Specialists or Specialising Generalists:

A Grounded Theory of the Role of the Clinical Pharmacist in Neuroscience

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Abstract

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Keywords: Clinical Pharmacy, Role, Role Development, Neuroscience, Neurology, Grounded Theory, Role Definition, Qualitative Research, United Kingdom.

Neuroscience is a relatively small and emerging clinical pharmacy specialism focusing on drug therapy for neurological disease. Against a professional momentum for specialist practice within pharmacy, there is paucity both of relevant research, and a clearly defined role for specialist pharmacy practice in neuroscience.

A qualitative research study was undertaken, using constructivist grounded theory method, to explore how hospital based pharmacists practicing in neuroscience define and develop their role and specialism. Data were concurrently generated and analysed, through verbatim transcription of telephone interviews with fourteen pharmacists.

Data analysis resulted in the identification of three processes: (1) Acquiring and utilising knowledge in practice; (2) Gatekeeping access to drug therapies; (3) Integrating into the neuroscience service. The key findings within each process are: (1) Pharmacists utilise different forms of knowledge and there can be barriers to gaining knowledge. Pharmacists identify strengths in their breadth of clinical knowledge and holistic consideration of patients' drug therapy. (2) Pharmacists act as barriers to drug therapy but also act to expedite and secure access to drug therapy. (3) Pharmacists act as an organisational nexus between pharmacy and neuroscience services and identify the importance in practice of forming working relationships within neuroscience services, underpinned by trust.

The study identified a basic social process: Maintaining an overview of drug therapy for patients with neurological disease. This process conceptualises the tensions experienced by the pharmacists between their role as near-patient facing clinical specialists, but also as pharmacist generalists. The study findings have implications for supporting pharmacy practice in neuroscience.

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I have been very fortunate to have been supported by the Pharmacy Department at Sheffield Teaching Hospitals. Amanda Plummer has provided me with advice and the friendly nudge that I sometimes needed to just get on with it. Neil Hamilton helped to create time within my job to complete these studies and set the bar by completing his DPharm thesis.

This study would not have been possible without the contribution of the pharmacists. I am indebted to the people who gave up their time to talk to me. I will never claim to be the expert in each of your complex roles but I hope this study offers a collective insight into practice and will help to continue the development of neuroscience as a clinical pharmacy specialism. There are also a number of people in various NHS research offices that I have to thank for navigating me through what, at times, seemed an impenetrable sea of forms and permissions to conduct research interviews.

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My wider family have always been a great source of support for me in many ways. A career in pharmacy could not have been possible without the early support of my parents. It is only now that I have my own children, I can truly appreciate what they have done for me. My final thanks go to my mum, Bridie - I think the fish fingers may have paid off!

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Abbreviations and acronyms

CCG	Clinical Commissioning Group
CPD	Continuing Professional Development
CRG	Clinical Reference Group
DoH	Department of Health
DPharm	Doctor of Pharmacy degree
GPhC	General Pharmaceutical Council
IFR	Individual Funding Request
IVIg	Intravenous immunoglobulin
MEE	Medical Education England
MMT	Medicines Management Technician
MPC	Modernising Pharmacy Careers
MPharm	Master of Pharmacy degree
MS	Multiple sclerosis
NHS	National Health Service
NHSFT	National Health Service Foundation Trust
NICE	National Institute for Health and Care Excellence
NSF	National Service Framework
PbR	Payment by Results
PCT	Primary Care Trust
PD	Parkinson's disease
RPS	Royal Pharmaceutical Society (for Great Britain)
SALT	Speech and language therapy
UK	United Kingdom
UKCPA	United Kingdom Clinical Pharmacy Association

Notes to the reader

1. This thesis is intentionally written in a first person narrative to convey my involvement in this qualitative research project as an instrument of data generation and analysis.
2. Referencing uses the University of Bradford version of the Harvard system, with Endnote software version X5.
3. Direct quotations, taken either from reference sources, or the interview data collected within the project, are presented in italicised font within double quotation marks. More substantial direct quotation text is presented in a separate paragraph, indented into the page.
4. Interview data are presented verbatim but with the removal of any text that may serve to identify individuals e.g. name of hospital, colleagues etc. Bold text represents the speech of the interviewer. Grammatical errors within the transcripts are acknowledged by the placement of [sic] adjacent to the text. Unless stated otherwise, the placement of ellipses (…) within quotation paragraphs indicate the sentence was not finished by the participant. Ellipses at the beginning or end of paragraphs indicate truncated text.
5. The terms drug(s) and medicine(s) are often used interchangeably in healthcare to describe a substance administered to a person for diagnostic or therapeutic purposes. For consistency I have used the term drug but I have left any referenced quotes or interview data unaltered which contain the term medicine or other synonym.

1 Introduction

1.1 A reflexive statement about the research

The thesis presented is the summary of a research project exploring the role of clinical pharmacists within the adult clinical neuroscience services of the National Health Service (NHS). As a neuroscience pharmacist myself, this thesis represents an analysis of my own area of professional practice. Reflexivity is a key consideration in the rigour of qualitative research. The concept of reflexivity is discussed further in section 3.3.2.3 (p.70) but in essence, being reflexive is acknowledging the experience and beliefs that the researcher brings to the research project and the effects this can have on the research process (Holloway and Brown, 2012). I therefore think it is appropriate at the outset to provide some personal context and background to this piece of research.

This thesis represents the second stage of, and contributes to the completion of, a professional doctoral degree programme - the Doctor of Pharmacy (DPharm). The DPharm programme has a broad aim of advancing the practice and research skills of professionally practicing pharmacists. The first stage of a DPharm programme comprises completion of a number of taught modules and the submission of three professional practice portfolios.

Reflective practice is entrenched in the DPharm programme and it has had quite a profound effect on my practice. One of the reflections that I made at the completion of the first stage of this degree was to consider how the development of my practice had taken place in relative isolation to other

pharmacists who practice in neuroscience. What interaction I had experienced with my peers, often brief conversations at national meetings, had suggested they faced similar issues and challenges in practice.

My own practice has evolved from the DPharm programme and I have delivered educational presentations of neurological diseases at local and national forums, often with emphasis on the role that the non-specialist pharmacist can play in the care of patients. In preparing these presentations I have reflected on my own practice, questioning what makes it 'specialised'. I also began to review guidance around neurological disease to try and understand the organisational positioning of pharmacists within neurological services.

During the first stage of the DPharm programme I became a committee member of the neuroscience group of the United Kingdom Clinical Pharmacy Association (UKCPA). This group has aims of advancing and supporting clinical pharmacy practice in neuroscience (see section 1.5.1). I believe that to achieve these aims requires a wider understanding of pharmacy practice in neuroscience.

The ongoing reflections which I consider to now imbue my practice, in tandem with the challenges of the ever changing nature of healthcare provision within the NHS, has fuelled an increasing curiosity in defining and understanding the role of a specialist clinical pharmacist in the medical speciality of neuroscience. If the UKCPA group is to achieve its intended aims of supporting and developing practice then some form of empirical investigation to attain a deeper understanding of current practice and how it is progressed seem necessary; that is what this study aims to achieve.

1.2 Setting out the chapter

An introduction chapter should provide background information and context for an intended piece of research and lead into a justification for the research (Holloway and Brown, 2012 , Wisker, 2001). This chapter is intended to orientate the reader to the substantive focus of the research: hospital clinical pharmacy practice in the NHS, within the specialism of neuroscience. The chapter provides a concise overview of the NHS, the pharmacy profession and the provision of neurological services. Recent changes and developments both within the NHS and pharmacy are described to provide some professional context to the study. The chapter then focuses on the role of pharmacy within the specialism of neuroscience and concludes with the key relevant considerations to the research.

1.3 The National Health Service

The NHS encompasses the health services provided to the four countries of the United Kingdom (UK): England, Wales, Scotland and Northern Ireland. The NHS was founded in 1948 on the principle that healthcare should be free to all at the point of need (Rivett, 1998). That mantra largely remains true today although not all services remain free, for example, prescriptions for medicines in England (with some exemptions).

The NHS has undergone several reorganisations since its inception. The health services of the four countries now function independently of each other. One of the most significant changes arose in 1991 out of the NHS and Community Care Act 1990 which introduced the idea of an internal market within the NHS

and of the discrete functions of ‘purchasers’ and ‘providers’ of healthcare. The purchaser and provider model, although slightly altered and assigned different terminology through subsequent governmental reforms, exists in the NHS today. At the time of writing NHS England was undergoing significant changes resulting from the Health and Social Care Act 2012 which came into effect from 1st April 2013.

Hospitals are providers of acute and specialised healthcare services. NHS hospitals or groups of hospitals are managed by acute Trusts. NHS Trusts are effectively public sector corporations with responsibility for managing hospital services. NHS Foundation Trusts (NHSFTs) were introduced into the NHS in 2004. NHSFTs are allowed greater managerial and financial autonomy with the intention of devolving centralised decision making and providing services based on local need.

The services and treatments provided by acute NHS Trusts are *commissioned*, a NHS term for the planning, purchasing and monitoring of services, by clinical commissioning groups (CCGs). CCGs came into existence on 1st April 2013 in place of Primary Care Trusts (PCTs). Within the NHS, CCGs are now responsible for commissioning the majority of services for patients within its locality. CCGs can commission non-NHS services that meet appropriate standards introducing external competition to NHS provider Trusts.

More specialised services for rarer diseases are commissioned directly by NHS England through a process known as specialised commissioning. These services are generally provided from specialist centres only. Clinical reference

groups (CRGs) guide the commissioning strategy around each specialised service.

This section has set out how hospitals, the substantive setting for this research, serve as the main providers for acute and specialised care within the NHS. I will now provide an overview of the pharmacy profession and its evolution before narrowing the focus to pharmacy practice, and more specifically to clinical pharmacy practice within hospitals, the empirical focus of this research.

1.4 The pharmacy profession

Pharmacy is one of the healthcare professions, concerned primarily with the use of drugs. Pharmacists are the traditional exponents of the profession and are the focus of this research project. However, pharmacy technicians are playing an increasingly prominent and important role in the work of pharmacy e.g. Millen et al. (2010). Pharmacy technicians are now formally recognised and regulated by the pharmacy profession (Rodgers et al., 2010).

In comparison to the other main healthcare professions, medicine and nursing, the pharmacy profession, although growing, remains relatively small. The most recent workforce survey for pharmacy in the UK recorded approximately 46,000 registered pharmacists (Seston and Hassell, 2013).

1.4.1 What is a pharmacist?

A contemporary lay definition of a pharmacist is "*A person who is professionally qualified to prepare and dispense medicinal drugs."* (Oxford Dictionaries, 2013b).

Although this definition encompasses some of the activities of pharmacy practice it is unsatisfactory in capturing the contribution that pharmacists make towards healthcare. But defining the generic role of a pharmacist is difficult because pharmacists practice within a range of sectors which include community (retail), hospitals, primary care, industry and academia.

The Royal Pharmaceutical Society (RPS), the broad professional representative body for pharmacists in Great Britain, describes pharmacists as "*… key players in the future of healthcare across the UK. To put it bluntly, they have greater expertise in medicines than any other health professional."* (Royal Pharmaceutical Society, 2013).

Drugs, or *medicines,* feature prominently within both of the above definitions of a pharmacist. A brief history of the profession of pharmacy in Britain is provided in the next section to illuminate the pharmacy profession's connection with drugs, and the evolution of the profession.

1.4.2 The history of the pharmacy profession

The history of pharmacy has strong roots in the compounding and supply of drugs as medicinal products. The origins of the pharmacy profession can be traced back to the apothecaries (Liaw and Peterson, 2009). By the sixteenth century in London, the term 'apothecary' had become synonymous with a person involved in the preparation and sale of amongst more general items, substances such as herbs for medicinal use. These medicinal substances were either sold by the apothecaries in accordance with a physician's prescription or by their own recommendation (The Worshipful Society of Apothecaries of London, 2013). As the role of the apothecary evolved to a more advisory one,

the role of the preparation and supply of medicinal products was taken on by the 'chemist and druggist' who would become pharmacists although the term 'pharmacist' would not come into more common parlance until later in the 19th century.

Regulation of the pharmacy profession dates back to 1841 with the formation of the Pharmaceutical Society, the forerunner of the RPS, by Jacob Bell (Rodgers et al., 2010). At that time, professional regulation to ensure standards of practice was seen as a way to protect against a perceived threat from the apothecaries to the trade of the chemists and druggists. Inclusion to the Pharmaceutical Society was on the basis of professional qualification. This was written into law by the Pharmacy Act of 1852 although membership for professional practice did not become compulsory until the Pharmacy Act of 1933 (Rodgers et al., 2010).

Well into mid-20th century the practice of pharmacy in Britain maintained its roots within the apothecaries and chemists and druggists, being primarily concerned with the compounding and dispensing of drug products. Beyond the mid-20th century, notably from the decades of the 1960s and 1970s, rapid scientific and medical advances and the commercial industrialisation of pharmaceutical development drove drug discovery (Abraham, 2009). This acceleration of drug discovery greatly widened the therapeutic armoury available for the drug treatment of disease.

As a result of commercialisation, drugs were increasingly being manufactured in ready to administer dosage forms and the traditional compounding and formulation skills of the pharmacist were becoming redundant. These changes

in drug development raised questions about the role of pharmacists and how the pharmacy profession could and should evolve to survive (Silcock et al., 2004).

As a consequence of the commercial industrialisation of drug preparation, the practice of pharmacy has evolved over the last three to four decades. Pharmacists have developed expertise in drugs and drug use, to have greater involvement with the clinical care of patients, and public health initiatives. Today registration as a practicing pharmacist in the United Kingdom requires successful completion of an accredited four year Master of Pharmacy (MPharm) degree and one year of professional 'pre-registration' training culminating in professional examination by the pharmacy regulatory body, the General Pharmaceutical Council (GPhC).

1.4.2.1 Regulation and leadership of the pharmacy profession

The RPS was a rather unique body for the healthcare professions in that it carried out both a regulatory and leadership role for the pharmacy profession. These two functions were misaligned. In September 2010, following on from the recommendations of the 'Carter' report into the pharmacy profession (Department of Health, 2007), professional regulation of pharmacy was transferred to a newly formed body, the GPhC.

Within the pharmacy profession the formation of the GPhC was viewed as a pivotal opportunity for the RPS to advance the pharmacy profession, free from its previous regulatory responsibilities. One of the key recommendations of the Carter report was the formation of a Royal College of Pharmacy, with functions

akin to the royal medical colleges to advance the practice of pharmacy by providing support with professional development. In 2013 the RPS launched the Faculty (Duggan, 2013). The Faculty has a broad aim of supporting, through frameworks and curricula, and recognising through accreditation, advancing and specialist pharmacy practice.

The work of the Faculty builds on from work undertaken elsewhere, notably the general and advanced consultant level frameworks (Competency Development & Evaluation Group, 2009), and the work of some UKCPA groups in credentialing practice and developing specialist curricula (McKenzie et al., 2011). In 2011 the RPS and UKCPA formed a partnership to advance the practice of pharmacy. Included within the themes of the partnership are plans to:

- Develop professional curricula for advanced and specialist pharmacy across pharmacy disciplines.
- Set professional standards and guidance for practice beyond those required for regulation.

The work of the RPS and UKCPA is further supported by recommendations from Modernising Pharmacy Careers (MPC) to develop advanced and specialist practice (Howe and Wilson, 2012). MPC is a work programme, reporting to the Department of Health and Medical Education England (MEE) and tasked with ensuring both undergraduate and post-graduate training is sufficient for the

English pharmacy workforce to meet future challenges of delivering effective healthcare.

The profession of pharmacy is evolving. The discussion now turns to hospital pharmacy practice with particular emphasis on clinical pharmacy.

1.4.3 Hospital pharmacy

Hospital pharmacy is the second most common sector of practice for pharmacists after community pharmacy, which accounts for the majority of practicing pharmacists. Most recent estimates place 21% of UK pharmacists practicing in the hospital sector (Centre for Workforce Intelligence, 2013). Pharmacists working in NHS hospitals are NHS employees. Pharmacists within the NHS are increasingly working across traditional healthcare sector boundaries to meet the ever increasing complex needs of providing patient care.

Articulating what hospital pharmacy is within the NHS is not straightforward, as it encompasses a broad range of services, with the individual extent of provision being dependent on the nature of the hospital and the pharmacy department within it. Table 1, adapted from Stephens (2011), summarises the common services provided within a hospital pharmacy. The provision of these pharmacy services does not occur in mutual exclusivity to each other; pharmacists can be involved in the provision of several aspects of a hospital pharmacy service. Table 1 illustrates that clinical pharmacy, described in the next section, is just one facet of a hospital pharmacy service.

Table 1. Common services provided by hospital pharmacies.

Service	Brief description
Drug Procurement	The cost-effective purchasing of drugs often through locally or nationally negotiated contracts.
Drug Supply	The safe and secure supply of drugs, either for ready use within clinical area, or for individual use by a patient dispensed against an authorised prescription.
Clinical Pharmacy	Providing direct patient care within a ward or clinic setting (see section 1.4.4 for a more detailed discussion of clinical pharmacy).
Technical Services	The compounding and provision of products such as specific intravenous medications, chemotherapy, and parenteral nutrition, often under aseptic conditions.
Risk Management	Proactively and reactively identifying the risks associated with drugs and their use and implementing strategies to reduce risk.
Medicines Information	Provision of accurate, unbiased and evidence-based advice on drug use on a single-patient and more widespread basis to facilitate the optimal use of drugs.
Medicines Management	Ensuring the controlled entry of new drugs into clinical practice to manage associated clinical and financial risks; encompassing drug supply and clinical pharmacy services. Initiatives like hospital drug formularies (a list of medicinal products that is kept within the hospital) managed by multidisciplinary committees are common within hospitals.

1.4.4 Clinical pharmacy

Clinical pharmacy has been defined as:

> … a health science discipline in which pharmacists provide patient care that optimizes medication therapy and promotes health, wellness, and disease prevention. The practice of clinical pharmacy embraces the philosophy of pharmaceutical care…
>
> (American College of Clinical Pharmacy, 2008 p.816)

Clinical pharmacy is the provision of pharmaceutical care, a concept defined by Hepler and Strand (1990) but practiced prior to their conceptualisation of it. The 'clinical' prefix denotes a move from a product-based focus (drug supply) to a patient-based focus, using the pharmacist's specialist drug knowledge to improve patient outcomes with drug therapy. Clinical pharmacy is more than just a transition from the pharmacists' traditional work setting of the dispensary and professional activity of dispensing drugs. Clinical pharmacy embraces an ethos of putting the patient at the centre of pharmacists activities, using values and judgements as well as the application of scientific and pharmaceutical knowledge (American College of Clinical Pharmacy, 2008 , UKCPA, 2013).

Clinical pharmacy is practiced in all the direct patient-facing sectors of pharmacy. Clinical pharmacy originated within hospital pharmacy in the 1960s when pharmacists began to visit wards and review drug prescription charts, making recommendations for drug use and drug monitoring. This move occurred in response to a number of factors, not least the increasing complexity of drug therapy (Child et al., 2011). The practice of pharmacists visiting wards continued to evolve and 'clinical pharmacy' was first formally acknowledged in

the 1986 Nuffield Report into hospital pharmacy with a recommendation that it should be practiced in all hospitals (Watson and Bond, 2004).

Clinical pharmacy and the role of the pharmacy profession generally has continued to evolve, with the development of an evidence base for practice (Child et al., 2004) and increasing recognition that pharmacists have a role to play in healthcare provision (Department of Health, 2008b). Child et al. (2011) argue that the 'clinical' prefix of clinical pharmacy is possibly no longer necessary as pharmacy is now recognised within the NHS as a clinical profession providing patient care.

The evolution of clinical pharmacy has led to pharmacists developing specialisms within certain areas of medicine and healthcare. Examples of clinical pharmacy specialism include critical care, antimicrobial stewardship, mental health and oncology. A traditional 'clinical' route of career progression for pharmacists practicing in hospital, beyond standardised post-registration training, is to undertake a role with responsibility for one, or a small number of often related medical specialities.

1.4.4.1 Clinical pharmacy groups

The evolution of clinical pharmacy in the UK has spawned a number of professional groups. Some groups are specific to medical specialities e.g. British Oncology Pharmacists Association (BOPA); UK Renal Pharmacy Group.

One of the larger and broader clinical pharmacy networks is the UKCPA, founded in 1981. The UKCPA has several thousand members from different sectors and specialities of pharmacy practice and its mission is to promote

expert practice in clinical pharmacy. There are a number of subgroups reflecting different specialities, sectors of work and job roles.

All clinical pharmacy organisations are voluntarily subscribed; their ongoing existence demonstrates a momentum amongst pharmacists to advance their practice within defined areas of medicine or healthcare.

Section 1.4 has described the evolution of the pharmacy profession and the recent regulatory changes within the profession. The current work of pharmacy bodies highlights a momentum to advance specialist practice within the profession. To complete the orientation, the medical and clinical pharmacy specialism of neuroscience is outlined in the following section.

1.5 The medical speciality of neuroscience

Neuroscience deals with diseases of the nervous system, commonly termed neurological diseases. Neuroscience typically encompasses the medical (neurology) and surgical (neurosurgery) treatment of neurological disease.

When including headache syndromes, It has been estimated that ten million people in the UK live with a neurological condition (Neurological Alliance, 2003). The prevalence of common diseases of the nervous system, taken from the Neurological Alliance (2003) is presented in Figure 1. These conditions represent a small portion of the spectrum of neurological diseases. The more prevalent neurological diseases identified in Figure 1 are relatively less common in comparison to diabetes, cardiovascular or respiratory diseases. For example, the estimated UK prevalence of chronic obstructive pulmonary disease is 850,000 and for asthma, in England alone, is between 3 and 5.4 million

(Department of Health, 2011b). So although neurological disease is relatively common *per se*, individual conditions are less so.

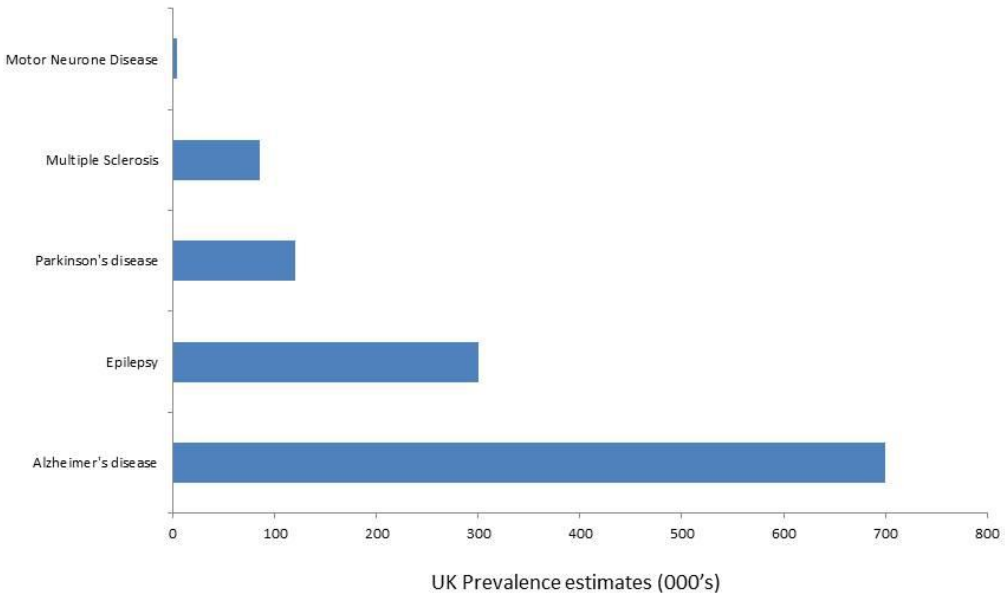

Figure 1. Estimated prevalence of chronic neurological diseases.

Neurology is a relatively modern medical speciality, with neurology departments only becoming common place in the large UK hospitals in the 1980s (Warlow et al., 2008). The provision of neurological services within the NHS largely follows a 'hub and spoke' model (Bateman, 2011). In such a model, consultant medical staff are often based in regional hospital centres which have the infrastructure to support the diagnosis and treatment of neurological diseases. These centres, which consist of neurology and neurosurgery services or neurology services alone, are often referred to as tertiary services. Medical staff also provide outreach services by visiting surrounding hospitals to undertake outpatient

clinics and receive referrals to review patients from non-specialised clinical teams.

As there are a large number of rare neurological disorders a significant number of the neurological services provided within NHS England come under specialised commissioning. There is a CRG for neuroscience to oversee the specialist commissioning which recognises 25 specialist neuroscience centres (NHS Commissioning Board, 2013).

1.5.1 Clinical pharmacy in neuroscience

There are clinical pharmacy posts in NHS hospitals specialising in neuroscience, either in neurology, neurosurgery or both. As with the medical discipline, neuroscience is a relatively recent clinical pharmacy specialism. There is no register of clinical pharmacy posts in neuroscience and the number of posts and specially practicing pharmacists is not known but I assume the figure to be relatively small in relation to other clinical pharmacy specialisms. An informal e-mail network for neuroscience pharmacists to exchange queries was in existence from early 2000. In 2009 a formal neuroscience subgroup of the UKCPA was formed with the following aims:

- Broaden the awareness of adult neurological conditions and their treatment.
- Share ideas, experience, evidence and resources.
- Encourage and support practice based research.
- Produce collaborative work to influence and establish national standards.

- Provide education and training events.

Since its inception the neuroscience group has functioned largely as an electronic forum for members to post questions to the wider professional group relating to specific drug or disease issues, superseding the previous e-mail forum. There has been little interaction through the group around collective recognition, enhancement or development of the pharmacist's role within neuroscience.

1.5.2 Pharmacist inclusion in guidelines for neurological disease

In beginning to ascertain the place of specialist pharmacists in neuroscience services I undertook a review of key national guidance relating to neurological disease to identify the inclusion of a role for pharmacy or pharmacists. This section summarises the findings.

1.5.2.1 National Institute for Health and Care Excellence

The National Institute for Health and Care Excellence (NICE) is a non-departmental body of the Department of Health with a remit in England and Wales to publish guidance on health technologies, including drugs, and best clinical practice for the care of specific diseases. NICE have produced clinical guidelines for the more prevalent neurological diseases - the epilepsies, multiple sclerosis (MS) and Parkinson's disease. Amongst these conditions drug therapy is a principal treatment modality.

Making an assumption that pharmacists, as the *experts* in drug therapies, would have a pivotal role in optimising drug therapies for these conditions I undertook a keyword search of the aforementioned guidelines for the terms 'pharmacist' or

'pharmacy' to test this assumption. For comparison I repeated the search using the search terms of other healthcare professional groups routinely involved in the care of patients with neurological disease. The search results are summarised in Table 2; they illustrate an omission, amongst NICE guidelines, of a recognised role for the pharmacist in the management of these common neurological diseases.

Table 2. The citation frequency of healthcare professionals within NICE guidance.

Professional keyword search term	Epilepsy[1]	Parkinson's disease[2]	Multiple sclerosis[3]
Pharmacist / pharmacy	0	0	0
Nurse	4	4	3
Neurologist	2	2	3
Physiotherapist / physiotherapy	0	12	7
Occupational therapist / occupational therapy	1	11	1

1.5.2.2 National Service Framework (NSF) for long term conditions

The NSF for long term conditions (Department of Health, 2005) is a 10 year strategy to improve health and social care services for people with long term conditions with particular emphasis on neurological conditions. It contains the following recommendations in relation to pharmacists:

[1] National Institute for Health and Care Excellence. (2012). *The epilepsies: the diagnosis and management of epilepsies in adults and children in primary and secondary care*. Clinical Guideline 137. London: NICE
[2] National Institute for Health and Care Excellence. (2006). *Parkinson's disease: Diagnosis and management in primary and secondary care*. Clinical Guideline 35. London: NICE
[3] National Institute for Health and Care Excellence. (2003). *Multiple sclerosis: Management of multiple sclerosis in primary and secondary care*. Clinical Guideline 8. London: NICE

- Pharmacists are recognised as possible people to undertake regular medication reviews.
- Pharmacists can provide support concerning medicines for the carers of people with long term conditions.
- Pharmacists to practice as independent prescribers of medicines for people with long term conditions.
- Developing community pharmacists with specialist interest in Parkinson's disease to support people in managing their medicines in the community.

The recommendations from the policy allude to roles for pharmacist with particular emphasis on community pharmacists. This is aligned with a more general ethos within the NHS to bring care nearer to the patient. The role for a pharmacist in the acute care setting of a hospital is less well defined.

1.6 Chapter summary

This chapter has illustrated how the practice of pharmacy within the UK has evolved greatly over the last 30 to 40 years. Pharmacists have moved from a drug compounding and supply role to develop expertise in all aspects of drug use, exemplified by the emergence of clinical pharmacy. Clinical pharmacy is the provision of pharmaceutical care which embraces the ethos of putting the patient at the centre of practice and applying specialist drug (pharmaceutical) knowledge to optimise the outcomes from drug use.

The emergence of clinical pharmacy has resulted in specialisation, particularly in hospital practice where pharmacist roles are aligned to specific medical specialities. Within UK pharmacy, there is momentum and will to further develop

and formally acknowledge higher levels of clinical pharmacy specialism. Accreditation programmes and professional curriculums have been created for a number of the clinical pharmacy specialisms.

Neuroscience is an emerging and relatively small clinical pharmacy specialism. Within current national guidance on managing neurological disease the role of a specialist clinical pharmacist is not well defined. Furthermore, within the specialty there have been no attempts by practitioners to collectively define the role and there is currently no formal support to develop as a clinical pharmacist in neuroscience. These observations form the basis on which to pursue further empirical investigation for pharmacy practice within neuroscience and undertake a more comprehensive literature review around this area. The next chapter describes the approach taken to reviewing the literature and an analysis of the findings.

2 Literature review

2.1 Introduction

Literature reviewing can be and was throughout this study, an iterative and ongoing process of the research (Wisker, 2001). The literature review for this study can be considered to have four strategies.

1. A documentary analysis of relevant UK clinical guidelines, general health and pharmacy practice policies, and documents, in relation to neurological disease to identify a role for pharmacists.

2. A review of the literature and empirical evidence of pharmacist involvement and pharmaceutical care in neurological diseases and neuroscience services.

3. A review of literature in relation into the concept of the role, and a wider review of the healthcare literature, examining nursing roles.

4. A literature review around the emerging concepts from the analysis of the empirical data generated in this study, adding to the discussion chapter (p.212).

This chapter explains and summarises the second and third literature searches in the above list, two distinct searches with differing approaches and methods. Both searches have been included to illustrate that I did not enter the research project with a preconceived intention to undertake qualitative research. I intend this chapter to illuminate the transition to qualitative research from my professional background as a pharmacist with a predominant exposure to

quantitative research. The chapter concludes with the research questions of the study.

The rest of section 2.1 identifies the need for a literature review and its place in grounded theory research. Section 2.2 examines the empirical evidence for pharmacist involvement in neurological disease. Section 2.3 examines the literature around roles and a wider examination of healthcare roles. Section 2.4 reflects on the literature findings in helping understand specialist clinical pharmacy practice in neuroscience, leading to the setting of research questions for the study in section 2.5.

2.1.1 The purpose of a literature review

The practice of research is concerned with adding knowledge and understanding to an area. A literature review helps to understand the existing knowledge and where the proposed research fits within and adds to that knowledge base (Wisker, 2001).

Punch (2005) advocates that a literature review can add to the planning of a research project in its early stages; my reflections and critical appraisal of the evidence helped to inform my decision to undertake qualitative research which is further explicated in section 3.2 (p.46). There is extensive overlap of the considerations between reviewing the literature, and the methodology; as a consequence, within this chapter frequent cross-reference is made to sections of the methodology chapter.

A documentary analysis was undertaken and incorporated into chapter 1, helping to form justification of the investigation into the role of the neuroscience

pharmacist. Further documentary analysis took place in conjunction with the fourth literature review around the emerging concepts of the study and integrated into chapters 5, 6, and 7. From the initial inception of the grounded theory method, literature and relevant documents were regarded as sources that help to construct the resultant theory (Glaser and Strauss, 1967). The use of literature as a data source is still advocated (Birks and Mills, 2011 , Charmaz, 2006 , Holloway and Brown, 2012).

2.1.2 Literature reviews in grounded theory studies

The role and positioning of a literature review in qualitative research and in particular within grounded theory research, is contested (Birks and Mills, 2011 , Holloway and Brown, 2012 , McGhee et al., 2007). The characteristics of grounded theory research, as well as being inductive, are that it is often iterative and non-linear. Therefore the positioning of a literature review chapter at this position in the thesis is a pragmatic compromise; it seems most appropriate because of the contribution that the literature review has in informing the methodological approach to the study.

Grounded theory method was developed to generate theory about phenomena through the collection and analysis of data without preconceived theoretical notions. Grounded theory method contrasts to deductive methods of research which, seek to verify theory by experimental testing of hypotheses generated from *a priori* assumptions (Glaser and Strauss, 1967).

Section 3.2.4.1 (p.56) describes the divergence in grounded theory method; this divergence is mirrored in the methods literature by varying opinions on the timing of a literature review and illuminated by Bryant and Charmaz (2007).

Concerns exist that early engagement with literature may influence what researchers *see* coming from the analysis of their data (Hallberg, 2010), running contrary to the inductive nature of grounded theory research, which should allow theoretical conceptualisation to arise, unforced from the data. There is however recognition that even in grounded theory studies researchers are often not new to the area of research, bringing a personal and professional history which is partly shaped from previous engagement in literature which will in turn influence interpretation of data (Birks and Mills, 2011 , Charmaz, 2006 , Hallberg, 2010 , McGhee et al., 2007).

I discuss the influence of both the literature and my background on my theoretical sensitivity to the research further in section 3.3.2.3 (p.70). Reflexivity, acknowledging your position within the research, links to theoretical sensitivity. McGhee et al. (2007) present a dialectic discussion of the place of literature searching in grounded theory studies, concluding that reflexivity is important in acknowledging prior interaction with related literature, which they perceive to be common in professional practice research and is applicable to this research situation. By being reflexive and acknowledging the role of the literature and personal experience it allows the researcher to consider and question how this affects their research as they proceed with it. This is an approach that I attempted to incorporate into this project.

2.1.3 Practical considerations for undertaking a literature review

For the purposes of this project there were also some practical considerations affecting the decision to undertake a literature search before entering into the research phase of the study. A research proposal was an academic

requirement of the degree programme, and provides justification of a need for the research to me, my academic supervisors, my employing NHS Trust funding my education, and to the various ethical and research bodies I was required to obtain permission from in order to conduct the research (3.4.2, p.73).

Part of the justification of this research is built on the premise that it addresses a gap in the literature. The requirement to undertake a literature search in grounded theory studies prior to the research in order to satisfy institutional and ethical requirements is an acknowledged consideration (Birks and Mills, 2011 , Holloway and Brown, 2012).

I was also advised by my supervisors to review the literature as an exercise in academic and scholarly development. Reviewing literature in pharmacy practice research and more widely in nursing and general healthcare research was a very valuable undertaking for the development and expansion of my own general knowledge of health services policy, practice and research. This exercise enabled me to contextualise my research. A literature review and analysis illuminated new ways to think about research, examine the empirical world, and the application of research methods. Undertaking critical analysis of literature helped me to develop my understanding of applied research methodology.

2.2 Pharmaceutical care in neurological diseases and services

A review of the current relevant UK clinical guidance and policy around neurological disease did not identify a defined role for a specialist clinical pharmacist. A strategy towards understanding this position was to identify and

appraise the literature and evidence for pharmacist involvement in neurological services, and the direct care of people with neurological disease which from here-on-in is referred as *pharmaceutical care*, embracing the concept of clinical pharmacy (see section 1.4.4, p.12).

2.2.1 Search strategy

A search was undertaken to identify literature examining the involvement of pharmacists in the care of adult patients with neurological disease, and in adult neurological services. Although I endeavoured to undertake a literature review with the principles of a systematic review, I did not undertake a systematic review in the sense of producing a meta-analysis from which to synthesise a more robust collaborative body of evidence supporting the effectiveness for *pharmaceutical care* in neurological disease (Ashcroft, 2011). Rather, I undertook a comprehensive and a reproducible literature search that identified as much relevant literature documenting pharmaceutical care in neurological disease and assessing the methodological approaches.

Using the guidance of Aveyard (2010) I iteratively developed a search strategy, initially using intuitive keyword search terms and developing that list further. I also reviewed the reference sections of the retrieved citations to identify further potentially appropriate literature. Appendix 1 summarises the search strategies.

I searched the traditional medical databases of Medline and EMBASE, and also CINAHL and AMED because of their coverage of allied health professional journals and potential to yield further relevant citations. I manually searched *International Journal of Clinical Pharmacy* and *International Journal of Pharmacy Practice* through their own search engines. As a result of the

database searches a number of relevant citations were identified within these publications. I was also able to add further citations I had collected in the course of my own professional practice.

I reviewed citations by title and abstract for appropriateness of inclusion. The criteria for inclusion were papers in the English language specifically examining pharmacists' involvement with neurological diseases or involvement in neurological services in adult populations in the UK. I also retrieved publications originating from mainland Europe, Australasia and North America where there are developed healthcare systems comparable to the UK. I had undertaken previous, less rigorous, literature searches in this practice area and perceived a paucity of literature to exist. Hence I did not place any restrictions around the study or publication type e.g. only randomised controlled trials in peer reviewed journals.

Pharmacy practice and healthcare services continually evolve expanding the literature base around it (Ashcroft, 2011). To ensure that the literature review was contemporary and relevant I restricted retrieval of publications to those since the year 2000 and repeated the search at regular intervals through the research.

I did not include literature that pertained to pharmacist involvement in stroke services. Although stroke is considered as a neurological condition, it is not exclusively treated by neurologists in the UK. The emergence of effective acute treatments for stroke and the national stroke strategy for the NHS has revolutionised stroke treatment with the development of stroke pathways. Stroke medicine is emerging as a clinical pharmacy speciality in its own right; a

speciality stroke group exists within the UKCPA. Stroke is not a condition included within the NSF for long-term conditions, being covered by the NSF for older people (Department of Health, 2005).

2.2.2 Literature review results

The results of the literature search are summarised and tabulated in Appendix 2. Studies are ordered by disease area and subsequently by the year of publication. A varying body of literature was identified with a predominance of studies from the United States, studies set in primary care or community pharmacy, and studies involving pharmacist interventions in specific disease states, notably headache and epilepsy syndromes. Headache and epilepsy syndromes are two of the most prevalent neurological disorders in the UK (Neurological Alliance, 2003). The observation I made of UK practice, that neuroscience is a relatively small clinical pharmacy specialism, has also been made in the United States (Welty, 2006). The search results confirmed my perceived paucity of literature around specialist UK hospital-based clinical pharmacy practice in neuroscience: two relevant citations were identified (Bourne and Dorward, 2011 , Harris, 2012).

Rather than critiquing each individual publication I will summarise the methodological issues I have identified within the literature findings. These run under three themes which are summarised in the following subsections.

- Methodological issues for bias and controlling for confounding variables, i.e. the effect of other healthcare professionals (2.2.2.1).

- The use of validated outcomes to measure the effects of pharmacists (2.2.2.2).

- Translating the findings to NHS hospital practice (2.2.2.3).

2.2.2.1 Methodological assessment of the studies

Using the criteria for experimental research cited as *manipulation*, *control* and *randomization* (Lawson, 2011 p.73), two primary care studies evaluating the impact of pharmaceutical care in patients with migraine (Stepkova et al., 2011) and/or headache (Hoffmann et al., 2008) fulfil this criteria. The rest of the identified literature can be described as non-experimental or self-proclaimed *quasi-experimental* (Skomo et al., 2008) studies providing descriptive observational accounts of pharmacy services or interventions.

The non-experimental research ranges from a statistical quantification of clinical interventions made by pharmacists (Bourne and Dorward, 2011 , Jefferies and Bromberg, 2012 , Swain, 2012) to more narrative accounts of a specialist pharmacist role in UK primary care (Barnes, 2011 , Barnes, 2012). These studies could be described as service evaluations as they frequently evaluate, using varying measures, new or enhanced clinical pharmacy services.

Within a positivist viewpoint of scientific inquiry, undertaking quantitative methods, the tenets of any credible investigation are that the findings stand up to scrutiny of reliability and validity (Creswell, 2003 , Elliott and Lazenbett, 2004 , Smith, 2010) in that the findings arise from meticulous and consistent data collection and measurement, and they accurately depict the phenomenon of interest under study (Smith, 2010).

The everyday human world of professional practice does not always lend itself to the tightly controlled experiments of science. Aparasu (2011 p.9) notes pharmacy practice research, as a form of applied research, involves *"…implementation of research methodologies in realistic settings. The extent of control in applied research is not the same as in the natural sciences"*. There are a number of pragmatic compromises that sometimes need to be made and acknowledged with practice research. These compromises are evident amongst this body of literature.

No study summarised the overall effect of pharmacists' services or interventions to be neutral or negative. The generally positive findings of the identified studies raise a question of whether a publication bias exists amongst this body of literature. Publication bias is a well-recognised and discussed phenomenon generally in clinical research e.g. Goldacre (2012).

