH	401 – 1,000 per MONTH	1,001 – 3,000 per MONTH	3,001 – 6,000 per MONTH	6,001 – 12,000 per MONTH	More than 12,000 per MONTH
☐	☐	☐	☐	☐	☐

Q6) On average approximately how many HOSPITAL prescription items (e.g. FP10HPs) do you personally dispense or directly supervise in 1 YEAR?

TICK ONE ONLY

NONE	1 – 25 per YEAR	26 – 100 per YEAR	101 – 500 per YEAR	501 – 1,000 per YEAR	More than 1,000 per YEAR
☐	☐	☐	☐	☐	☐

Q7) What is the postcode of the community pharmacy where the survey was delivered?

SECTION B: YOUR EXPERIENCE AND OPINIONS CONCERNING PROBLEMS WHEN DISPENSING HOSPITAL PRESCRIPTIONS

We are interested in your experiences and / or opinions in relation to any problems or difficulties that may exist when dispensing hospital prescriptions in community pharmacy

Q8) On average approximately how much of your time does it take to dispense a single item on a script? Include any problem solving time:

HOSPITAL Rx	mins
GP Rx	mins

*Q9) In comparison to an average GP (FP10) prescription what is the **likelihood of problems** when dispensing a hospital (FP10HP) prescription in a community pharmacy?*

(Tick one box)

Hospital prescriptions problems are …					
MUCH LESS frequent	**LESS frequent**	**About the SAME frequency**	**MORE frequent**	**MUCH MORE frequent**	**DON'T KNOW**
☐	☐	☐	☐	☐	☐

Q10) For the following statements please indicate the extent to which you agree or disagree:

10.1 Hospital prescriptions are generally more complex to dispense than GP prescriptions

TICK ONE ONLY

Strongly disagree	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly agree**
☐	☐	☐	☐	☐

10.2 I am less likely to challenge an unfamiliar dose on a hospital prescription compared with a GP prescription

TICK ONE ONLY

Strongly disagree	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly agree**
☐	☐	☐	☐	☐

10.3 Hospitals should NOT be allowed to issue prescriptions to be dispensed by community pharmacies

TICK ONE ONLY

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
☐	☐	☐	☐	☐

10.4 Hospitals should ensure that all out-patient prescriptions are issued to patients so that they can be dispensed by community pharmacies

TICK ONE ONLY

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
☐	☐	☐	☐	☐

Q11) This question shows a list of possible problems on prescriptions. In comparison to an average GP prescription please indicate the likely occurrence on a hospital prescription. (Tick ONE box on EACH line)

	Hospital Rx MUCH MORE frequent	Hospital Rx MORE frequent	Hospital SAME as GP	Hospital Rx LESS frequent	Hospital Rx MUCH LESS frequent
Cannot read the prescription	☐	☐	☐	☐	☐
Unfamiliar drug	☐	☐	☐	☐	☐
Unfamiliar dose regimen	☐	☐	☐	☐	☐
Information on Rx is missing	☐	☐	☐	☐	☐
Problems with obtaining the product	☐	☐	☐	☐	☐

If you would like to expand on your answers do so in this box:

Q12) In comparison to an average GP (FP10) prescription how confident are <u>YOU that you</u>

<u>will be able to identify any prescribing errors</u> when dispensing a hospital (FP10HP) prescription in a community pharmacy?

TICK ONE ONLY

Much less confident	Less confident	Same	More confident	Much more confident
☐	☐	☐	☐	☐

Q13) As a community pharmacist do you believe that there is more risk of error when dispensing a hospital prescription compared to a GP prescription? (Tick one box)

[ ] Yes
[ ] No
[ ] Don't know

Please add any comments here:

SECTION C: OBTAINING FURTHER INFORMATION

This section explores your experiences and / or opinions in relation to obtaining further information when dispensing hospital prescriptions in community pharmacy