Pharmacy services need to be funded for, amongst other factors, appropriate professional remuneration. Pharmacy practice research can generate an evidence base for pharmacy services to support their successful commissioning (Roberts and Kennington, 2010); there can be an inherent agenda behind research. Bond and Raehl (2006 p. 1370) also cite the potential for *"intervener's bias"* in pharmacist studies, where observed interventions promote greater diligence in practice from those being observed, posing a threat to the validity of the findings (Smith, 2010).

Studies producing neutral or negative results would be equally as informative, particularly to understand the reasons why a new service or intervention was not successful. This knowledge could assist the progression of services and

interventions by modification. Within the literature, the descriptions of how interventions were made or how services were implemented and provided were often limited, accepting probable editorial constraints on word counts and that a number of the identified citations were conference abstracts.

There are some examples of clearly described interventions; for example, Brown (2012) included a defined patient checklist as the basis for her primary care consultations with epilepsy patients. This checklist is well aligned to the epilepsy care plan domain of the NICE quality standard for the epilepsies in adults (National Institute for Health and Care Excellence, 2013).

Non-experimental research that makes measures prior to and after an intervention generally has weaker internal validity and limits confidence to make inferential cause and effect assumptions from the study results (Johnson, 2011). Weant et al. (2009) assessed the effect of implementing a dedicated clinical pharmacy service to a neurosurgical intensive care unit (ICU) by comparing financial and clinical outcomes in the two-year periods prior to and after service implementation. A significant number of pharmacist interventions into patient care were recorded (11,250) and statistically significant reductions in average drug costs and length of stay per patient were observed after the implementation of the pharmacist. A direct cause and effect inference, that the interventions made by the pharmacist led to the observed reduction in drug costs and length of patient stay, cannot be concluded beyond doubt from these data although the multidisciplinary authors note there were no other significant changes in service provision, protocols or pathways during the study period.

Similar pre and post analyses of pharmacist interventions were undertaken in the therapeutic areas of epilepsy (Fogg et al., 2012) and headache (Hoffmann et al., 2008). Fogg et al. (2012) undertook measurements of patient self-reported medication adherence, quality of life and satisfaction with medicines information provided before and two months after an interview and medication review with a primary care practice pharmacist. Statistically significant improvements in self-reported medication adherence and psychological wellbeing were noted after the pharmacist intervention. The validity of this study is challenged because it did not include a control for the study subjects' interactions with other health care professionals such as neurologists, general practitioners, or epilepsy nurse specialists during the study period. A further limitation is the assessment of a singular intervention in what is routinely a long-term or life-long condition.

In another UK primary care study of pharmacist involvement in epilepsy, Brown (2012) noted, although did not quantify, reduced emergency hospital admissions and hospital appointments after the involvement of a primary care pharmacist. As well as the issues towards validity, as discussed with the previous study, by not controlling for the interventions of other healthcare professionals, without characterising the nature of epilepsy in each patient there is a risk of prevalence bias. Prevalence bias does not control for the point in a disease where an intervention is made within a study (Johnson, 2011). For example the pharmacist may become involved in a patient's care after an initial diagnosis of epilepsy and instigation of anti-epileptic drug therapy, which initially in monotherapy is effective at controlling further seizures in up to 50% of adult patients (Perucca and Tomson, 2011) i.e. the effect on hospital admissions

could have been observed regardless of the pharmacist intervention. Therefore the observation of reduced hospital admissions and appointments after involvement of the pharmacist is an interesting one, but not one from which a cause and effect inference that the intervention of the pharmacist reduced hospital admissions, can be confidently concluded.

Introducing a *control*, or *comparison* group where no intervention occurs can improve confidence in the inferential interpretation of a pre and post-intervention analysis (Johnson, 2011) but it is not always feasible in everyday practice. Pharmacy services need to be developed around what works best to deliver the service, above considerations of the methodological rigour of its evaluation.

Bond and Raehl (2006) were able to include a control group in their retrospective multi-centre analysis of pharmacist inpatient management of anti-epileptic drugs, under a scheme of *collaborative drug therapy management* in US Medicare hospitals. Collaborative drug therapy management is a US scheme that allows pharmacists to have an agreed level of autonomy to control drug therapy; it is defined by Hammond et al. (2003 p. 1210) as:

> …a collaborative practice agreement between one or more physicians and pharmacists wherein qualified pharmacists working within the context of a defined protocol are permitted to assume professional responsibility performing patient assessments; ordering drug-therapy related laboratory tests; administering drugs and selecting, initiating, monitoring, continuing and adjusting dose regimes.

Routinely collected clinical outcome and financial data were collected and compared for patients admitted with a diagnosis of epilepsy or seizure disorder between hospitals that ran collaborative drug therapy management, and hospitals that did not. Statistically significant differences in mortality rates,

length of patient stay, healthcare costs and rates of aspiration pneumonia were observed in favour of the hospitals which ran a collaborative drug therapy management service for anti-epileptic drugs. The general severity of patient illness as measured by a *case mix index* was comparable between the two sets of hospitals. No other comparisons of overall hospital performance were made and the omission to identify and mitigate for confounders of the measured outcomes limits the internal validity of these findings in making confident assumptions that the observed differences were due to collaborative drug therapy management, and not other factors within the running of the hospitals.

2.2.2.2 Outcome measures for pharmaceutical care interventions

Several studies provided descriptive analyses of the number and type of the clinical interventions made by pharmacists (Bourne and Dorward, 2011 , Brown, 2012 , Jefferies and Bromberg, 2012 , Poon et al., 2012 , Schröder et al., 2011 , Swain, 2012 , Weant et al., 2009 , Weitzel et al., 2004). Most of these studies quantify and categorise the interventions being made. The studies generally conclude with claims of pharmacists contributing to the safety, quality and productivity of patient care. These studies may help to inform where pharmaceutical care is best placed or should be prioritized.

Observational studies of pharmacists' interventions serve as a proxy measure of what pharmacists *do* in the direct patient care aspect of their role and the sorts of interventions that are made. Studies of this nature do not allow assignment of a *valuation,* or *quantification* of the impact of the interventions made by pharmacists although this is an acknowledged challenge in clinical pharmacy services (Pawloski et al., 2012). This leads to a question of what is

the *construct* that a measure of pharmacist interventions represents. This depends on how one chooses to *measure* the intervention and the context in which to measure it. In the context of the studies identified I would take the construct to be patient care and one surmises that the interventions improve patient care although in most studies patients were not assessed for the effect of the intervention. Therefore the validity of pharmacist interventions to measure the construct of patient care (construct validity) is weak in this context.

Bourne and Dorward (2011)[4] attempted to assess the clinical significance of interventions made in a two week service evaluation on a neurosurgical ICU by a validated method of the mean score of potential harm avoidance made from a panel of 5 healthcare professionals independently assessing the interventions. Using a visual analogue assessment scale of 0 (no harm) to 10 (death), the mean score of 246 interventions was 3.7. Similar studies have been undertaken in other clinical pharmacy specialisms such as oncology; the study of Knez et al. (2008) concluded more significant interventions were made by pharmacists of higher grades in cancer services.

The generalisability of observational studies measuring pharmacist interventions is limited by claims that could be made of the variation in relative clinical competence and experience of the pharmacists in the study and the practice setting. For example one may hypothesize that pharmacists need to make fewer interventions in clinical departments or hospitals having more thorough working practices and protocols in relation to drug use. A strategy to make observational studies of this kind more generalisable is to conduct studies

[4] The manuscript for this paper is within Appendix 9 as an example of previous practice research I have undertaken.

within multiple hospitals or Trusts, with multiple pharmacists. The Protected ICU study is a multi-centre UK observational study (yet to be published) of clinical pharmacy activity in intensive care units using similar methodology to Bourne and Dorward (2011) to assess the clinical significance of interventions and capturing a national snapshot of clinical pharmacy activity in intensive care units (Bourne, 2014, Pers. Comm., 30th Sept).

A number of studies used questionnaires or surveys to assess patients' perceptions of pharmacist's interventions. Surveys can be useful in assessing thoughts and perceptions of pharmacy services (Worley, 2011). Patient questionnaires were used in studies of pharmacist interventions in epilepsy (Brown, 2012 , Fogg et al., 2012) and headache (Harris, 2012 , Skomo et al., 2008 , Stepkova et al., 2011 , Wenzel and Schommer, 2002). Where described, the surveys used appear largely closed question, using rating scales for response allowing a measure of the responses but no opportunity to further explore patients' perceptions of the intervention or service.

Quality of life measures were used to assess the effect of pharmaceutical care in populations with epilepsy (Fogg et al., 2012), headache (Hoffmann et al., 2008 , Stepkova et al., 2011), and Parkinson's disease (Schröder et al., 2011). These are all long term neurological conditions. Moving away from a biomedical understanding of these conditions, which measures outcomes such as the frequency of seizures or headache, assessing quality of life facilitates an assessment of how pharmacists support people to live with a long-term neurological condition (Fitzpatrick, 1997). Of the four studies that used quality of life measures only one reported a statistically significant improvement post pharmacist intervention (Hoffmann et al., 2008).

2.2.2.3 Transferring the current evidence to specialist practice

Pharmacy practice research, as a form of applied health research, is concerned with understanding and improving the provision of pharmaceutical services. External validity is an important consideration in healthcare research and may be termed *generalisation* in the sense that the findings could be applicable when applied to other people, in other places and at other times (Aparasu, 2011). In many respects practice research is concerned with the sharing of good practice and desirably, successful interventions would produce comparable beneficial results if replicated in other healthcare or pharmacy settings. Given the findings from pharmacist intervention study in oncology (Knez et al., 2008), one might hypothesize that interventions made by *specialist* neuroscience pharmacists would be more significant and of higher patient benefit than those identified from non-specialist clinical pharmacy practice.

There are limitations however in translating the findings from the identified literature, especially primary care studies, into clinical pharmacy practice in hospital-based neuroscience centres. These concerns arise not only from the identified methodological issues of bias, internal validity, and reliability, but also from a consideration that the *experimental* conditions of primary care studies are not translatable into a specialist hospital setting. Translating that viewpoint in terms of pharmacy practice I take the view that the practice conditions of a hospital based specialist pharmacist are different when encountering patients with neurological disease.

My *a priori* assumption of the neuroscience pharmacist role, based on my previous interaction and discussion with peers, is that if the pharmacists do

participate in outpatient clinic settings it is a minor component of their role. The majority of pharmacists' *clinical*, near-patient role occurs on inpatient wards.

People with neurological disease invariably do not need to be admitted to hospital. UK healthcare policy generally is increasingly focused on optimising healthcare provision in the community and reducing hospital admissions (Edwards, 2014). Hospital admissions incur an associated expensive, cause disruption to patients and their families, and carry risks to the patient such as hospital acquired infection (National Institute for Health and Care Excellence, 2014).

Based on my experience of clinical neuroscience, admission to hospital for patients with a neurological disease inevitably represents:

- Exacerbation of a condition e.g. a relapse of MS, seizures in epilepsy, acute deterioration of myasthenia gravis.
- Acute monophasic illness e.g. Guillain-Barre Syndrome, viral encephalitis.
- Progression of neurodegenerative disorders e.g. Parkinson's disease, motor neurone disease.
- A requirement for specialist treatment or surgery that can only be administered or performed within a hospital.

So in contrast to many of the identified studies in primary care and community pharmacy, hospital based pharmacists practicing in inpatient hospital settings are not dealing with long term neurological conditions in relative stability, they

deal with those patients at times of disease exacerbation, or whose condition lies more towards the challenging end of a particular disease-spectrum.

Due to the acuity and nature of their illness, a person with a neurological condition admitted to hospital may need to be cared for by a multidisciplinary team. This team could include doctors, ward-based and specialist nurses, healthcare assistants, physiotherapists, occupational therapists, pharmacists, speech and language therapists. All these professional groups can apply their expertise to affect a particular aspect of a patient's condition and influence both the outcome, and the patient's experience of that care. Multidisciplinary care is important for many patients with long term conditions (Department of Health, 2005); in an inpatient hospital setting a patient is likely to experience a more concentrated overlapping of interaction with differing healthcare professionals. In such a scenario eliciting the effect of pharmacists' contribution to the care of neurological inpatients, while controlling for confounders such as the contribution of other members of the multidisciplinary team, is an inherently complex undertaking.

Given the emphasis on multidisciplinary treatment of long term neurological disease, none of the literature has focused on how pharmacists work within a multidisciplinary team with complex neurological patients. Brown (2012) described establishing good working relationships with neurologists and epilepsy specialist nurses in the primary care management of epilepsy. Barnes (2011) describes her UK primary care role as a member of a multidisciplinary team and meeting and overcoming initial resistance from consultant neurologists (Barnes, 2012). Observational studies provide evidence that pharmacists make interventions into patient care but do not offer an insight as

to how those interventions are presented, received, negotiated and actioned within a multidisciplinary setting.

The identified literature has concentrated on analysing pharmacists' clinical interventions. Table 1 (p.11) illustrates the different aspects of UK hospital pharmacy services of which clinical pharmacy is one facet. *A priori* I take the view that neurosciences pharmacists are involved directly or indirectly with several to many of these facets. Thus to concentrate on studying patient interventions does not progress an understanding of the pharmacist role in its entirety and how pharmacists reconcile the facets of the role to shape it.

2.3 Literature examining roles in pharmacy and healthcare

The results of the literature review in the previous section led me to reflect on what the true nature of my research question was. Evaluating interventions or the outcomes of interventions pharmacists make provides *evidence* for the pharmacists' role (see section 3.2.1 (p.46) for a further discussion of evidence). Evidence provides the 'what' of the role, but it does not explain the 'how' or the 'why'. Focusing on clinical interventions has the potential to produce a unilateral 'outcomes' analysis of the pharmacist role and does not answer the question of how a role for a specialist neurosciences pharmacist is defined.

2.3.1 Search strategy

After discussion with my supervisors I further explored the concept of *the role* more generally within the literature and how this might be defined. I undertook a literature review around *role* theory. I looked for literature concerning roles in

pharmacy and more widely, in the literature of nursing practice. I undertook a less structured and defined literature search to orientate me to this research area rather than to define a theoretical framework for exploring the concept of the *role* within the context of clinical pharmacy specialism in neurosciences. I also undertook a literature review to ensure I would not be duplicating existing research of clinical pharmacy practice in neuroscience.

2.3.2 Role theory

My initial attempts at identifying relevant citations around the concept *role theory* yielded limited success in terms of citation quantity and recent publications. I began with a definition of role theory provided by Biddle (1986 p.67) as:

> It [role theory] explains roles by presuming that persons are members of social positions and hold expectations for their own behaviours and the behaviours of others.

My literature searching for role theory and pharmacy identified very few citations and none in relation to pharmacy practice in neuroscience. Guirguis and Chewning (2005), citing Biddle (1986), have provided an overview of role theory in its application to research of community pharmacist-patient interaction. They argued the potential for role theory in pharmacy research and a paucity of literature in this field.

Biddle identified the prominence of expectations, formed through experience, in theories about roles. To me, role theory legitimises the investigation of the social or organisational construction of the pharmacist's role, rather than empirical quantification of role outputs.

2.3.3 Professional role research in nursing

I reviewed literature that examined advanced specialist and consultant nursing practice. I chose to examine this literature base because, like neuroscience pharmacists, specialist and consultant nursing roles are evolving ones practiced predominantly, although not exclusively, within hospitals.

I observed a greater prominence of qualitative and mixed methods research amongst the literature examining nursing roles. A variety of findings were discovered. A recurrent finding throughout the literature was the prominence placed in defining these advanced nursing roles within an organisational context (Abbott, 2007 , McSherry et al., 2007 , Mullen et al., 2011 , Woodward et al., 2006).

2.4 Chapter summary

A varying body of literature was identified pertaining to pharmaceutical care in neurological disease which in the main studied the interventions of pharmacists within individual neurological disease states. The studies illustrate pharmacists can and do become involved in providing *pharmaceutical care* to patients with neurological disease. There are some methodological concerns about drawing inferential conclusions from the studies, notably controlling for confounders. While acknowledging myself as a pharmacist I would make some assumptions that the *pharmaceutical care* interventions were in the main beneficial to patients.

The literature search identified a lack of evidence for the involvement of specialist pharmacists in neuroscience. The identified studies could support the hypothesis that specialist pharmacists improve patient care but the complexity of multidisciplinary management of neurological illness in a specialist setting and the diversity of neurological illness present challenges to developing reliable and valid measurement techniques for testing of this hypothesis.

A literature review examining the concept of *the role* suggests that lack of role clarity can be a barrier to effective clinical practice and developing theories of roles can better understand practice. The existing empirical literature for pharmaceutical care in neurological disease focuses primarily on the quantitative analysis of clinical interventions. No identified research has examined this specialist pharmacist role within a multidisciplinary context in the hospital setting of a neuroscience service through a sociologically informed analysis. The conundrum of defining and understanding the role for a specialist neurosciences pharmacist has potential to lend itself to a metaphysical interpretative analysis.

2.5 Research questions for the study

The setting of aims and objectives is not concordant with traditional approaches to qualitative research as it may serve to focus the research too narrowly, at the expense of collecting useful data (Creswell, 1994). Setting research questions is the more typical approach undertaken within qualitative research (Holloway and Brown, 2012); Miles and Huberman (1994 p.25) advocate that for even the most inductive research it is advisable to devise some research questions to

answer to *"…make the implicit explicit without necessarily freezing or limiting your vision."* This viewpoint is still contentious in grounded theory research (Birks and Mills, 2011).

While acknowledging these tensions I elected to set some research questions stemming from my initial reflections in section 1.1 (p.1), and refined by a literature search. I considered these questions to be sufficiently broad to allow flexibility in my data collection and analysis while at the same time not allowing me to lose sight of the fact that I was undertaking a piece of applied research to address the practice issues that had prompted the research. While understanding the inductive nature of grounded theory research I remained cognisant of the need for the research to retain relevance and resonance to the substantive research area of contemporary specialist clinical pharmacy practice in neurosciences.

The research questions for the study are:

1. How do neurosciences pharmacists perceive and define their role within a neurosciences service?

2. How do pharmacists specialising in neurosciences develop their role and specialism?

The rationale for the use of the grounded theory method to produce theoretical insights into these processes is presented in the next chapter, which outlines the methodology of the research.

3 Methodology

3.1 Introduction

This chapter will set out the methodological approach and methods used to answer the research questions of the study. In section 3.2 I will provide some context to the need to study the clinical pharmacist's role (evidence based healthcare) and outline the formation of my philosophical underpinnings (ontology) to studying the pharmacist's role, to illuminate the reasoning of my decision to undertake qualitative research.

Section 3.2.3 provides a brief overview and critique of qualitative strategies of inquiry in relation to the research project, explaining my decision to use the grounded theory method. In section 3.2.4 I will outline the grounded theory method as a methodological approach, its various forms and the philosophical underpinnings of the method. I then set out my decision to use the constructivist grounded theory method, through the assumption of a subjective epistemology.

Section 3.3 describes the methodological procedures and processes of data collection and analysis. Section 3.4 discusses the ethical considerations that were addressed to undertake the research. Section 3.5 provides a brief overview of the study participants before presenting the findings.

3.2 Choosing the methodological approach

This section sets out the reasoning to undertake a qualitative research study using the constructivist grounded theory method

3.2.1 Evidence based pharmacy practice

The literature search I undertook in section 2.2 (p.25) examined the empirical evidence for the involvement of pharmacists in the care of patients with neurological disease and yielded relatively little appropriate research. In reflecting on my initial approach to the literature search strategy I concluded that my professional and educational background, shaped by a need for 'evidence', informed my initial approach to the literature.

My reflections have led me to further question, what is evidence? A lay, general definition of evidence is *"the available body of facts or information indicating whether a belief or proposition is true or valid"* (Oxford Dictionaries, 2013a). Such a definition aligns within a positivist paradigm, and as identified by Barbour (2000), can invoke a sense of objective measurement (empiricism) to validate or refute a held belief or proposition.

The use of evidence within healthcare, now commonly termed 'evidence based healthcare', has emerged with increasing predominance since the 1970s (Aveyard, 2010). Evidence based healthcare is built upon a doctrine of ensuring medical services and therapeutic interventions offered to people are effective, safe and increasingly, provide value for money. The Cochrane Collaboration (2013), an internationally recognized and respected body promoting and supporting evidence based healthcare, define it as, *"… the*

conscientious use of current best evidence in making decisions about the care of individual patients or the delivery of health services.".

Wiffen (2001) has highlighted the argument that evidence should support decision making in healthcare and not dictate it; the expertise of practitioners cannot be overlooked. However evidence based healthcare has been pivotal in informing UK healthcare policy since the early 1990s (Harrison and Checkland, 2009).

The use of evidence imbues the clinical and regulatory assessment of drug technologies. The randomised controlled trial is second only to the meta-analysis in hierarchies of evidence in healthcare, a grading system of evidence quality, usually set against the criteria of evidence being the objective truth (Aveyard, 2010 p.62). Randomised controlled trials are largely a pre-requisite for the licencing of new health technologies by the regulatory agencies of Europe and North America.

The randomised controlled clinical trial is underpinned by hypothetical deductive scientific reasoning, a concept defined by Karl Popper (see Bilton et al. (2002) for further discussion within the meaning of science). Through hypothetical deductive reasoning, a drug or intervention is postulated to cause a clinical effect in patients with a specific medical condition (the hypothesis) through pre-clinical scientific work or observation of clinical practice. A controlled trial is devised with empirical recording of clinical outcomes or physiological/radiological measurements which are an operationalization, or surrogate markers of the perceived clinical effect. Statistical analyses of predominantly numerical data then occur, which may need to account for

confounding variables, to deduce if the results have occurred by chance or not and if the null hypothesis, that the drug or intervention does not cause an effect, can be rejected.

My background as a pharmacist and biomedical scientific training has equipped me to be relatively comfortable with assessing quantitative empirical research in the form of randomised trials. This positivist cause and effect inference from analysis of (quantitative) empirical measurement is evident in my initial literature search strategy which attempted to identify studies where a pharmacist intervention (cause) led to a beneficial effect in defined patient populations with a neurological disease.

The requirement for the *evidence* of effectiveness also underpins UK hospital clinical pharmacy practice, dating back to the 1986 Nuffield report into clinical pharmacy (Child et al., 2004). Child et al. (2004) have previously assessed the quality of evidence for hospital (clinical) pharmacy and found it to be lacking against the tenets of quantitative research, of internal and external validity i.e. the results accurate reflect what happened in the study and can be applied to other settings. Yet despite these criticisms the accumulation of *evidence* which proves the *value* of clinical pharmacy has been pivotal in improving recognition of the contribution of clinical pharmacy within healthcare e.g. Child et al. (2004).

If I turn the concept of evidence on to pharmacy practice within neuroscience: within a positivist paradigm, I might theorise that the involvement of a pharmacist within a neuroscience centre improves the quality of patient care. Taking the concept of quality healthcare I would then seek to operationalize that concept in to measurable outcomes which may be, for example, a particular

medical outcome, a patient experience measured by some form of questionnaire, or a reduced length of stay as other investigators have (cf. 2.2.2.2, p.34). Assuming that a sensitive and validated outcome measure is identified or developed, I would then need to account for the input of other healthcare professionals i.e. confounding variables which, depending on the number and location of study sites, could be variable.

In summary, as I have previously identified, undertaking an experimental or quasi-experimental analysis of the contribution of a pharmacist in a neuroscience centre, accounting for all the confounding variables, is an inherently complex undertaking. So *a priori*, I take the view that the overall role of the neurosciences pharmacist is too complex and multifaceted to operationalize into a list of measurable outcomes. Furthermore such an analysis would not capture the overall role of the pharmacist and, assuming that a discernible effect was noted, would not inform how the effect was achieved. Such a study would be of limited of limited benefit in supporting and developing practice.

I shall once again acknowledge my reasons for studying the role of neuroscience pharmacists. I am a committee member of a professional body representing neuroscience pharmacists which has a broad aim of supporting and developing practice. A research project of this scale will consume not inconsiderable resources of my time, the time of potential participants and any material costs and educational costs to support the supervision of my research. Therefore rather than try to prove the value of neuroscience pharmacists' roles I think it is a more appropriate use of resources to better understand current practice and how pharmacists develop within their roles.

A quantitative research study will enable ‘measurement’ of the effects or outputs of pharmacists but it will not enable a deeper understanding of their role and how it is performed within everyday practice. I therefore seek a mode of, or frame of reference for inquiry (paradigm) that can illuminate and understand (interpret) contemporary clinical pharmacy practice within the specialism of neuroscience, in an everyday naturalistic setting and with all the complexities of professional and social interactions that entails.

My experiences and reflections as a practicing hospital pharmacist, of which the latter has been enhanced by the requirements of a professional doctorate, have informed the following viewpoint: good healthcare within an acute hospital setting for people with acute or long-term neurological conditions is a complex gestalt of the collaborative working of members of the multidisciplinary healthcare team, the patient, and the patients’ carers/family. In using the term good healthcare my intention is to encapsulate the concept of a positive human experience for the patient, their family and carers, as well as biomedical outcomes.

Hence to undertake a study that specifically *measures* pharmacists’ unique contribution to the care of patients with neurological disease does not capture that contribution as part of a multidisciplinary team. In my opinion, such a focused analysis is not congruent with the prevailing ethos of co-ordinated care for treating patients with neurological diseases that can be chronic, fluctuant and progressive.

My professional experiences, reflections, and engagement with research literature, particularly within nursing practice research, have led me to consider

a relativist ontological perspective towards studying the role of the neuroscience pharmacist. The pharmacist's role is not something that can be simply measured; it is constructed, with multiple perceptions of it from the groups and individuals that interact with the role (cf. 'multiple realities', see Creswell (2013 p. 21)). The construction of the pharmacist's role takes place through the everyday activities of the pharmacists during their interactions with patients, healthcare professionals and other groups that take place within professional, organisational, and social contexts. Hence a more informative analysis of the pharmacist's role in neuroscience might be produced by employing more sociologically informed, interpretative qualitative research methods.

3.2.2 Choosing a qualitative research paradigm

Quantitative and qualitative research approaches have been distinguished in the literature as differing 'paradigms' or sets of assumptions through which to see the empirical world e.g. Punch (2005). Holloway and Brown (2012) argue this distinction between quantitative and qualitative research can carry dichotomous connotations of research being purely one or the other; they prefer to consider research approaches lying on a continuum between quantitative and qualitative research in their purest forms. I am in agreement with this view and I will further explicate this viewpoint in my discussion of the grounded theory method (3.2.4).

At this juncture of the research journey it seems appropriate to consider what the essence of qualitative research is, to evaluate if it is the most appropriate strategy of inquiry to answer the research questions for the study. Holloway and Brown (2012 p.15) define qualitative research below.

> Qualitative research will give you an insight into various perspectives on a phenomenon, on behaviours and feelings, and it allows a deep exploration of different experiences. Researchers study people in their natural surroundings and build up relationships so they can learn and see the world from the participants' point of view, on the basis of a common humanity and sometimes a shared culture although they can never put themselves wholly in "other people's shoes".

Through this definition I identify qualitative research as an approach that could enable the development of a rich descriptive reconstruction of everyday clinical pharmacy practice within neuroscience. Qualitative research studies of nursing practice have already illuminated this potential.

Furthermore, qualitative research can help to develop an understanding of the meaning of everyday events and interactions and how they shape the pharmacist's role in neuroscience. There is an acknowledgement that individuals' (emic) perspective will never be truly re-created but qualitative research can enable a better understanding towards this.

In her discussion of the place of qualitative research in forming an evidence base for clinical practice, Barbour (2000 p.157) further defines its value.

> Qualitative research is suited to the study of process - how outcomes are achieved, the mechanisms involved, how situations or changes unfold in the short- or long-term. It can document difficulties and obstacles encountered, how these are perceived and dealt with and can provide insights into why particular interventions and attempts at implementation are successful or unsuccessful.

I infer Barbour's advocacy of qualitative research towards examining clinical interventions in healthcare. However the potential for the discovery of processes and identification for facilitators and obstacles to process suggest to

me that qualitative research is a potentially useful strategy to study the process of pharmacists developing into their role.

3.2.3 The strategy of inquiry

Qualitative research generally entails the generation of a detailed or 'thick' description of everyday events to reconstruct them and develop an understanding of the phenomenon (Babbie, 2010). While I have stated that I wish to develop an emic understanding of pharmacists' role, the research questions of the study and the context of the study drive the analysis to uncover the processes that are occurring throughout it. Applied qualitative research is intended to produce findings that can answer specific information needs (Ritchie and Spencer, 1994). The intention of this research is to understand the processes that clinical pharmacists practicing in neuroscience go through to develop and define their role, to develop appropriate professional support.

The phenomenon of interest for this research project, the professional role and its development, is placed within a substantive context, clinical pharmacy practice in neuroscience. One may term this a 'bounded system', in order to form the basis of a case study research (Creswell, 2003). A nomothetic approach using multiple cases (pharmacists) could identify issues of commonality and variation within the practice. Creswell (2003) has highlighted differing opinions on the case study as either definition of what or who to study, or a methodological approach. Case studies enable a rich description of phenomenon and this method has been used to study of other healthcare roles, for example, nurse consultants (Graham, 2007). I prefer at this point to consider a case study, of multiple pharmacists, as defining the focus of the study. I

believe the grounded theory method is the best methodological procedure for analysing the case studies and answering the research questions for the study. I will explain this decision in the next section.

3.2.4 The grounded theory method

The grounded theory method was developed by the sociologists Barney Glaser and Anselm Strauss and presented in their seminal text 'The Discovery of Grounded Theory' (1967), which from hereon, is referred to as *Discovery*.

The grounded theory method is a methodological approach that develops a theory *grounded* in the empirical data i.e. it is an inductive research process that generates new or evolved explanations about phenomena rather than testing hypotheses (Lingard et al., 2008 , Mills et al., 2006). The grounded theory method is suitable for studying processes (Elliott and Lazenbett, 2004 , Holloway, 2012), and topics with little previous empirical research (Holloway, 2012). Trying to understand the development of specialist pharmacy practice is a process analysis and the literature search had identified that very little is known about this specific area of pharmacy practice. The substantive focus for this study therefore appears to fulfil the criteria to make a suitable grounded theory method study.

Grounded theory method is unique in qualitative research in that is produces an explanatory analysis rather than a descriptive one (Holloway and Brown, 2012). Theory provides the 'why' to the 'what' description analysis of phenomenon (Babbie, 2010) to facilitate a conceptual understanding of everyday phenomena that can otherwise be difficult to explain (Reeves et al., 2008). Rovers (2011 p.

1) in his discussion of social theory in pharmacy practice asserts *"Theory provides a base upon which practice change can occur"*. This study is intended as a piece of applied qualitative research to answer some specific questions about everyday pharmacy practice in neuroscience and the grounded theory method is suited to answering those questions.

It is important to be clear that the grounded theory method is the methodological approach which results in the generation of a grounded theory. For consistency I shall refer to the grounded theory method when discussing the methodological approach to the study and a grounded theory when discussing the analytical findings of the study. Two forms of grounded theory can be produced: formal theory which has more widespread relevance and fit across a number of substantive areas, and substantive theory which is workable in explaining phenomenon and has *fit* to a specific area of empirical investigation (Glaser and Strauss, 1967). The aim of this study is to produce a substantive theory of clinical pharmacy practice in neuroscience that answers the research questions to this study.

One of the strengths of the grounded theory method in relation to the planned research is the tenet of 'grounding' the analysis within the data. I have already identified my axiological position in relation to the research in that I have a professional attachment to the substantive area and I am not merely undertaking neutral observation and analysis of the empirical data. Babbie (2010) identifies that ultimately, all social science is a human construct while Punch (2005) states that much applied social science research takes place within professional practice and researchers are closely connected to it.

I acknowledge that my professional and personal background cannot be completely bracketed from the research process. As a neophyte researcher, my concern is to undertake data collection and analysis completely fed by conscious or subconscious, *a priori* assumptions, about the role. I am drawn to grounded theory method because of its inbuilt methodological checks through the constant comparative method, abductive logic, and memo writing. These processes do not absolve these factors, but acknowledge them and build them into the research process (Holloway, 2012). These processes place emphasis on findings emerging from, and hence grounded within the data.

Appendix 7 provides my defence of the rigour of this study through the responses to an evaluative quality framework for qualitative research, developed by Spencer et al. (2003). There has been scepticism over 'checklists' for assessing qualitative research (Barbour, 2001). However as an inexperienced researcher this evaluation seemed an appropriate undertaking.

3.2.4.1 The different forms of grounded theory method

Since its development in the 1960s, grounded theory method development has followed divergent paths with Glaser, and Strauss (latterly in collaboration with Juliet Corbin) developing their own particular stances on the method. Kathy Charmaz, a student of Glaser and Strauss subsequently proposed constructivist grounded theory (Charmaz, 2006). Within the extant methodology literature, these three forms of grounded theory predominate within the field under a common vernacular of *Classic* or *Glaserian* grounded theory method; *Straussian* grounded theory method and Charmaz's *constructivist* grounded theory method.

Birks and Mills (2011) provide a more comprehensive historical account of the development and evolution of the grounded theory method. In current research practice, Bryant and Charmaz (2007) consider the grounded theory method as a family of approaches while Mills et al. (2006) have referred to the different versions of grounded theory method as points along a methodological spiral indicating overlap between the approaches.

With divergent forms of grounded theory method available to choose from there are multiple views on what constitutes the essence of grounded theory as illustrated in the introduction to 'The SAGE Handbook of Grounded Theory' (Bryant and Charmaz, 2007). This choice of approaches further raises issues about whether grounded theory constitutes a set of prescriptive rules to be followed or a set of guidelines to be used flexibly according to the research situation. Birks and Mills (2011), Bryant and Charmaz (2007) and Charmaz (2006) advocate the latter methodological approach. Birks and Mills (2011) provide one of the most comprehensive itineraries for essential procedural methods within a grounded theory method study which is shown in Figure 2. Having undertaken extensive reading of the grounded theory methods literature, I have chosen this list as the basis for my methodological approach and describe how these processes were undertaken within the study in section 3.3.

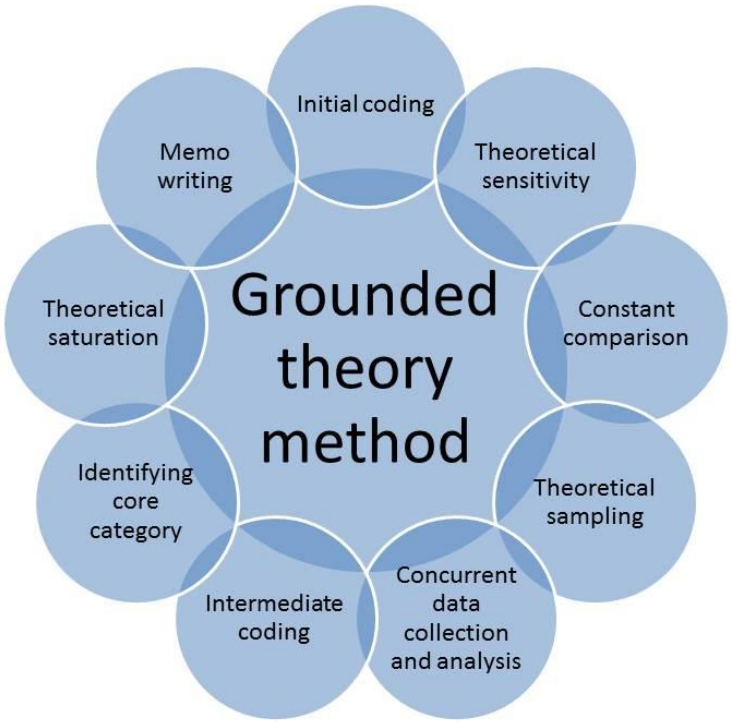

Figure 2. Elements of the grounded theory method.

3.2.4.2 The case for constructivist grounded theory method

In deciding which version of the grounded theory method to undertake, one needs to consider what is meant by theory. One also needs to consider their ontological and epistemological perspective towards the study to ensure it is aligned to the methodological approach and methods, to ensure what Birks and Mills (2011 p.36) term *"methodological congruence"*.

Discovery listed the 'jobs' of theory specifically within sociology, which included the need to *"enable prediction and explanation of behaviour"*, *"to be useful in theoretical advance of sociology"* and *"be usable in practical applications"* (Glaser and Strauss, 1967 p.3). Strauss and Corbin (1998) define theory as:

> A set of well defined concepts related through statements of relationship, which together constitute an integrated framework that can be used to explain or predict phenomena.

Glaser and Strauss (1967) were clear in *Discovery* that a grounded theory does not provide a perfect description of the substantive area but can account for much of the relevant behaviour, or actions. However the use of terms such as *"statements of relationship"* (Glaser and Strauss, 1967 p.30), and descriptions of explanatory or predictor power invoke a positivist sense towards research. Indeed grounded theory method has been described as occupying the middle ground between positivist and post-positivist approaches (Suddaby, 2006). One of the criticisms placed on Glaser and Strauss has been their lack of explicitness about their philosophical underpinnings (Birks and Mills, 2011), although Annells (1996) has attempted to define these.

The grounded theory method was developed in the 1960s as a response to the prevailing sociological research practice at that time which was to Glaser and Strauss' view, centred on empirical verification of grand theories via the use of quantitative methods (Suddaby, 2006). The grounded theory method is theoretically underpinned by Strauss' background in symbolic interactionism (Annells, 1996 , Milliken and Schreiber, 2012) but combines with Glaser's background of quantitative research, to incorporate rigorous data analysis (Charmaz, 2006). The theoretical premise of symbolic interactionism is that the self, society and reality are constructed through interaction to ascribe meanings and actions that are inter-dependent (Annells, 1996 , Bryant and Charmaz, 2007 , Charmaz, 2006).

Glaser's version of grounded theory has remained largely true to the original method within *Discovery*, with strong emphasis on theory emerging from the data, independent of the objective researcher by avoidance of initial literature searching and entering the research *tabula rasa* (with a blank mind i.e. without preconceived notions).

Strauss' iterations of grounded theory method have come to further acknowledge the role of the researcher as a research tool with modified coding strategies and more tolerance of earlier engagement with literature relevant to a study.

Charmaz's constructivist version of grounded theory method further builds on its symbolic interactionism foundations, placing grounded theory within the constructivist paradigm with emphasis on understanding rather than explanation. Charmaz also acknowledges the contribution of the researcher in the construction of a theory. I have already stated my assumptions and closeness to the substantive area. I believe in doing so, I align myself to Charmaz's constructivist grounded theory.

Within the alignment to Charmaz I acknowledge that the theory produced from the study will be a co-constructed interpretive analysis between me as the researcher and my professional peers as study participants. My epistemological stance towards the knowledge generated from this study is a subjective one. By adhering to the methodological processes of the grounded theory method, my intention is to produce a study that stands up robustly to the scrutiny of rigour; ultimately, the result of the study will provide one depiction of reality, out of many co-existent ones.

3.3 Methods

The methods are divided below as data generation methods and data analysis methods. For ease of reading the two sections are presented sequentially. However grounded theory method is iterative and non-linear (Birks and Mills, 2011) and the processes were interwoven and overlapped throughout the study. Concurrent data generation and analysis is a key feature of the grounded theory method (see Figure 2 on p.58). It should also be noted that the research design of a grounded theory method study is iterative and often needs to incorporate flexibility to address the changing focus of the research as developing concepts emerge from data analysis (Elliott and Lazenbett, 2004).

3.3.1 Data generation methods

I have used the term data generation rather than data collection to indicate a process which involves the researcher engaging with sources of data to produce materials for analysis rather than a process of passive acquisition (Birks and Mills, 2011 p. 74). In this study, data were generated from interview conversations with pharmacists and the data codes were then generated from my analysis and interpretations of the interview transcripts.

Standard data collection methods for qualitative research include individual interviews, focus groups (group interviews), observation of participants within the substantive setting and documentary analysis (Holloway and Wheeler, 2010 , Punch, 2005 , Silverman, 2010). The design of the research project must address what is the optimal method to *extract* or generate data, balancing what is theoretically desirable from a methodological perspective against what is practically achievable within the time and resources allocated to the project.

Recorded, unstructured telephone interviews were chosen as the main data collection method. The data were also supplemented by documentary analysis, relevant literature and the experience and beliefs that I, as the researcher, brought to the research project. I will discuss my involvement as a data source within section 3.3.2.3.

The inclusion criterion for participation in telephone interviews was pharmacists practicing partly or fully within the clinical specialism of neurosciences. There is no formally held list of specialist neuroscience pharmacists in the NHS. I therefore undertook a manual search of NHS Trusts to identify clinical pharmacist posts within neuroscience services. I also used a 'snowballing' strategy by enquiring amongst neuroscience pharmacists that I was acquainted with to identify further posts and potential participants.

Individual interviews provide a forum for interaction with participants to discuss and explore issues relevant to them within the context of the research. According to Bowling (2002 p.378), unstructured in-depth interviews:

> …aim to delve deep below the surface of superficial responses to obtain true meanings that individuals assign to events, and the complexities of their attitudes, behaviours and experiences.

The flexibility of loosely or semi-structured interviews is particularly appropriate to grounded theory studies where further exploration of responses can attain rich data. I exploited this property to develop theoretical sampling by altering my research interview questions as the study proceeded; I discuss this strategy further in section 3.3.2.2

Co-ordinating focus groups, by inviting groups of pharmacists to one location to participate in a group discussion, would have been an efficient way to generate data for the study. Furthermore it is recognised that the dynamics of focus groups can enable topics to be generated and explored further by group discussion (Bowling, 2002). There are several reasons why I chose not to pursue focus groups. From a practical perspective, my knowledge of the study population and experience in previously trying to arrange meetings indicated that co-ordinating a mutually suitable venue and time for participants would be challenging.

From a methodological perspective the rapid data generation that focus groups can achieve does not seem to fit with the grounded theory method and its iterative cycles of data generation and analysis driving theoretical sampling, as described in section 3.3.2.2. Methodological incongruence between the use of focus groups and the grounded theory method has been observed by Webb and Kevern (2001) while others, such as Birks and Mills (2011) have advocated a potential role for focus groups. The final deciding factor not to utilise focus groups was my limited experience as a researcher, with little experience of facilitating group events. I felt that data generation needed to be controlled by me to allow sufficient time for familiarisation and analysis, while heuristically developing interview skills.

One of the practical considerations of the project was how to access participants for individual interviews. An initial search for clinical pharmacist posts in neuroscience revealed that there were relatively few practitioners and that the posts are often relatively geographically dispersed and isolated. Undertaking face to face interviews with the pharmacists would have involved

extensive travel around the UK. Figure 3 below summarises recruitment of pharmacists into the study.

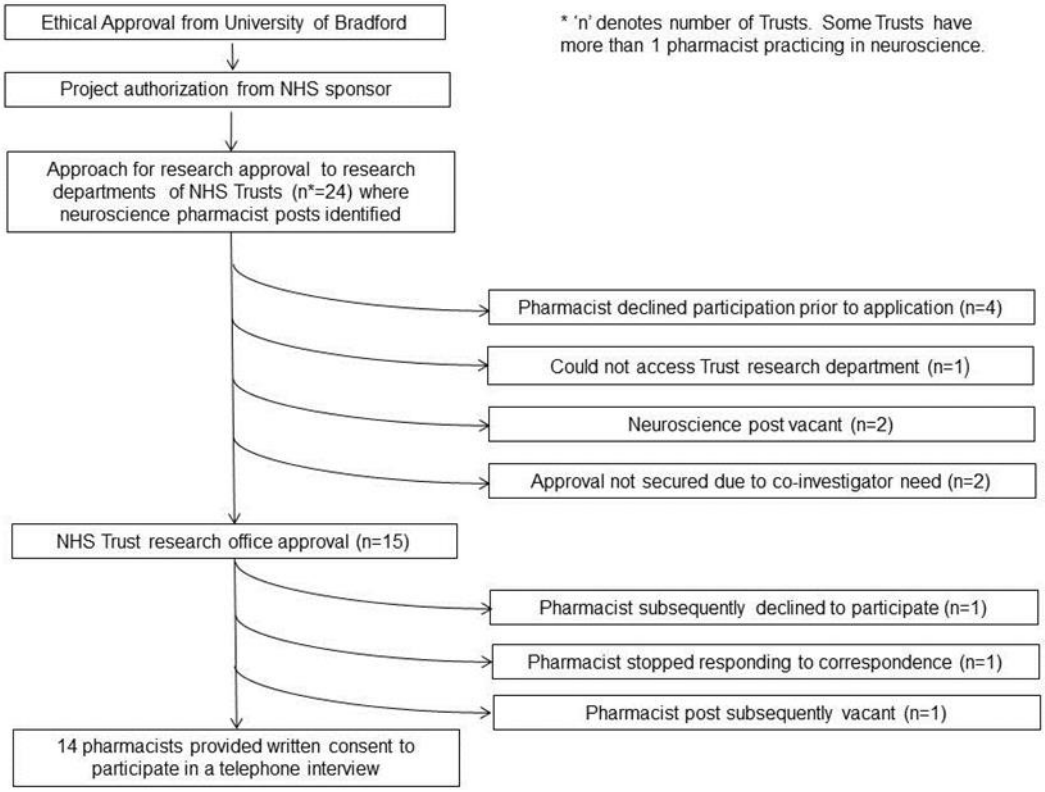

Figure 3. Summary of participant recruitment.

Recorded telephone interviews were undertaken instead of face to face interviews. The decision to undertake telephone interviews was a pragmatic one, based on the logistical and financial challenges of travelling to meet pharmacists to undertake interviews. While there are a number of video conferencing packages freely available I did not consider them necessarily to be readily available (to the potential participants) and sufficiently reliable to record interviews.

There are limitations to interviews. The accounts provided by participants are frequently historical ones subjected to interpretative renderings through time and subsequent experiences (Creswell, 2003). The relationship between interviewer and interviewee, and the context and way in which questions are asked can all affect the conversation and the data collected (Charmaz, 2006 , Kvale, 2007).

Telephone interviews presented challenges, not least the ability to make participants sufficiently at ease to disclose experiences and opinions of their professional role. Data collection in qualitative research involves a co-operation between the researcher and participant (Graneheim and Lundman, 2004). Morse (2007) asserts that establishment of trust from the participant early on in the interview is needed to gain relevant information from the interview. Without initial face to face contact the initial establishment of a rapport and trust can be a challenge. Furthermore telephone interviewing does not allow the researcher to detect non-verbal clues from the participants, such as facial expressions, body gestures (Birks and Mills, 2011).

I also considered that my dual role as a researcher and yet at the same time a professional peer to the research participants, could be a potential issue in gaining useful data. I perceived the issue could unfold in two ways. Firstly, participants, seeing me as a professional peer, might disclose and attempt to draw me into discussions about very specific aspects of their practice, for example the use of a specific drug therapy, which would potentially be of little value to the research project. Secondly, participants might be reticent to talk openly about their practice to a possibly judgemental peer.

I undertook the following measures to mitigate the issues associated with telephone interviews and my dual role as a researcher and pharmacist.

- Providing a written information leaflet about the research (Appendix 4) and taking formal written consent (Appendix 5) before research interviews to provide assurance of confidentiality.

- Establishing congenial, yet professional e-mail contact with the participants when trying to arrange a date and time for an interview.

- Discussing what the interview entailed with the participant immediately before it. In later interviews I asked the participants to consider it more of a chat or conversation than an interview (Kotchokova, 2013, Pers. Comm., 27th July).

- Noting all pauses, sighs or intonations of the participant within the interview transcripts.

- Emphasising my role as a researcher rather than a pharmacist in the information leaflet and again verbally prior to each interview.

In reflecting on the interview process, from the notes I made about the interview process after each interview; Appendix 6 (p.274) includes some memo extracts from my journals. I do not believe my role as a pharmacist was unduly detrimental to the flow of the conversations. Within a number of the interviews participants did attempt to engage me over specific clinical and professional issues in practice. I explained within the interview that I would be happy to discuss those issues immediately after the interview. That approach was satisfactory in all cases.

Telephone interviews were recorded using a digital voice recorder with an additional ear piece microphone to record the interviewee. Interviews were then transcribed verbatim by me using *Dragon Naturally Speaking* voice recognition software (Premium version 11.5, Nuance Communications Inc.). After initial transcription the interview was then played through again and compared to the transcript to allow correction of any initial transcribing errors. The use of voice recognition software approximately halved the time to transcribe each interview compared to manual typing. I had to manually type one interview transcript when experiencing a problem with the Dragon software.

Personal transcription of the interviews allowed opportunities for further familiarisation with the data and I made a number of notes and observations as the transcript text appeared before me for the first time on the computer monitor. By personally generating the transcripts I avoided the costs of a professional typist and avoided issues of confidentiality by not passing audio recordings to a third party.

It was not possible to pre-determine the number of interviews that would be required. A grounded theory study continues until theoretical saturation is achieved (see section 3.3.2.4). A total of fourteen individual research interviews were undertaken and transcribed for coding.

3.3.2 Data analysis

3.3.2.1 Coding

Coding is essentially a process to label and index varying forms of qualitative data for analysis, comparison, and identification of recurring events within the

data (Coffey and Atkinson, 1996). The processes of coding within grounded theory method vary depending on the version used – see Holton (2007), Strauss and Corbin (1998), and Charmaz (2006) respectively for guidance on coding in *Glaserian*, *Straussian* and *constructivist* grounded theory method.

A common feature of all coding approaches in grounded theory method is that coding moves from initially remaining very close to the data towards a higher level of abstraction as conceptual ideas about the data, and its theoretical integration to the central phenomenon, emerge from the study (Birks and Mills, 2011). I interpreted the ethos of using grounded theory method as a set of flexible rather than prescriptive guidelines and I chose to adopt an approach of moving from initial focused coding to higher level coding rather than consciously aligning myself to a particular coding strategy.

I coded my initial interview transcripts by undertaking a line by line analysis. My initial coding strategy was to remain close to the data and identify processes (Charmaz, 2006). I utilised significant *in vivo* coding and gerunds. I reviewed my initial coded transcripts with my supervisors. Appendix 6 (p.272) includes an example of coding from an early interview.

I assigned a further label for my codes in the format of *x.y* with *x* representing the interview number and *y* the line number of the code within the transcript. This labelling system enabled me to locate the corresponding text when I was undertaking data analysis and the constant comparative method by comparing findings from different interviews.

I listed all my codes initially within an Excel spreadsheet with their locational labels. I iteratively grouped my codes representing the same phenomenon. As

interviews proceeded I started to place my grouped codes within the worksheets of Microsoft OneNote and analyse them diagrammatically. I was able to move the codes around and maintain an electronic copy of the coding diagrams as they developed and an audit trail of my emerging analysis. By using Microsoft OneNote I could hyperlink my sheets to notes, memos and appropriate internet-based references to aid my developing analysis.

I maintained a researcher journal throughout the study both electronically in Microsoft OneNote and I maintained a paper notebook for ideas that would come to me on my daily train journey to and from work. I iteratively moved between my spreadsheets, coding diagrams, journal and memos throughout the research to review and progress my analysis and thoughts.

3.3.2.2 Theoretical sampling

Theoretical sampling is a key strategy for developing grounded theory (Birks and Mills, 2011). Draucker et al. (2007) have observed how theoretical sampling is differently undertaken within grounded theory method research studies. My interpretation of theoretical sampling was that as ideas and concepts emerged from the interview data I sought to explore and develop them further in subsequent research interviews. As there are relatively few neuroscience pharmacists and my research was focused within a defined substantive setting I did not have a large participant pool to sample from. Theoretical sampling was undertaken by modification of my interview questions. However I also retained an opening general question of asking people to describe their roles.

3.3.2.3 Higher level coding to develop the theory

As I began to group codes together through the comparison of the data I iteratively began to explore higher level concepts that began to emerge from the data. I found this process to be a fine balance between the identity that I held to some of the data by virtue of being a neuroscience pharmacist, and employing abductive logic to consider all possibilities for the data.

Birks and Mills (2011 p.59) concisely define theoretical sensitivity as *"… the ability to recognize and extract from the data elements that have relevance to your emerging theory"*. My concern was that I would only identify things in the data that resonated with my own practice. I acknowledge that my professional experiences aided in the construction of the theory but I did not intend for them to stifle that process and overlook other relevant data. Writing memos, constantly questioning my codes, and returning to the data were strategies that I employed to address these concerns and improve my theoretical sensitivity. Appendix 6 contains examples of memos and reflections that I made around the emerging concept of being a clinical generalist and specialist (5.5, p.115) and how I altered my interview questioning strategy in response to these reflections.

I was also attuned to the roots of constructivist grounded theory within symbolic interactionism and the use of language to construct reality. In this phase of higher level coding I regularly consulted dictionaries to check the definitions of codes or gerunds that I had labelled to data or concepts to verify the fit and relevance of those labels. I also wanted to retain the primacy of the participants' experiences within the theory and a number of *in vivo* codes are retained within the presented theory because I believe them to convey the constructed

phenomena. Examples include ‘Policing the formulary’ (6.3.1, p.149), and ‘Classis CPD’ (5.2.3, p.86).

I also turned to the literature around emerging concepts. I did not necessarily read the literature in great detail at this point but it sometimes highlighted different ways for me to think about my data.

3.3.2.4 Achieving theoretical saturation

Theoretical saturation is a contested concept with grounded theory method research, as to whether it represents the point where no new data codes occur or the theory is not able to be further developed. After interview twelve I did not feel that any new categories were emerging from *interview* data; I discuss the potential for observational data to develop the theory further in the limitations of the study (9.3, p.232). I undertook two further interviews which helped to generate useful data extracts that could illuminate the theory but did not serve to alter the concepts I had constructed. I therefore concluded the data generation phase of the study after fourteen interviews.

3.4 Ethical considerations

This section details the ethical considerations towards the participants of the research project and the research process itself. I will also outline the ethical and research permissions that were gained to conduct the study.

3.4.1 Ethical considerations towards the research

The ethical obligation to the research process is underpinned by a prior assessment of the value of the research i.e. the legitimate necessity to undertake it, and the utilisation of a robust methodology.

There was a legitimate need to undertake this research to address the gap within the pharmacy practice research literature, and to understand and support professional practice. A methodological description of the study, and its adherence to the principles of the grounded theory method, has already been provided in section 3.3. The rest of this section deals with addressing the ethical considerations towards the participants.

The use of interviews as the main data collection method entails direct involvement between the researcher and participants; a degree of trust from the participant towards the researcher needs to be built to enable honest disclosure of views and experiences and thus gain useful data (Orb et al., 2001). Underpinning the principle of trust is the concept of informed consent to participate in the research, so that participants understand why the research is being undertaken (Orb et al., 2001 , Richards and Schwartz, 2001 , Sture, 2010). Information leaflets were provided to potential participants to detail the reasons for undertaking the study and what was involved (see Appendix 4). Signed informed consent was obtained from participants willing to be involved before the research interviews were conducted (see Appendix 5).

Adopting a reflexive approach to the research harboured a reflective assessment of my performance as a researcher as well as analysis of the data, when analysing interviews. The iterative nature of the grounded theory method

allowed me to develop my interview technique. Appendix 6 contains memos and reflections on my interview technique. There is also an example of how I felt I may have been forcing data generation and altered my interview questions accordingly.

A further consideration of my dual role was what action to take in the event of a participant disclosing professional practice that was illegal or a gross breach of their professional ethical code. My researcher obligation of maintaining participant confidentiality and anonymity conflicts with my professional code of ethics as a pharmacist to report illegal or unethical practice (General Pharmaceutical Council, 2010). Johnson and Long (2010) assert that confidentiality cannot be maintained if the researcher is made aware of a serious issue and my professional code of ethics led me to concur with that assertion. Although I perceived it very unlikely to happen, given that the project did not seek to deliberately explore highly contentious or litigious areas of professional practice, the project information leaflet did include a statement of my professional obligation to report any unethical or illegal practice that was disclosed during research interviews. I re-emphasised this obligation at the beginning of each interview. I entered the study with a strategy to be cognisant to steer conversations away from topic areas if I felt there was a risk of such a disclosure being made. Such a scenario did not arise during the interviews.

3.4.2 Ethical and NHS permissions for the research

Independent ethical review is important to ensure research is appropriate to be undertaken. The Biomedical, Natural and Physical Sciences Research Ethics

Panel at the University of Bradford reviewed and approved the Project on 24th August 2012 (see Appendix 3).

Research governance approval for the project was granted by the research department of Sheffield Teaching Hospitals NHS Foundation Trust (see Appendix 3). The participants of the study were NHS staff and under guidance from the NHS Health Research Authority the project did not require review by a NHS research ethics committee (Department of Health, 2011a). Before formally approaching and consenting each participant, I was required to obtain permission from their NHS Trust research department to conduct the research interviews. To maintain the confidentiality of the participants I have not included within the appendices, research permissions from the individual Trusts.

There was considerable variation in the requirements from each Trust's research department. These requirements ranged from providing just a covering letter outlining the intended research, to the need for an 'Integrated Research Application System' account and the need for a site-specific co-investigator. I had not anticipated the need for such a high level of detail. I learnt that if I intend to conduct further research with pharmacists across the NHS, not to underestimate the research permission process.

3.5 Study participants

To maintain their anonymity each participating pharmacist has been assigned a pseudonym. A brief and non-specific overview of each pharmacist is provided to assist the reader in placing the interview quotes in context of the pharmacist's professional experiences. Given the relatively small number of neuroscience pharmacists I have not specifically detailed the duration of professional qualification of each pharmacist, to maintain anonymity. Instead I have characterised them by being experienced (5 to 10 years of professional qualification) or very experienced (greater than 10 years of professional qualification).

I have chosen to assign pseudonyms to each participant rather than a study number because I wish to convey the study findings as those of human professional experiences.

(1) Michael: Michael is a very experienced senior pharmacist with a lead pharmacist role within a large teaching hospital Trust.

(2) Kate: Kate is a very experienced senior pharmacist with a lead pharmacist role for neuroscience in a large teaching hospital Trust.

(3) Belinda: Belinda is a very experienced clinical pharmacist with a lead pharmacist role for neurology within a large tertiary neuroscience service.

(4) Beth: Beth is an experienced pharmacist working within a neuroscience rotational role in a large teaching hospital

Trust.

(5) Natalie: Natalie is a very experienced pharmacist working in a mid-sized NHS Trust. Part of her role comprises a lead clinical role for the neurology service.

(6) Laura: Laura is a very experienced clinical pharmacist working as part of a pharmacy team within a large tertiary neuroscience service.

(7) Lisa: Lisa is a very experienced senior clinical pharmacist with a lead pharmacist role within a large tertiary neuroscience service.

(8) Billy: Billy is a very experienced clinical pharmacist with a lead pharmacist role within the neuroscience service of a large teaching hospital Trust.

(9) Patti: Patti is a very experienced pharmacist with a lead pharmacist role in the neurology service of a teaching hospital Trust.

(10) Polly: Polly is a very experienced pharmacist in a large teaching hospital Trust who has previously worked in a clinical role within the neuroscience service of that organisation.

(11) Lauren: Lauren is a very experienced pharmacist who has a lead role for a tertiary neuroscience service within a large teaching hospital Trust.

(12) Megan: Megan is an experienced pharmacist working as part of a pharmacy team within a large tertiary neuroscience

service.

(13) Sally: Sally is a very experienced pharmacist working within a mid-sized NHS Trust. She is assigned pharmacy responsibility for a neurology service.

(14) Sophie: Sophie is a very experienced pharmacist working as part of a pharmacy team in a large tertiary neuroscience service.

4 Introducing the grounded theory

The processes of data generation and analysis, as described in the previous chapter, resulted in the identification of three conceptual processes within specialist clinical pharmacy practice in neuroscience. These processes are:

(1) Acquiring and utilising knowledge.

(2) Gatekeeping access to drugs.

(3) Integrating into the neuroscience service.

Theoretical abstraction of the data resulted in the identification of the basic social process for clinical pharmacy practice in neuroscience of 'Maintaining an overview of drug therapy for patients with neurological disease'.

The three conceptual categories are presented sequentially within the next three chapters. The core category of maintaining an overview is set out in chapter 8. The theory is presented firstly in their own right (chapters 5 to 8) with extracts of interview data to illuminate the analysis. By presenting the theory first I have followed the recommendations of Charmaz (2006) and Birks and Mills (2011) to facilitate the reader in judging the merit of the theory without having to unpick it from discussion.

5 Acquiring and utilising knowledge

5.1 Introduction

This research study set out to explore how pharmacists in neuroscience develop within their role, to understand what differentiates their practice as assumed specialists in their clinical field from the non-specialist pharmacist. A strongly emergent conceptual process from the interviews with the pharmacists is a two stage process of acquiring knowledge and then utilising it in their clinical practice.

Clinical pharmacy practice in neuroscience is focused on drug use for neurological disease. The knowledge base that pharmacists develop to support clinical pharmacy practice centres on two aspects:

(1) Knowledge of neurological disease

a. The clinical manifestations of neurological disease

b. The pathological processes of neurological disease to:

i. Rationalise the mechanism of action (pharmacology) of drug treatments.

ii. Understand the prognostic implications of the disease i.e. the risks of morbidity and mortality.

(2) Knowledge of drug therapy for neurological disease

a. The clinical application of drugs to treat neurological disease with:

i. The expectant benefits of drug therapy.

ii. The expectant risks of drug therapy.

b. The organisational rules around drug use:

i. In what circumstances drug therapies can be used and how to give them.

ii. What needs to be undertaken to authorise drug use i.e. gatekeeping issues.

The drug knowledge types listed in 2b help pharmacists to navigate around the issues of gatekeeping access to specialist drug therapies for neurological diseases. This knowledge type and the process of gatekeeping access to drug therapy are presented in chapter 6. This chapter focuses on the other aspects of knowledge that are outlined above.

Lay definitions of knowledge place emphasis on the experiential or educational acquisition of facts and information (Oxford Dictionaries, 2014). These processes are evident among the data generated from this study. More fundamental discussions around knowledge identify it as a basic commodity that humans require to make sense of the world around us (Beijerse, 1999). This study data identified three forms of knowledge that neuroscience pharmacists utilise, and how these serve as reference points to make sense of and guide their clinical practice. Figure 4 summarises the three identified clinical knowledge types; sections 5.2 to 5.4 present and discuss these sequentially.

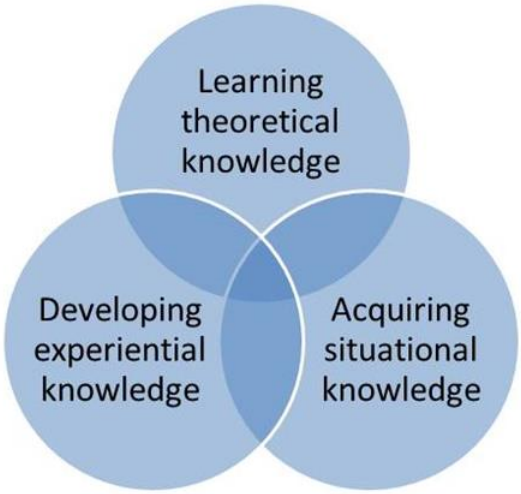

Figure 4. Acquisition of knowledge types.

The study data also illuminate a tension within professional practice of balancing developing specialist knowledge in neuroscience whilst maintaining the broader clinical knowledge base. Running concomitantly to the knowledge acquisition processes of Figure 4 is the need for knowledge to support general clinical practice in other areas outside of neuroscience. Section 5.5 outlines this tension, and how pharmacists respond to that.

Section 5.6 presents a process of how the relative utilisation of different forms of clinical knowledge changes as clinical practice in neuroscience develops. Through exploring the processes of knowledge acquisition, the data also indicated perceived barriers and facilitators to these processes. These findings

have important implications for supporting professional practice that which are discussed further in section 9.2.1 (p.214).

5.2 Learning theoretical knowledge

5.2.1 Navigating early practice

Most of the pharmacists interviewed entered into a clinical post in neuroscience with little previous professional exposure to, or knowledge of neurological disease. Reasons for taking up a clinical role in neuroscience were varied, but commonly the job vacancy arose at the right time for that person and neuroscience seemed an attractive proposition as a clinical pharmacy specialism.

> I came to the end of my diploma and started looking for what was at the time, the D grade jobs, and they got funding within the hospital I was working in at the time and the neurology job came up and it just seemed perfect. So I kind of a didn't really have any experience so it wasn't that we had, that I'd done a rotation and really loved it or anything. But there is a lot to get your teeth into it neurology so it just seemed a good choice really.
>
> Belinda [3.115]

> …it [neurology role] was offered to me – “do you want to do it?” And I thought, yes why not, I’ve never done it before, why not do it (laughs). So that's how I kind of fell into it really, more by accident (laughs).
>
> Sophie [14.54]

Laura alludes to a more widespread lack of knowledge of neurological disease in pharmacy practice, beyond the most prevalent disorders. The identification of

this knowledge deficit arises through observations of her rotational pharmacist colleagues as they enter a period of practice within her neuroscience unit.

> Generally, I think there's a lot deficit in neurology knowledge in general. I mean what you normally know [of neurology] as a band 7 [pharmacist] is the basic Parkinson's [disease] and a little bit about epilepsy. Anything that comes outside is new and different…
>
> Laura [6.265]

Laura describes receiving a high volume of enquiries initially from junior pharmacists as they enter the neuroscience rotation to verify the appropriateness of unfamiliar drug treatments they encounter.

A similar observation of general pharmacy practice is made by Lauren in that she identifies a general lack of pharmacists' exposure to neurological disease. Lauren also identifies a diversity of neurological disease through an extent of disease sub-types.

> **One thing you mentioned there was that they [junior pharmacists] said it [neurology] was different. I just wondered what they meant by that?**
>
> I think sometimes they haven't done neurology before and I think it is also because it's very specialised, and it's neurology. But then you've got this very specialist areas within that you know what I mean. So you've got your MS [multiple sclerosis] and then you've got neuromyelitis optica and "Oh what's that?" And then the next thing is NF2 [neurofibromatosis type 2] and they've never heard of that before.
>
> Lauren [11.309]

The neuroscience pharmacists identify initial deficits in their clinical knowledge of neurological disease and its treatment and seek to address these deficits in knowledge by learning about neurological disease. I have termed this form of learnt knowledge as theoretical knowledge; it is knowledge that is consciously

gained outside of everyday practice. It is the knowledge that is used to make sense of clinical practice.

Theoretical knowledge assumes a prominence in the early stages of clinical pharmacy practice in neuroscience. As the pharmacists enter unchartered areas of specialist clinical practice they seek to make sense of the new diseases and forms of drug use they encounter and to establish the conformity of these phenomena to *normal* practice. The theoretical knowledge the pharmacists learn provide points of reference to make judgements about the normality and acceptability of the new clinical practice they encounter. In these early days of specialist practice and in the absence of experiential knowledge, which is developed over time through clinical practice and experience (section 5.3), the pharmacists otherwise lack points of reference to make sense of the new clinical scenarios they practice within.

5.2.2 Making sense of new practice in specialism isolation

The initial need to find theoretical knowledge, references for drug use, is prominent amongst although not confined to the pharmacists who practice in speciality isolation i.e. as the only specialist neuroscience pharmacist within their organisation. When pharmacists practice in specialism isolation they cannot easily compare their practice with peers, who serve as another point of reference in their learning. This feeling of professional isolation was offered by several of the pharmacists often when debriefing towards the end of the research interviews.

Belinda disclosed her feelings of isolation after I had felt it necessary in the interview to interject and reassure her that an aspect of her practice which she

had just disclosed was similar to that of other pharmacists. She wonders about how her practice compares to her neuroscience pharmacist peers and in the absence of that knowledge, this brings feelings of uncertainty about the competency of her practice.

> Oh good (laughs). You just you know feel very much isolated because you're the only one [neuroscience pharmacist] in one hospital. I sort of sit here and think oh God all the other people [neuroscience pharmacists] across the country they've probably in their post for years and years and years. That's probably a bit of a warped idea and they know loads more than I do. They wouldn't have done originally.
>
> Belinda [9.469]

Lisa also disclosed how hearing the experiences of other neuroscience pharmacists provided some reassurance that the practice she encountered was *normal,* in that it conforms to practice in other centres.

> What was interesting, you know the pharmacy conference last year and I came to you[5] and there were things that you said then which made me think oh actually I'm not alone in this because it is quite different to a lot of other specialities. I've not had much opportunity to network with other people that work in neuro so that, even that little thing where you mentioned other things it's quite interesting to hear okay, maybe that's normal for neuro[logy].
>
> Lisa [7.680]

Polly recalls the challenges of trying to make sense of previously unmet drug therapies and how she would look to other neuroscience centres as sources of theoretical knowledge to make comparisons with the drug use she is exposed to in practice. She acknowledges these experiences in a time before the formation of a professional (UKCPA) network for neuroscience pharmacists.

[5] I had delivered an educational talk about epilepsy and headache at a pharmacy conference which the participant had attended. She approached me afterwards to discuss some aspects of my presentation.

> I found there wasn't a huge amount of support out there at that point. It was just at the point where the UKCPA [neuroscience] group was beginning to take off, even a little bit before it really. So it didn't feel that there was a huge amount of resource to go to find out why somebody would be on something bizarre and had anybody used it before. So we'd do things like call at the pharmacy in [Specialist Hospital] and get some idea of whether they'd used it before and if they had any protocols or guidelines that they would be happy to share.
>
> Polly [10.215]

The benefit of the UKCPA network is highlighted by Beth when we were discussing the progression of her career. Beth acknowledges the benefit of the network for gaining insight into the practice of her peers. By putting practice issues and queries onto the network she will not only gain knowledge for the specific issue but be able to judge how the practice she encounters compares to that of peers.

> I think it's a great opportunity to not just network but to see what's going on and get an insight into other people's practice. To make connections and know that you can always you can always put something on there without, I don't know what the proper word is, but without prejudice. You can write on there and you know you'll get a response. It will either be an answer or at least advice.
>
> Beth [4.499]

These data reveal how practicing in specialism isolation can heighten the difficulties pharmacists experience in finding reference points for comparison of their clinical practice to *the normal*.

5.2.3 '*Classic CPD'* – strategies for learning theoretical knowledge

Having identified gaps in their knowledge base from encountering new practice, the pharmacists seek to address those gaps through learning about

neurological disease and its treatment. Undertaking continual professional development (CPD) was a common answer provided when the pharmacists were asked how they sought to develop their clinical knowledge in neuroscience. An interpretation of CPD provided by Polly, and also similarly provided by Billy, is to identify and fill gaps in their knowledge base.

> … I suppose it was classic CPD but it wasn't really recorded in such a way at that time. It was just like you would come across something, I wouldn't know much about it. I would then go and try and find out more about the disease and how the drugs work within the disease.
>
> Polly [10.362]

The pharmacists identified various strategies for developing their clinical knowledge in neuroscience; these are summarised in Figure 5.

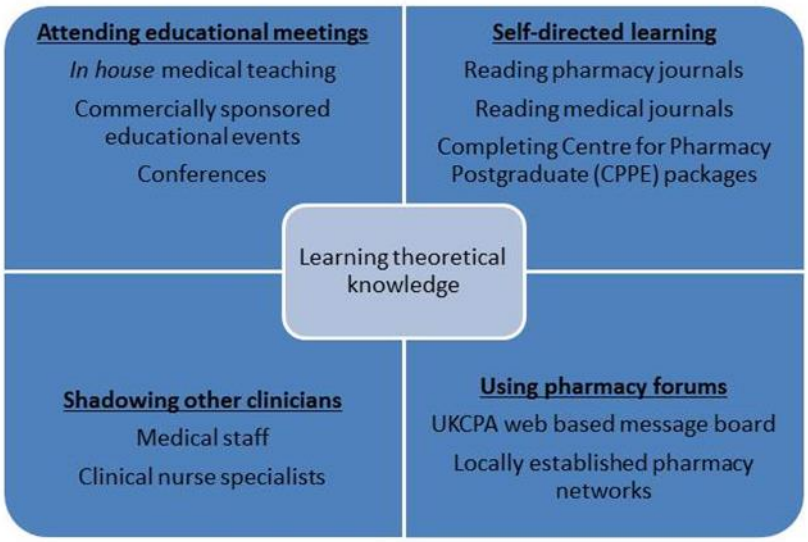

Figure 5. Strategies for learning the theoretical knowledge of neurological disease.

The effectiveness of CPD strategies is variably perceived. Self-directed study, reading around the subject, was a commonly employed strategy to develop theoretical knowledge. A lack of pharmacy specific educational material and events was noted. One of the common strategies for learning about neuroscience was to attend the in house teaching provided for medical staff.

Pharmacy specific educational material about neurological disease was identified in general pharmacy journals such as the *Pharmaceutical Journal* and *Clinical Pharmacist*. It was sometimes perceived however that general pharmacy educational material was not of a sufficient level of detail to support

specialist practice. Conversely review articles in medical journals or textbooks could be overly technical and esoteric to provide a rudimentary introduction into a specific neurological disease, or not concentrate sufficiently on the drug therapy. Some pharmacists, like Sophie, feel there are limitations to this form of learning.

> I just did my own research, my own reading. It was quite difficult because you can only learn so much from textbooks, theoretical things.
>
> Sophie [14.72]

As pharmacists become established into their post the demands of the role and maintaining a work - home life balance mean that initial intentions of learning about neurological disease can fall by the wayside. Pharmacists made efforts to gather educational material but did not always get around to studying it as their time became limited.

> …I've not had chance to, I've got files full of articles that I have never just got to the bottom of reading which I would like to have done but you know I haven't managed to. So really it's just been sort of learning on the job really as I've gone along. You know anything unusual I've looked up but not really in any depth which is incredibly frustrating. I was hoping that one day I will be able to but it never quite arrives (laughs).
>
> Belinda [9.298]

> …all the other demands of my role just didn't allow time for that [spending time with clinical nurse specialists]. So I just had to do some reading and I attended talks and that kind of thing when I got a chance.
>
> Lisa [7.101]

> And again I've got a few CPPE packs that are on my coffee table at home (laughs), but they are there, I do physically have them, and a couple of books and stuff but it's really difficult to [find time to read them]…
>
> Megan [12.563]

Pharmacists also become less reliant on theoretical knowledge as their experiential knowledge base develops (see Figure 7, p.130).

5.2.4 Signposting to clinical guidelines

The interview data evince pharmacists' affinity towards clinical guidelines as theoretical knowledge sources. Clinical guidelines seek to standardise practice; in the practice of neuroscience, clinical guidelines cover the treatment of a specific neurological condition or condition groups, or the use of a specific drug treatment.

Clinical guidelines are concentrated sources of information that can bring together multiple information and evidence sources to guide the practice of *how to* use a drug or treat a specific neurological disease. Clinical guidelines may define the conditions in which a drug may or may not be used, the dose or dose range to be used, the exact method of administering the drug and the specific monitoring required to assessing therapeutic and adverse effects. Within the interview data *policy* and *protocol* were mentioned as coterminous descriptors to *guideline*. While these synonyms might be construed differently in their prescriptive intent, they convey the same concept of a guiding framework for drug use; for consistency I have used the term *clinical guideline* except where its synonyms are presented within the interview data. Neuroscience

pharmacists encounter clinical guidelines with scope at varying organisational levels, as summarised in Table 3 below.

Table 3. The organisational levels of clinical guidelines.

Organisational level	Examples
Micro-level	Unit / departmental guideline
Meso-level	NHS Trust guideline
Macro-level	National guideline e.g. NICE guidance, NHS England

Where the pharmacists are responsible for inducting or mentoring junior or rotational pharmacist colleagues, they often *signpost* the available guidelines to their colleagues as part of the induction process.

> … we have our standard training tools. Obviously we go through [with pharmacists] all the policies and protocols and things…
>
> Kate [2.359]

The affinity that pharmacists can hold to guidelines is illustrated by the response Natalie gave when I asked her how she might define specialist pharmacy practice in neuroscience.

> Being able to know the NICE guidelines like the back of your hand and quote things like that. I suppose it's being able to quote your trials which sometimes you just can't just because there's that many (laughs).
>
> Natalie [5.436]

This response infers that practice can be standardised based on evidence, then learnt, understood and followed. Natalie's response refers to standard reference points (guidelines, evidence base) that practice can be compared for

confirmation of conformity to these standards. This opinion of clinical practice in neuroscience however is not universally held; this disparity with other practitioners' viewpoints is explicated in the next section.

5.2.5 Encountering the weird and wonderful of neurology

Ten of the fourteen pharmacists practice in tertiary neuroscience centres. Practice within tertiary centres is often described as involving exposure to challenging or difficult clinical cases or rare conditions that could not be managed in local hospitals. Where clinical guidelines or standardized therapies do exist they have invariably already been tried and were not successful.

Michael, Beth, Laura, Billy, Polly, and Megan, who all work in regional neurosciences centres described, unprompted, the "*weird and wonderful"* of neurology. This term is a reference to often rare neurological conditions with uncommonly used drugs or drug usage outside of the parameters of what might be considered routine practice. Laura describes the British National Formulary (BNF), the standard drug monograph compendium reference in UK clinical practice, not giving much away. This alludes to indications for drugs, doses prescribed and indeed the drugs being used being outside of *routine* clinical practice in the UK. Table 4 overleaf presents a typology of the weird and wonderful drug use in neuroscience as identified from the interview data.

Table 4. A typology for the 'weird and wonderful': non-routine forms of drug use.

Conditions of drug use	Examples from the data
Off-licence drug use:	
Use of a drug outside of the indications permitted by the drug licensing authorities.	Rituximab for neuromyelitis optica (Devic's disease).
Deviation from the licensing authorities dosing recommendations for drugs by:	
Exceeding maximum recommended dose.	Indometacin for headache syndromes.
The recommended dose titration schedule.	Rapid dose titration of anti-epileptic drugs.
Unlicensed drug use:	
Use of a drug that does not have a marketing authorisation (licence) – a *pharmaceutical special.*	3,4-diaminopyridine for Lambert-Eaton myasthenic syndrome. Intrathecal baclofen for spasticity. Buccal midazolam for epilepsy.
Use of an imported drug that is not licensed and marketed in the UK.	Sulthiame for epilepsy.
Use of substances not classified a medicinal product for a therapeutic purpose.	Co-enzyme Q10 (uniquinone) for myopathies.

The nature of clinical practice in tertiary neuroscience centres, often involving *difficult* or rare cases of neurological disease, leads to more nuanced drug therapies and therefore practice does not necessarily lend itself to the formation of standardised clinical guidelines. Billy feels that working often without guidelines is the main difference from his previous role in a medical speciality. Megan who practices in a large tertiary centre identifies how a paucity of guidelines can be a challenge for junior pharmacist entering a rotation in neuroscience under her supervision, particularly when they have been used to clinical guidelines in other appears of practice.

> We do think they [junior pharmacist] struggle… they come from where they've been in cardiology, respiratory where there is a NICE guideline for everything. A NICE flowchart and a step-by-step how to introduce bisoprolol and you don't get that here, you don't even hardly get any Trust guidelines…
>
> Megan [12.606]

The majority of pharmacists describe being involved in the development of clinical guidelines. The interview data highlighted differences amongst neuroscience centres in the prevailing culture of the acceptance of clinical guidelines. Michael devises protocols for new medicines which he perceives to be helpfully received by the consultant staff he works with suggesting a culture that was embracing of guidelines.

> There was [sic] a lot of things we had to do around that [drug] patient information leaflets and policies and procedures and supportive therapies, protocolising things and standard drug charts for it etc. etc. etc. So that stuff was all just 'Thank God you're here Michael because we [medical staff] wouldn't have known what to do without you…
>
> Michael [1.139]

In contrast, Megan has encountered resistance to the development of guidelines within her practice.

> … they're [medical staff are] much less policy driven, much less guideline driven than… Probably because of the nature of the conditions we deal with. You know some of them are so niche you don't have a general guideline for them but they just don't have general guidelines and policies… They're coming round to that but it's still a bit (pause), you know, "we've always done it this way and why are we having to do this now?"
>
> Megan [12.113]

5.2.6 Summary

As pharmacists enter into clinical practice in neuroscience they encounter new disease states and forms of drug use. Pharmacists seek to learn theoretical knowledge about neurological disease and its treatment, and seek to locate appropriate clinical guidelines. These forms of theoretical knowledge serve as points of reference to enable the pharmacists to assess the conformity of the clinical practice they encounter towards a *normal* practice. Within neuroscience the pharmacists identify difficulties in accessing appropriate learning materials and a relative lack of clinical guidelines and standardisation of practice. The deficiency of relevant theoretical knowledge sources can make initial practice in neuroscience challenging for pharmacists as they struggle to make sense of the practice they encounter.

5.3 Developing experiential knowledge

Experiential knowledge is knowledge gained through the experience of direct professional exposure to neurological disease and its treatment i.e. seeing real life patients and directly observing the effects of drug treatments.

Experiential knowledge can help to consolidate theoretical knowledge. However in everyday clinical work, pharmacists can encounter practices that may differ from the theory they have learnt or, what they have previously understood to be the normal acceptable practice. Through the development of experiential knowledge, pharmacists begin to alter their points of reference for the parameters of acceptable practice.

Experiential knowledge does not purely define clinical knowledge but encompasses ways or working, processes and prevailing cultures within neuroscience units which is encapsulated by Natalie.

> I've got a lot more knowledge about particular diseases that just comes with time and working on the ward and knowing what nursing practices are and how it all gels together really.
>
> Natalie [5.86]

5.3.1 Resetting the reference points for the parameters of drug use

In the clinical specialism of neuroscience, pharmacists can encounter new practices of drug usage that do not conform to what they have previously learnt or been exposed to. Forms and examples of non-routine drug use have been provided in Table 4 (p.93). The parameters for drug use, for example the disease that a drug is used to treat, or the doses at which drugs are prescribed, do not match the pharmacists' reference points for acceptable drug use at that

stage of their practice experience. Pharmacists may be exposed to completely new drugs or neurological diseases not previously encountered. In these situations the pharmacists may have no, or very faint, reference points to assess and make sense of the clinical situation. Over time the pharmacists can reconcile the differences in drug use between what they have previously learnt (the theoretical knowledge) and what they see in practice (experiential knowledge) to alter their parameters for acceptable drug use that accommodate these newly encountered drug practices.

Patti's account of her practice exemplifies this process: she changes the acceptable dose parameters for the non-steroidal anti-inflammatory drug indometacin from what she has previously learnt from the licencing guidelines, to a dose that is commonly prescribed by a consultant neurologist she works with.