Q14) If you require further advice / information when dispensing a HOSPITAL PRESCRIPTION what or whom will you consult? Please indicate how likely you are to use the following sources of information? (Tick ONE box on EACH line)

	VERY LIKELY	QUITE LIKELY	SOMETIMES	QUITE UNLIKELY	VERY UNLIKELY
The patient or carer	☐	☐	☐	☐	☐
Standard text (eg BNF)	☐	☐	☐	☐	☐
GP (or their staff)	☐	☐	☐	☐	☐
Hospital Pharmacy	☐	☐	☐	☐	☐
Medicines information	☐	☐	☐	☐	☐
Hospital Prescriber	☐	☐	☐	☐	☐
Hosp prescriber's support staff eg registrar	☐	☐	☐	☐	☐

14.8 If you are likely to use another source of information please describe this in the box

Q15) Do you have standard operating procedures that provide guidance in resolving prescription problems? (Tick ONE box)

[ ] Yes
[ ] No
[ ] Don't know

Q16) Do you record details of when you 'intervene' on a prescription (e.g. change dose or regimen after obtaining further information)? (Tick ONE box)

[ ] No
[ ] Sometimes
[ ] Always
[ ] Don't know

Q17) In the last 12 months approximately how often have you or the staff under your supervision contacted a hospital for advice concerning a hospital prescription? (Tick ONE box)

[ ] Never
[ ] 1 - 12
[ ] 13 – 24
[ ] 25 – 52
[ ] 53 – 180
[ ] 181 – 360
[ ] more than 360 times

Q18) In the last 12 months approximately how often have you or the staff under your supervision contacted a GP practice for advice concerning a GP prescription? (Tick ONE box)

[ ] Never
[ ] 1 - 12
[ ] 13 – 24
[ ] 25 – 52
[ ] 53 – 180
[ ] 181 – 360
[ ] more than 360 times

SECTION D: IMPROVING EXISTING ARRANGEMENTS

This section explores your opinions in relation to improving existing arrangements concerning dispensing hospital prescriptions in community pharmacy

Q19) Please indicate in your opinion how beneficial the following changes would be in reducing the problems associated with dispensing hospital prescriptions in community pharmacy

19.1 Ensure all hospital prescriptions are computer printed

TICK ONE ONLY

No benefit	Little benefit	Medium benefit	High benefit	Very high benefit
☐	☐	☐	☐	☐

19.2 Ensure all hospital prescriptions include direct contact details for the prescriber

TICK ONE ONLY

No benefit	Little benefit	Medium benefit	High benefit	Very high benefit
☐	☐	☐	☐	☐

19.3 Create an internet site to enable access to the hospital's formulary and provide web address on the prescription

TICK ONE ONLY

No benefit	Little benefit	Medium benefit	High benefit	Very high benefit
☐	☐	☐	☐	☐

19.4 Create an internet site to enable access to the hospital's clinical protocols and provide web address on the prescription

TICK ONE ONLY

No benefit	Little benefit	Medium benefit	High benefit	Very high benefit
☐	☐	☐	☐	☐

19.5 Create an internet site to enable access to the hospital's usual formulations and source of unlicensed medicines and provide web address on the prescription

TICK ONE ONLY

No benefit	Little benefit	Medium benefit	High benefit	Very high benefit
☐	☐	☐	☐	☐

19.6 If prescribed dose regimens are not included in standard texts ensure the prescriber acknowledges that they have done so knowingly on the prescription (eg endorse as ~~BNF~~)

TICK ONE ONLY

No benefit	Little benefit	Medium benefit	High benefit	Very high benefit
☐	☐	☐	☐	☐

19.7 Provide a prescription fax back system to the hospital– so that the prescription can be faxed to the Pharmacy of the hospital for comment. Provide the fax number on the prescription.