> I guess I'm sort of open to these bizarre things because I'm still learning about it all, not seeing it all. It's like seeing very high doses of indomethacin[6] prescribed that I've had to query with the consultant they are unlicensed [doses] that he does use.
>
> Patti [9.288]

In Lisa's neuroscience unit neurological sub-specialities tend to be grouped together on specific wards. The organisation of the wards increases the exposure to similar clinical conditions and scenarios for the pharmacists visiting the same ward each day. Lisa's observation of this pattern of working illustrates how time and repeated exposure to practices that are initially perceived to be

[6] Indometacin and indomethacin are names for the same drug. Indometacin is the approved name for this drug under the current nomenclature; indomethacin is the name under the previous drug nomenclature system.

unusual helps to reset the reference points for acceptable drug use which can be incorporated into the specific practices within the unit: the *unusual* becomes the *normal*.

> We've got another one [ward] which is a neuro oncology ward. I suppose within that, on the wards they're [pharmacists are] seeing a bit more of the same thing and a bit more of the unusual stuff together than they might be when they were covering one of five wards and patients were spread all over the place. So that probably helps a bit because the more you see it, the more quickly I suppose you get used… Yes it's an unusual thing in general but this is what's normally done here.
>
> Lisa [7.434]

Pharmacists do not necessarily alter the reference points for the parameters of acceptable drug use immediately. They do not take on face value that different forms of drug use are acceptable. Through answering my question of how she would define an expert neurology pharmacist, Patti explicates the reconciliation process further by explaining how professional exposure to drug treatments provides assurance of having seen them given without adverse consequences.

> (nervous laugh) I think I'd struggle to agree that I was that person [an expert pharmacist]. Just because (sighs) I don't feel I've got the experience to be the expert.
>
> **So you feel experience is an important thing?**
>
> Yeah. Because you see so many bizarre things [drug treatments] don't you that don't appear to be written down anywhere very clearly. So it's experience of coming across those things and seeing them being given without any problem.
>
> Patti [9.438]

5.3.2 Getting professional exposure to neurological disease

Experiential knowledge is by its nature of clinical exposure, a reinforcing knowledge type. The importance of getting sufficient exposure to neurological disease was raised by a number of pharmacists. Natalie identifies the importance of daily working for maintaining her *to-hand* knowledge base.

> **Is there anything you think that's really helped you to develop your role?**
>
> Err (pause) definitely the day-to-day on the ward helps because there was a short time when I was moved off the neurology ward and had to cover different specialities. And I think you do lose that, you do not knowing what happens on a day-to-day, at ground level sometimes.
>
> **Can you give sorts of examples of things that you mean by that?**
>
> Just for example if somebody came in fitting and knowing that they weren't on any epilepsy medication, what we use, this is what we use in a stroke patient so it's… Yeah. So it's things like that, knowing things like that off the top of your head which if you didn't work, you know, if you were looking after a respiratory ward [instead] you sometimes lose, you know, what happens.
>
> Natalie [5.344]

At the end of the previous subsection, Patti identified the importance of actually seeing drug treatments given and therefore the tangible assurance that the *bizarre* treatments she encounters are given without problem. Sophie identifies a concern that she does not have the experience of seeing the therapeutic and adverse effects of drugs on patients once they have left the hospital in order to help her generate a tangible repository of real life cases.

> Because often we just give out loads of drugs here but we never see the patient again so you don't have that, I guess the other side of it saying well the patient came back a few weeks later or the patient came that because had this side-effect. You never really get to see that side of it because you don't follow them up in clinic or anything.
>
> Sophie [14.579]

Similarly Polly was not always able to follow through the patient journey of complex clinical cases she was involved in, as the patients care could be transferred to more specialist centres.

> Like the really, really complex patients get shipped down to [specialist centre] to be reviewed and so you kind of got bypassed and actually didn't find out what they were doing to be able to follow the patient up carefully and completely.
>
> Polly [10.272]

There can be a wider issue in clinical practice of attaining sufficient professional exposure to neurological disease. Lisa perceives this as a challenge in neurology, the medical treatment of neurological disease. In Lisa's neuroscience centre patients with neurological conditions are not in the main treated as inpatients by neurologists, yet Lisa's clinical practice takes place predominantly in this setting.

> … in [other specialities], a lot of the clinical stuff you're expected to know about you would actually see day-to-day on the wards because you have patients with [common diseases] coming into the wards regularly.
>
> Where as in neurology, yes some of the patients with neurological diseases do come in but to a much lesser extent and the bulk of it seems to be managed in outpatients so I didn't have that sort of automatic connection with them to get those bits of knowledge with everything.
>
> Lisa [7.82]

The perception of not gaining sufficient professional exposure can arise from comparison to other clinical practitioners – medical staff and clinical nursing specialists in particular, clinicians who are at the forefront of patient management.

> There's [sic] quite a lot of clinics that they [clinical nurse specialists] hold so sometimes if they're at the forefront of managing the patient…
>
> Natalie [5.130]

Getting sufficient exposure to neurological disease to develop experiential knowledge is a perceived challenge of clinical pharmacy practice in neuroscience.

5.3.3 *Getting a feel* for neuroscience and dealing with the unknown

As pharmacists encounter more clinical practice in neurology they develop their knowledge base. Through clinical experience, pharmacists form a tangible *feel* for the diseases and drug use they are encountering. They reconcile the theoretical knowledge they have learnt about neurological disease with the experiential knowledge they have gained through their practice of seeing patients with neurological diseases being treated with drugs. This process is best described by Laura, a very experienced pharmacist in neuroscience.

> **So when you're getting these obscure, niche things [drug therapies] how do you decide whether they're appropriate?**
>
> I think that is [many] years of experience (laughs). I don't underestimate experience. You do get a feel for… You have got a big knowledge about all these conditions after a time and so I think when I first started and I came up across all these new conditions I actually had to sit down and read up so when people come with certain requests I either have come across them previously or I know where to look to see what's happening.
>
> Laura [6.185]

The diversity of neurological disease encompassing a range of rare and orphan diseases means that even experienced neuroscience pharmacists can be

confronted with previously unmet conditions and situations; Laura describes the *"…conditions you might come across once every 10 years".* Experiential knowledge is identified as an important tool to deal with these situations as identified by Billy below.

> You have to deal with using your knowledge that you gained and experience that you gain to help out with a scenario that there is no evidence or no guideline.
>
> Billy [8.307]

Laura recalls a specific neurological condition of copper deficiency and how she kept notes and references from the first time she encountered this and how that helped her with subsequent cases.

> We've had patients with copper deficiencies where we were looking for oral copper preparations years ago in somebody who was copper deficient and then about 10 or 12 years later somebody else asked and I remember that I did huge calculations of what copper content was in different sources and I luckily found all of the old papers I had. So sometimes you know things come back and you know where to look basically. You might not retain all the information that if you come across certain things you know where to look, you know where you are most likely to get a good answer.
>
> Laura [6.373]

Similarly, through the practice of encountering neurological disease, Polly has developed a folder of notes and theoretical knowledge sources, references for the *weird and wonderful.* This repository serves as signposts to guide colleagues who have followed in her footsteps walking through clinical practice in neuroscience.

> And we give them some background but we've got quite a lot of files in our clinical information on our intranet that the pharmacy section gives them a lot of information for the weird and wonderful things that go on.

> So the routine ones they would never come across. It's one of those things that you are specialists in an area and they see it all the time, nobody else gets to see it at all and then when somebody goes into it new they've never come across but it's something that is done on a regular basis. So things like that we try to keep information about so that there is [sic] now files and records and references for them to refer to.
>
> Polly [10.300]

5.3.4 Summary

Experiential knowledge is knowledge gained of neuroscience from tangible experiences in clinical practice of seeing neurological disease and drug treatments being given. As pharmacists encounter unusual practice experiential knowledge helps them to reset the reference points for the parameters of usual and acceptable practice. This reconciliation process is a gradual one, reliant on professional exposure to the clinical practice which provides pharmacists with reassurance. The diversity of neurological disease and rarity of some of its forms, and the breadth of pharmacists' roles can dilute their professional exposure to neurological disease to develop experiential knowledge. This dilution of exposure can be perceived as a challenge in clinical practice. Pharmacists can recognise the importance of turning their experiential knowledge into theoretical knowledge by making notes and keeping reference material they have collated in dealing with rare or complicated cases of neurological disease.

5.4 Acquiring situational knowledge

Situational knowledge is collateral information that is patient or situation specific, gained for judgement and decision making. Situational knowledge

provides context with which to assess the appropriateness of drug therapies and treatments for the individual patient. Sophie identifies the importance of situational knowledge: she identifies a cautionary tale of how individual patient factors, in this case the patient not being able to swallow a capsule, can override all other considerations in prescribing a drug therapy.

> So you always get this – we want to use this drug and it's all like this but then nobody has thought can the patient actually take it. For whatever reason, they can't swallow and we can't crush the capsule. So medically they [doctors] spent a lot of time and effort looking at these things and then forget that the patient has to take it and they can't take it. So where's the thought process in that?
>
> Sophie [14.210]

5.4.1 *Scratching the surface* to find situational knowledge

Situational knowledge needs to be actively gained. *Scratching the surface* is an *in vivo* code described by Billy for gathering patient specific information. In Billy's metaphor of *scratching the surface,* the patient drug chart serves as the metaphorical *surface* to be scratched through. The drug chart is an electronic or paper order list of drug prescriptions for the patient, which also serves as a record of drug administration. Billy alludes to the basic activities in clinical ward pharmacy of reviewing a patient's drug chart, which can be done remotely without seeing the patient. Information about a patient's ability to take drug therapy, such as issues with cognition, dexterity and vision, cannot necessarily be gleaned from the drug chart.

> I think it's about (pause) from experience you can easily, pharmacy can be very closed and you can do your own job, make sure the charts are safe etc., supplies of medicines and walk off. But if you scratch the surface and find out things that the patient can't… has got eyesight problems or dexterity problems or cognition… [says nothing further]

So you sort of mention there that people just go on, do the basics if you like (interrupted)…

And yes the medicines will be safe, they will be correct hopefully but they may not be aware the patient's got hemianopia, or can't manage… or certainly the social aspects, what happens at home – do they have support at home, that sort of thing.

Billy [8.73]

Billy's observation of pharmacist colleagues being rather "closed" suggests an inter-individual variation in each pharmacist's inherent ability and motivation to pro-actively scratch the surface, to look beyond the drug chart. Polly makes a similar observation, in that her junior colleagues focus on the drugs in isolation, rather than linking the drugs to the patient, citing lack of experience as a factor for this.

…they don't know what they don't know. They can miss lots without even having a clue that they're missing stuff. They're almost doing a patient safety check for the medicines but not actually looking into what the patients on why there on it, why the patient's sodium might not be right. They're just not really picking up on some of those things.

And why do you think that is?

I think it's just experience and it's an awareness that they just don't get to see specialist patients in the same way.

Polly [10.312]

Lisa identifies a variation in the ability of the junior pharmacists she supervises to '*look at the bigger picture'* and contextualise the drug therapy to the patient.

… I was thinking about the way they [junior pharmacists] make their assessment of the patients, the drug therapy, the patient. Are there any differences you've picked up on at all?

It depends where they're at some ways in their diploma I think. Some of them who are more into the diploma will approach it in a bit more of a

> structured way. I think some of the ones who are a bit more newly qualified, it depends very much where they were trained as to what approach they take. And some of them seem to be able to pick out quite quickly what the important things are. And some of them seem to struggle a bit more and will find one small thing that is wrong and get hung up on that and not really look at the bigger picture.
>
> Lisa [7.405]

The data illuminate that the ability to acquire situational knowledge is a skill that is possessed by more senior pharmacists through experience. The next section identifies the processes through which situational knowledge is acquired.

5.4.2 Strategies for the acquisition of situational knowledge

5.4.2.1 Working with the ward-based multidisciplinary team

Neuroscience pharmacists interact with a range of healthcare professionals aside from the medical and nursing staff they encounter in the course of their clinical pharmacy practice at a ward level. They utilise the expertise of these healthcare professionals to elicit specific information about patients that enables them to make judgements about drug therapy and pharmaceutical interventions.

When asked about the healthcare professionals they work with on the ward, many of the pharmacists describe working with speech and language therapists. Dysphagia is an impairment in swallowing and is a relatively common sequela of a number of neurological diseases (Leslie et al., 2003). Dysphagia may be temporary or permanent, dependent on the nature of the pathological cause and can impair the ability of a patient to swallow safely with the risk that oral intake may enter into the lungs. Patients may require a temporary or permanent enteral feeding tube to enable safe administration of

nutrition and oral drug therapy. Conventional oral drug formulations of tablets and capsules cannot be administered via this route.

I was unable to find any published empirical evidence of the incidence and prevalence of dysphagia amongst neurological inpatients. However the relative frequency with which pharmacists describe liaison with speech and language therapists over patients with dysphagia, suggests dysphagia is a relatively common condition encountered in neurological patients.

The pharmacists work with the speech and language therapists, utilising their expertise to ascertain the extent and time course of swallowing difficulties in patients. This information is utilised by the pharmacists to advise a suitable formulation of drug for a patient, or to consider an alternative drug if necessary.

Beth describes this process in her practice, highlighting a reciprocal sharing of knowledge and expertise between herself and the speech and language therapist, which focuses collaboratively on optimising the suitability of oral drug therapy for that specific patient.

> …and SALT [speech and language therapists], especially obviously with the neurosciences patients, we have to work quite closely with them in order for their regimes when they're switching from soft to pure to normal so we work together on the [drug] formulations and what they feel is appropriate for the patient and what can I do to change [drug] formulations to make that appropriate for that patient.
>
> Beth [4.218]

Pharmacists also liaise with physiotherapists to assess the effects of drug therapies prescribed for pain and spasticity, and with dieticians to manage interactions between drugs and enteral feed regimes.

> So we work with those quite closely and with the physios for spasticity and things like that; they could be quite useful for respiratory weaning of nebs and things like that you need to be working with the physios.
>
> Kate [2.171]

5.4.2.2 Working with clinical nurses specialists

Pharmacists regard clinical nurse specialists as a source of patient specific knowledge. Billy identifies this when describing how he works with clinical nurse specialists.

> …but also I can find out what's happening with a particular patient. Because they see them in the clinic potentially and if they've been admitted as an inpatient or a day patient they have that knowledge, the nurses have that knowledge of what's gone on previously so I could suggest 'x' particular drug to help with this symptom or control if we're talking about Parkinson. But the nurses say well we've already tried that or it didn't work or…
>
> Billy [8.239]

Billy's perception of clinical nurse specialists having greater individual knowledge is held by other pharmacists. Kate makes a similar observation of the oncology nurse specialists she practices with. Furthermore she identifies how this collaboration facilitates acquisition of situational knowledge by facilitating a holistic overview of patients.

> … so I work quite closely with them [nurse specialists] in terms of you often find that they know the patients a lot better and have contact with them once they're discharged which is where we would normally lose contact so it's quite useful to be able to follow through on their drugs and they'll kind of send e-mails to say they're now on this what do we do next and things like that. Yeah quite useful from that point of view but very kind of drug specific but it just somehow allows you to look at the whole patient.
>
> Kate [2.206]

Like Billy, Kate identifies that clinical nurse specialists gain this unique patient-specific knowledge through their chronic interaction with patients and follow up through outpatient clinics. None of the pharmacists interviewed work in an outpatient clinic setting; their direct patient contact and clinical practice occurs predominantly in the inpatient setting. Patti identifies that the nature of her role will not allow her to develop the level of unique patient knowledge in comparison to specialist nurses.

> And they know the patients because they see them regularly. You know they must get to know, they perhaps don't remember specifics and they read their notes and get reminders. You know they know what the patient has tried and what side-effects they've had and they've built up a rapport with the patients which you just can't do flying around a ward every day (nervous laugh).
>
> Patti [9.352]

Belinda identifies the wider usefulness of nurse specialists, by referring her pharmacist colleagues to nurse specialists if they encounter a patient with a neurological condition in a non-neurological clinical area. She also believes that her junior colleagues have less awareness of the specialist nursing role. Section 7.5.2 (p.192) explores how working relationships are formed over time. Junior pharmacists undertaking relatively short term rotations in neuroscience may not be afforded the time to form these professional links to exploit nurse specialist as sources of situational knowledge.

> I would have thought they [specialist nurses] were a really useful resource and that if I had been a junior pharmacist, and you know what I mean, covering on a ward then I would have been more than happy to go up-can I have your opinion on this patient you know they've gone nil by mouth or whatever. I think I would have been quite happy to but they [junior pharmacists] don't seem to be quite as aware maybe.
>
> Belinda [3.196]

Pharmacists identify how the chronicity of clinical nurse specialists' interaction with the patient enables development of patient-specific knowledge. However when encountering patients in an inpatient hospital setting Megan identified a clinical case where her continuity of being on the ward and seeing a patient every day, which the senior medical staff did not do, enabled her to attain situational knowledge about a patient with epilepsy and detect non-compliance with the taking of anti-epileptic drugs.

> I think they're [doctors are] starting to realise that sometimes you are the continuity of the ward, you're the only person who sees every patient every day.
>
> So yesterday I was able to say of a telemetry[7] patient who came in on the Monday, she walked in, she was TCI [to come in] – looked fine. By Thursday she was [vomiting], she had a headache; she looked like a sick person and it was because, as I said yesterday to him [consultant], do you think she's non-compliant with drugs with all these high doses of the [anti-] epileptics?
>
> The answer was yes so they cut them all down. They don't have that continuity because they don't see them every day. So I think they're coming round to the- oh actually, it would be quite useful on this round.
>
> Megan [12.226]

5.4.2.3 Participating in multidisciplinary ward rounds

Billy attributes his participation in ward rounds as pivotal in the acquisition of situational knowledge to understand prescribing decisions.

> So you can influence [prescribing] and also there's a learning thing from pharmacy staff that you can learn why a particular prescriber's decided to do that at the time which may not always be documented. And also you're able to sort of reason, to discuss why, with the person there.
>
> Billy [8.180]

[7] Telemetry is a diagnostic technique for epilepsy requiring admission to hospital for simultaneous video monitoring of the patient with physiological monitoring of electrical activity of the brain.

Megan also identifies the importance of attending ward rounds as an efficient strategy of gathering situational information and unwritten considerations underpinning prescribing decisions. Ward round participation facilitates *getting a feel* for a case, implying an attainment of comprehension of the issues and mitigating factors within a clinical case beyond that which can be attained from reading of the medical notes.

> …you don't have to trawl through X number of case notes, you sort of know what to expect… so we got a couple patients who have, they've been in the seven months one of them and she's going home and the epilepsy specialist wants the same generic manufactured drugs, you know that whole can of worms (laughs), but in her I can see why he does because she's been on ITU for months this girl. So it's sort of teeing that all up for when she goes home the next day. So it [attending ward rounds] is useful yes.
>
> Megan [12.268]

Eight of the fourteen pharmacists stated they participate in ward rounds. Of the four pharmacists that explicitly stated they did not participate in ward rounds, three stated lack of time or time pressures as the main reason for not doing so.

Ward rounds vary in their characteristics; Table 5 (p.114) summarises how the properties of ward rounds affect the ability of pharmacists to attend and their usefulness in acquiring situational knowledge.

Ward rounds, particularly neurosurgical ward rounds, may also take place very quickly with limited time and opportunity to elicit situational knowledge. The focus of the ward round may be very medically or surgically orientated with limited opportunity for pharmaceutical input. Lauren describes the time pressure that her junior colleagues are under to collate situational knowledge, *"what's*

happened to the patient", from which to make pharmaceutical interventions beyond assurance that the drug treatments are safe.

> So you've got to very quickly go through, try and work out what's happened to that patient so that they can maybe have meaningful input from a pharmacist colleague.
>
> Lauren [11.320]

Despite the challenges of attending the surgical ward round, Lauren still perceives participation as important to understanding the daily plan and patient movement in and out of the neurosurgical unit. Participation in the ward rounds involves one of her team beginning the working day at 7.30am, outside of the core pharmacy working hours. Hence pharmacist involvement in ward rounds involves some co-ordination of staff to ensure that the attending pharmacist does not work above their contracted hours whilst the overall pharmacy service is still maintained. Kate also starts work *"at a ridiculous time in the morning"* to undertake her pre-surgical rounds. Some of the pharmacists interviewed have less personal or job flexibility to accommodate such changes to working patterns.

Larger tertiary neuroscience units employ a large number of consultant medical staff, resulting in multiple medical teams of junior doctors assigned to a group of consultants. Ward rounds can therefore occur concurrently, creating a dilemma of which ward round to attend for the pharmacist. Sophie identifies that the ward round she attends will enable her to see as many patients as possible and with the highest likelihood of providing successful interventions into patient care.

Where neurological services are provided through a 'hub-and-spoke' model, consultant medical staff split their time between the tertiary neuroscience centre

and the local base hospital they provide their outreach service to. In these circumstances consultant medical staff may only undertake a ward round when they have patients under their care as inpatients. The *ad hoc* nature of these ward rounds makes it difficult for pharmacists to participate, as they may not know they have taken place or do not have sufficient flexibility within their role to attend impromptu ward rounds. Despite Beth's strong involvement with neurosurgical ward rounds, she does not attend neurology ward rounds partly because of their unpredictability.

Table 5. Properties of ward rounds for pharmacist participation and acquisition of situational knowledge.

Property	Dimension	Implications for acquiring situational knowledge
Scope and focus of the ward round.	Medical / surgical overview of the patient	Lack of focus on medicines or focus only on the medical condition under review in the ward round.
	Sub-speciality ward round e.g. epilepsy, microbiology	
	Full multidisciplinary involvement – SALT, occupational therapy, physiotherapy, specialist nurses, pharmacy.	Holistic overview of patient with considerations for drug therapy: swallowing ability, cognition, dexterity, patient beliefs and preferences over drug therapy.
Location / proximity of ward round to patient.	Remote from patient e.g. within ward office.	Drug chart not present to focus analysis on drugs (mitigated with electronic prescribing systems).
	Patient bedside.	Facilitates *end of bed* assessment of patient and patient involvement with drug therapy decisions.
	Combination of remote and bedside.	
Duration of ward round.	Short (minutes) to long (half a day).	Ward round too short to acquire useful information. Long duration is prohibitive to attending due to time pressures.
Scheduling and timing of the ward round in relation to pharmacists' working hours.	Scheduled to the same time.	Ward rounds scheduled into working week.
	Occur spontaneously or are ad hoc.	Ward rounds not attended as cannot be scheduled.
	Within or outside of core pharmacy working hours. Pharmacist role is full time or part time.	Working hours amended to attend or may not be possible due to personal/family circumstances, personal preference not to do so.

5.5 Balancing specialist and general clinical knowledge

In clinical practice neuroscience pharmacists experience tension in balancing the extent of their specialist clinical knowledge in neuroscience and their general clinical knowledge. This process is summarised by Figure 6 below by a metaphorical comparison to the filling of a cone with two immiscible liquids.

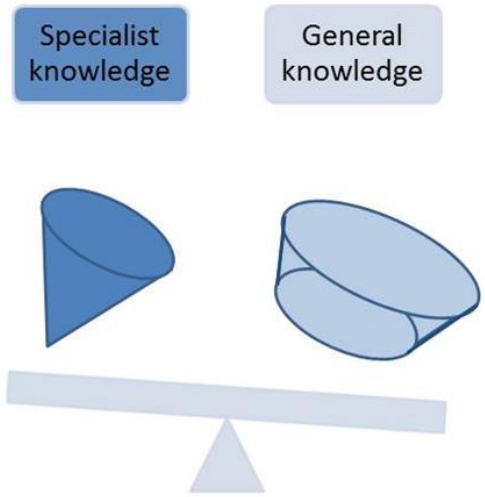

Figure 6. Balancing specialist and general knowledge in clinical practice.

General clinical knowledge conveys a broader, less detailed knowledge base that supports a competent level of general clinical pharmacy practice in areas of general and specialist medicine. Clinical knowledge is reinforced and maintained by exposure to clinical situations that require use of that knowledge. General knowledge is depicted in Figure 6 by the lighter shading in the top

section of the cone. The top section of the cone, relative to the lower section, is shallower and broader; these properties convey those of general knowledge.

Specialist knowledge, the dark liquid at the bottom of the cone, is gained through clinical practice. As specialist knowledge enters pharmacists' knowledge base (is poured into the cone) it sinks to the bottom of the cone. The bottom of a cone is narrower and deeper, conveying the properties of specialist knowledge that is focused on neurological disease.

Pharmacists identify that they have a finite capacity for usable clinical knowledge – the metaphorical cone has a defined maximum volume. Any additional fluid added to the cone merely flows out of the top of it. As specialist knowledge is poured into the cone, being denser, it displaces general knowledge through the top of the cone as it sinks to the bottom. The tension the pharmacists experience in practice is balancing how much of their knowledge base (the cone) comprises specialist knowledge (is filled with dark liquid) and how much of it comprises general knowledge (is filled with light liquid).

5.5.1 Identifying the diversity of neuroscience as a clinical specialism

While carrying an identity as practitioners within a specialist clinical field of neuroscience, pharmacists can also perceive they are generalists within neuroscience through identifying neuroscience as a broad and diverse clinical specialism. Belinda identifies the scope for clinical pharmacy involvement.

> …there is a lot to get your teeth into in neurology.
>
> Belinda [3.118]

There is variation amongst the pharmacists in the breadth of practice exposure to neuroscience which is predominantly determined by the size and service profile of the unit that they practice within i.e. what neurological conditions are treated within the unit and therefore what pharmacists are exposed to. Belinda, Natalie, Patti and Sally practice within a medical neurology service; the other pharmacists practice in neuroscience centres offering neurology and neurosurgical services. Practice exposure is also determined by the extent of pharmacists' *clinical* or direct patient facing involvement, primarily within an inpatient ward setting, within their role.

The diversity of neuroscience is partly identified through observation of the extent of subspecialisation amongst the medical and nursing staff that they work with. Most pharmacists frequently work with condition-specific specialist nurses, most commonly in epilepsy, multiple sclerosis and Parkinson's disease, but also stroke, motor neurone disease, headache and other neurological conditions. Billy commented on working with disease-specific specialist nurses in neuroscience, something he had not encountered in his previous roles.

Clinical nursing specialism is identified as an established clinical service preceding the introduction of clinical pharmacy services. The role for the clinical nurse specialist in neurological disease is recognised in health policy by NICE clinical guidance (see section 1.5.2.1, p.17) and through other forms of policy review e.g. All Party Parliamentary Group on Epilepsy (2007), All Party Parliamentary Group for Parkinson's Disease (2009).

When making comparisons to nurse specialists, pharmacist can perceive their neuroscience expertise to be less extensive and more generalised.

…One of the things I'm interested to know is how pharmacists work with those groups of specialist nurses – if you've had any involvement with those.

No not really… You know, just pharmacy related queries more so than advice particularly on… Because I still class them as knowing more than I do about even the combinations of drugs that are used and what would particularly in epilepsy, you know they would stop one and start another one. You know I'm not the point yet where they asked me questions.

And why do you feel they know more?

Because they've got the experience… You know looking at those drugs because that would be their specialist area and that's what they do specifically, you know day in day out. Whereas I've got to worry about all this specialities across neurology so I can't possibly know it in as depth as they do their areas.

Patti [9.337]

Patti's response to my questioning of how she works with nurse specialists identifies a pressure of her role to maintain a broader overview of neurological disease. She is responsible for overseeing a clinical directorate rather than a service for a specific condition. She also places an importance in experiential knowledge underpinning expertise which is analysed further within this chapter.

5.5.2 Identifying the strength of the generalist amongst the specialists

While also acknowledging that their disease specific knowledge may not be as extensive as that of their specialist nursing colleagues, other pharmacists recognise that clinical sub specialism can be limiting to effective clinical pharmacy practice. This is evident in the pharmacists' belief that their broader clinical knowledge base, within neurological disease and also more generally, makes an important clinical contribution to patients under the care of neuroscience services. An initial data code of *broad knowledge* was identified from a spontaneous contribution made by Michael in the first research interview.

> Sometimes the value of what we bring, say clinically, is the fact that there's a diabetic on the ward and nobody knows about the management of diabetes or hypertension or something. Now we kind of have that broad overview whereas a lot of the doctors get niched and kind of lose track of some of the broader views.
>
> Michael [1.160]

Also unprompted, when describing a lack of engagement from neurosurgical medical staff over drug-related issues, Megan identified limits to their drug knowledge and her role as a pharmacist to stop inappropriate prescribing in areas outside of the expertise of those medical staff.

> **You don't think it's [drugs are] on their agenda?**
>
> No. Drugs aren't are they, they have their own little pool, depending on what their specialty is, they have probably about eight drugs that they use if that all the time and that's it. And anything else just bamboozles them and they do silly things and you have to stop them.
>
> Megan [12.396]

Beth makes similar observations of the knowledge base of neurosurgeons.

> … I guess when you become a specialist as they are-surgeons, they don't think about normal medical practice. They can't understand how to restart people's warfarin and bits and bobs…
>
> Beth [4.393]

Michael's viewpoint that a broad knowledge base is a strength of the pharmacist, was offered to Kate for her thoughts and it evoked a general concurrence.

> **One of the things that has come up previously was about specialism and pharmacy and one of the strengths being that pharmacists know quite a lot about quite a lot rather than an awful lot about a few things. How do you feel about that statement?**

> I think it probably is and I think it's why we're in a good position with that in that the specialist nurses know a lot about their little area but we've got, or we should have if we keep our knowledge up-to-date, a much broader understanding of medicines for everything not just for the little condition we're trying to treat. So we do tend to take everything into consideration… And I don't really know where that comes from because I mean I've done neuro for six and a half years so my exposure is very similar to a specialist in any other profession but I don't know…
>
> Kate [2.558]

Like Michael, Laura identifies that a key role for the contribution of pharmacists is to consider all the medical conditions a patient has. Laura also identifies that her broader knowledge outside of neuroscience is acknowledged within the wider clinical team through her contributions within that team, and by her being consulted for advice on patients' general drug therapy.

> **…Say that you've got a patient in with you and they are in for some neurological issue but they also happen to have asthma or diabetes. How do your teams get on with managing the other conditions?**
>
> I think that's one of the key roles of pharmacy because your consultant and your nurses will not be so aware of what's going on otherwise. So it is actually down to the pharmacy to pick up other issues like steroids in diabetic patients. So this is one of the areas where we actually intervene mostly or where we get asked for advice as well.
>
> Laura [6.309]

Maintaining broad clinical knowledge is necessary to undertake a holistic analysis of patients' drug therapy which is considered to be an essential element of clinical pharmacy practice. This belief is underpinned by an imbued sense that the role of the pharmacist is to analyse a patient's medicine chart in its entirety for all drugs prescribed, checking for their suitability and compatibility for the patient in combination with other drugs and other co-morbidities. The

response above from Laura is illustrative of this consideration in this case, considering the effect that steroids can have on glycaemic control in people with diabetes. Kate could not initially define why she maintained a broader knowledge base but she did subsequently identify the requirement to clinically assess (screen) the appropriateness of a patient's entire medication regime prescribed on a drug chart.

> …I just think because we screen a whole patient chart rather than just the bit they're in for. I think that's just inbred in us whereas a specialist nurse will just look at the bit that is relevant to them.
>
> Kate [2.569]

Laura justifies the process of screening an entire patient drug chart, by identifying the need to assess or judge the appropriateness of an individual drug in combination with other drugs that the patient may be taking.

> …as a pharmacist even when you take in a prescription of course you need to ask what else they are taking so you come across a whole range of medications. And so you might have to be broader because if you don't know what the other things do you can't make a judgement.
>
> Laura [6.340]

While still identifying herself as a specialist practitioner, Lisa provided similar justification of the need as a pharmacist, to asses a patient's entire medication regime as an integral part of the pharmacist role.

> … even as a specialist pharmacist, yes you might be a bit more clued up on the neurology, neurosurgery things in my case but that doesn't mean… You know I see my role on the wards as well as being a specialist for that, to very much be the one that looks at all the other drugs and doesn't just ignore them as… you know, 'that's a just pile of stuff' where as normally, it's a key part of what we're looking at every day.
>
> Lisa [7.331]

Belinda [3.317] and Natalie [5.427] believe the ability to *clinically check* a drug chart *to a standard* is a basic clinical pharmacy skill that equips a pharmacist with the competency to practice on neurosciences wards. When asked how they would distinguish specialist clinical pharmacy practice from that of junior colleagues neither could readily identify any perceivable difference. Belinda cites completion of a clinical diploma, a general rather than neuroscience specific clinical pharmacy qualification, as the criteria for competent practice. A similar observation is made by Lauren of her junior colleagues.

> They [junior pharmacists] tend to… The diploma, especially when they start doing the diploma they tend to be quite good by then. They have done many other rotations - they have done renal, things like oncology, gastro so they tend to pick things up medically.
>
> Lauren [11.338]

Lisa identifies the ethos of clinical diploma training that she has been involved with, to consider the patient holistically.

> Maybe it is just the training. Because we're very much trained to look at the person and the prescription as a whole; not just focusing on 'they're in with Parkinson's' or whatever so what do I need to do about this? We are very much expected to interlink it all. Certainly the diplomas I've been involved in have very much had a focus about not just dealing with one specific problem but interlinking all the different drugs, and conditions and patient factors together.
>
> Lisa [7.320]

These data support the viewpoint that a rounded clinical knowledge and experience base, as well as the ability to *screen* a drug chart, can support a competent level of clinical pharmacy practice within the neuroscience unit.

Several pharmacists describe how the requirement of their role to work in other clinical areas or within other areas of the pharmacy department aside from

neuroscience broadens their clinical exposure and professional exposure to drug therapies. The broader scope of their practice requires them to maintain, and also facilitates, development of a broad knowledge base to practice proficiently within those areas.

> …from the way the department is set up there's no way in our department that you could get away from being, from keeping up your general knowledge because we still have to do on calls, and things like that for the whole hospital so we can still be getting calls about TPN [total parenteral nutrition] patients or, do you know what I mean?
>
> Belinda [3.380]

> We do, obviously our weekend service I don't get to just cover neuro[logy]. We get to cover everything. We do post take ward rounds and bits and bobs so I still need to maintain a baseline clinical knowledge…
>
> Beth [4.404]

Belinda's response conveys a requirement of and expectation from the pharmacy department to maintain a broad knowledge and skill base. She further acknowledged the requirement of working in the pharmacy department to remain somewhat of a generalist.

> Even when you're a specialist pharmacist you still have to work within the [pharmacy] department and it's a general department.
>
> Belinda [3.390]

The study data reveal an identity of being a pharmacist, and that despite practicing within a clinical specialism, of belonging within a general pharmacy department. In her description above of pharmacy services Beth makes use of *we* as the subject personal pronoun in statements about the pharmacy

department, invoking a sense of collective belonging; similar patterns in the use of personal pronouns were found in the transcripts of other interviews.

Neuroscience pharmacists acknowledge the expertise of their pharmacist peers within other clinical specialities and pharmacy departments being relatively close-knit departments of practitioners within different specialisms. Kate describes a culture of collaborative learning within pharmacy through events such as lunchtime teaching sessions led by pharmacists.

Neuroscience pharmacists identify limits to their general clinical knowledge and they cannot keep up to date with clinical and drug advances in other medical specialities.

> **…one of the strengths of pharmacy is that we know quite a lot about a lot of things and I don't know what you feel about that.**
>
> Yeah we do I think but the thing is that it's like a fast moving market so I think it's quite hard to keep up to date with everything so say with the diabetes, type 2 diabetes there's so many new drugs on the market…
>
> …I think it's really hard to keep up to date with everything; I don't think you can. But I think you're right in that we do have a more general overview of things or kind of like the bread and butter things you'll know. Medics when they're in their speciality will only concentrate really on in that area; they're not interested really in anything else.
>
> Sophie [14.657]

Clinical pharmacists within other medical specialities are used as sources of knowledge or advice when feeling unsure or not confident of a clinical issue or situation.

> … you know I'm part of pharmacy; we have regular meetings where we present to each other on that kind of thing. That really does help me to keep up to date with all the other different specialities. But more than that as well it means if something comes in and I'm not too up-to-date on it or I've forgotten then there's a specialist as part of my own department I can just ring up and ask for informal advice.
>
> Lisa [7.310]

The affiliation to the pharmacy department and identification of pharmacist colleagues as resources for information and advice can be maintained when pharmacists have work bases outside of the pharmacy department, or practice within units that are geographically separated from the main pharmacy department of their Trust.

> If it's something we are not familiar with-we get a complicated patient on anti-retrovirals we actually probably refer back to our colleagues over at [neighbouring Trust] and ask for advice if we can't make that sort of decision.
>
> Laura [6.316]

Pharmacists' affinity to the pharmacy department, and the underlying sense of generalised practice, creates a tension as their roles develop and specialise. Michael and Belinda acknowledged that as their roles became more senior and specialist they spend less time within the pharmacy department, to the detriment of the maintenance and further development of their general knowledge base; both were concerned about this. The response of Michael again illustrates an inherent need in the role of the pharmacist to maintain a broad clinical knowledge base to practice, and how a loss of a broad knowledge could detract from his role and clinical input as a pharmacist. His use of the term *touch base* implies a need to interact professionally within the pharmacy

department to continue a broad range of clinical exposure and maintain a broad knowledge base.

> **And it's kind of interesting how you alluded to earlier about… one of the strengths of pharmacist seems to be that breadth of knowledge… [interrupted]**
>
> Yes that's one of the things that's being eroded. These days I'm seldom in a dispensary and that's actually kind of worrying that I'm kind of losing that broad skill base as a senior pharmacist… we are losing some of the core skills.
>
> **What's your feeling on that?**
>
> I think we need to be able to touch base and know what things are because if you're only ever working in your area you start to lose the benefit you bring of being the kind of pharmacist that yeah you know the stuff in your area you know also how to manage like what the latest guidelines on hypertension are or the latest whatever else. You need to see patients from other areas and be confronted with this clinical checking in a dispensary or something to keep yourself up-to-date with things that are going on.
>
> Michael [1.370]

Patti, who is relatively new within her post, identifies her level of expertise by positioning it within the pharmacy department; her response again illuminates an identity of belonging in a pharmacy department and the influence which that exerts on her perception of her role and expertise.

> But you know I've had this conversation with my line manager in many a one-to-one meeting and they sort of, quite rightly I think, said well you're not an expert above a consultant. You're really… you know my role as the pharmacist in the pharmacy department here is to guide fellow pharmacists in neurology. So I'm an expert amongst them about neurology but not necessarily on the ward with the consultants.
>
> Patti [9.453]

The tension between generalised and specialised practice is not universally held. By contrast, Billy is concerned his specialist practice is being

compromised by service reconfiguration and the requirement of his role as a lead pharmacist to provide cover for gaps in the service. These factors detract from his ability to provide a specialist role; he perceives generalisation in the sense of covering the neuroscience directorate.

> I see the 8a's role is… it seems to be, whether this is intentional or not, it seems to become more generalised, I'm losing the specialist. Because of the way circumstances are this could be a [local] thing I don't know but I really want to be, I think that's a primary role – we need to be there having contact with the clinicians and the other MDT members .
>
> **So generalised in the sense of neurology generalised or… [interrupted]**
>
> Generally, as an overall the way things are working we've now got within certain neurosciences, because historically there used to be neurology and stroke was separate, and neurosurgery was separate… So I'm having to deal with sort of things that are not traditionally, sort of neurosurgery side of things which takes me away.
>
> **From?**
>
> Neurology and stroke which is overall a good thing for the patient and the staff that they've got someone, they've got access to a clinical pharmacist on the ward through the normal working hours… But the worry I feel is we could be taken away from the specialist, not being able to devote enough time to that.
>
> Billy [8.140]

The data reveal a tension that can exist in the practice of neuroscience pharmacists between developing a specialised knowledge base and maintaining a broad clinical knowledge base that allows the pharmacists to maintain an overview of a patient and their drug therapy. An affiliation towards maintaining a broad knowledge base is evident, although not universally held. This affiliation towards maintaining a broad practice and knowledge base is influenced by a deep sense that, as a pharmacist, to be able to assess a patient's drug therapy in its entirety; belonging to a hospital pharmacy

department with role commitments in other clinical and pharmacy areas; an identification that an ability to holistically assess a patient in the context of concomitant morbidities and drug therapy is a strength which the pharmacist, who has more of a generalist drug overview of the patient, brings to patient care in neuroscience services.

5.6 Utilising knowledge in clinical practice

5.6.1 The pharmacist as the dispenser of drug knowledge

Neuroscience pharmacists find credence in the currency of their clinical knowledge as a marker of the wealth of their expertise. The importance of knowledge in clinical pharmacy practice is exemplified by the efforts which pharmacists place in acquiring this knowledge, as has been presented so far in this chapter.

5.6.1.1 Being the drug advisor

The interview data illustrate at numerous points how pharmacists serve as providers of information or advice about drugs. Lisa describes from day one of her job how she had a pile of information queries waiting for her.

> …the e-mails and letters with requests for advice and that kind of thing started pretty immediately. I had a pile waiting for me the day I started (laughs), with the handover from the previous person.
>
> Lisa [7.150]

Some pharmacists, like Natalie, identify their strength in acquiring knowledge in the form of information – medicines information. Being approached for advice

on medicines is a marker of expertise. When pharmacists are more remotely removed from the clinical case, their knowledge of drugs is required to support a clinical decision making process but the pharmacists are not necessarily involved in the final decision.

> **Do they [neurologists] ever ask for an opinion on something, you know do you think this is a suitable drug to use, or course of action?**
>
> Definitely that's not their approach they know, they know (laughs). They're the experts and they don't ask me my opinion on something. They'll ask me more factual questions you know like are there interactions or are there supply problems? They wouldn't ask me my opinion.
>
> **And how do you feel about that?**
>
> I don't generally feel too perturbed.
>
> Sally [13.434]

5.6.2 Using knowledge for clinical decision making

Figure 7 (p.130) is a schematic representation using a Venn diagram to represent the interplay between theoretical, experiential and situational knowledge in the clinical practice of pharmacists.

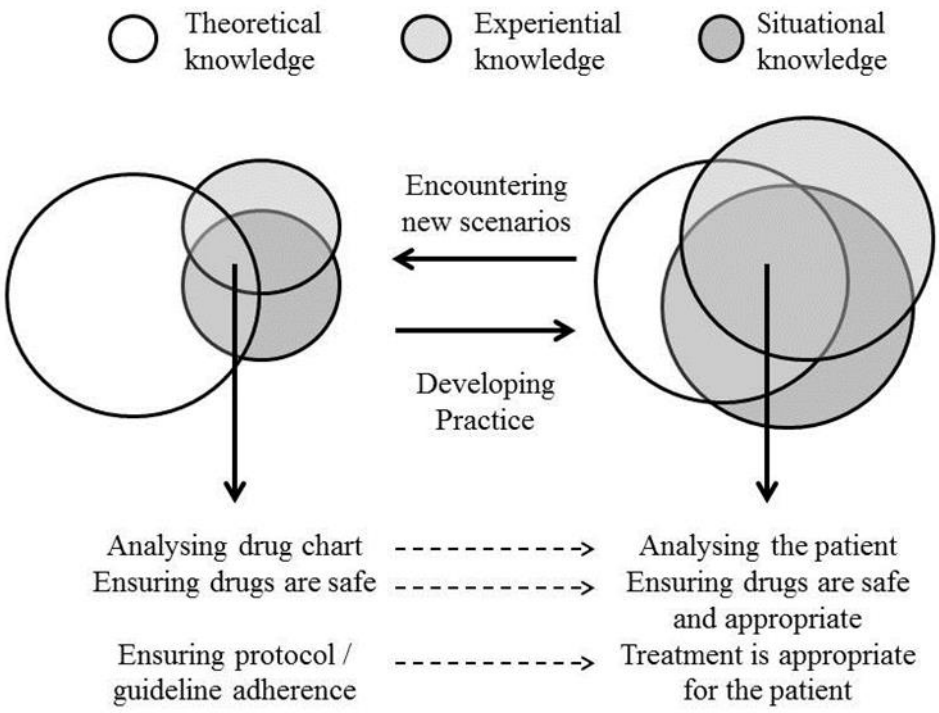

Figure 7. Utilisation of knowledge types in clinical practice.

The enlarging of the shaded circles symbolizes the acquisition and expansion of experiential (section 5.3) and situational knowledge (section 5.4) through clinical practice and experience. There is variability in how extensively pharmacists acquire these knowledge forms due to the heterogeneity of clinical practice. As theoretical and situational knowledge become more prominent they facilitate the pharmacist's clinical analysis and practice to focus on the individual patient. Ensuring drug therapy is safe is an inherent gatekeeping process imbued in clinical pharmacy practice in neuroscience; its significance is discussed in section 6.3.3 (p.157).

Clinical practice does not progress in the sense of moving steadily in a unidirectional motion from left to right; pharmacy practice may move in either direction along this continuum.

Sophie, a very experienced pharmacist working in a large tertiary neuroscience service, encountering rare and refractory neurological disease, exemplifies practice towards the right of Figure 7 in her discussion of expert practice.

> I think anybody can write a guideline but you're not really an expert in it unless you can (sigh), I suppose apply the guideline to the patient individually or know what the guideline doesn't fit the patient and what do you do then.
>
> Sophie [14.633]

I acknowledge that portrayal of a process through diagramming is to an extent a pejorative depiction of professional practice. The study data did identify other factors that can influence where practice is situated along the continuum of Figure 7 on the previous page.

5.6.2.1 Becoming a pharmacist prescriber

Two of the pharmacists interviewed were independent pharmacist prescribers. One pharmacist was in the process of completing their qualification as a pharmacist prescriber.

Billy and Lauren both describe how undertaking a prescribing qualification shifted their clinical focus to considering the patient holistically, moving their practice towards the right of Figure 7. Lauren who practices predominantly within a critical care setting considers the patient more holistically in a physiological sense.

> I think it has reinforced looking at the patient globally rather than just focusing on the therapy, drug, sort of medical issues because when you do that course, when I did that I'd have to 'I'm doing that from an ICU perspective' but then have to go through all the organ systems…
>
> Lauren [11.240]

Billy practices in less acute, general ward settings. He identifies how multidisciplinary learning with nurses on a prescribing course revealed a different way of looking at a patient, aside from identifying drug issues.

> I was shown again when I did prescribing course that we [pharmacists] can potentially have a blinkered, we focus in on what's the problem with the meds, "right, we'll sort out by prescribing this or stopping that". Whereas the nurses come from a more holistic way of looking at how the patient is generally.
>
> Billy [8.243]

The differing skill sets that nurses and pharmacists bring to pharmacist prescribing has been identified in other clinical areas such as oncology (Williamson et al., 2010).

5.7 Chapter summary

Pharmacists practicing in neuroscience identify the need for knowledge to make sense of their clinical practice. They also recognise that the possession of knowledge, particularly about drugs, is part of their professional identity as a pharmacist. Three forms of knowledge are identified to support clinical practice in neuroscience – theoretical knowledge, experiential knowledge and situational knowledge.

Learnt or taught theoretical knowledge is a prominent knowledge type in the early stages of clinical practice, as pharmacists seek to make sense of the new practice they encounter. There is a particular reliance on clinical guidelines which serve as a reference points for comparison of this previously unmet practice.

As clinical practice develops there is a realization, especially in more specialised tertiary neuroscience centres dealing with difficult or very rare forms of neurological disease, that clinical practice can be nuanced and less standardised in relation to other areas of medicine. Pharmacists develop an experiential knowledge base of tangible experiences of neurological disease and drug treatments. An experiential knowledge base helps to create new reference points for clinical practice and may move the reference points for comparison of practice that were created from experiential knowledge.

A third form of knowledge is situational knowledge, background and collateral information around individual clinical cases. Situational knowledge helps to focus clinical decision making on the individual patient, and has less emphasis on compliance with clinical guidelines. Pharmacists learn to acquire situational knowledge through their ward working and integration within the multidisciplinary team. Acquiring situational knowledge can be time consuming and there can be challenges in practice to being able to acquire this form of knowledge.

As clinical practice in neuroscience progresses, pharmacists have less reliance on theoretical knowledge as they develop their experiential knowledge base and learn how to acquire situational knowledge. This change in knowledge focus

facilitates practice that is more orientated to the individual patient. While still striving for the standardisation of practice through the development of guidelines, pharmacists are able to become more tolerant of clinical practice that deviates from guidelines.

The ability to gain and use knowledge to underpin clinical decision making and making clinical sense of the drug therapies which pharmacists encounter, is an important consideration in another emergent conceptual process gatekeeping access to drug therapies. The involvement of pharmacists in gatekeeping access to drug therapy will be presented in the next chapter.

6 Gatekeeping access to drug therapies

6.1 Introduction

Gatekeeping is a well described phenomenon in many fields; it is concerned with the regulation of processes. In the substantive theory of clinical pharmacy practice within neuroscience, gatekeeping is the process of regulating access to drug therapies for patients being treated by neuroscience services.

Gatekeeping issues may arise within individual patient cases or more widely, for example, if a new drug or new use (indication) for a drug is introduced into clinical practice. Gatekeeping processes affect both patients being directly treated within a neuroscience hospital unit, and patients receiving ongoing specialist drug treatments for neurological diseases on an outpatient basis.

Neuroscience pharmacists, through their intermediary role, act as the link between the clinical teams in neuroscience who wish to prescribe drug therapies for patients, and the pharmacy department which is the major repository for drugs within the hospital (cf. section 7.1, p.176). The study data identify how pharmacists frequently serve as the conduit through which requests to use drugs are channelled. Section 6.2 sets out the professional and organisational antecedents for gatekeeping by exploring the conditions of pharmacy practice that bring about pharmacists' exposure to, and involvement with gatekeeping processes.

Within neuroscience, gatekeeping assumes a certain prominence in clinical pharmacy practice. Neuroscience pharmacists can serve as a gatekeeper to

drug access; they also, at times, serve as the metaphorical key to help unlock and open the gate, and facilitate access to drug therapies.

This prominence of gatekeeping arises from the pharmacists' perception that neurological diseases, and by association their drug treatments, are at times relatively rare and complex. The nature of clinical practice in neuroscience can result in the use of *specialist* drugs which I will define as those that are prescribed only by neurologists or neurosurgeons. These specialist drug treatments may also be expensive, or prescribed outside of the parameters of what the pharmacists consider to be routine practice (cf. 'weird and wonderful' of drug usage: 5.2.5, p.92).

Section 6.3 sets out the gatekeeping issues recognised by pharmacists in their clinical practice, through consideration of:

- Adherence to organisational policies around drug usage (6.3.1).
- The financial implications of drug usage (6.3.2).
- Ensuring the safe use of drugs (6.3.3).

Section 6.4 sets out the processes of how pharmacists deal with and analyse the implications of identified gatekeeping issues. Section 6.5 illuminates how pharmacists work with the clinical teams to resolve gatekeeping issues. These sequential stages are summarised in Figure 8.

Figure 8. Stages of gatekeeping access to drug therapies.

6.2 Professional and organisational antecedents to gatekeeping

Charmaz (2006) acknowledges that grounded theories serve as contemporary analyses of phenomenon that are contextualised within a time and place. A brief overview of how drugs within NHS hospitals are supplied and funded is provided in this section. An outline of these processes, provided within sections 6.2.1 to 6.2.3, sketches an organisational framework for drug use that the pharmacists practice within. The purpose for providing this information is to enable the contextualisation of the processes and interview data presented.

6.2.1 Drug supply processes within hospitals

Pharmacy departments, in the main, are the point of entry (procurement) for drugs into, and distribution (supply) throughout hospitals. These two functions remain a significant facet of hospital pharmacy services (see Table 1, p.11).

In clinical and ward areas of NHS hospitals, although the exact mechanisms may vary, the standard practice for managing medicines is to maintain a profile of stock drugs that are routinely used or may be urgently required within that area. A supply of these *stock* drugs is stored within the clinical area. As part of their role, pharmacists visiting a ward or clinical area initiate the supply of, or authorise the supply of non-stock individual drugs required for patients. This process runs alongside the pharmacists' *clinical check* of patients' drug regimes. In applying a clinical check, the pharmacist is indicating that the prescribed drug is appropriate for the patient and if necessary, supplies can be made i.e. the drug can be dispensed.

The pharmacists provide accounts of being involved in the ongoing supply of specialist drug treatments for patients, outside of the hospital. There has been an increasing trend within the NHS for hospitals to outsource the supply, of often high cost or specialist drugs that cannot or will not be routinely prescribed by non-specialist clinicians, to external pharmacy companies. These companies dispense drugs and delivery them directly to patients within their homes. This mechanism of drug supply is known as homecare. In response to growing concerns over the regulation of homecare drug supply, a report was published by the Department of Health (Hackett, 2011). One of the recommendations of this report was greater involvement of pharmacy within the homecare process.

6.2.2 Drug funding processes within hospitals

All the pharmacists interviewed for this study practice within secondary and tertiary neuroscience services of acute NHS Trusts. Within the NHS, acute Trusts function as care providers (cf. 1.3, p.3). A care provider Trust receives income in the form of a tariff for each episode of patient care provided. This tariff charge provides reimbursement for the cost of providing all aspects of the care and treatment for that patient, including the drug therapy. This activity-based tariff system is known as Payment by Results (PbR) and it was gradually introduced into the NHS from 2003 (Appleby et al., 2012).

There is recognition within the PbR system that certain aspects of care are too expensive to be included within standard tariffs. Amongst those exclusions is an extensive list of certain high-cost drug therapies. It has been estimated, by cost, that up to 60% of drugs prescribed by hospital clinicians are excluded from the PbR tariffs (Howard, 2012) i.e. they are high cost, specialised drugs.

For some of these high-cost drug therapies commissioning policies exist and the drug treatments provided by the provider Trust will be automatically recompensed for providing the treatment. Commissioning policies will stipulate the clinical circumstances in which use of a specific drug therapy is acceptable and will be funded. A number of high cost drug treatments for neurological diseases fall into this category; examples of high cost drugs, identified by pharmacists in the interview data, are summarised in Table 6 on the following page.

Table 6. Examples of high-cost drug therapies for neurological disease.

Drug name (Branded name)	Therapeutic indication
Fingolimod (Gilenya®) Natalizumab (Tysabri®)	Multiple sclerosis.
Intravenous Immunoglobulin (IVIg)	Various auto-immune neurological diseases.
Botulinum toxin	Spasticity; Dystonia; Prevention of migraine headaches.

For drugs where a commissioning policy does not exist or there is an intention to use a drug outside of the commissioning criteria, provider Trusts seek a funding approval through a process termed 'individual funding requests' (IFRs). Failure to seek funding approval before use of a high cost drug can result in the Trust ultimately paying for the treatment.

Having presented the organisational mechanism around drug use in the NHS the next section presents data that identify pharmacists' participation within these processes, and the construction of their role as the drug supplier.

6.2.3 The pharmacist as the drug supplier

Involvement in, or acknowledgement of drug supply processes, was a recurrent theme throughout the interview data. This section describes how the drug supply role of pharmacists is perceived in practice.

6.2.3.1 Practicing pharmacy beyond the dispensing role

In pharmacy practice, *dispensing* is the task or process of preparing a drug for administration to the patient either directly by a patient or more commonly in hospital for a nurse or other suitably qualified healthcare professional to administer to the patient. The dispensing of drugs is undertaken against the orders of a drug prescription.

The drug dispensing function is the historical antecedent of the modern clinical pharmacist role (cf. 1.4.2, p.6). There is an acknowledgement of that professional heritage from Laura, a very experienced pharmacist. Laura also recognises the evolution of the clinical role and in the passage below, she places a certain distancing from the past dispensing role of the pharmacist. Laura's observation of past practices also alludes to a more balancing change in the power relationship between the doctor as drug prescriber, and pharmacist as drug supplier. Laura describes how the historical dispensing role assumed subservience to the doctor's prescribing orders.

> I come from the time when pharmacists dispensed basically (laughs). When the doctor ordered and the pharmacist dispensed. The broad work was basically make sure that everything [drugs] is there labelled up correctly and in a timely manner. We become [sic] a lot more clinical over the years which actually reflects a lot more in what, (pause) well, what responsibilities we get as well.
>
> Laura [6.83]

There were three interviews where the term 'dispense' or its derivatives were mentioned; apart from Laura's historical reference to pharmacists as dispensers, no reference to dispensing was made in the context of the pharmacist being directly involved in that process. These findings corroborate

Laura's perception that the dispensing role of the pharmacist is a historical one, and the pharmacists do not associate their clinical role with the mechanical task of dispensing drugs.

6.2.3.2 Seeing the pharmacist as the drug supplier

Despite the pharmacists distancing themselves from a historical dispensing role, within current pharmacy practice the data identify within the multidisciplinary neuroscience clinical teams, the pharmacist as the conduit through which access to drug therapy can be secured, and their role is associated with supplying drugs.

This perception of pharmacists as suppliers of drugs is not necessarily held explicitly by the pharmacists themselves. Only Kate and Billy make reference to the supply of drugs in response to the standard opening question of each interview of how the pharmacists would describe their role. Billy identifies the drug supply function of the *pharmacy service* although he does not explicitly state that he, as a pharmacist, supplies drugs.

> …[the role is] obviously [ensuring] safe and appropriate supply, prescribing, administration of medicines.
>
> Billy [8.8]

Kate's description of her involvement with specialist drug treatments (fingolimod, natalizumab, IVIg) is one of co-ordinating their supply. Kate does not imply that she is necessarily involved in the physical process of supplying that drug, but rather she oversees and co-ordinates it.

> I provide support for PIU, so our programmed investigation unit, with all our regular IVIg and Tysabri [natalizumab], sort out the fingolimod service. That's my day-to-day job.
>
> **Okay so when you say sort out fingolimod etc. what do you mean by sorting out?**
>
> So organise supplies. We brought the MS nurse back from the community to do this kind of practical side of the fingolimod service and then I just oversee it from a more structural, financial… (did not complete sentence).
>
> Kate [2.39]

Billy holds an opinion that the *basics* of ward-based pharmacy practice in reviewing patients' drug therapy, aside to ensuring safety, is to ensure the supply of drugs. Billy then continued to discuss how pharmacists can become more directly involved in patient care, implying that supplying drugs is a more traditional, core activity of pharmacy practice on hospital wards.

> … you can do your own job, make sure the charts are safe etc., supplies of medicines and walk off [the ward]…
>
> Billy [8.75]

Although the pharmacists do not necessarily describe their role as a supplier of drugs, they identify that perception of the role from other healthcare professionals that they work with. Notably, the pharmacists recognised that ward-based nurses identify them as suppliers of drugs.

> …that's probably where the nurses come in as well - they see us as the discharger of patients and the supplier of drugs…
>
> Michael [1.114]

Section 6.5.2 (p.171) further illuminates the identity of the pharmacist as the drug supplier on hospital wards. Pharmacists have an acceptance of this role function through the identification of their contribution to patient care by expediting access to drug therapies. Megan however expresses some frustration at how being perceived as the drug supplier (as well as safety net for drugs cf. 6.3.3), by medical staff, because it detracts from her role as a clinical practitioner.

> **What do you think their [consultants'] perception of the pharmacist role is then?**
>
> I still think, here, they think it's predominantly a safety and supply of just cost effective medicines but I don't think they get that we have... I think they think we have less clinical knowledge than we actually do if that makes sense?
>
> Megan [12.206]

The standard practice within hospitals is for nurses to administer drugs to patients. The ability of nurses to administer drugs to patients is dependent on the drugs being available. Section 6.5.2 illuminates a common interface between nurses and pharmacists to be issues of drug supply. This gives rise, as identified above by Michael, to the perception of pharmacists as drug suppliers.

Clinical nurse specialists also identify the function of supplying drugs within the role of the pharmacists. Pharmacists describe being approached by specialist nurses when there is an issue in relation to the supply of a particular drug.

> **What sort of things does she [Parkinson's disease nurse] tend to come to you [about]?**
>
> She's recently taken up post so she came to us about supply of apomorphine [drug for Parkinson's disease]…

> …She works with us very much coordinating [drug supplies], making sure we've got the stock in; asking us questions about where to get the lines from. She's more principally about that…
>
> Sally [13.336]

> **One of the things I'm interested to know is how pharmacists work with those groups of specialist nurses, if you've had any involvement with those.**
>
> No not really. Just the odd question about: "is such a drug out of stock because we've got a patient here who says they can't get any of it in community". You know, just pharmacy related queries more so than advice particularly.
>
> Patti [9.337]

> …they [nurse specialists] do see me as a port of call when they've got queries with medication and shortages, and you know, where to get hold of unlicensed [drug] products and things like that.
>
> Natalie [5.124]

Through coming to the pharmacist, the nurses make an identification of the pharmacist as the drug supplier and somebody who can resolve issues with the supply of drugs.

6.2.3.3 Delegating the drug supply role to pharmacy technicians

Some pharmacists discussed and acknowledged the role of ward-based pharmacy technicians, sometimes referred to as medicines management technicians (MMTs), to supply drugs. Three pharmacists explicitly described working alongside a MMT; In Polly's Trust, the MMTs now undertake the processes of co-ordinating the preparation of drugs for patient discharges.

In Lauren's practice, traditional supply roles have been delegated to her medicines management technician colleague. Clinical staff within the neuroscience unit can distinguish between the role of the pharmacist, as the clinical practitioner, and the technician by approaching the latter for the supply of a drug.

> Yes because now we've got more people [pharmacy staff] around more, our drug charts, I don't think they ever go to pharmacy during working hours and they [ward staff] know who our medicines management technician is [to go to] if it's a simple supply issue.
>
> Lauren [11.391]

The provision of medicines management technicians to work alongside the neuroscience pharmacists is variable amongst neuroscience units. While some pharmacists like Lauren work alongside dedicated technicians, Patti shares the MMT she works alongside with other wards in the hospital.

> I have a medicines management technician. He spends some of his day on the [neurology] ward. He is responsible for three wards in total. He's spread rather thinly (laughs).
>
> Patti [9.17]

Michael and Sophie do not work alongside MMTs in their Trusts. They both, unprompted, declared this information within their interviews. Michael identifies the potential advantages of MMTs to free up pharmacist time and assist in patient discharge. Sophie's description of her ward-based activities places emphasis on doing *"all the ward work"*, which involves the ordering of drugs and an acknowledgement that those functions of the role could and perhaps should

be undertaken by a MMT to release time for the pharmacist to undertake other roles.

> …we don't have any ward-based technicians here so all the ward work is done by pharmacists. So it involves everything. So you go to the ward…
>
> And then ordering medication so just like inpatient ordering sheets, doing TTA's [to take away (discharge) prescriptions], checking discharge prescriptions...
>
> Sophie [14.177]

Pharmacists are able to make a distinction for the drug supply role that can be undertaken by MMTs. MMTs are not a ubiquitous presence within pharmacy teams in neuroscience services however their presence can shift the focus of the drug supply role away from the pharmacist.

6.2.4 Summary

Within the clinical specialism of neuroscience the heritage of the pharmacy profession, as the suppliers of drugs, still permeates through the contemporary perception of the pharmacist from members of the neuroscience clinical teams. In the main, pharmacists do not explicitly identify their role with supplying drugs. The perceptions of pharmacists held by their multidisciplinary colleagues, notably nurses, aid in the construction of the drug supply role of the pharmacist.

The identity of the pharmacist as the drug supplier can be diminished where pharmacists have the support of medicines management technicians to relinquish the traditional drug supply functions. However the mechanisms of medicines management within hospitals posit the pharmacist as the conduit to drug access for the neuroscience services, through their ability to clinically check prescriptions and authorise supplies of drugs.

The next section presents the analytical processes, aside of their clinical assessment (cf. 5.6.2, p.129), the pharmacists apply in their routine daily activities of assessing drug therapies.

6.3 Identifying gatekeeping issues

From the data analysis, there are three processes through which the pharmacists identify gatekeeping issues in clinical practice; these are presented in Figure 9. More than one gatekeeping issue may arise from the use of a drug.

Figure 9. Processes in clinical practice for identifying drug gatekeeping issues.

This section explicates the individual gatekeeping processes, through the pharmacists' interpretation of clinical practice.

6.3.1 Policing the formulary

Pharmacists identify how they regulate or are perceived to regulate prescribing access to drug therapies by policing the formulary. The purpose of a hospital or NHS Trust formulary is outlined in Table 1 (p.11). To provide a brief re-orientation, a drug formulary is a list of drugs and drug products which may be prescribed within an organisation, and a mechanism to control the prescribing of drugs.

The concept of the formulary operates for specialised and expensive drug therapies at a macro (national) level through the remit of NICE technology appraisals (cf. 1.5.2.1, p.17), and NHS commissioning policies (cf. 6.2.2) authorising drugs to be used within the NHS. These policies may also dictate in what specific clinical circumstances the drugs may be used.

Policing the formulary is an *in vivo* code for the action of how pharmacists seek to maintain adherence to the rules of drug use dictated by hospital formularies or national guidelines. The initial code of 'policemen of the formulary' arose from the interview with Belinda when we were discussing her relationship with medical consultants.

> Some of them [consultants] do tend to be a bit old-fashioned in their ideas but not just about whether pharmacy can help them clinically but also regarding you know, pharmacist being the policeman of the formulary, and I've had like comments…
>
> **Is that how you've been described then?**

> Well not so much they've never described me like that but that's certainly how I feel. I have had consultants say “tell your director of pharmacy” and then something about a budgetary thing.
>
> Belinda [3.61]

Policing serves as a useful metaphorical analogy to the action of pharmacists regulating access to drug therapies. The rest of this section sets out the processes of policing the formulary.

6.3.1.1 Adhering to organisational rules for drug usage

Pharmacists describe having to work through organisational rules to help clinicians gain access to the use certain drugs. Commissioning or organisational policies may stipulate extra requirements in order to access drug therapies. In the analogy to gatekeeping these rules create barriers to accessing drug treatments that can require implementation of changes in practice.

Ten of the fourteen pharmacists cited their involvement in the provision of IVIg therapy. This treatment was not an included topic in any of the interview question guides. IVIg is a high-cost treatment used to treat a wide range of conditions in different medical specialities but, specifically within neurology, for a number of relatively rare auto-immune diseases. There is a national commissioning policy for the use of IVIg which requires submission of clinical data around each treatment use (Department of Health, 2008a). A common challenge in professional practice is ensuring neurology services comply with the requirements of the commissioning policy.

> ….with regards to the [national IVIg] database, the processes that we had within the Trust, they weren't tight enough basically. So it's a case of

> getting all the consultants on board the fact that this database is [emphasised] going to be filled in; we're not going to miss data off.
>
> Megan [12.56]

At a more local level, Belinda describes setting up a new system for supplying botulinum toxin (Botox®) to a neurology clinic that captured details of all the patients that receive treatment. She identifies an external driver, a change in the level of information required by commissioners, the body that ultimately pays for the drug and clinical service, as the need for this system change.

> Sort of one of my pieces of work is regarding Botox and the sort of ordering of supplies…
>
> …But, with obviously commissioning sort of changing and it's all a bit unknown we felt that a point was gonna [sic] come where the CCGs were going to be asking for proper patient details as to who'd had it, because of the [high cost] spend on it.
>
> Belinda [9.121]

Sally is also dealing with an organisational requirement for the use of botulinum toxin, where a policy change within her Trust has also stipulated extra recording requirements (in a register) for its use.

> … botulinum toxin is one of my issues where I do have a (slight pause) not a disagreement with the consultant. So for example, we have a policy in our Trust where botulinum toxin is managed as a controlled drug…
>
> …our neurology consultant [who] uses it for spasticity flatly refuses to do that.
>
> Sally [13.409]

Pharmacists encounter a range of organisational rules for drugs to be used.

6.3.1.2 Undertaking surveillance of prescribing

Eight of the fourteen pharmacists identified at the outset of the interview, from the opening question of describing their role, that they were involved in monitoring and reporting on the usage of drugs within the neuroscience clinical service. I interpret the early mention of monitoring drug usage within the interviews to assign some prominence of this activity to those pharmacists within their individual roles.

The requirement to monitor and report on the usage of drugs can be set by the pharmacy department. Several of the pharmacists describe how within their Trust, monitoring of drug expenditure and usage to be compliant with the formulary is an established aspect of the directorate pharmacist role.

> We've [pharmacy have] always been quite proactive within the Trust about the formulary and sticking to formulary choices and things.
>
> Belinda [3.92]

> We [pharmacy] look at their usage reports in terms of the kind of prescribing they're doing through outpatients and we pick up any anomalies or strange prescribing habits.
>
> Sally [13.28]

> **You mentioned financial reports, was one of the things that you do. What things are you doing there?**
>
> Well that's a bit driven from within the pharmacy department. We have historically always produced directorate reports. So we look at [drug] spend, the top 50 [most expensive drugs] spend for each quarter…
>
> Patti [9.166]

The surveillance role, monitoring the usage and expenditure of drugs, can permeate everyday perceptions of practice. An example is Sally who makes a favourable assessment of the neurologists she works with, by the criterion of their compliance with prescribing drugs within the Trust formulary.

> And we also write twice yearly annual reports for them [neurology directorate], which is picking up their prescribing, issues we might have picked up on. They're pretty good though in neurology, they pretty much stick to the formulary.
>
> Sally [13.35]

An exploration with Laura of everyday working on the ward identifies how she is cognisant of the formulary as she undertakes her review of prescription charts, identifying drug prescribing not within the formulary.

> **… do you think you can sort of talk me through what that entails in terms of when you are on the ward what you are actually doing?**
>
> Okay. I am attending ward rounds. I review every prescription on a daily basis. I look at formulary issues…
>
> Laura [6.39]

6.3.2 Being the accountant

There is a widespread acknowledgement amongst the pharmacists of the financial pressures the NHS is currently facing and the pressures that creates in practice to contain drug expenditure.

6.3.2.1 Being the reluctant accountant

There is a general resigned acceptance amongst the pharmacists that financial gatekeeping, monitoring and regulating drug prescribing on the basis of cost, is part of their professional role.

> So you're sitting in a meeting, they [managers] want to balance their books but as far as you're concerned everything is spent appropriately so that can be a bit frustrating thinking, if I want to be an accountant (laughs), but I chose to be a pharmacist. But I think it's kind of something that comes with the role.
>
> Lauren [11.442]

Lisa similarly identifies the need to consider the financial implications of drug usage as a fact of professional life.

> You can't get away from funding unfortunately. Much as you would like it always be about is it [clinically] effective, you can't ignore the cost issue where the money is going to come from.
>
> Lisa [7.621]

Kate identifies financial processes as a means to an end in securing access to drug therapy.

> I guess yes I prefer the kind of clinical hands-on and stuff and some of the other stuff yeah can be a bit… the finance stuff and the kind of trying to get things through ridiculous committees sometimes can be a bit frustrating but I guess it all needs to be done.
>
> Kate [2.157]

Like Lauren, Patti is also frustrated by a perceived incessant need to save money but also identifies this function as an intrinsic element of the pharmacist's role.

> **What do you feel about the financial aspect of saving money in terms of your role?**
>
> I understand that that's a big portion of why we're here doing the job, to find, to make sure it's cost-effective prescribing. But I think that it's almost been done to death. It's been going on for years, trying to come up with money-saving initiatives that really aren't there anymore. The ones that were there, we've done and tackled. There aren't, as far as I can see, there's not much left, anything left to do.
>
> Patti [9.202]

6.3.2.2 Acknowledging the need to spend money wisely

Both Belinda and Natalie's observation of cost being more of a historical issue alludes to a time when consultants experienced more freedom in their prescribing of drug therapies. Natalie identifies a change in the prevailing culture of her neurology service, and a wider acknowledgement, outside of pharmacy, of the current requirement to find financial savings within the NHS. This change in attitudes has helped to relieve the tension in financially gatekeeping access to drug therapies.

> **Is there ever any tension when you talk about financial things to clinicians, problems there?**
>
> I suppose not in the last year or two because I think everybody understands the reasons why costs are… you know in today's day and age that everything is financially based at the moment. Maybe three or four years ago probably people were a bit "oh you only want this because it's the cheapest one" or whatever.
>
> So I think people (sigh and pause), I think everybody is on the same wavelength at the moment because everybody knows there are cost savings that need to be made…

> …it's not just pharmacy being funny sort of thing you know it's a bit of a wider problem now (laughs).
>
> Natalie [5.291]

In contrast, Belinda's experience with the medical staff she works alongside is that they do not fully understand the implications of the current financial situation on their ability to prescribe drugs without financial consideration.

> They don't seem to have grasped necessarily the way that the NHS is going. Do you know what I mean? They seem to think that pharmacy, we have a pharmacy [drug] budget and we don't. We have a directorate budget. It's their budget, we don't have money for drugs that we only let them have a bit of but they still seem to think that.
>
> Belinda [3.68]

Laura similarly recognises that the clinicians she works with do not necessarily identify or acknowledge the prevailing financial climate. She provides an admonition that the current financial climate within the NHS requires judicious use of drugs.

> I get very angry with CCG's and NHS England but on the other hand I think people here need to wake up to reality. There isn't enough money around for everybody so we need to choose wisely.
>
> Laura [6.554]

Laura identifies how one of the aspects of her role is to explain to medical staff the concept of a formulary and that there is not complete autonomy within the NHS to prescribe any drug that they deem clinically appropriate for their patients.

> [some consultants] don't quite understand how the NHS works so we sometimes actually have to educate people on that. Consultants who prescribe something and have no concept of a formulary at all…
>
> Laura [6.206]

There is a widespread acknowledgement amongst the pharmacists that the need to save money on the expenditure of drugs, and provide evidence of doing so, is a *de facto* professional activity. This requirement to save money is not identified to be a new aspect of the pharmacist role. Through the pharmacists' acknowledgement of the financial climate within the NHS and their involvement with a number of high-cost drug therapies they assume a certain prominence to financial gatekeeping within the role.

The extent to which the current financial pressures facing the NHS are more widely identified and acknowledged by other clinicians is variably perceived. Where there is wider acknowledgement of the financial pressures of the NHS, financial gatekeeping by pharmacists can be more acceptably received.

6.3.3 Being the safety net for drugs

A recurring theme through the data is a doctrine within practice of ensuring that drug therapy is safe, and used safely. Several of the pharmacists identify how ensuring safety around drug usage is a perceived key characteristic of the pharmacist role within neurological clinical services.

> I think they're [clinical members if the neurology team] aware that I'm there as a safety check for the prescription, so I hope that they have confidence that I'm doing a good job there.
>
> Belinda [9.217]

> …but the most important factor for them [senior clinical staff] is our involvement in discharge and ensuring medicines safety on the ward.
>
> Beth [4.179]

There are two ways that pharmacists identify safety issues around the use of drugs.

6.3.3.1 Ensuring the drug is safe

Section 5.6 (p.128) identified how the default position for pharmacists, in their interpretation of treatment strategies and clinical reasoning, is to ensure that drug therapy does no harm to patients (see Figure 7, p.130). The notion of safe is free from the risk of adverse effects and the neuroscience pharmacists actualise safe as doing no harm.

6.3.3.2 Ensuring procedures for drug use are safe

The pharmacists identify that in supplying drugs they have a responsibility to ensure the drugs are used safely.

> We do a lot of work with theatres the gliolans and gliadels, intrathecal pumps and things like that. Making sure they [neurosurgeons] get what they need, and they're safe down there.
>
> Kate [2.65]

Megan similarly has concerns about the safe use of intrathecal drugs that are supplied to a clinic.

> It's [the use of intrathecal drugs] just an untapped area [from pharmacy] and we just want to be a bit more informed. It might be perfect but (laughs) we need to be safe in the knowledge that these drugs we're just churning out on a monthly basis are being utilised safely.
>
> Megan [12.356]

6.3.4 Summary

Pharmacists consider a range of factors when assessing the appropriateness of drug therapies for patients with neurological diseases. These considerations, which guide daily practice, are inbuilt into their constructed professional identity of the pharmacist within neuroscience services. The identity of the pharmacists is further discussed in section 7.3.2 (p.183). The next section describes the processes of analysing gatekeeping situations.

6.4 Analysing the implications of gatekeeping

Section 6.3 identifies that neuroscience pharmacists consider a heterogeneous mix of issues that regulate access to drug use. These considerations take place with individual clinical cases, as well as for more widespread service implications for drug use. Having identified a gatekeeping issue with the intended use of a drug, the pharmacists are required to make a decision of how to proceed with one of several outcomes:

- Proposed drug use is acceptable and may proceed.
- Proposed drug use is not acceptable and needs to be challenged.

Where a gatekeeping issue arises in respect of a formulary or cost issue, the pharmacists do not necessarily have the autonomy within their organisation to authorise treatment. In these cases resolution often proceeds through mechanisms such as individual funding requests or applications to formulary committees, as set out in section 6.2.2. Some pharmacists in more senior posts

are afforded a greater degree of autonomy within their role to make deliberations on authorising drug use.

Gatekeeping situations which require greater involvement from the pharmacists arise from the non-routine clinical use of a drug, requiring a judgement about its therapeutic appropriateness, or ensuring local compliance of drug use with organisational or national policies. Two factors were identified that influence the pharmacists' analytical process and are subsequently discussed.

- Understanding local and individual needs.
- Clinical experience in neuroscience.

6.4.1 Understanding local and individual needs

Neuroscience pharmacists can experience a tension in these gatekeeping situations because they are aware of policies and guidelines but can also have insight into individual clinical cases or the running of local services. As a consequence the pharmacists have an appreciation of the impact gatekeeping decisions can have. They can be sympathetic to the local and individual needs.

Section 6.3.1.2 highlighted an issue within Sally's practice of extra recording requirements for a drug and a neurologist's refusal to do that. Sally has empathy and sympathy to the recalcitrance of the neurologist because she understands the implications for his practice. Consequently she has not forced the required changes in practice and is seeking a compromise.

> But I partly don't agree with what's being proposed from the governance side of things so I'm a bit stuck really. I'm kind of more on the [laughs] neurologist's side than the governance side…

> …I understand exactly where he's coming from and I can see the difficulties that he has. The amount of recording that they're asking him to do in addition to the routine recording that he has to do anyway as part of seeing the patient.
>
> Sally [13.416]

Belinda was involved in gatekeeping access to IVIg for a patient who did not meet the national criteria for its use. She has empathy to the patient concerned but ultimately acknowledges the need to comply with national policy.

> …you kind of feel a bit torn really because if it was your relative you would want them to have the treatment wouldn't you, straightaway. But you kind of have to step back from that and you know that's the policy, that's what we have to follow.
>
> Belinda [9.422]

6.4.2 Clinical experience in neuroscience

When encountered with a previously unmet proposed drug treatment that they are unfamiliar with and does not fit within any recognised guidelines, pharmacists will intuitively seek empirical evidence to make an assessment of the potential benefits and risks for the patient.

> …you just have to weigh up effectiveness and cost and potential side effects and all that kind of thing.
>
> Lisa [7.588]

Experiential and situational knowledge are important in supporting decision making and the pharmacists approach to these situations mirrors the clinical reasoning set out in Figure 7 (p.130).

Gathering evidence for drug use provides reassurance for the pharmacists. When evidence for drug use is not available the pharmacists can feel anxiety. Billy describes neurology as often being 'at the cutting edge', qualifying that statement through a recognition of working without established guidelines. Billy recalls feelings of anxiety when being involved in treatments with little evidence base behind their use.

> … you do get the flashbacks when you're sat at home or watching the TV and you suddenly think oh my word what are we doing here?
>
> Billy [8.319]

Similarly Polly recollects feelings of anxiety and vulnerability from her involvement in clinical cases where treatments with a limited evidence base have been provided. Those feelings appear to emanate from a perceived involvement with, but lack of control, over a treatment decision.

> They [neurologists] would have a few random papers but not really huge amounts of evidence. So it's sort of, like critiquing those papers as well and looking at it. But sometimes they wouldn't give you huge amounts of information or huge confidence or it might be that it has worked in some patients or anecdotal information-some Professor somewhere had tried something and they thought they would give it a go as well. So at that point it seemed to be not very controlled. It made me feel quite vulnerable, being involved in that process too.
>
> **In what respect?**
>
> Professionally-knowing that you will be involved within a process that you're not entirely sure that its meeting standard of care for the patient really.
>
> Polly [10.240]

Through the acquisition of theoretical and experiential knowledge in clinical practice, and as they learn about neurological disease, pharmacists start to

reconcile limited evidence bases for drug treatments with the rarity of the conditions being treated. They also have a greater knowledge of the treatment alternatives, or lack of them, and consider the implications for the patient of not providing the treatment.

Lisa, who is relatively more experienced in neuroscience, has learnt to become more comfortable with a less robust evidence base for proposed drug treatments. She is more sanguine in dealing with drug therapies supported by a limited evidence base, although she does still look to locate evidence to support the use of a treatment. She acknowledges a need for the patient to be treated in the absence of other suitably tested treatments.

> Because sometimes there are just things [proposed drug treatments] that we'll say no to straight off because the evidence just isn't good enough, or we don't think the cost effectiveness is right, or it's just not safe or something.
>
> **Right so is the evidence one of the primary things for assessing it?**
>
> Yeah. Certainly I'd want to see something that endorses the use of it. I think sometimes with neurology it's literally just a case study, you know a series of case studies published and not much more than that, particularly if it's a fairly rare disease. So again I think you kind of get used to that sort of thing.
>
> The first time I saw one I thought 'there doesn't seem to be much evidence base for this at all'. But you get a bit more used to the fact that some of the diseases are very rare and there isn't anything else out there, and where there isn't a lot of evidence, and you have to accept sometimes that it might not be unreasonable to use something that's got poor quality evidence because at least it's something to try.
>
> Lisa [7.575]

Sophie is also an experienced pharmacist in neurology. Like Lisa, Sophie acknowledges a lingering professional tension with clinical cases where there is a paucity of evidence to guide therapeutic decision making. But again, like Lisa,

Sophie can reconcile limited evidence for use of a drug with the limited treatment options available, and by adopting an honest and transparent acknowledgement of that situation.

> **And as a pharmacist how does that feel to be in a position where, sort of, it's a bit of the unknown isn't it?**
>
> I think you have to be upfront about it and say to somebody if you don't know you don't know and say the data isn't there. There's no clinical, like trial data or whatever but these are the options really, and these are the risks and benefits of… Well it's not an easy thing to do at all but I think you have to be upfront about it.
>
> Sophie [14.611]

The ability of the pharmacist to locate evidence is identified by the medical neurology staff and where that recognition takes place it can lead to the pharmacist being proactively approached to assist in implementing a new drug therapy.

> They [consultants] will find out that they want to use a new drug in a particular way, or an unlicensed version and they want more evidence, or want us to do some research, how can they get that drug to the patient, sort of support with drug and therapeutics etc.
>
> Billy [8.122]

6.5 Resolving gatekeeping issues in drug therapy

If after analysis of the situation, the initially identified gatekeeping issue is not upheld the pharmacist may decide that the drug can be supplied and authorise its supply. Where after analysis of the situation the gatekeeping issue is upheld the pharmacist will work to resolve the issue. The outcomes of resolving

gatekeeping issues are that the treatment is not authorised or the prescriber is directed to another route to gain permission for drug use.