TICK ONE ONLY

No benefit	Little benefit	Medium benefit	High benefit	Very high benefit
☐	☐	☐	☐	☐

19.8 Ensure all hospital prescriptions are clinically screened by a hospital clinical pharmacist before being issued to the patient

TICK ONE ONLY

No benefit	Little benefit	Medium benefit	High benefit	Very high benefit
☐	☐	☐	☐	☐

19.9 Ensure prescribers indicate the dose calculation as well as the final dose on hospital prescriptions for children (eg state mg per kg as well as calculated dose)

TICK ONE ONLY

No benefit	Little benefit	Medium benefit	High benefit	Very high benefit
☐	☐	☐	☐	☐

Q20) In your opinion which single achievable change would bring about the most benefit (one mentioned in this section or one of your own ideas)?

Q21) To what extent have you personal experience of dispensing hospital prescriptions in the community?

TICK ONE ONLY

Very little experience	Little experience	Moderate experience	High experience	Very high experience
☐	☐	☐	☐	☐

We welcome any further comments concerning hospital prescriptions dispensed in the community. Please write in the box below.

THANK YOU VERY MUCH

We know how busy community pharmacists are and we much appreciate your time.
Please now return the whole of the questionnaire using the pre-paid envelope or the address on page 1.

Please see the study website for summary results.

Do Not Write below this line – for administrative use only.

a	b	c	d	e
f	d-base	follow-up	date	ref

PUBLICATIONS RELATING TO THIS PROGRAMME OF WORK

1) Terry DRP, Solanki GA, Sinclair AG, Marriott JF, Wilson KA. Medicines reconciliation on admission - don't forget the children. The British Journal of Clinical Pharmacy. 2009;1:22.

2) Terry DRP, Solanki GA, Sinclair AG, Marriott JF, Wilson KA. The clinical significance of medication reconciliation in children admitted to hospital: observational study of 100 neurosurgical patients. International Journal of Pharmacy Practice. 2009 September;17, Supplement 2:B13-4.

3) Terry DRP, Solanki GA, Sinclair AG, Marriott JF, Wilson KA. Clinical Significance of Medication Reconciliation in Children Admitted to a UK Pediatric Hospital. Observational Study of Neurosurgical Patients. Pediatr Drugs. 2010;12(5):331-7.

4) Terry DRP, Solanki GA, Sinclair AG, Marriott JF, Wilson KA. Influence of parent/carer information on initial hospital prescriptions: prospective observational study of 100 paediatric neurosurgery ward admissions. Arch Dis Child. 2009;94(e2 (http://adc.bmj.com/cgi/content/full/94/7/e2). doi:10.1136/adc.2009.167205).

5) Terry DRP, Solanki GA, Sinclair AG, Marriott JF, Wilson KA. The clinical significance of medication reconciliation in children admitted to hospital: observational study of 100 neurosurgical patients. Arch Dis Child. 2009;94(e2 (http://adc.bmj.com/cgi/content/full/94/7/e2). doi:10.1136/adc.2009.167205).

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7) Terry DRP, Sinclair AG, Marriott J, Wilson K. Guidance provided by English Primary Care Trusts to general practitioners concerning medication information on admission to hospital. International Journal of Pharmacy Practice. 2009 September;17, Supplement 2:B 39-40.

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10) Terry DRP, Sinclair AG, Marriott JF, Wilson KA. An evaluation of urgent medication supplies from a paediatric hospital pharmacy at the request of parent-carers of children in primary care 2009 [cited 15/07/2010]; Available from:

http://www.nppg.scot.nhs.uk/Glasgow_2009/pearls/An%20evaluation%20of%20urgent%20medication%20supplies.htm

11) Terry D, Sinclair A, Marriott J, Wilson K, Davis P. Medication access in primary care for paediatric home-patients: involvement and opinions of medical staff in a UK paediatric hospital. International Journal of Pharmacy Practice. 2010 September;18(Supp 2):42-3.

12) El-Azzabi T, Terry D. An audit of urgent medication provided in paediatric neurology. Birmingham: Birmingham Children's Hospital; 2007.

13) Terry DRP, Sinclair AG. Children's "specials" need to be more easily available. Pharm J. 2011;286:196.