6.5.1 Engaging the clinical team

Pharmacists employ varying strategies to engage with the clinical teams to resolve gatekeeping issues in drug therapy. The approaches identified within the interview data are listed below.

- Leaving notes (post its) on the drug chart.
- Writing in the medical notes.
- Approaching the medical team directly in person.
- Bleeping (telephone paging) a member of the clinical team.
- Liaising with third parties e.g. microbiologists, senior clinicians, management staff.

Approaches undertaken by the pharmacists depend on the perceived urgency and complexity of the drug issue to resolve. Other factors include the time that the pharmacist has to spend on the ward, accessibility of the medical teams, and the normal cultural and working practices within the clinical environments. Lisa recognises the need for a balance between resolving issues and overburdening medical staff.

> I mean sometimes if it's a TTO then it might not be the most important thing in the world but if the patients out there waiting to go then you need to sort it sooner rather than later. So again we struggle with bleep policies here about not disturbing doctors too much over unimportant things but you've just got to have the balance haven't you and make sure the patients coming out all right at the end of it.
>
> Lisa [7.212]

Pharmacists tend not to *challenge* prescribing decisions with medical staff. They take a less confrontational approach of questioning the reasons for prescribing decisions as illustrated by Sally. This stance is also taken because the pharmacists do not necessarily identify a black and white answer to the situation.

> I think if I came across something that I thought was incorrect or inappropriate. So like actually, thinking about teriflunomide, I did challenge him, not challenge him. He was pretty much saying that everybody who was appropriate, new presentation relapsing remitting MS, he was going to pretty much move towards teriflunomide and I just questioned that a little bit with him because of all the monitoring and queries that go with it…
>
> Sally [13.244]

The organisational culture within neuroscience services can also affect the way in which pharmacists approach medical staff over an issue of drug prescribing, as illustrated by Megan.

> And I come from an environment [previous job]… where I used to just (laughs) boss them [medical staff] about with the drug chart, you know you'd be able to be candid and say, that's stupid don't do that, do this. Over here (with emphasis), if you did that, you would not go down well.
>
> Megan [12.180]

6.5.1.1 Escalating through the medical team and service teams

Pharmacists recognise within the medical teams a hierarchy of clinical decision making. Prescribing decisions in relation to the treatment of neurological illness are taken at a senior level, usually by a registrar or consultant, within the medical team. The pharmacists also identify that for complex specialist cases, junior medical staff do not possess sufficient comprehension of the issue being

raised. Consequently the pharmacists veer towards interacting more directly with senior medical staff over a drug prescribing issue. This process is exemplified by Polly's recollection of practice.

> But the registrar would be on the ward, like senior registrars would be on the ward quite a lot. So they were the people that we ended up actually having discussions with because the juniors… It wasn't like F1 [foundation doctors] equivalents, so they were all SHO's or junior registrars. But it was the senior registrars we ended up talking to directly because the juniors would always say I don't know I need to speak to my senior. So we almost ended up bypassing them.
>
> Polly [10.103]

Similarly, Billy will bypass the junior members of the medical team if he perceives an unsatisfactory recognition and response from them in relation to his intervention.

> …if the staff on the ward, the medical staff, are unaware or not much of a help with that, then I've always gone direct to the consultant, either ringing them through switchboard or whatever.
>
> Billy [8.195]

Sophie identifies that often trying to resolve clinical issues through the junior medical staff as in effect, third parties, is often unsatisfactory. Direct communication with consultants enables her to communicate the exact issue and results in a more receptive response.

> …normally when you end up speaking to the consultants yourself they're usually a lot more reasonable if you have a valid point to put forward. Whereas I think if you try to approach it through the junior doctor, if you're not going to be there on the [ward] round, your message never really gets across. You're always told "Oh that's what they [the consultant] wanted to do" (spoken with slight exasperation).
>
> Sophie [14.237]

In her response above, Sophie acknowledges the ward round and the challenges of retrospectively challenging prescribing decisions. Billy recognises that participation in ward rounds enables him to influence prescribing decisions at the point of them being made.

> **…do you feel they're [ward rounds are] important to be on them as a pharmacist?**
>
> Yep.
>
> **Can you expand on that?**
>
> To be there at the point of prescribing certainly…
>
> …So you can influence…
>
> …And also you're able to sort of reason, to discuss why, with the person [prescriber] there.
>
> Billy [8.175]

Where there are recurrent issues in relation to a drug, or an issue that has more widespread implications, pharmacists can identify limitations in their ability to influence these processes. In these situations, a number of pharmacists described escalating to senior clinical and managerial staff within the neuroscience services to resolve issues.

Megan escalated the national requirements for IVIg use to senior managers to get compliance from the medical staff.

> So we discussed it at that meeting and it's reached the point where we escalated it to be honest to the divisional managers; as soon as the cost implications were discussed…
>
> Megan [12.74]

Kate has a very good professional relationship with a senior consultant; their involvement exerts the required influence to ensure comply with the necessary requirements for drug use.

> If your lead consultant will have a go at them [registrars] every time it goes wrong it soon gets sorted out quite quickly.
>
> Kate [2.118]

6.5.1.2 Delineating the boundaries of clinical responsibility

As gatekeeping emerged as a theoretical concept within the study I sought to explore the parameters of the pharmacists control over these processes. I asked the pharmacists about situations where there had been a difference of opinion over a therapeutic decision or if they had ever refused to supply or authorise the supply of a drug. Most pharmacists could not readily identify situations where that had occurred. Issues relating to drug formularies are usually dealt with through the relevant organisational mechanisms as already described in section 6.4.

Where gatekeeping issues arise in relation to the use of a drug that require more of a clinical judgement, pharmacists often describe acquiescing to the prescribing wishes of the medical team. The proviso to this course of action is that the patients will not come to any real harm. Underpinning this action is the perception that the clinical responsibility for the care of the patient ultimately lies with the medical team caring for the patient.

> If it's [therapeutic issue is] something where it’s a bit more, maybe a matter of opinion, or, you know, we don't think the most rational thing to do but it's not going to do the patient too much harm or hopefully any harm. In the end you sometimes have to accept that it's their patient…

…And if we're happy it wasn't completely unsafe what they were doing we would probably leave it at that.

Lisa [7.237]

Other pharmacists identified how they could advise on drug therapies but the therapeutic decision was ultimately taken by the medical staff. However the pharmacists will document discussions or recommendations with the medical teams. This action infers that although pharmacists identify the ultimate clinical responsibility to be with the medical team, it does not absolve their accountability as healthcare professionals.

And in terms of getting them [antibiotics] stopped then, who steps in to speak to the neurosurgeons? Is it a joint thing?

It is a joint thing. We both write in the notes… So the nurses then alert the doctors that this has been stopped and what they're supposed to do is to check if they want to continue or need to continue, or stop it completely.

Okay. But ultimately it's the surgeons decision?

Yeah [it's] the surgeons decision. If microbiology does not agree with certain antibiotic treatments all they do is write in the notes… There is the occasional disagreement where surgeons want to proceed and there's nothing to stop them. So (pause), you document everything in the notes.

Laura [6.127]

… [if] you notice a prescribing or drug issue how do those get resolved normally on the ward?

Depending on the severity-you know if it was a serious one I'd go to one at the registrars, try and work out which registrar was responsible for that patient you know which consultant they were under. I'd go and speak to them directly about it, or at least get their opinion on why they have done what they've done, and give my opinion on why I don't agree with it.

And what happens then?

> If it was a mistake they will correct it. If they're adamant that that's what they want then I would probably endorse on the prescription that I've confirmed those, or whatever it may be, with the prescriber and then document that.
>
> Belinda [9.264]

6.5.2 Expediting drug supplies

As a result of working on hospital wards and closely with clinical teams the pharmacist develops a perceptible understanding of the importance of timely drug supply for the benefit of the patients and for the operational running of clinical services.

6.5.2.1 Ensuring the patient gets the drug

When working on neurology wards Lisa analyses the administration section of drug charts to ensure that drugs have been administered to patients. She identifies specifically patients with Parkinson's disease and myasthenia gravis: the drug therapies for these conditions largely provide symptomatic relief and treatment regimens can be individualised. The omission of drug dose doses in Parkinson's disease and myasthenia gravis can be uncomfortable and distressing for patients with potentially significant medical consequences.

> Some of the things [activities she undertakes on the ward] are very specific neuro wise-things like Parkinson's [disease] and myasthenia [gravis] - trying to make sure that things are prescribed at the right time, people aren't missing doses and keeping an eye out generally about missed doses.
>
> Lisa [7.198]

6.5.2.2 Being the discharge pioneer

A common theme that arose from discussions of daily ward practice was the increasing turnover of patients in hospital wards. There was a perceptible emphasis on prioritising patient discharge. Beth perceives that the nurses she works alongside on a neurosurgical ward view pharmacists as 'discharge pioneers', a reference to facilitating patient discharges through the timely supply of drugs. Her practice appears to conform to the nurses' viewpoint through her attempts to pre-emptively order drugs for patients *in lieu* of their expected discharge.

> … then that particular ward is quite high turnover as you can imagine so my priority then is to do the discharges. So, I don't know if you do in your Trust but we do drug lists here so we try and pre-empt and transcribe medicines onto the discharge letter and get them dispensed in order to speed up discharge before the doctor then adds their bit on and check the prescription that nothing else needs to be added.
>
> Beth [4.32]

Similarly when discussing with ward-based nurses, Natalie identifies a perception that pharmacists need to be able to facilitate timely patient discharge and that the pressure to do so is becoming more pronounced due to a reduction in the average length of an inpatient admission to hospital. Like Beth, Natalie describes her practice at ward level focusing on patient discharge through timely supply of drugs and thus also conforming to the status of the *discharge pioneer*. Through working on the wards Natalie identifies a tangible pressure that the discharge process creates for her nursing colleagues and how her role in facilitating the timely supply of drugs helps to relieve that pressure.

> [Working] at ward level obviously [with] the nursing staff, just making sure that the medication is there ready to give them in the right form and the

> right dosage… Facilitating discharges really-just helping with them, making sure we can ease their pressure and getting the patients out in a timely manner (laughs).
>
> **So at a ward level then how do you think your role is perceived by the other staff on the ward?**
>
> Errm… (pause) I think it's still mainly they perceive you there to just make sure that the tablets are there with the patient ready for them to go [be discharged from the ward] (laughs).
>
> Natalie [5.152]

Through working on the neuroscience wards the pharmacists develop an appreciation of the importance of the importance of timely drug supply. They identify this importance through the adverse clinical consequences of drug dose omissions and the pressure on their professional colleagues, notably nurses.

Within standard models of medicines management in hospitals pharmacists permit the dispensing of medicines through the authorisation or clinical checking of prescriptions and medicine charts. In working in a ward environment the pharmacists attain a tangible appreciation of the benefit medicine supply has at a ward level for the clinical benefit of patients and the running of the ward. Pharmacists working at a ward level see their supply role to allow access to drugs working through the barriers to accessing drugs through the hospital's medicines management processes and where necessary expediting that process.

6.6 Chapter summary

Gatekeeping is a prominent process, regulating access to drug therapies, within clinical pharmacy practice in neuroscience. Within NHS hospitals, the pharmacy

department remains the major repository for drugs, and pharmacists remain direct employees of the pharmacy department. Although the pharmacists distance themselves from, or do not readily identify themselves with, the traditional dispensing role of the pharmacy profession, they remain custodians to drugs.

Pharmacists regulate access to drug therapy not by the traditional means of dispensing prescriptions, but through their analysis of patients' drug regimes. The provision of a *clinical check* by the pharmacist authorises drug supply to occur.

Gatekeeping assumes a certain prominence in neuroscience pharmacy practice because of the use of specialist drugs, or unconventional use of drugs, which may also be expensive. For neurological disease, specialist drug therapies are increasingly provided through third party *homecare* providers. Neuroscience pharmacists also describe their increasing involvement in the regulation of this supply route for drug therapy.

Aside from the clinical analysis of patients' drug therapies (cf. 5.6, p.128), neuroscience pharmacists undertake assessment for compliance with organisational policies around drug use, and issues of cost and safety. These gatekeeping processes can form the basis of interaction between the pharmacist and the clinical teams in neuroscience. Where pharmacists are less integrated into the neuroscience services and not providing regular clinical input into patient care, interactions over gatekeeping issues lead to more prominent identities of the pharmacist 'policing the formulary', 'being the accountant' and 'being the safety net'.

Pharmacists can experience tension when situated within gatekeeping processes. They are cognisant of their professional and organisational obligations to ensure drug use fits within organisational frameworks. Yet at times, pharmacists can identify a genuine patient need for drug therapy, despite the intended drug use falling outside of the parameters of normal practice and rules.

Pharmacists practicing at a ward level have a tangible appreciation of the benefits of timely drug supply, both for patient benefit and for the operational running of ward areas. They describe a current pressure to rapidly admit and discharge patients, and identify a contribution to the operational efficiency of clinical services by facilitating the timely supply of drugs for patient discharges.

7 Integrating into the neuroscience service

7.1 Introduction

This chapter presents the process abstracted from the data of how pharmacists integrate into the clinical neuroscience service. Neuroscience pharmacists, as hospital based clinicians and often working within large clinical services, do not practice in isolation from other healthcare professionals. Aside from working with other clinical practitioners within neuroscience services, the pharmacists also work with other non-clinical i.e. non ward-based groups of staff.

Pharmacists' professional task of facilitating the optimization of safe and effective drug therapy for neurological disease, within organisational policies and constraints, is contingent upon the co-ordinated involvement of a range of professional groups, organisations, and patients. To achieve the commonly described goals of safe and effective drug therapy for neurological disease, pharmacists identify a requirement to form working relationships and integrate into the neuroscience service. This process was succinctly described by Billy.

> Well I would describe it [the role] as lead for pharmacy services integrating within the clinical and multidisciplinary teams first of all…
>
> Billy [8.6]

This chapter illuminates the processes of pharmacist integration into the neuroscience service, the conditions that are necessary to bring about these processes and the value of integration to the pharmacists in their practice. The chapter begins by describing the pharmacists' organisational position, sitting between the pharmacy service and the neuroscience service.

7.2 Being the *face of pharmacy*, the link with the neuroscience service

Section 5.5 (p.115) illuminates a tension that can arise from the pharmacists identifying themselves as specialist clinical practitioners in neuroscience while also remaining as clinical generalists. This duality of identity arises partly from the participants' simultaneous identity of themselves as a pharmacist belonging to a general pharmacy service, and a member of the multidisciplinary clinical teams within neuroscience services. Neuroscience pharmacists remain direct employees of the pharmacy service but in their state of organisational overlap with the neuroscience service they can function as a nexus between the two services.

Acting as an organisational link to the neuroscience service, the pharmacist can be viewed as, what Megan observed of her senior colleague, "*the face of pharmacy"*. Being the face of a body or service connotes a representative and ambassadorial role. The role of the neuroscience pharmacist can serve as a form of pharmacy ambassador within the neuroscience service. I will outline this function in the next two paragraphs.

Pharmacists represent the strategic medicines-management agendas and interests of the pharmacy service, or more widely the strategic agendas of their employing NHS Trust and NHS England. Pharmacists' involvement in gatekeeping specialised drug therapies section (chapter 6) illustrates their awareness of strategic drug policies.

Pharmacists are also attuned to the local drug needs of the neuroscience service they are situated within. By integrating into the neuroscience service the

pharmacists can begin to understand the needs of the service to support drug use, but remaining cognisant of the wider organisational issues and rules.

Sally highlights how her newly created role has improved relations between the pharmacy and neurology departments by presenting a positive, helpful façade of the pharmacy service to the neurologists she works with.

> I think it's been quite reassuring to see that over the past three years [pharmacy's] relationships with the neurology department are definitely much better and they're coming to us now whereas before they wouldn't have come to us.
>
> **Why do you think they weren't good?**
>
> I think is just that pharmacy was always seen… I'm just trying to describe the consultants, they're not very forthcoming consultants anyway and perhaps their experiences with pharmacy hadn't been particularly good up until that time. I think once I started sort of doing positive things for them they came to see me as a resource they can come to.
>
> Sally [13.95]

Much like an ambassador, the pharmacists also need to be able to integrate into the local environment of the neuroscience service and establish relationships with key personnel. They need to understand local cultures and customs of how things are done in the local neuroscience service, what Beth describes as the etiquette.

> I first went along [to meetings] to see the formats of what was expected, you know of us, etiquette etc.
>
> Beth [4.271]

Amongst the pharmacists interviewed there is variation in the size of the neuroscience centres they practice within. I have used numbers of inpatient beds and consultant medical and surgical staff as dimensional proxy measures

of the size of neuroscience services. I acknowledge the limited validity of these measures as constructs of the size and complexity of neuroscience services but seek to convey in some tangible way the variation in practice settings amongst the pharmacists.

The neuroscience centres in which the interviewed pharmacists practice, range in size between locality services resourced with less than ten consultant medical staff and a small number of dedicated inpatient beds, to tertiary services occupying large dedicated hospital units and with many affiliated consultant medical staff.

Megan, who practices in one of the larger neuroscience services, provides a flavour of the challenges pharmacists face in integrating into the clinical service.

> **And how have you found that, moving [from the previous clinical role] to that environment [neuroscience department]?**
>
> Errm (slight pause), difficult. I think it took about a year really to even settle in. I really enjoy it but I think it takes that long to get to know who people are, who does what. …
>
> But, I don't know, obviously it's very outpatient led out here so your consultants you mightn't see them for ages but they're here. There's [a lot] of them (exasperated laugh). You don't see them that often. There's [sic] a lot of managers over here; there seems to be a lot more structural management over here. So I spent a year learning who's what, who does what, who speaks to who, what meeting this is, what meeting that is, and now that I'm getting there I think now I'll be able to get things done because I've bedded in if you like.
>
> Megan [12.124]

Regardless of the size of the neuroscience service similar issues are faced by pharmacists in integrating into the clinical service. The next section sets out the process of how pharmacists reconcile their role within the neuroscience service.

7.3 Early stages of specialist practice: scoping the pharmacist role

Section 5.2 (p.82) identified how, commonly the pharmacists have little prior experience of neurological disease before entering their role. Just as the pharmacists identified a need to develop their clinical knowledge of neurological disease and its treatment they also often identify a need to learn about the professional role itself, what it entails and the expectations of it.

Sally and Michael entered into newly formalised posts with little guidance or expectation of how to perform the role, beyond a generic job description for a senior clinical pharmacist with pharmacy responsibility for a clinical directorate or service.

> … I came in[to the role] almost at a point of there not having been much of the pharmacy service. So you had to really establish, I had to definitely very much establish what we could do and what the value of us would be to them.
>
> **And do you think that was very much you setting that out or did the directorate come to you and say well we have this agenda, or was it a joint thing?**
>
> There was no agenda given to me so I devised one.
>
> Michael [1.53]

Even within established pharmacist posts some of the data highlight a lack of both internal and external clarity around the functions of the role. Internal clarity is the clarity with which pharmacists perceive their role. External clarity is the clarity with which colleagues and stakeholders perceive the pharmacists' role.

Billy and Patti, on entering into established clinical pharmacist posts in neuroscience and stepping into the shoes of their predecessors, attempted to learn about their new roles by meeting with stakeholders of their role –

managers, senior medical and nursing staff. From these discussions both pharmacists appeared to form perceptions of an expectation to fit in, to *continue the good work,* but with little articulation of what the role would entail. The accounts of their discussions suggest there was little clarity from the neuroscience service around the purpose of the pharmacist role.

> I tried to get involved straight away and meet them [the medical staff] when I first started: just to ask them what they expected of me, that sort of thing.
>
> **So you asked them [medical staff] what they expected of you?**
>
> Yeah because obviously they've worked with pharmacists and [colleague] who is just leaving, they've worked with her for years and obviously [other colleague] had input as well. So again they're obviously fortunately used to clinical pharmacists so it wasn't as though it was a brand new thing.
>
> **So I'm just curious to know what things they said as answers to that question.**
>
> Well basically continue the good work was one sort of broad thing.
>
> Billy [8.113]

My discussion with Patti revealed a similar experience to Billy. While there was an acknowledgement of Patti's lack of experience in neurology, like Billy's account there also appeared to be no clearly defined expectation from the neurology department towards Patti, of her role.

> When I was applying for the job I sort of went and met the directorate manager who is non-clinical and a couple of the consultants, one being the lead consultant. So I'd met them prior before my interview, before I got the job. I'm trying to think (laughs) what happened. I suppose I had an introduction where I think I was expected to make appointments to see some more other people. So I met with the specialist nurses, Parkinson's nurses and the epilepsy nurses. I'd already met the ward manager and the matron. I was pretty much thrown into it really (laughs)….

…Did you come away with any expectations from those conversations of what you felt they wanted from you?

No (sighs), not really. I think they realised that I hadn't got any neurology experience so I didn't feel that they'd got any expectations of me at first . You know, other than just to settle in, just to gradually become part of their team.

Patti [9.23]

Lisa also moved into an established neuroscience post; she feels she did have a clearer expectation of the role through discussion with her predecessor, the person that had already performed the role. Not all pharmacists who entered into established roles had the same opportunity as Lisa because their predecessor had moved on to another organisation. In Lisa's case, despite the clearer expectation of the role, it did not necessarily provide the preparation she had envisaged.

But I don't think I was entirely prepared for it [the role] until it hit me.

Lisa [7.65]

The lack of clarity around the roles of neuroscience pharmacists may be explained by two factors: neuroscience as an emerging clinical pharmacy specialism; the broad scope of the role of the neuroscience pharmacist. An explanation of these causal factors is provided below.

7.3.1 Neuroscience as an emerging clinical specialism

A general perception formed by the pharmacists of their clinical pharmacy speciality, neuroscience, is as a relatively small and nascent clinical field. This perception is often formed by making comparisons with the collective profile and achievements of other clinical pharmacy specialisms. Below, Belinda's hints at

issues of peer isolation in neuroscience (see section 5.2.2, p.84). Her views are drawn from comparisons with the clinical pharmacy specialism of renal medicine which further illuminates to her the emergence of neuroscience as a clinical pharmacy specialism.

> I think it's difficult within neurosciences because it's a relatively new speciality and there's a few of us. Like the renal pharmacists here, there's more of a group of them. Obviously is easier to band together and discuss things that come up within your directorate. So I think it's more difficult if you're a small group.
>
> Belinda [3.424]

The study identified some empirical verification of the infancy of neuroscience as a clinical pharmacy specialism, through the identification of the relatively recent creation, within the last 10 years, of some of the posts the pharmacists are practicing within. These posts are either new or newly formalised; the previous pharmacy services provided to neuroscience wards were unfunded or provided on a more *ad hoc* basis.

The consequence of being an emerging specialism and practicing in relative peer isolation can be a lack of assurance (see section 5.2, p.82) and clarity around the role both internally to the pharmacists and externally to stakeholders.

7.3.2 Viewing a multifaceted role from one aspect

The lack of external clarity around the role of the neuroscience pharmacist may be explained by the broad scope of their role and the broad groups of people the pharmacists interact with in the course of their practice. The interaction with members of the multidisciplinary team to acquire knowledge has already been

highlighted in section 5.4.2 (p.106). In the majority of practice, professional interaction occurs with at least the ward-based medical and nursing staff and clinical nurse specialists. Michael, who practices at a more strategic level within his role, provided one of the broadest lists of professional collaborators and stakeholders to his role.

> **…what sort of people are you having to work with and liaise with to get those jobs done?**
>
> Okay, so clinically the whole gamut-speech and language, dieticians, ODP's [operating department practitioners], consultants, junior doctors, rotational staff nurses etc. etc. clinically. But also more strategically, a broad range of anaesthetists, patient safety specialists, commissioning-people from within the Trust and out with as in the PCT's and [local] specialist commissioning.
>
> So lots of negotiations for cost sharing schemes the resource for change team and the turnaround team trying to get… and [neuroscience service managers], director of operations etc., clinical directors for getting cost improvement program projects pushed through, drug and therapeutics committee and drug and therapeutics chair for new therapies. Oh god, it's practically endless.
>
> Michael [1.19]

I later asked Michael how he felt his role was perceived by the people he works with.

> It's interesting. I think (pause) if you take broad staff groups I think we're seen very differently between them. I think our [neuroscience service manager] knows that I see patients but doesn't really think about it. She sees me as the one that gives her the financial reports on drugs and devising strategies maybe to save money.
>
> The consultants see me as a way of helping them get new therapies in and someone who points out risks issues or governance issues to them and tries to manage it and devises protocols to help do things. Almost like an administrative support for things to do with medicines and safety role…
>
> … I think the SPR's [specialist registrar doctors] and FY2's [foundation year doctors] etc. on the ward, they're the ones who really see you as the guru of things relating to drugs and when they've got a problem they come to you. They see that you can sort them out and keep the patient

> safe and make sure that everything's flowing along nicely and help discharges.
>
> …where the nurses come in as well they see us as the discharger of patients and the supplier of drugs, which is funny.
>
> Michael [1.101]

Michael's response highlights a diverse set of expectations for his role. Within other interviews pharmacists identified different expectations for their roles.

In digesting Michael's response above I spontaneously externalised in the interview how I likened his role to that of a dodecahedron and he agreed with the analogy. As a three-dimensional multi-faceted object it is not possible to see all the faces of a dodecahedron examining it from just one viewpoint. Analogously, colleagues or stakeholders may only need to interact with the neuroscience pharmacist role over one specific issue relating to drug therapy such as how to use a drug more cost effectively, how to get permissions to be able to prescribe a drug, or how to administer a drug safely. Through these focused interactions colleagues or stakeholders do not necessarily form a holistic viewpoint of the pharmacist's role.

7.4 Finding the gaps to fit into the service: strategies for visibility

Commonly, pharmacists seek early opportunities in their role to establish themselves within the neuroscience service. They identify gaps in the service for pieces of work they can do, where they can make an intervention and an impact; as Belinda identifies, doing something to "*get my name about"*. Belinda identified her strengths of expediting gatekeeping issues in drug therapy (section 6.5.2, p.171), and as a gatherer of clinical information (section 5.6.1,

p.128) to assist consultant neurologists with applications for the addition of new drugs to the hospital formulary, and producing shared care guidelines. What Belinda identifies, is that these are tasks consultant neurologists are not necessarily skilled in and furthermore, do not have the inclination to become skilled in.

> So I tried initially to be as useful as possible on the things that they weren't good at. So as well as trying clinically, I offered an awful lot to write formulary applications, to do the literature search for the formulary applications and that type of thing. Anything that would get my name about - writing shared care protocols, things like that. So I kind of offered to do the stuff that perhaps they weren't dead good at doing (laughs).
>
> Belinda [3.134]

Although Lauren was provided with some signposting for her role early on, through the types of work (guidelines) she should produce, she too started to identify, *"figured out"*, other guidelines that could be written.

> **And in terms of when you started [in the role] was there a list of requirements or jobs that you were given from the directorate?**
>
> I think when you start in neuro ICU there were some guidelines that they wanted to put in place and the rest of them I just kind of figured out why don't we do this, or when things were introduced into the Trust tailoring them for the clinical area.
>
> Lauren [11.413]

7.4.1 Recognising the role boundaries

The strategy of finding gaps in the service to make an impact arises from an awareness of boundaries of the roles of others. Although the pharmacists might identify potentials areas of practice within the neuroscience service where they may be able to make an impact, they acknowledge there can be difficulties in

encroaching on practice if there is a perceived ownership of a service, or area of practice.

> I think if it's somebody, like if the service is somebody's baby, it's quite hard coming along and telling them what you think should be done, even if a small part of it should be done differently. It depends, some people take that well and other people don't like that much. But I do think that it helps if you're there from the beginning.
>
> Belinda [3.235]

There can be an initial reluctance within the role to encroach on the perceived roles of others. By acceding to the expectation *to fit in*, some of the pharmacists assume a position of what Billy describes *"not stepping on anybody's toes"*. Pharmacists can be conscious of the roles of others. Without a clearly defined perception of their own role, pharmacists tend to err on the side of caution to avoid encroachment on the role boundaries of others.

The reluctance to impinge on the role of others can be heightened where an issue is identified that needs to be challenged by the pharmacist and where there is a perception that their intervention will be negatively received. Section 6.4 (p.159) illuminates reluctance in gatekeeping issues that pharmacists can experience and it evinces a desire to form positive working relationships within the neuroscience service.

Not every pharmacist adopts an initial approach to practicing within role boundaries. Megan started to attend medical ward rounds relatively soon into her position, something that other pharmacists become more gradually involved in, through invitation (see section 7.5.2.1). In stepping out of the traditional pharmacist role boundaries, in a service where *"they're not used to seeing*

clinical pharmacy", Megan's presence at a ward round was out of context to one of the neurologists, drawing a comment from him.

> … the first three or four [ward rounds] that I attended, one of our epilepsy professors who attended who's quite young, you know he's not sort of an old dragon, said to me, "Why are you here? Are you here to audit the drug charts?" And that's just so demoralising [resigned laugh] because no that's not why I'm here.
>
> **And what was your response to that?**
>
> No not at all. But I'll have a look at them, you know just a bit of banter back with him.
>
> Megan [12.220]

Megan was able to assert her reasons for being on the ward round and went on to recall an important intervention she made into the care of a patient on that ward round and justifying her participation. She believes she is slowly winning round the consultant medical staff to appreciating the clinical contribution of her role as a pharmacist.

7.4.2 Redefining the role boundaries once established in post

The initial strategy of taking on pieces of work and performing tasks to be helpful can have implications for subsequent practice. Initial good will and enthusiasm can lead to enhanced expectations and assumed responsibilities being formed of the pharmacist's role by the neuroscience service. As pharmacists become established into their roles they can struggle to meet the increased demands from their workload and they start to identify the need to offload work. Some renegotiation can become necessary to deal with the workload and different strategies are taken by the pharmacists to address this.

Belinda's challenges were heightened by a reduction in working hours. She did not completely renege on the work activities that she used to undertake for consultant neurologists but there was an element of education and negotiation required to reset the level of her involvement with drug formulary applications.

> I think that's what I tried to do, to see a gap that needed to be filled. But then in later years as the formulary applications increased (laughs) then it was kind of seen as my job and that was quite difficult when I dropped my number of days for them to, do you know what I mean? What it's not actually - pharmacy don't always write formulary applications that you [neurologists] just sign the bottom of? It's meant to be written by you [neurologists] and I can help you with your literature searches but really you've got to sort of….
>
> Belinda [3.143]

Michael has been more tactical with his initial approach of offering an enhanced pharmacy service, beyond what he was funded to provide, and then withdrawing that service to attempt to secure funding to re-establish and properly resource it.

> … I would deliberately provide over and above service that wasn't funded to our neurology ward so that they could get some decent quality advice. And I did that purely off my own back and then got them to think actually…
>
> Because what I then did was stop providing the service and say it's not funded until they went 'actually probably we should get that service funded because that was quite useful'. So it's been very much off my back (laughs) to get things pushed through
>
> Michael [1.62]

Lauren sometimes sees the advantage of undertaking tasks that are not really hers if they can bring about bargaining power at later times.

> **Were there things that were ever put to you to sort out and you thought, actually that's not really my job. Was there anything that you felt I'm not sure I should be doing this?**

Yes [laughs] quite often.

Were you ever able to say no to those?

I think it's usually a balancing act - there are things that are not your job that would take two minutes to sort out and then you think oh actually I could do that and then that's a bit of leverage for when you need things done for you (laughs).

Lauren [11.424]

7.5 Antecedents for pharmacist involvement and the development of working relationships

A relationship in the context of human experience defines the way in which two or more individuals are connected. Neuroscience pharmacists' professional practice focuses on drug treatment for patients with neurological disease. In the main, pharmacists' professional working relationships are formed over interactions relating to drug therapy. The formation of a working relationship between people confirms a conscious acknowledgement of an issue in which their roles are connected. This section describes the conditions (antecedents) that bring pharmacists into contact with members of the neuroscience service to germinate the formation of working relationships.

7.5.1 Identifying a need for pharmacist involvement

Members of the multidisciplinary service identify the need to involve a pharmacist if they perceive there to be an issue in drug therapy that would benefit from the involvement of the pharmacist.

Kate, Belinda, Lauren and Sally all describe developing closer working relationships with nurse specialists in MS over recent years. These enhanced working relationships have resulted from the introduction of a number of new

disease-modifying drug therapies (e.g. fingolimod) that require co-ordination over their supply and safety monitoring. Facilitating and arranging the supply of specialist drug treatments for neurological diseases is a common antecedent for collaborative working between pharmacists and clinical nurse specialists.

> I've got quite a good relationship with the MS specialist nurses, two of them, because obviously of the new drugs that we've been dealing with recently and home care. They sometimes come to me with home care issues…
>
> Sally [13.329]

> I work with the MS specialist quite a lot because they've got home care and I found since I got involved in home care they tend to contact me more…
>
> Lauren [11.267]

There is not always a mutual recognition for the need to in involve a pharmacist. Some pharmacists describe the predominance within their clinical practice of providing pharmaceutical care to neurosurgical patients, where a higher proportion of inpatient beds are dedicated to neurosurgical admissions.

Pharmacists perceive a general lack of interest in drug therapy from neurosurgical medical staff. In section 5.4.2.3 (p.110), pharmacists identify how neurosurgical ward rounds can often be very short in duration and lack focus on drug therapy. Against this background, pharmacists identify challenges in forming working relationships with the neurosurgical medical staff.

There is variation in the extent to which neurosurgeons acknowledge the need to interact with pharmacists. Michael identifies how some neurosurgeons are

more receptive to than others based on their recognition of their need to be involved with drugs.

> Surgeons are, like there's [sic] a couple of them who I have very little dealing with at all because they kind of think well [pharmacists,] that's drugs. I don't need to know anything about drugs in the neurosurgeon's field, particularly the more established ones [think like that].
>
> Michael [1.129]

Kate identifies how the introduction of specific drug products (indocyanine green, Gliolan, fluorescein) into neurosurgical procedures has provided a focus for working relationships between neurosurgeons and pharmacists.

> Before, whatever we did on the wards wasn't relevant because neurosurgeons weren't really worried about drugs on the ward. Whereas now they've got so many different indocyanine greens and Gliolans, and fluorescein and all that kind of thing down there [in theatre] they have kind of had to work more closely with us.
>
> Kate [2.130]

Kate describes the introduction of these drugs as a catalyst to improve working relationships with the neurosurgical doctors.

7.5.2 Demonstrating the pharmacist role in practice

Where there is an overt and mutual recognition for the pharmacists to become involved in a process, or service, working relationships can be established. Concurrently with these more spontaneous identification processes, the pharmacists begin to demonstrate their role within the neuroscience service. This process of demonstration takes place in several forums and tends to result in a more gradual establishment of the pharmacist role, and working relationships. This section summarises the processes of role demonstration.

7.5.2.1 Ward working and involvement in multidisciplinary ward rounds

As already identified in section 5.4.2.3 (p.110), participation in multidisciplinary ward rounds is not universal within clinical pharmacy practice in neuroscience. For those pharmacists that do participate in ward rounds, their inclusion is a more evolutionary development within the role.

Inclusion into the ward rounds can stem from observations by the multidisciplinary team that pharmacists can contribute to the care of the patients. While reviewing patients in neurology and neurosurgery wards, pharmacists pro-actively offer drug-related advice or are asked by members of the multidisciplinary team to provide advice or information in relation to drug therapies.

Repeated interventions made by the pharmacists into patient care, particularly when ward rounds are happening, can lead to an acceptance amongst the medical, and multidisciplinary teams that the pharmacist can make useful contributions. This realisation can lead to the pharmacist's inclusion in ward rounds, either by formal invitation or gradual inclusion, as Laura describes.

> I think we've extended more. The pharmacists have become more prominent in the ward rounds. It was not always the case so initially it was only [pharmacists] in situ [on the ward during] the ward rounds, the pharmacists were there. And with time and experience you get asked actually a lot more questions. Rather than just standing there you are very active member of that team.
>
> Laura [6.76]

In Polly's Trust, interventions made by pharmacists resulted in recognition by the medical staff of the contribution that pharmacists make to patient care.

Whilst these observations and acknowledgements resulted in an invitation to attend the ward rounds, lack of pharmacist time prohibited participation.

> And then we would talk to the consultants as well while they were on ward round too. Try and understand what they were doing, why they were doing it. So they actually had an awareness of the amount of interaction we were having with their juniors [doctors] too.
>
> **So you did attend ward rounds as well?**
>
> Not really. It was more that the ward round was going on and we were sort of in the same place at the same time but it wasn't official ward round attendance. We didn't have the capacity to do that. They had actually asked if, they said that at any point in time if you were able to join us you can but we actually just didn't have the capacity to do that.
>
> Polly [10.108]

Table 5 (p.114) identifies some barriers to pharmacists attending ward rounds in the context of acquiring situational knowledge. Similarly, non-participation in ward rounds can also hinder opportunities for pharmacists to demonstrate their clinical knowledge and their provision of pharmaceutical care to patients, to other members of the multidisciplinary team. Pharmacists who do not participate in ward rounds tend not to identify their clinical input into patient care as an externally held perception of their role.

Aside from the issues highlighted in Table 5, Lauren identifies reluctance in her junior colleagues to attend ward rounds. This hesitancy arises from the trepidation of being asked questions that they cannot answer.

> I think for the more junior pharmacists it's [attending ward rounds] more daunting I think they find. When I've asked them 'just join the ward round' I don't know if there is a fear will be asked all sorts of questions but I try to encourage them that they'll actually learn more.
>
> Lauren [11.146]

Beth has been through the process Lauren describes above. Her experiences confirm Lauren's assertion of learning and her relative comfort now with challenging clinical questions suggests a feeling of being ensconced in the clinical team.

> **And thinking about those early days and ward rounds were you being asked clinical questions fairly early on?**
>
> Err yes. I think it's just now that I just answer them with more confidence and I have a lot more experience. Whereas in those early days I would dread the questions now I look forward to them (laughs). Not that I know the answers all the time still that's for sure. It's just that I don't have [the worry of not knowing the answer] in my head.
>
> When I first started I would have been fretting a little bit about you know 'I wonder what they going to ask me' whereas now I hope it's going to be something I have to think about.
>
> Beth [4.379]

7.5.2.2 Attending meeting forums

Neuroscience pharmacists participate in range of meeting forums within the clinical services, most commonly describing clinical governance, infection control and general departmental meetings. The pharmacists identify how these meetings are usually attended by senior medical, nursing and managerial staff and find they provide a forum in which to demonstrate the value of their role.

> …going to risk and governance, and infection control [meetings]. You start seeing the same people at each meeting and then, you're taking back what you learn there, or what you're asked to do there. And then action points from there; delivering them on the ward. I think they do appreciate what effort we put in…
>
> Beth [4.69]

Patti identifies how demonstration of her *usefulness* at departmental meetings, through her interaction with other neurologists, is favourably turning around the

perception of a neurologist she has previously experienced professional difficulties with.

> …well I get the impression that in the few consultant meetings I've been to that my consultant who wasn't very pleased with my Botox idea has perhaps, seen other consultants involving me more. I think he's perhaps come round to realise that perhaps I'm not that bad after all and has started to ask me more. So he possibly saw me as a pain (laughs) and then thought you know, well perhaps actually we could actually make use of this person (laughs).
>
> Patti [9.228]

7.5.2.3 Establishing non-personal contact

Pharmacists describe in the main, consultant neurologists and neurosurgeons only visiting wards to participate in ward rounds, providing a limited window of opportunity for the pharmacists to interact with them personally. Personal interaction with consultant staff is a challenge in practice which is more pronounced in larger neuroscience centres as a consequence of the hub-and-spoke service model (cf. 1.5, p.14), as identified by Lisa.

> So I guess that's where, maybe, I had a lot of contact with my consultants in my previous post that didn't really happen here.
>
> Lisa [7.124]

This can result in a reliance on electronic (e-mail) communication with consultants.

> Our service is a bit bizarre from a neurology point of view. Most of our consultants work around the region and then just come into [the neurology unit] for one or two days a week. So I largely end up e-mailing them all, while they're out and about. They're only really here when they're on-call.
>
> Kate [2.229]

> Sometimes you e-mail them [consultants], most of them have e-mail on their BlackBerry anyway don't they. Although you can ring them if it's really urgent…
>
> Sophie [14.255]

Belinda and Laura identify how e-mail communication from medical staff making enquiries and requests for information, was a predominant method of contact in their early role.

> …but I would also receive a lot of medicines information enquiries via e-mail and things from our consultants because we have, because we are the tertiary referral centre we have something like 30 consultants working between here and other centres. So a lot of them would e-mail me regarding enquiries about their patients both here and at the local centres in secondary care.
>
> Belinda [3.27]

This form of early communication appears to be an early non-committal sounding out of the pharmacist by the consultants. For Lisa, being approached personally by the consultants is more common now that she is personally known to them.

> Now I'm much more established they [consultants] know my face and are more likely to stop me on the wards and tell me about a patient and see what I think will ask me about whatever else…
>
> Lisa [7.137]

Amongst the pharmacists there is recognition of the usefulness of e-mail communication but there appears a preference for personal contact.

> I work on a Friday and that's our academic meeting so all the consultants are in on a Friday afternoon so I can still sort of get the chance to go and visit them face-to-face and they can still put a name to face really. But that is a worrying part to an extent that you sort of you see somebody's name come up an awful lot on e-mail but you don't necessarily have face-to-face contact.
>
> Belinda [3.39]

Beth would prefer to communicate a service development personally to anaesthetists but will use e-mail as a back-up.

> So we'll have to obviously start off actually having a meeting with all those involved or if meetings not possible then an e-mail to those, you know that particular group of anaesthetists to let them know what service we'll be providing.
>
> Beth [4.150]

7.5.3 Developing within the same Trust

Several of the pharmacists identify that they started in their post when some of the consultants they work with currently, were also in more junior training positions. The pharmacists identify how the progression of their careers in tandem with these consultants has nurtured closer and more open working relationships.

> …a lot of our consultants, if they haven't been in post long it because they've been registrars here at some point. So obviously I've met them through that because I've been in post for quite a while now so I tend to know them historically before they get to the consultant role that they are.
>
> **And those people you've been registrars with that are now consultants, does that relationship differ to the older consultants?**

> It tends to be more, a lot easier to… We have a lot more chatty relationship because obviously we've sort of, our careers have kind of matured together so it tends to be easier to contact them. I'm a lot more familiar with them.
>
> Belinda [3.49]

Laura and Michael explicate this phenomenon by observing that at more formative stages of doctors' careers, they utilise pharmacists' knowledge to a greater extent to address gaps in their own knowledge base about drugs. These perceptions of pharmacists as being a knowledgeable and trustworthy information source, if formed during speciality training, can be maintained and strengthened through bonds of collaborative professional development.

> I'm in that age where I know them from SHO level to consultant level so you have got a different relationship now because they came to you for advice when they were in SHO. So they are more likely to come to you for advice when they are consultants.
>
> Laura [6.235]

> For me personally, it's been very beneficial that my first involvement in neurosciences was when I became the clinical pharmacist for the neuro critical care unit, because [the Trust] likes to grow its own…
>
> …a lot of the younger consultants I worked with when they were trainees. So that's anaesthetists, neurosurgeons, neurologists and they were learning from me when they came through. They as a result respect my knowledge and my role etc.
>
> Michael [1.35]

7.6 Integration into the neuroscience service

Integration into the neuroscience service is not a dichotomous outcome in the sense that a pharmacist is either integrated or not; it does not mark a transition

from the pharmacist's position in the pharmacy service into the neuroscience service. In the main, pharmacists still retain their identity as a pharmacist, belonging to a pharmacy department (cf. section 5.5, p.115), and forming the organisational link with the neuroscience service. Integration is a process of movement along a continuum towards a state of the pharmacist being an accepted member within the neuroscience service.

Pharmacists identify that integration into the clinical team is built upon the development of trust. Through the processes of demonstrating their contribution to patient care the pharmacists can also demonstrate an allegiance towards the neuroscience service. This process is always tempered against the gatekeeping processes that pharmacists undertake (chapter 6).

Pharmacists identify how acceptance and integration into the wider neuroscience team, built upon trust, permits them to pursue their own agendas of developing their practice and developing the pharmacy service. The pharmacists begin to encroach on role boundaries, the process becoming more permissible through the pharmacists demonstration that they are working with the service to progress its aims.

Beth's involvement in surgical ward rounds has instilled a culture amongst the surgeons to review the drug chart and consider drug issues. This practice is facilitated by a good relationship with the medical staff and an enforcement of the practice by Beth.

> … and on the ward round it obviously-we're electronic so we take a [computer] round the ward round so that they then actually, we all look at the medicine chart together because of the… Well on the days that I haven't been on the ward round, they do the ward round without looking

at the medicine chart so we get a lot of stuff resolved as we're going round on the ward round.

Right. So on the days you're not there then?

We always have a pharmacist but say for example I'm 15 minutes late as per a few weeks ago then they'd done the first six beds without looking at the medicine charts of those patients.

Right (laughs). What was your reaction to that?

Well we re-did them (laughs). They know they should be looking at them themselves but I think it eases… It's a time pressure thing for them and they like, have a good deal of trust in us to bring issues to them you know, we work well together.

Beth [4.76]

In Michael's practice, his ability to change practices with drugs like parecoxib and IVIg, is dependent upon trust amongst the staff that he is working with.

So they end up trusting [emphasised] you. That's been hugely beneficial from being able to take my ideas forward, whether it's telling the anaesthetists to stop using parecoxib and they all say 'well Michael says it so that's fine' to pushing forward CIP projects like we don't dose IVIg differently for all neurosciences patients except Guillain Barres for the next month and they all said 'well Michael said it so that's fine'. And it's just grown from having that kind of involvement at early stages and building it up.

Michael [1.45]

Integration within the neuroscience service and attendance at meetings also optimises their linkage function, reconciling the needs of the neurology service with how pharmacy services can work with them. As Polly identifies, the value of attending meetings is that she can link pharmacy to the neuroscience.

It also meant that they had somebody there at the meeting while it was being discussed to give some insight which was really helpful to them. And then it meant that we could follow things up more quickly. Whereas

> previously we didn't feel like anything was fed back to pharmacy to actually act on, change, help support.
>
> Polly [10.75]

Integration into the neuroscience service is not passage through a gateway into tension-free clinical practice. Gatekeeping issues continue to arise; differences of opinion between the pharmacists and other clinicians still occur. Kate describes a difficult practice situation below but acknowledges the support of consultants because she perceives the support she provides for them.

> I guess having known them for a long time that kind of get to trust you and the work you do with them. Because we just had all the kind of with trying to switch, well we did switch botulinum toxin in the movement disorders clinic, and we're in the process of switching back. But throughout that, consultants have been brilliant with me through what was a very difficult transition.
>
> Kate [2.261]

7.7 Chapter summary

Within clinical practice, pharmacists identify that their ability to influence and control the processes of drug use within neuroscience services is partly dependent upon their ability to integrate into and become an accepted member within the neuroscience service. Integration takes place through the development of working relationships.

Early stages of the integration process involve the pharmacists learning about their professional role and understanding where it fits within the neuroscience service. The process of fitting into the service involves identifying opportunities where the unique contribution of the pharmacist can make a positive impact into the service. Conflict from encroachment on the roles of others, or impingement

on established practices is generally avoided in the early phases of the role to promote a positive façade of the pharmacist role.

Establishment and acceptance into the neuroscience service is contingent upon a mutually identified need for the pharmacist's involvement and opportunities for the pharmacists to demonstrate the value of their role. There can be barriers to opportunities to demonstrate the role. Integration into the neuroscience service is usually assumed by the pharmacists, to take time.

Through the processes described in this chapter, the pharmacists identify the development of trust for their role as a marker of their integration and acceptance as a member of the neuroscience service. The establishment of trust then allows the pharmacists opportunities to pursue their own agendas and the wider agendas of the pharmacy service around drug use within the neuroscience service.

8 The grounded theory: Maintaining an overview of drug therapy for patients with neurological disease

8.1 Presenting the theory

The research questions that were set to guide this piece of exploratory research were to understand how pharmacists define their role within a neuroscience service and how they develop their role and how they develop their specialism in neuroscience.

This chapter presents the grounded theory with the theoretically abstracted core conceptual process of maintaining an overview of drug therapy for patients with neurological disease. The grounded theory is diagrammatically summarised in Figure 10, overleaf. For succinctness, from hereon I refer to the core process in a shortened form of ‘maintaining an overview’.

The core concept of maintaining an overview encapsulates the metaphysical essence of the role of the pharmacist in the clinical specialism of neuroscience while integrating the concepts of the theory through its identification as the basic social process. Maintaining an overview is the tension that pharmacists experience in both the transitional and established phases of specialist clinical practice in neuroscience.

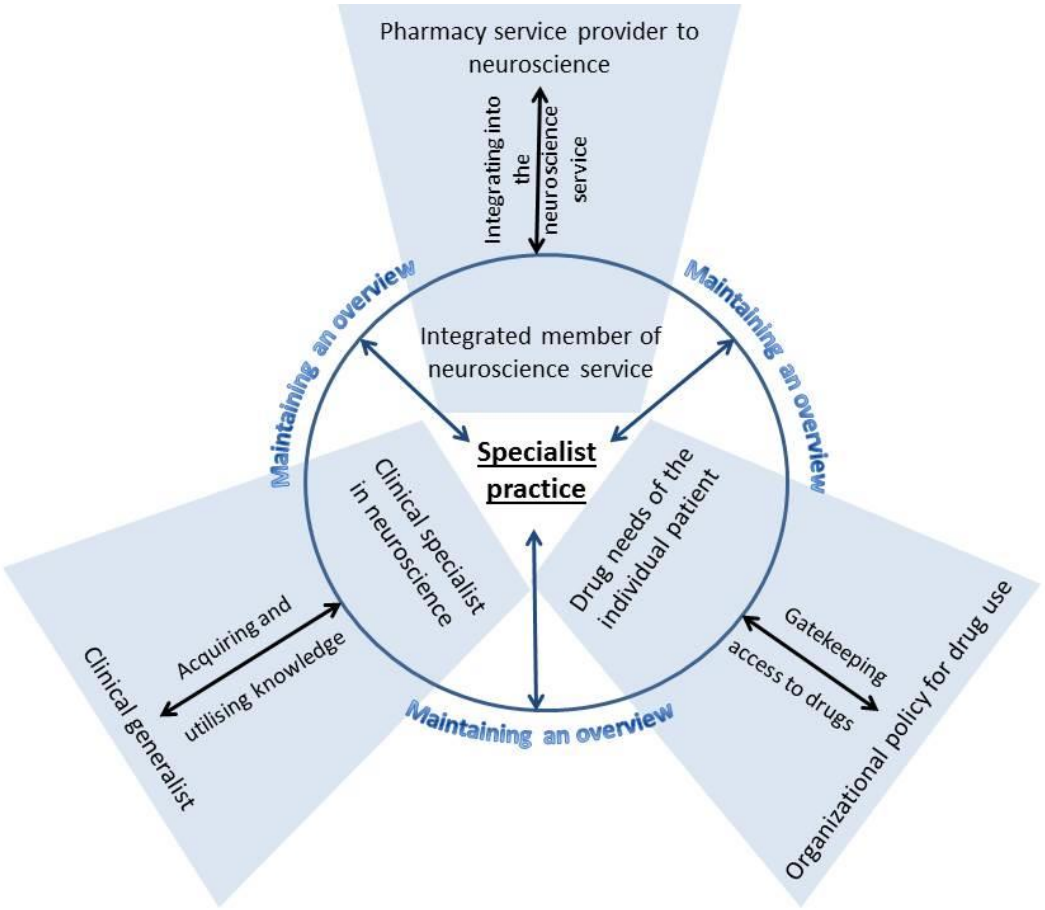

Figure 10. Maintaining an overview of drug therapy for patients with neurological disease.

8.2 Explaining the theory

Maintaining an overview is a conceptual phenomenon emanating partly in response to the often perceived breadth of the role of the neuroscience pharmacist. The neuroscience pharmacist role spans and serves two hospital services, pharmacy and neuroscience. In professional practice pharmacists identify the diversity of neuroscience services through their observations of the array of neurological diseases they encounter, the extent of disease-specific clinical subspecialisation amongst nursing and medical staff, and the sometimes complex organisational structures of neuroscience departments.

Figure 10 illustrates the three conceptual categories, or processes, derived from analysis of the data, as to how pharmacists transition into and define specialist clinical pharmacy practice in neuroscience. Chapters 5, 6 and 7 have set out the processes of how pharmacists move along and navigate these pathways. Each process is represented by a pathway converging towards the centre where specialist clinical practice in neuroscience is performed. Each pathway narrows as it converges towards the centre, symbolic of the narrowing in focus of near-patient, specialist clinical practice. The properties at the outer edge of each pathway are the *non-specialist, generalist* properties of practice upon entering into the specialism of neuroscience. The properties at the inner convergent edges of each pathway are those perceived of specialist practice by the pharmacists. Sometimes the pharmacists identify that their practice does not necessarily attain those properties of specialist practice.

As pharmacists develop within their role in neuroscience, practice generally moves towards specialism. The variable and evolutionary nature of clinical practice means it can change and hence the arrows along each pathway are

double-headed. As practice moves inwardly in Figure 10, neuroscience pharmacists identify the need to still maintain the initial generalist properties of their practice at the outer edge of each pathway. The interview data illuminate that in making sense and constructing the reality of clinical practice, neuroscience pharmacists can experience tension in where they situate themselves along the continuum of each pathway.

Maintaining an overview, represented by the circle and the double headed radial arrows in contact with the circle, is the basic social process arising from the situational tensions in the three pathways of Figure 10. For an aesthetic presentation I have represented the concept of maintaining an overview as a circle joining points of equal radial proximity along each pathway. However clinical practice does not necessarily evolve along each pathway at a uniform rate and the footprint of practice is unlikely to be represented by the blue circle in Figure 10. The footprint of practice drawn out from the apex points along the pathways is individual to each pharmacist, and furthermore there is situational variability within each individual role. In that sense, in the dimensions of the conceptual categories of the theory, there is no single template shape that fits exactly the role of every pharmacist practicing in neuroscience.

The word *overview* may carry connotations of generality and non-specialism in practice but this is not the case. Maintaining an overview is not necessarily a prohibitive process to the development of specialist clinical practice. Within the interview data pharmacists do identify their development of clinical specialism and specialist practice; several pharmacists do identify areas of disease-specific specialism, commonly in Parkinson's disease. However in maintaining an overview, pharmacists remain cognisant of the wider implications of drugs use

despite a developing clinical specialism in neuroscience. The tension between clinical specialism in neuroscience and a generalist overview results in pharmacy practice being dynamic in the sense that it is not statically situated along each pathway. The tensions are constantly changing in practice and so practice is continually moving backwards and forwards along each pathway.

8.2.1 Stepping back to maintain an overview

To maintain an overview of an object, situation or process one needs to be able to remove oneself or step back to view it externally in its entirety. Neuroscience pharmacists are professionally exposed to the implications of drug therapy through a range of lenses. The pharmacists are exposed to the individual drug needs of patients with neurological disease requiring drug therapy; they retain a professional cognisance of larger organisational issues and constraints for using sometimes complex and expensive drug therapies within the NHS.

Beth identifies through her participation in neuroscience departmental meetings that her role has implications at several levels, amending my initial interpretation that meeting participation is useful for acquiring knowledge.

> It's difficult to explain in the right words but yeah having more knowledge and more awareness of what each individual thing you do impacts on at such a higher level, you know trust wide really.
>
> Beth [4.284]

In practice, neuroscience pharmacists can sometimes need to step back along each of the conceptual pathways to view situations through a wider angle lens.

Pharmacists step back to assess the implications of drug therapies for neurological disease in the context of other medical conditions the patient may

have and the concomitant drug therapies they may be prescribed for those conditions. In considering the wider clinical implications of drug use pharmacists utilise their broader, generalist clinical knowledge outside of neuroscience. This results in a tension of the pharmacists identifying themselves as clinical specialists or generalists (section 5.5, p.115)

Pharmacists can be integrally involved in the care of patients with neurological disease but they need to step back and consider gatekeeping issues around proposed drug therapies such as organisational, financial and safety constraints for using a drug therapy (section 6.4.1, p.160).

Pharmacists become integrated into the specialist neuroscience service, but they also need to be able to *step back* into the pharmacy service. By serving as a conduit for the funnelling of interaction between the two services of pharmacy and neuroscience, the pharmacists are required to have an overview of what is happening more globally, within their Trust and the NHS, and locally, within the neuroscience service.

The process of pharmacists needing to step back in practice is best encapsulated by the viewpoint of Billy who identifies how stepping back can reveal a broader viewpoint of considerations for drug therapy.

> … it [pharmacy practice in neuroscience] is a balance between confidence and actually just stepping back and thinking what is actually going on, reflecting what's going on. And I think we have that, pharmacy hopefully has that where we can step back.
>
> **So step back-what's the advantage of stepping back?**
>
> So we can appraise the whole situation. Obviously you've got [a] consultant wanting to do a particular thing [with a drug] or [in] a different way. And they may not have thought of the whole picture…
>
> Billy [8.320]

8.2.2 Maintaining an overview as an active process

Maintaining an overview is an active process and not a passive one. If an object has to be maintained it means that it does not remain static or the same, in the sense that physical or metaphysical forces are working to move or alter it.

Within the theory, the forces working on the pharmacist's role are metaphysical ones. The pharmacists enter into practice in the specialism of neuroscience and encounter highly specialised clinical practitioners. Consequently the pharmacists seek to develop their own specialism. These metaphysical forces seek to skew practice towards specialism (inwardly directional in Figure 10). The role of the pharmacists requires them to maintain generalist drug considerations in their practice; there is a metaphysical force heading outwardly in Figure 10. These opposing metaphysical forces create a tension. The pharmacists have a conscious awareness of these tensions; acknowledgement of the tensions is a factor in defining and shaping professional practice.

8.3 Chapter summary

This study resulted in a grounded theory which identified a basic social process running through contemporary pharmacy practice in neuroscience of maintaining an overview of drug therapy for patients with neurological disease. To assess the usefulness of the theory one needs to return to the original research questions and attempt to answer them. The questions were:

1. How do neurosciences pharmacists perceive and define their role within a neuroscience service?

The theory explains that practice of pharmacists in neuroscience might be perceived as one of specialising generalists rather than pure specialists. That is not a value laden observation and it does not imply that one form of practice is inferior or superior. It is the conclusion drawn from a constructed reality attained through the generation of empirical accounts of practice, and subjected to an interpretive analysis through the grounded theory method.

2. How do pharmacists specialising in neuroscience develop their role and specialism?

The theory explains that there is tension in developing the pharmacists role and specialism in neuroscience. Pharmacists identify the need to develop specialism in neuroscience to develop as specialist practitioners. They also identify the core generalist needs of their pharmacist role. These opposing needs of the role create a tension within practice.

The implications of the research findings in the context of the existing literature, and for clinical pharmacy practice in neuroscience, are discussed in the next chapter.

9 Discussion and recommendations

9.1 Introduction

I have adopted the recommendations of Holloway and Brown (2012) for the construction of this chapter. Firstly, in section 9.2, I will discuss the findings of the research in relation to current pharmacy practice and the existing literature. I will identify where I believe the study findings to make new contributions to the literature.

I make frequent reference to studies in the literature and the findings of this study. To aid clarity when reading this chapter, where I refer to the study of neuroscience pharmacists I have emphasised this by the use of italicisation, e.g. *this* study. Where reference is made to specific findings within the study the section and page numbers are provided in brackets to enable cross referencing.

Following an analysis of the findings, an assessment of the relative strengths and limitations of the research is provided in section 9.3. The recommendations for further research and for pharmacy practice in neuroscience, identified within this chapter in light of the research findings, are summarised in section 9.4. The chapter concludes with a reflective note on the effects of the research journey to my personal and professional development.

9.2 Discussion

This study set out to investigate the practice of pharmacy within the clinical specialism of neuroscience with some relatively loosely defined research

questions. Perhaps not unsurprisingly from using an inductive research strategy, analysis from the empirically generated data resulted in the identification of three conceptually broad processes:

- Acquiring and utilising knowledge.
- Gatekeeping access to drugs.
- Integration into the neuroscience service.

I will discuss these findings in relation to pharmacy practice and I will also draw on existing literature to compare the findings. Where I have been unable to locate appropriate literature in pharmacy practice, I have drawn upon the literature from other healthcare professions, notably nursing.

I have discovered the substantive focus of *this* research, multidisciplinary hospital-based clinical practice, has identified concepts that have been explored more extensively within the literature of nursing practice. I observed within the nursing literature a frequent reference to the work of Patricia Benner, e.g. Benner (1984), and her work on developing expertise and competence in nursing practice. Her work emphasises the importance of experience in developing nursing practice; the findings from *this* empirical research of pharmacy practice in neuroscience draw some parallels to her work. The findings from *this* study also draw in concepts from the fields of education, and applied sociology.

9.2.1 Acquiring and utilising knowledge

This study of neuroscience pharmacists identifies the prominence they place on the possession of knowledge to support their specialist practice (chapter 5). Clinical pharmacy practice within neuroscience is not task oriented in the sense that it does not entail the undertaking of manipulative or technical procedures on patients *e.g.* administering drugs, taking blood samples. The interview data confirm that dispensing, the traditional skill of the pharmacist, is largely a redundant aspect of the modern practice of hospital pharmacists. However, within neuroscience services, the role of the pharmacist is still associated with the function of supplying drugs (6.2.3, p.140); this finding is discussed further in section 9.2.2.

As identified in section 1.4.4 (p.12), the discipline of clinical pharmacy is conceptualised around the application of pharmaceutical knowledge to individuals or groups of patients, to optimise outcomes from drug therapy. The finding that knowledge supports specialist pharmacy practice is therefore, perhaps not surprising. What *this* study identifies is that the knowledge required to support practice is more than a repository of facts, termed theoretical knowledge (5.2, p.82). Pharmacists also utilise experiential knowledge (5.3, p.96) and situational knowledge (5.4, p.103), to support and develop their practice.

The possession of a specific body of knowledge or theory of knowledge is one of the defining characteristics of a profession (Traulsen and Bissel, 2004). Within the specialist clinical practice settings of *this* study, pharmacists perceive that at times, and certainly in the formative stages of specialist practice, medical

and specialist nursing staff possess greater knowledge, acquired through more extensive professional experience of neurological disease and its drug treatment. Pharmacists are not always in possession of the collateral knowledge of unique clinical situations in which the drugs are being used (situational knowledge) to be able to make totally informed judgements about the appropriateness of treatment. These findings raise a question as to how to define the unique body of knowledge of pharmacists practicing in neuroscience. The rest of this subsection discusses that question.

Analysis of the data identified a distinction between specialist knowledge about neurological disease, and a broader generalist clinical knowledge. Figure 6 (p.115) metaphorically presented these two types of knowledge as liquids in a cone, with specialist knowledge as a denser, deeper liquid and generalist knowledge a lighter, shallower liquid. De Jong and Ferguson-Hessler (1996) observed how levels of knowledge can often be presented as superficial (general) versus deep (specialist); they also observe a general inference that deep knowledge is superior to superficial knowledge.

I do not intend to depict that for clinical pharmacy practice in neuroscience, specialist knowledge is necessarily a superior knowledge to generalist knowledge. Specialist knowledge undoubtedly assists pharmacists in informing an appropriate course of action when encountering patients with complex neurological disease but these scenarios do not represent the entirety of practice for the pharmacists.

What *this* study identifies, is that the breadth of pharmacists' knowledge and considerations for drug use, is a perceived strength of their contribution to

practicing within a specialist setting. The pharmacists' knowledge and focus can go beyond the patient's neurological condition, to consider their drug therapy more holistically, in combination with comorbid disease states and concomitant drugs. The self-perception of pharmacists practicing in hospitals, as generalists in drug therapy with a broader knowledge base, has previously been identified by Elvey et al. (2010).

Section 1.5 (p.15) highlighted a momentum for specialist practice within UK clinical pharmacy; focusing practice within a specific medical speciality. What *this* study of pharmacy practice in neuroscience reveals, within an inpatient hospital setting in particular, is the holistic overview of drug therapy that pharmacists maintain through their everyday activity of reviewing patients' entire drug regimes. There can be a tension amongst pharmacists of how they define themselves: as generalist practitioners with a broad drug knowledge base or as specialist practitioners with a deep knowledge base in neurological disease and its drug treatment (5.5, p.115).

Abramowitz (2009) commented how the early pioneers of clinical pharmacy are generalist pharmacists by modern standards, an acknowledgement of how pharmacy practice has evolved, with the establishment of specialism in practice. The aim of *this* research was not to define the parameters of specialist pharmacy practice in neuroscience but to better understand how specialist practice develops. The discovery of a tension between specialist and generalist practice is, I believe, a significant one which raises an important question that should be debated, of whether specialism in neuroscience, and perhaps any clinical speciality, should be pursued at the expense of losing a generalist overview of drug therapy.

Setting aside the debate between specialist and generalist practice, I will now look at the implications from the research findings for advancing specialist practice in neuroscience. Advanced, or specialist clinical pharmacy practice in neuroscience cannot necessarily be taught by methods of imparting *facts* through didactic teaching, reading of a textbook, learning of a protocol or guideline. Yet this form of knowledge is useful to signpost pharmacists in the early stages of practice (5.2.1, p.82).

The empirical findings from *this* research identify that pharmacists can experience early difficulties in accessing appropriate learning and teaching materials about neurological disease, the theory of neurological practice. Therefore it seems imperative that any curricular framework for developing neurological practice is able to signpost pharmacists to appropriate reference and learning materials to develop their knowledge. The accounts of the pharmacists would suggest they could also benefit from appropriately tailored study opportunities. The Centre for Postgraduate Pharmacy Education has previously produced three learning programmes for epilepsy, multiple sclerosis, and Parkinson's disease; these programmes would serve as useful templates to develop further learning self-learning packages[8].

A guided and targeted curricular framework has the potential to accelerate the learning of, and support for, new practitioners in the field of neuroscience. The framework should be explicit in highlighting the deficiencies and controversies of current evidence bases and illuminate heuristic methods to help pharmacists explore local practice, reflect on their professional experiences, and develop their own experiential practice base.

[8] I acknowledge I was content guardian for this programme for several years.

Having identified the limits of taught theoretical knowledge to support pharmacy practice in neuroscience the discussion now turns to the more tacit forms of knowledge identified to support practice: experiential knowledge and situational knowledge.

This study generated two constructs, experiential knowledge (section 5.3, p.96) and situational knowledge (section 5.4, p.103), that support advancing clinical practice in neuroscience. These knowledge forms have also been identified in other studies that have examined the acquisition of *expertise* in nursing practice, notably the notion of experiential knowledge (Morrison and Symes, 2011). These knowledge types are further discussed sequentially below.

Bonner and Greenwood (2006) studied the acquisition of clinical expertise in renal (nephrology) nursing. Their grounded theory method research identified how experiential learning, gained from repeated undertaking of tasks, creates familiarity and a positive enforcing feedback loop, to support confidence and competence in practice. The grounded theory produced from the research explains how as nursing practice develops in nephrology, it focuses on the individual patient. The processes in renal nursing practice are congruent with the processes identified for practice development in neuroscience clinical pharmacy (5.6, p.128), of how the reassurance of seeing drugs used in clinical practice supports more confident practice.

Smith et al. (2003) studied the acquisition and use of knowledge in anaesthesia, through ethnographic research. Their study identified that the clinical knowledge used by anaesthetists comprised several subtypes.

- Social knowledge or knowledge about the patient, which may be considered coterminous with situational knowledge (cf. 5.4, p.103) in the practice of neuroscience pharmacists.
- Theoretical or 'textbook' knowledge (cf. 5.2, p.82).
- Electronic knowledge which is information gleaned from anaesthetic monitoring equipment, a knowledge form not applicable to clinical pharmacy practice.
- Experiential knowledge (cf. 5.3, p.96).

As with advancing clinical pharmacy practice in neuroscience, expert practice in anaesthesia was identified as a practitioner not being dependent on theoretical knowledge alone, but having the ability to collate and reconcile different types of knowledge.

The observations of Smith at al., of anaesthetic practice, also identified the utilisation of knowledge about individual patients. The concept of knowing individual patients will form the basis of the next discussion of how pharmacists utilise situational knowledge.

As identified in *this study*, situational knowledge enables pharmacists to make judgements about drug therapies in the context of individual patients. Situational knowledge provides pharmacists with an awareness of factors that may affect patients' ability to take drug therapy, or their likely response to it. This individual patient focus seen in clinical pharmacy practice draws some parallels with a

concept in the nursing literature of *knowing the patient*, a complex construct, entwined with the concept of holistic patient care.

*Knowing the patie*nt has often been empirically studied in relation to critical care nursing (Kelley et al., 2013 , Tanner et al., 1993) with the notion of identifying changes in acutely unwell patients. However the importance of 'knowing the patient' has also been identified in studies of treating more chronic conditions such as chronic obstructive pulmonary disease (Risor et al., 2013).

The spectrum of clinical scenarios encountered within clinical pharmacy practice in neuroscience, ranges from acutely critically unwell patients, to patients with long term conditions. Across the range of the acuity of patient illness, pharmacists identify the importance of understanding the individual history of the patient and their condition. However, the challenges pharmacists face can be the difficulty of eliciting this information, resulting from their limited interaction with patients and, sometimes, distal proximity to the therapeutic discussions that occur within the multidisciplinary teams and ward rounds.

The importance of time, and the chronicity of patient interactions to support a practitioner in knowing their patient, has been highlighted in the reviews of the topic by Radwin (1996) and Zolnierek (2014). Both reviews noted within the empirical evidence, time pressures within nursing practice, in getting to know the patients. In the current era of the NHS, post-Francis report into care failings, the concept of patient centred care is taking prominence (The King's Fund, 2013). There are real challenges for pharmacists in particular to deliver patient centred care if their workload does not allow the time to elicit the appropriate

patient information which enables them to make individualised decisions about drug therapy.

Pharmacists practicing in neuroscience identify clinical nurse specialists as sources of patient specific knowledge, gained from the nurses' knowledge of knowing the patient. The data illuminate how collaborative working, not just with clinical nurse specialists, but other healthcare professionals such as speech and language therapists, helps the pharmacists to contribute to the optimisation of drug therapy for patients with sometimes complex medical and drug needs. Kelley et al. (2013) have also identified how intensive care nurses interrogate different information sources to learn about their patients.

The findings of *this* study of clinical pharmacy practice in neuroscience add to the literature that identifies how clinically practicing healthcare professionals require different forms of knowledge to apply their particular expertise to patient care. The importance of multidisciplinary working for pharmacists to optimally obtain the information they require to exercise pharmaceutical care and contribute to the care of patients is also illuminated.

The empirical findings from clinical pharmacy practice in neuroscience corroborate findings in the existing literature that identify clinical experience as a source of knowledge to support practice. Pharmacists identify that gaining sufficient clinical exposure to neurological disease can be a challenge of practice (5.3.2, p.99). This can be a result of the diversity and sometimes rarity of neurological diseases. Pharmacists also identity how they are not afforded the same level of clinical exposure of others, when they compare their own practice to that of nursing and medical colleagues.

Not all pharmacists practice their entire role in direct clinical situations; they work within other non-directly patient facing pharmacy services such as dispensaries and medicines information (cf. table 1, p.11). Attending ward rounds (sections 5.4.2.3, p.110, and 7.5.2.1, p.193) is identified as a pivotal process for knowledge acquisition and for influencing prescribing decisions, yet not all pharmacists attend these rounds.

Within the findings of *this* study, the role of the clinical pharmacist has clearly evolved from dispensing and drug supply, but they do not practice purely in clinical settings, when compared to nursing and medical staff. Pharmacists support other aspects of pharmacy services and clinical areas, and also have non-clinical aspects to their role. This is a double edged sword for pharmacists: while the development of experiential knowledge can be stifled, participation within other services enables pharmacists to maintain the knowledge needed to hold a broad overview of drug therapy.

Waterfield (2010) has questioned whether pharmacy, in this context defined as the practice of pharmacists, having evolved from the drug dispenser and supply role, is now a knowledge-based profession. The findings from *this* study would support 'yes' as an answer to that question in the context of clinical practice in neuroscience. However in advancing the knowledge and practice in neuroscience through the development of a curriculum, there needs to be a rethinking of what knowledge is and how that is defined.

De Jong and Ferguson-Hessler (1996) describe deeper knowledge as a form of processed knowledge. Figure 7 (p.130) summarises the processing of clinical knowledge that occurs through clinical practice. Entry level, theoretical

knowledge is cognitively processed by the pharmacists through its comparisons with real life practice (experiential knowledge) within an increasing range of situational contexts using situational knowledge. The integration of the three knowledge types can be more tacit and difficult to define because the composite application occurs within highly contextualised individual clinical cases.

The Advanced to Consultant level framework (Competency Development & Evaluation Group, 2009) is a framework for developing and credentialing expert pharmacy practice in the UK. The RPS Faculty accreditation criteria closely mirror the ACLF framework. Within this framework, one of the competencies for advancing specialist practice is the ability to demonstrate 'specialist pharmaceutical knowledge'; the detail of the knowledge is to be defined through a curriculum. At the time of completing this thesis, a curriculum for neuroscience is in the early stages of development by the UKCPA neuroscience group.

This study shows that theoretical knowledge, learning the "what" of neurological disease, can be insufficient alone to support clinical pharmacy practice. Neurological diseases can be too rare and heterogeneous for treatment approaches to fall within prescriptive guidelines. That is not to say that where robust evidence bases exist for clinical practice they should not be applied. However the teaching of clinical pharmacy for neurological diseases should inculcate the ethos of experiential learning, the individualised patient, and multidisciplinary care. This approach should begin at the undergraduate stage of pharmacy teaching and continue through all levels of pharmacy practice.

Furthermore the analysis identified how neuroscience pharmacists learn from multidisciplinary colleagues. Notably two pharmacists, who attained a

prescribing qualification from a multidisciplinary course, altered their clinical assessment of patients. These findings suggest a potential role for multidisciplinary learning, illuminating to pharmacists more lateral ways to assess and consider patient care and the role of drug therapy.

9.2.2 Gatekeeping access to drugs

Neuroscience pharmacists, as pharmacy service representatives within neuroscience services, are posited as the link between the two services and are the conduit through which drug therapies can be accessed. Although devolved of dispensing responsibilities, neuroscience pharmacists still maintain an identity as drug suppliers. Pharmacy technicians have the potential to relinquish some of the traditional supply roles from pharmacists. Yet technician posts are not established in all neuroscience centres and there needs to be a greater understanding of the role for pharmacy technicians in pharmacy services for neuroscience.

Historical sociological analyses of pharmacy have questioned its place as a true profession, partly based on its conflict of interest between commercial (cost) and patient interests (see Traulsen and Bissel (2004) for a further discussion). While acknowledging myself as a pharmacist, I refute these writings in relation to UK clinical pharmacy practice on the basis of several factors:

- They are based on US pharmacy practice.
- They are based on community (retail) pharmacy practice.
- UK healthcare policy identifies (in general) pharmacy as a profession to deliver direct patient care and public healthcare initiatives.

Yet gatekeeping drug access on the basis of cost is a process of clinical pharmacy practice within neuroscience, and amongst some pharmacists, an innate professional identity of 'Being the accountant' (6.3.2, p.153). Chiarello (2013) studied gatekeeping processes amongst community (retail) and hospital pharmacists in the US. I initially discounted this study for comparison on the basis of differences in the NHS and US healthcare systems; on further reflection I identify some commonality between the two systems.

Healthcare provided by the NHS remains free at the point of access for eligible citizens. Hospital care is provided by acute NHS Trusts which is paid for by local or national commissioning bodies depending on the nature of the service provided (cf. 1.3, p.3). Specialist neurological services tend to deal with rare or complex conditions where drug use can be beyond standard commissioning arrangements. The requirement for neuroscience services to obtain funding permission to provide sometimes specialist and expensive drug therapies to patients draws some parallels between the NHS commissioning bodies in the UK and healthcare insurers within US systems as, in effect, financial underwriters for these treatments.

Chiarello used the term 'fiscal gatekeeping', a construct approximating the combination of 'Policing the formulary' (6.3.1, p.149), and 'Being the accountant' (6.3.2, p.153). Hospital pharmacists were identified as having less autonomy in respect of fiscal gatekeeping by being more orientated to the interests of the hospital; being more remote to patients and less inclined to advocate on their behalf. These findings draw some parallels to the UK practice of neuroscience pharmacists. Neuroscience pharmacists can be constrained by organisational policies and cognisant of the financial implications of drug use. However

neuroscience pharmacists can experience tension in these processes by their understanding the patient needs, and displaying empathy to medical staff. Neuroscience pharmacists are not always remote to the patient, especially patients being treated within hospital wards, where the pharmacists predominantly practice.

At times, the pharmacists expressed uncertainty over commissioning arrangements. This may reflect the dynamic changes that are occurring within the NHS. Given the sometimes complex use of drugs within neuroscience services it is imperative that pharmacists practicing within this field have a robust working knowledge of commissioning processes within the NHS. A curriculum for advanced practice in neuroscience should reflect these needs.

Section 6.5 (p.164) identifies the hegemony of the neuroscience medical teams in prescribing decisions that are based on clinical judgement. This position of the medical team is constructed by the pharmacists' perceptions that ultimate responsibility for patients' care lies with the medical team. Pullinger and Dean Franklin (2010) identified a reluctance amongst hospital pharmacists to document patient care issues in medical notes, citing one of the factors as pharmacists' perceived lack of ownership of the medical records and therefore, right to contribute within them. Neuroscience pharmacists will document issues of patient care in the medical notes where they perceive issues of patient safety.

9.2.3 Integrating into the neuroscience service

The pharmacists identify that integration and acceptance into the neuroscience service, particularly by medical staff, is a key antecedent to optimising their

involvement in neurological services and patient care. This finding illuminates the role of the neuroscience pharmacist through a more sociologically focused lens.

Empirical research by Kammeyer-Mueller and Wanberg (2003), within a range of employment settings, identified how the early stages of new roles, termed *organisational entry,* influence long term retention within an organisation and role productivity. Knowledge about the role is a predictor for successful integration into it. *This* study of clinical pharmacy practice in neuroscience identifies how there can be a lack of clarity around the function of the pharmacist's role in neuroscience services.

The literature highlights lack of role clarity as a wider issue within healthcare organisations. Jones (2005) identified amongst the literature of advanced nursing posts how, a lack of role clarity for nursing, was cited as a barrier to advanced nursing roles within hospital settings. Advancing nursing and pharmacy roles are by their evolutionary nature, dynamic and therefore often difficult to define. *These* study findings highlight that work needs be undertaken by the UKCPA neuroscience group to raise and define the profile of clinical pharmacy within neuroscience services. Furthermore, the UKCPA neuroscience group should produce a recommended induction programme for clinical pharmacy posts in neuroscience. This programme should identify key personnel with whom to meet and establish working relationships and activities to be undertaken within an induction period.

Trust was identified as a key factor to neuroscience pharmacists developing successful working relationships, particularly with doctors (see section 7.6,

p.199). *This* finding echoes other research examining collaborative working relationships between pharmacists and doctors, undertaken mainly in primary care practice settings, and extends the concept of trust as pivotal in collaborative working.

Much of the US based literature for pharmacists' collaborative working draws on a model developed by McDonough and Doucette (2001). This model proposes five progressive stages for collaborative working between pharmacists and doctors:

0. Professional awareness
1. Professional recognition
2. Exploration and trial
3. Professional relationship expansion
4. Commitment to the collaborative working relationship

The model was developed for discrete working relationships. Neuroscience pharmacists often work with a large group of doctors, at varying levels of medical seniority. However the model does have some relevance to clinical pharmacy practice in neuroscience. The model identifies that initial attempts to move through the stages are instigated by pharmacists (cf. 7.4, p.185). The model also identifies how the *exchange characteristics* between the pharmacist and doctor, i.e. what and how they interact over, determine progression through the stages. Further literature has examined these processes and their findings echo *this* study of clinical pharmacy practice in neuroscience. This literature is discussed below.

Snyder et al. (2010) studied the development of working relationships between doctors and pharmacists in a US primary care setting. They concluded that establishment of pharmacist trustworthiness was a key underpinning of the development of collaborative working relationships. Establishment of trustworthiness was a time dependent process, contingent upon the pharmacists displaying interventions into patient care. The findings from *this* study draw parallels, but also extend the model of professional relationship development through more indirect means of patient benefit. For example, neuroscience pharmacists assist to secure access to drug therapies for the patients of neuroscience services, demonstrating to the medical staff their alignment to a commitment for patient care.

Liu et al. (2010) examined the factors that brought about collaborative working between pharmacists and doctors within a United States, primary care based, formal drug management programme. Under this programme, pharmacists review patients' drug therapies and make recommendations for change to the primary care doctor. Trustworthiness and professional interaction between the pharmacists and physicians were predictors for the development of collaborative working in formal drug management programmes.

Kozminski et al. (2011) studied the integration of pharmacists into care teams within US care homes. Their study identified that it took up to six months for the pharmacists to feel integrated into the care teams. Similarly, the study of Makowsky et al. (2009), of hospital pharmacists' collaborative working, demonstrated the development of mutual trust and respect was facilitated by repeated working with individual doctors and nurses.

The empirical findings from clinical pharmacy practice in neuroscience support existing literature that the integration of pharmacists into healthcare teams is a time-dependent process. This is an important finding to acknowledge. Neuroscience pharmacists commonly described being supported by more *junior* pharmacists on a rotational basis. Pharmacists in rotational posts should be actively supported and encouraged to become involved within the multidisciplinary teams of neuroscience services.

What permeated through *this* research was the clear professional identity, as pharmacists, the participants held, illustrating their professional socialisation. Professional socialisation is the process by which individuals develop professional identity, through institutionalised training, and occurs aside to the requisite formal knowledge they develop in their training (Blane, 1997). Nimmo and Holland (1999) assert that pharmacists' professional socialisation begins with entry into undergraduate training and continues upon the transition into qualified profession practice.

The landscape of healthcare provision is changing, partly through the evolution of professional roles. For example, a number of non-medical professions, including pharmacists, are now able to prescribe drugs. The demarcation of role boundaries between healthcare professionals are less pronounced, requiring greater tolerance and understanding of professional roles.

Several neuroscience pharmacists identified how early collaborative working with trainee neurology medical staff could seed the formation of good professional relationships. Hind et al. (2003) found that healthcare students from differing health disciplines quickly gained an intra-professional identity but

held positive attitudes towards other professions and were willing to participate in inter-professional learning. They recommended inter-professional involvement in the early stages of healthcare careers. The findings from *this* study also support the notion that early inter-professional working is essential to establish collaborative, inter-disciplinary working as the *norm* of practice.

Neuroscience pharmacists identified several advantages to attending multidisciplinary ward rounds, eliciting useful situational information about patients (5.4.2.3, p.110), their ability to influence prescribing decisions, and demonstrate their contribution to patient care (7.5.2.1, p.193). Miller et al. (2011) evaluated the effect of pharmacists' participation in ward rounds upon their clinical interventions using a prospective, non-randomized, controlled study design. The number of interventions and the rate of intervention acceptance were compared within the same Trust between pharmacists who attended consultant-led ward rounds, and a control group of pharmacists who provided a *traditional* ward pharmacy service, but did not attend ward rounds. A statistically significant increase in the number of interventions made and the rate of intervention acceptance was observed for those who attended ward rounds.

For neuroscience pharmacists to make their optimal contribution to the inpatient care of patients within neuroscience services, their inclusion on multidisciplinary ward rounds should be become an established and ubiquitous practice. I acknowledge there are potential organisational issues to achieve this, as there are several barriers to pharmacists' participation (see Table 5, p.114).

However *this* study strengthens the existing literature that supports the requirement of pharmacists to directly demonstrate their clinical contribution to

other members of the healthcare team. By doing so, pharmacists can integrate into healthcare teams and collaboratively contribute to the care of patients with neurological disease.

9.3 Strengths and limitations of the research

This study contributes a further piece of qualitative research into UK pharmacy practice. It is the first attempt to collate the experience of a group of pharmacists who frequently describe working in isolation within their own specialism. By using a flexible set of exploratory procedures afforded by the grounded theory method I believe that the research has enabled an insight into the practice of a group of specialist pharmacy practitioners. The findings of the study could not have been generated through a questionnaire or survey study design, or other form of quantitative research that sought to measure the practice of pharmacists. The study findings have implications for developing pharmacy practice and research, which are summarised in section 9.4.

This study reveals how a specialist clinical pharmacist role is constructed within a multidisciplinary hospital setting, from working with and alongside other healthcare team members. With an increasing emphasis in the NHS of multidisciplinary and cross-sector working it is important to understand how contemporary pharmacist roles are assimilated into healthcare teams.

Elvey et al. (2013) examined professional identity amongst pharmacists from a cross section of pharmacy practice settings, not just hospital. Nine identities for pharmacists were constructed from the analysis and the authors concluded the range of professional identities could either reflect role ambiguity, or merely a

flexibility of roles. *This* more focused study, of neuroscience pharmacists, did not set out to define a professional identity *per se,* but the data do reveal a number of identities and a complexity for the role (7.3.2, p.183); in this sense, there are some similarities to the findings of Elvey et al.

I do not present this substantive grounded theory as a unifying explanatory framework for the practice of every neuroscience pharmacist, or indeed for every participant in the study. The intention of the research was not to produce a generic job description. Qualitative research is not concerned with producing generalisable results (Barbour, 2000). Of note however, is that the data were generated from pharmacists practicing within a range of acute provider Trusts across NHS England. I hope that pharmacists who practice within neuroscience will identify with the conceptual processes of the theory.

Charmaz (2006) acknowledges grounded theories as being ephemeral: they have a finite application in that they are contextualised within a time and a place. Independently, and towards the conclusion of this study, an opportunity arose for a group of neuroscience pharmacists from across the UK to meet together for the first time. This meeting opportunity has resulted in a rejuvenation of the UKCPA neuroscience group. It is my hope and intention that *this* work will generate discussion amongst neuroscience pharmacists. As well as providing resonance, I hope that my analysis will also be challenged by my professional peers, and that it will spur some people to disprove or amend the theory. Consequently, and collectively as a group, we will continue to develop clinical pharmacy practice within neuroscience.

I acknowledge that by using constructivist grounded theory, the theory presented represents a construction of the neuroscience pharmacist role through the pharmacists themselves, and framed through my analysis and presentation. I chose to construct the reality of this role through the pharmacists because I approached the substantive area from a viewpoint of wanting to understand and help to support professional practice. The pharmacists, also as the people who perform the role, would provide rich data to deepen the understanding of this area of pharmacy practice.

Using the grounded theory method, sampling proceeds with theoretical sampling (3.3.2.2, p.69). In this study, data were generated from research interviews, with sources who can help to develop the conceptual analysis. I did experience difficulties in recruitment to the study; in retrospect, recruitment was always going to be challenging when studying a very small, defined group of pharmacists. While I believe that I did achieve theoretical saturation I would have liked to interview some less experienced pharmacists to scope the journey of development into the specialism of neuroscience. I explored the early experiences of established pharmacists to develop and theoretically saturate the categories. I acknowledge that these pharmacists' perception of their early experiences may have been rendered over time however they often provided rich sources of data, through their extensive practice experience.

The focus of the research on clinical practice within a multidisciplinary setting has elements of ethnography. Observational data of the pharmacists in practice may have helped to add further validity to the interview data by observing pharmacists' interactions. Observational episodes were not able to be undertaken due to the resources allocated to the study and the practical

challenges of reaching study sites where the pharmacists practice, throughout England. I still believe however that I was able to attain rich data through interviews to construct and illuminate the grounded theory. However observational research has the potential to develop the theory further by discovering and understanding processes through generating data beyond the conscious recollection of the pharmacists within the research interviews.

In section 1.1 (p.1), I set out my axiomatic position towards the research by reflexively acknowledging my professional alignment towards the substantive area. *This* study does not define a value of the role of the neuroscience pharmacist, but a concept that identifies a process for the role. The premise of the central concept is that neuroscience pharmacists maintain an overview of all aspects of drug therapy for patients treated within neurological services.

The grounded theory has resulted in a construct for the role of neuroscience pharmacists of maintaining an overview of drug therapy. The extant literature examining the effects of pharmaceutical care studies largely studies interventions in single disease states (see section 2.2.2, p.28). Pharmaceutical care in specialist neuroscience centres could be constructed by intervention studies capturing all aspects of patients' drug therapy, including non-neurological drugs.

This study was an examination of pharmacists' roles within multidisciplinary specialist settings. The processes identified within the grounded theory are those constructed through the accounts and interpretations of the pharmacists and is a valid and justified research approach. What this research project has

not done is directly identify how the role is perceived by colleagues and stakeholders.

Multisource assessment, sometimes called 360 degree feedback, has been employed as a method for the appraisal of professional roles, by garnering opinions from colleagues and stakeholders. Multisource assessment has also been used a research method to examine healthcare roles, for example, non-medical consultants within the NHS (McSherry et al., 2007). Other studies have combined data from post holders and stakeholders to examine professional roles (Abbott, 2007 , McIntosh and Tolson, 2009 , Stevenson et al., 2011). This form of research could identify how aligned neuroscience pharmacists' perceptions of their role are to those of stakeholders and is a potential future research project.

9.4 Recommendations from the research

This study, as a piece of applied pharmacy practice research, has findings with implications for both pharmacy practice and the research of practice. Both these threads are inextricably linked because research should be informed by professional practice (Smith, 2010). Therefore the recommendations are presented in one list below:

1. There should be an open discussion and acknowledgement amongst pharmacists and stakeholders of the generalist drug overview that clinical pharmacy can bring to neuroscience services.

2. A curriculum for advanced pharmacy practice in neuroscience should be developed. The curriculum should be developed in conjunction with the

RPS Faculty (1.4.2.1, p.8), to support those who wish to pursue accreditation through this body. The following factors should be considered in the development of the curriculum:

a. The curriculum should encompass the broadness of neurological disease but acknowledge that practice will vary for each pharmacist and their exposure is dependent on the service profile of the service they practice within. Pharmacists should be able to tailor the curriculum to their practice.

b. A curriculum should signpost people to relevant reference sources for self-learning. Heuristic learning opportunities should be highlighted for professional self-development.

c. A curriculum not only needs to concentrate on the clinical aspects of drug use but generic commissioning arrangements around drug use within the NHS. Knowledge of these processes will equip pharmacists to navigate issues in gatekeeping drug therapies with greater clarity.

d. A generic induction guide for clinical pharmacy posts in neuroscience should also be produced aside to a curriculum. This document should identify key activities which need to be undertaken and key personnel within neuroscience services to meet, during the induction process.

3. In conjunction with a curriculum, more educational events for pharmacists should be organised for neurological disease. Consideration should also be given to organising collaborative multidisciplinary

educational events around neurological disease, for example with the British Association of Neurological Nurses (BANN). Such events could bring together the diverse knowledge of the professions, enriching the learning process beyond consideration of just the drug therapy for pharmacists and all involved, and promoting collaborative working.

4. More opportunities for peer networking should be provided for neuroscience pharmacists. The study has highlighted the challenges of practicing in isolation, especially in the early stages of the role. Work is beginning to take place with the UKCPA neuroscience group; this work should continue and attempt to reach out to as many pharmacists as possible, using virtual or digital forums that can circumvent the geographical spread of neuroscience pharmacist posts. A mentoring system should be explored, to support pharmacists entering into neuroscience and to pharmacists practicing in isolation.

5. Pharmacy and neuroscience services should explore ways for more comprehensive pharmacist inclusion within multidisciplinary ward rounds. This study identifies the importance of ward round participation for pharmacists to glean knowledge about individual patients, optimising their interventions. The study also identifies the problems pharmacists can experience in challenging prescribing decisions retrospectively.

6. Further research should be undertaken to quantify clinical pharmacy service provision within hospital-based neuroscience services. This work should also identify the provision of medicines management technicians and how those roles are employed. A research study could be

considered which examines the interventions made by neuroscience pharmacists. Potential research questions to explore within the study are:

a. What is the relative proportion of interventions made in direct relation to patients' drug therapy for their neurological condition, compared to non-neurological co-morbidities?

b. How do factors like ward round participation and length of time within the role affect the number of interventions made by pharmacists and the rate of acceptance from the multidisciplinary team?

7. Research should explore stakeholders' views of the role for clinical pharmacists in neurological services.

9.5 A final reflection on the research journey

I entered into this research project with the notion of wanting to examine clinical pharmacy practice in neuroscience but with no strong inclination of how I would go about it. As an (up and down) intellectual endeavour, I am grateful for the opportunities qualitative research afforded me to think differently about my professional world, and the world in general.

A feature of qualitative research, and the grounded theory method, that stands out to me, is the breadth of its application. I have read literature and met people from other professional walks of life that I cannot imagine would have happened had I undertaken a quantitative pharmacy practice research project.

Like other pharmacists who have undertaken qualitative research (Tonna and Edwards, 2013), I do not feel that I can make claims to be any kind of expert in all its forms but my eyes have been opened to its potential for further research.

Undertaking a research project through a more interpretive, humanistic lens has re-affirmed to me that healthcare, receiving it as a patient and delivering it as a professional, is a strong human experience. That affirmation, combined with reflections on my personal and professional experiences that have occurred concurrently to my DPharm and research journey, have strengthened my belief in the principles and the immense value of the NHS and I am proud to be working within it as a pharmacist.

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Appendix 1: Search strategy for pharmaceutical care in neurological disease

1. pharmacist*.ti,ab,ab
2. PHARMACISTS
3. "clinical pharmacist".ti,ab,ab
4. "clinical pharmacy".ti,ab,ab
5. (pharmacy AND service).ti,ab,ab
6. "pharmacy service".ti,ab,ab
7. 1 OR 2 OR 3 OR 4 OR 5 OR 6
8. neuro*.ti,ab
9. epilep*.ti,ab,ab
10. EPILEPSY/ OR EPILEPSY, POST-TRAUMATIC
11. MEDLINE; 9 OR 10
12. parkinson*.ti,ab,ab
13. "parkinson's disease".ti,ab
14. PARKINSON DISEASE/
15. 12 OR 13 OR 14
16. "multiple sclerosis".ti,ab,ab
17. MULTIPLE SCLEROSIS

19"motor neuron disease".ti,ab,ab

20. "motor neurone disease".ti,ab,ab
21. MOTOR NEURON DISEASE/
22. "amyotrophic lateral sclerosis".ti,ab
23. AMYOTROPHIC LATERAL SCLEROSIS
24. 19 OR 20 OR 21 OR 22 OR 23
25. "myasthenia gravis".ti,ab
26. MEDLINE; MYASTHENIA GRAVIS/

27. 25 OR 26

28. headache.ti,ab

29. HEADACHE/ OR CLUSTER HEADACHE/ OR HEADACHE DISORDERS/ OR HEADACHE

DISORDERS, PRIMARY/ OR HEADACHE DISORDERS, SECONDARY/ OR POST-DURAL PUNCTURE

HEADACHE/ OR POST-TRAUMATIC HEADACHE/ OR TENSION-TYPE HEADACHE/

30. migrain*.ti,ab

31. MIGRAINE DISORDERS

32. 28 OR 29 OR 30 OR

33. 16 OR 17

34. MEDLINE; 7 AND (8 OR 11 OR 15 OR 24 OR 27 OR 32 OR 33) [Limit to: English Language and Humans and Publication Year 2000-2014 and (Age Groups Young Adult 19 to 24 years or Young Adult and Adult 19-24 and 19-44 or Middle Age 45 to 64 years or Middle Aged 45 plus years or All Aged 65 and Over or Aged 80 and Over)]

Appendix 2: Literature of pharmaceutical care in neurological disease

The summary table begins on the following page.

Author(s) / Year	Title / Context (Broad aim)	Organisational / clinical setting	Methodology	Data collection and analysis	Findings and comments
Epilepsy					
Bond, C. A. Raehl, C. L. (2006)	Effect of pharmacist managed AED therapy under the umbrella of 'collaborative drug therapy management'	Hospital inpatients with epilepsy (US Medicare system – multi-site)	Quantitative (naturalistic study - large) Comparing institutions with pharmacist managed AEDs vs not.	Retrospective data collection – clinical (mortality, LOS) and economic (Medicare/drug/lab costs) outcomes).	Improved clinical and economic outcomes (statistically significant). 120% higher mortality without pharmacist involvement. Case mix index comparable between the 2 hospital sets but no other general performance indicators compared. Study undertaken within US healthcare system. Details of how collaborative drug therapy management specifically works with epilepsy lacking.
Bhattacharya, D. Fogg, A. Staufenberg, E. et al (2008)	Pharmacist management of epilepsy	Pharmacist led primary care epilepsy clinic (UK) – single intervention of 30 min interview and medication review (n=50)	Conference abstract Quantitative (Service review)	Psychological well being (GHQ-12) Satisfaction of meds info (SIMS). Non-parametric stat analysis	Statistically significant improvement in both scores. Most common intervention – giving details of epilepsy charity. Suggests epilepsy services in the area poor? Access to epilepsy nurse specialist?

McAuley, J.M. Miller, M.A. Klatte, E. et al (2009)	Patients with epilepsy perceptions of community pharmacist involvement.	Primary Care (US) (n=75).	Survey design	Descriptive statistics of survey response.	Most common reasons to consult pharmacist were for information on drug interactions and adverse effects. Evidence to support survey design lacking. Yes/no answers so limited opportunities to probe reasons and limitations of extrapolating from UK to US.
Brown, C (2012)	Pharmacist led management.	Primary care (UK) 0.4wte pharmacist undertaking structured clinic reviews and action treatment plans.	Quantitative	Largely descriptive statistics of pharmacist activities. Quality measures – questionnaire but no example or evidence it is validated and sensitive.	Reduction in emergency admissions and hospital appointments (no statistical analysis).High proportion (82/86) described good experience of the service. Note interaction with community matron, GP, neurologist, epilepsy nurse specialist – no assessment of their views.
Fogg, A., Staufenberg,E. Small, I. Bhattacharyya, D. (2012)	Pharmacist-led epilepsy consultation study – feasibility study.	Primary care (UK). Practice pharmacist led single intervention of 30 min interview and medication review (n=106).	Quantitative. Pre-intervention and 2 months post-intervention.	Self-reported adherence (MARS) QoL (QOLIE-10) Psychological wellbeing (GHQ-12) Satisfaction of meds info (SIMS) Side effects (epilepsy diary) Non-parametric stat analysis	67% completion rate (f/u at 2 months) Stat significant improvement in MARS, GHQ-12,

Headache

Wenzel, R. Schommer, J. (2002)	Patient satisfaction with pharmacist education.	Hospital outpatient (tertiary referral) clinic (US).	Quantitative	Questionnaire	Favourable assessment of pharmacist for headache counselling. Patients also attending monoamine oxidase inhibitor clinic invited to complete questionnaire; results not presented – not favourable assessment?
Gahir, K. K. Larner, A. J. (2004)	Consultation to community pharmacists by headache sufferers.	100 consecutive admissions to tertiary referral headache service (UK).	Quantitative	Survey – descriptive statistics.	15% patients had consulted a community pharmacy – authors (neurologists) conclude community pharmacy underused but more training required.
Weitzel, K Presley, D. Showalter, M. *et al* (2004)	Pharmacist managed headache clinic.	Primary Care Clinic (US).	n/a	Largely descriptive statistics of patient demographics and recommendations.	Author acknowledge limitations: No outcome data. No patient satisfaction assessment.
Hoffmann, W. Herzog, B. Muhlig, S. (2008)	Effect of 'pharmaceutical care' (intensive counselling) on frequency of headache and migraine	Community pharmacies (Germany). Patient recruitment: people buying OTC headache drugs (n=482)	Quantitative	Before and after telephone interviews to measure: No. days with headache. No. and severity of headaches. QoL measures (self-administered).	No improvement in headache frequency or severity but QoL scores 'statistically' better. Findings perhaps not surprising if pharmacists could not alter drug therapy.

Skomo, M. Desselle, S. Berdine, H. (2008)	Effect of pharmacist intervention (counselling) on seeking medical care by migraineurs	Migraineurs within a university population (US) – primary care	Described as 'quasi-experimental' – looks quantitative	Self-administered questionnaires	Outcomes don't appear to match the aims – difficult to understand the effect of pharmacist intervention.
Skomo, M. L. Desselle, S. P. Shah, N. (2008)	Migraineurs perceptions of the role community pharmacists can play in their condition	Migraineurs within a US population (US) – primary care	Qualitative – phenomenology	Focus groups – 'inductive' content analysis	Many communication barriers exist between patients and pharmacists. Focus groups potentially within a very specific population of people educated to degree level and beyond.
Stepkova, M. Vanhecke, S. Putman, K. De, J. *et al* (2011)	Comparing 'intensive' vs 'standard' clinical pharmacy on clinical outcomes for migraineurs	Primary Care community pharmacy (Belgium)	<u>Conference abstract</u> Quantitative – randomisation to intensive vs standard p'ceutical care	Standardised questionnaires pre and post intervention Medication use Migraine specific assessment tool (MIDAS) QoL – EQ-5D	No significant difference in medication use and quality of life. Stat significant differences in average MIDAS score and headache days but no actual scores provided so difficult to interpret the clinical significance.
Harris, A. (2012)	Pharmacist involvement in headache clinic with telephone follow up.	Hospital outpatients (UK)	<u>Conference abstract</u> Quantitative	Questionnaire of patient within clinic of their satisfaction. Questionnaire developed from RCGP	47% response rate. Raw presentation of responses which are very favourable towards pharmacist involvement.

Motor neurone disease					
Jefferies, K.A. Bromberg M.B.	Pharmacist involvement within multi-disciplinary clinic	Hospital outpatients (US)	n/a	Largely descriptive statistics of interventions made by pharmacist	2 interventions per patient on average Education on 2.5 topics per patient on average
Movement disorders					
Schroeder, S. Martus, P. Odin, P. *et al* (2011)	Pharmacist identification of drug-related problems (DRPs) in patients with Parkinson's disease against defined checklist	Primary care (Germany) Community pharmacists (n=33) reviewing outpatients with IPD (n=113)	Quantitative	Baseline demographics and QoL scores (PS-23; PDQ-8 (abbreviated PDQ-39); EQ-5D/EQ-5D-VAS). Descriptive statistics of interventions made)	331 DRPs identified and 474 interventions proposed (patient advice most common – c. 20%) 215 outcomes recorded for the 331 identified DRPs although by different groups – physician, patient so lack of consistent assessment. No follow up Qol assessment so difficult to assess overall impact.
Poon, L. H. Lee, A. J. Chiao, T. B. *et al* (2012)	Effect of a pharmacist in movement disorders clinic	Outpatient movement disorders clinic (US)	Quantitative (review of pilot study)	Quantification of interventions Anonymous questionnaire to colleagues and patients (5 point Likert scale)	General favourable assessment from survey data 69 recommendations accepted in 131 patients – unclear whether all recommendations accepted. Recommendations followed up in terms of patient outcome but grading of this not entirely clear – who was it done by?

Neurosurgery

Weant, K. Armitstead, J. Ladha, A (2009)	The cost-effectiveness of a clinical pharmacist in a neurosurgical team	Neurosurgical patients (US)	Quantitative	Cost comparisons pre and post introduction of pharmacist into neurosurgical team.	Statistically significant reductions in drug costs per patient admission (approx. 25%) and length of patient stay. Direct cause and effect cannot be assumed as study not designed/powered to test this hypothesis. Authors note no other significant service/protocol changes during study period.
Bourne, R, Dorward, B. (2011)	Quantifying pharmacists interventions and clinical significance	Hospital pharmacists in tertiary referral neurosurgical intensive care unit (UK)	Quantitative	Prospective collection of all interventions, coding and significance assessment using validated rating scale.	Significant interventions made with high acceptance rate by medical staff. Limitations are short duration of the study.

General

Welty, T. (2006)	Clinical pharmacy practice in neurology and neurosurgery	Specialist hospital setting (US)	n/a	Commentary paper on the evolution of specialist clinical pharmacy practice	Notes neuroscience as a small medical speciality and also small clinical pharmacy specialism – comparative observations to UK practice.

Barnes, J. (2011)	Primary care involvement with patients with long term neurological conditions	Primary care (UK)	n/a	Description of role and examples of input	Pharmacist involved with the care of patients with Parkinson's disease and multiple sclerosis.
Barnes, J. (2012)	Primary care involvement with PD and MS	Primary care (UK)	n/a	Further description of role from 2011 paper	Note initial resistance from neurologists.
Swain, L. D. (2012)	Identifying pharmacist interventions and quantifying patient satisfaction	Hospital outpatient neurology clinic (US)	Quantitative	Prospective collection of data and	192 recommendations (interventions) in 56 patients. Most common reasons were to discontinue (29%) or add (24%) medication. Does not indicate if recommendations accepted. High levels of patient satisfaction

Appendix 3: Ethical approval and NHS research approval

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20th September 2012

Benjamin Dorwood
PhD Student
School of Pharmacy
University of Bradford

Hi Benjamin

Ethics Application E.243, Supervisor Prof Alison Blenkinsopp
Title: A study of the clinical pharmacists role within clinical specialism of neuroscience

I have just had a phone call from Reviewer 2 and he has stated that as long as your data is stored on a secure server then he is fine with that. As Reviewer 1 recommended approval to the Chair, I can confirm that Dr Martin Brinkworth, Chair of the Biomedical, Natural and Physical Sciences Research Ethics Panel is happy to take Chair's action to approve your application on behalf of the Research Ethics Panel.

Please add a sentence to any information given out to participants that ethics approval was granted by the Biomedical, Natural and Physical Sciences Research Ethics Panel at the University of Bradford on 24th August 2012.

Best wishes
Lynda

Lynda Nuttall

Lynda Nuttall
Ethics Administrator
Research Support Unit Administrator
Research and Knowledge Transfer Support
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Sheffield Teaching Hospitals NHS

NHS Foundation Trust

25th October 2012

Mr Benjamin Dorward
Lead Neurosciences Pharmacist
Pharmacy Department
C Floor
Royal Hallamshire Hospital

Dear Mr Dorward

Project Authorisation
NHS Permission for Research to commence

STH ref:	STH16495
NIHR CSP ref:	Not applicable
REC ref:	**E.243 (Bradford University)**
MHRA ref:	**CTA no.:** Not applicable **EudraCT no.:** Not applicable
Study title:	A study of the clinical pharmacists role within clinical specialism of neuroscience
Chief Investigator:	B Dorward, Sheffield Teaching Hospitals
Principal Investigator:	B Dorward, Sheffield Teaching Hospitals
Sponsor:	Sheffield Teaching Hospitals
Funder:	Unfunded
URMS ref:	Not applicable

The Research Department has received the required documentation as listed below:

1.	**Sponsorship Agreement** **Clinical Trial Agreement** **Material Transfer Agreement** **Funding Award Letter**	Not applicable Not applicable Not applicable Not applicable
2.	**Monitoring Arrangements**	Not applicable
3.	**STH registration document**	UREC application form Appended to protocol Jun 12 R & D Form B Dorward 25 Oct 12
4.	**Evidence of favourable scientific review**	University of Bradford 20 Sep 12
5.	**Protocol – final version**	Jun 12
6.	**Participant Information sheet**	Appended to protocol Jun 12
7.	**Consent form**	Appended to protocol Jun 12
8.	**Letter of indemnity arrangements** **Insurance Certificate**	NHS indemnity
9.	**ARSAC certificate / IRMER assessment**	Not applicable

10. Ethical review- Letter of approval from NHS REC/ UREC	University of Bradford Biomedical, Natural and Physical Sciences Panel 24 Aug 12
11. Site Specific Assessment	STH R&D 18 Oct 12
12. Clinical Trial Authorisation from MHRA	Not applicable
13. Evidence of hosting approvals	STH Finance Form
- **STH Principal Investigator**	B Dorward 03 Oct 12
- **Clinical Director**	D Smith 25 Sep 12
- **Research Finance**	D Patel 04 Oct 12
- **Data Protection Officer**	P Wilson 25 Oct 12
14. Honorary Contract/Letter of Access	Not applicable
15. Associated documents	
Interview guide	Appended to protocol Jun 12

This project has been reviewed by the Research Department. NHS permission for the above research to commence has been granted on the basis described in the application form, protocol and supporting documentation on the understanding that the study is conducted in accordance with the Research Governance Framework, GCP and Sheffield Teaching Hospitals policies and procedures.

Yours sincerely

pp

Professor S Heller
Director of R&D, Sheffield Teaching Hospitals NHS Foundation Trust
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Appendix 4: Study information leaflet

A study of the clinical pharmacist's role within the specialism of neurosciences

INFORMATION SHEET

You are being invited to take part in a research study.

- You do not have to say yes.
- If you do not want to take part in the study then you do not have to say why.

Before you decide, it is important for you to understand why this research is being done and what it will involve. Please take some time to read the following information carefully and discuss it with others if you wish.

What is the purpose of this study?

This study aims to understand how clinical pharmacists specialising in the area of neurosciences develop their role and speciality by discussing your experiences and opinions of your role.

Why have I been asked to take part?

You have been asked to take part because you are a clinical pharmacist working within the clinical specialism of neurosciences.

Do I have to take part?

Taking part in the study is entirely voluntary and you do not have to if you do not wish to do so.

What will happen to me if I take part? What will I be asked to do?

- You will be asked to take part in a telephone interview which should last between 30 and 60 minutes.
- You can choose when the interview will take place.
- During the interview you will be asked some general questions about your professional role and your experiences of it.
- You may be asked to clarify some of the things that you say in the interview or asked some further questions relating to what you said.
- The interviews will be taped.

What do I have to do?

- Please return the form that came with this letter indicating whether you do or do not wish to take part in this study
- If you do not want to take part then you will not be contacted again
- If you do wish to take part in the study then please indicate the best means of contacting you with the appropriate contact details

What are benefits of the study?

The study aims to achieve a better understanding of your specialist clinical pharmacist role. By doing so we hope we will develop a better understanding of how to try and support you professionally.

What are the possible disadvantages and risks of taking part?

There are very few risks in taking part in interviews. You will have to give up some of your time. If there is a professional issue or incident that you do not want to discuss then you do not have to. The researcher would have a professional obligation to consider reporting any incident mentioned during the interview that was an illegal act or a gross breach of the General Pharmaceutical Society's code of ethics. You can stop the interview at any time.

Will my taking part in the study be kept confidential?

- Some professional information about you will be collected and stored in password protected computer system. This includes:

    - Your name, age and gender
    - The number of years you have been registered as a pharmacist and the number of years you have worked in your current role
    - The Agenda for Change grading of your current post
    - Your level of academic qualification (e.g. BSc, MPharm, *etc.*)
- This information will not be stored on a laptop or memory stick
- All interview tapes will stored in a locked drawer in the researcher's hospital office
- The transcript of your interview will not contain your name; a code will be used and these codes will be stored electronically and securely as described above
- All interviews and electronic and paper copies of transcripts will be destroyed at the end of the study.

What if there is a problem or something goes wrong?

The researcher is accountable to the following person:

Dr Amanda Plummer, Clinical Services Manager
Pharmacy Department, Royal Hallamshire Hospital, Glossop Road, Sheffield, S10 2JF
Tel: 0114 2712424

What will happen to the results of this study?

- Your interview will be analysed along with the interviews conducted with other pharmacists.
- The results will be written up as a research report to be submitted for the award of a Doctor of Pharmacy degree.
- The results will also be written as papers to be submitted to peer-reviewed journals.
- You will be offered a copy of these reports to read them if you wish.
- You will not be identifiable in any of these reports.

Who is organising and funding the research?

This research is being undertaken by a hospital pharmacist at Sheffield Teaching Hospitals NHS Foundation Trust who is also undertaking a research degree (DPharm) at the University of Bradford.

Who has reviewed this research?

This research has been reviewed by the ethics committee at the University of Bradford.

What if I want more information?

You can contact the researcher

Mr Ben Dorward, Lead Neurosciences Pharmacist
Pharmacy Department, Royal Hallamshire Hospital, Glossop Road, Sheffield, S10 2JF
Tel: 0114 2713225 or 0114 2434343 (asking for bleep 2580)
E-mail: B.J.Dorward@student.bradford.ac.uk

Thank you for reading this.

Appendix 5: Study consent form

A Study of clinical pharmacist practice in neurosciences
CONSENT FORM

Name of Researcher: Mr Ben Dorward
Contact telephone number: 0114 2713225 or 0114 2434343 (bleep 2580)

Please tick the appropriate boxes to indicate yes

I confirm that I have read and understand the information sheet dated for this study.	☐
I have been given the opportunity to ask questions about the study.	☐
I understand that any details about me will be held in confidence and no personal details that might identify me will be included in any report from this study.	☐
I understand my participation is voluntary and I am free to withdraw from the study at any time without giving any reason.	☐
I agree to take part in the above study.	☐
Please provide me with a copy of the research report.	☐

Name of Participant	Signature	Date
Researcher: Ben Dorward	Signature	Date

Appendix 6: Examples of coding and memo writing

Coding example

The transcript below is an example of how I coded interview transcripts. It also illustrates how I analysed my interview technique, using footnotes. This extract also illustrates how I originally missed a key code of 'proving value' (illuminated in yellow) which I subsequently identified from a later re-analysis.

I: Were there any other nurse groups that you were working with?

R: We work with the MS nurses quite closely because of the number of outpatients that we have coming in for natalizumab (Tysabri) and also the Gilenya, the new, oh you know all about this (laughs) I'm not talking to a researcher (laughs)[1] when we get the Gilenya patients and the heart care nurses coming. So I work quite closely with the MS nurses for that and organising the Homecare side of things. But the epilepsy nurses not so much. I think they tend to be out in the community an awful lot. I think once you prove your value to a certain group, you know like with the Parkinson's disease nurses I get a lot of queries and I give them a lot back because we have that type of relationship. Where as the epilepsy nurses, I have in the past done teaching sessions for carers for patients with epilepsy but we never really formed the same form of bond and I don't see them and I don't get as much sort of work from them really. Considering that the epileptologists here do ask an awful lot of questions he nursing, it is not reflected in the nursing staff. Do you know what I mean?

Comment [B1]: Working with nurses over a specific drug

Comment [B2]: Organising homecare

Comment [B3]: Less close working with community based nurses

Comment [B4]: Delivering teaching sessions

Comment [B5]: Forming a professional bond

Comment [B6]: Differing relationships with differing nurse specialists

I: Yes I do[2]. How do you think your role is perceived by the nursing specialist group? Do you think you could summarise your role?

R: I'm not really sure. I'm not sure they know entirely what I do. I think... Oh yes I also work really closely with the neuro muscular team because of the IVIG. So all the chronic IVIG are looked after by the neuro muscular team and they're registered on the Department of Health database and things like that by the specialist nurses.

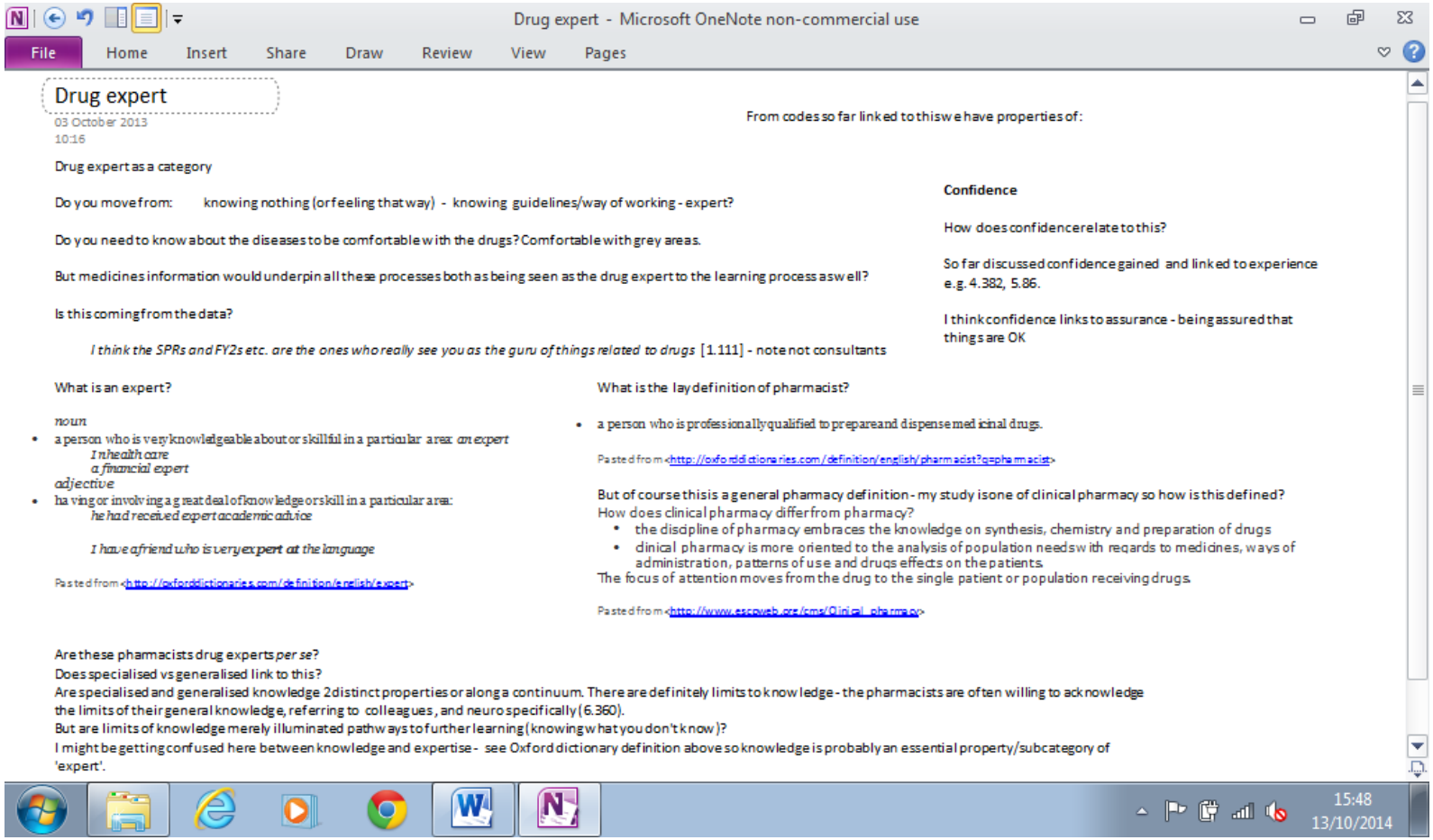
Comment [B7]: Lack of role clarity

Comment [B8]: Recording clinical data

[1] The interviewee sees me as a pharmacist and not researcher

[2] I should have said no and got them to expand this further – why does it follow that if the doctor asks the pharmacist, the nurse does as well? Do they have the same needs of a pharmacy service?

Example of a memo on knowledge



Drug expert - Microsoft OneNote non-commercial use

File Home Insert Share Draw Review View Pages

Drug expert

03 October 2013
10:16

Drug expert as a category

Do you move from: knowing nothing (or feeling that way) - knowing guidelines/way of working - expert?

Do you need to know about the diseases to be comfortable with the drugs? Comfortable with grey areas.

But medicines information would underpin all these processes both as being seen as the drug expert to the learning process as well?

Is this coming from the data?

I think the SPRs and FY2s etc. are the ones who really see you as the guru of things related to drugs [1.111] - note not consultants

What is an expert?

noun
- a person who is very knowledgeable about or skillful in a particular area: *an expert*
  in health care
  a financial expert

adjective
- having or involving a great deal of knowledge or skill in a particular area:
  he had received expert academic advice

I have a friend who is very expert at the language

Pasted from <http://oxforddictionaries.com/definition/english/expert>

From codes so far linked to this we have properties of:

Confidence

How does confidence relate to this?

So far discussed confidence gained and linked to experience e.g. 4.382, 5.86.

I think confidence links to assurance - being assured that things are OK

What is the lay definition of pharmacist?

- a person who is professionally qualified to prepare and dispense medicinal drugs.

Pasted from <http://oxforddictionaries.com/definition/english/pharmacist?q=pharmacist>

But of course this is a general pharmacy definition - my study is one of clinical pharmacy so how is this defined?
How does clinical pharmacy differ from pharmacy?
- the discipline of pharmacy embraces the knowledge on synthesis, chemistry and preparation of drugs
- clinical pharmacy is more oriented to the analysis of population needs with regards to medicines, ways of administration, patterns of use and drugs effects on the patients.

The focus of attention moves from the drug to the single patient or population receiving drugs.

Pasted from <http://www.escpweb.org/cms/Clinical_pharmacy>

Are these pharmacists drug experts *per se*?
Does specialised vs generalised link to this?
Are specialised and generalised knowledge 2 distinct properties or along a continuum. There are definitely limits to knowledge - the pharmacists are often willing to acknowledge the limits of their general knowledge, referring to colleagues, and neuro specifically (6.360).
But are limits of knowledge merely illuminated pathways to further learning (knowing what you don't know)?
I might be getting confused here between knowledge and expertise - see Oxford dictionary definition above so knowledge is probably an essential property/subcategory of 'expert'.

15:48
13/10/2014

Examples of memos

These are excerpts from memos that I made after interviews.

Interview 1 (21/11/2012)

Overall, I felt that my first interview went OK. The interview lasted just over 46 minutes and I felt it came to a fairly natural ending. What was difficult was the cognitive challenge of processing the information coming from the participant to decide what to ask next. I think I coped reasonably well at the beginning but struggled as the interview went on. Although I was making notes on paper I wasn't capturing the thread of the interview and having read the interview transcript I can identify missed opportunities to probe question responses further (e.g. line 237 – should have probed further as to why the matron, ADO and clinical director were key personnel) and the interview became less coherent its focus in the latter half. That said I can identify points in the interview where I identified previous statements and attempted to link them in the conversation such as line 323 where I picked up on 'niche' and from reviewing the transcript I can see that the participant had used this word 5 times up to this point of the interview.

Interview 4 (05/06/2013)

Research technique issues

This interview went better than the previous one in terms of the interview process. Half an hour before this interview I sat down and I thought quite closely about the interview process. I had written down 3 statements and I consciously read those.

> I am a researcher not a pharmacist – talk about 'pharmacists' and not me or 'us'
>
> No I do not know what pharmacists mean when they ask me that. I need respondents to explain that further to me.
>
> I am trying to undo 14 years of professional experience. That's impossible but I need to 'bracket' those experiences and perceptions as best that I can

There are some long and slightly uncomfortable pauses (for me at least) within the interview but this strategy did elicit some further responses from the interviewee. One example is line 293 to 303 in the response to a question around differing professional perspectives of an issue. In previous interviews I would have probably been inclined to interject the silence with a further question or more specific question which may have then missed some data that could have been provided from the response to the original question.

There was a telling statement towards the end of the interview:

> ***I: Right. I think that was actually a very good response actually. I don't have anything further to ask. Was there anything you wanted to add that I had not discussed in the interview?***
>
> *R: No I don't think so. I mean I had a read through your of your proposal. I wasn't really sure in terms of what you are going to ask me actually initially. Have you got everything you needed?*

This section of interview highlights 3 issues to me

1. Some apprehension on behalf of the interviewee about what they were going to be asked. I wish in retrospect I had asked how the actual experience compared to their expectations. If this is raised within a subsequent interview I will ask.

2. An illustration of the 'power asymmetry in qualitative research interviews' (reference Kvale). The question 'Have you got everything that you needed?' implies to me an expectation on behalf on the interviewee to provide the information I, as the interviewer, require.

3. A realisation that I am probably taking the interviewees slightly outside of their comfort zone. As a professional peer I feel that I do have some empathy with that as I think it unlikely that participants will have been exposed to this form of interviewing. My standard opening question of asking participants to describe their role does tend to elicit a very descriptive response. I think true qualitative researchers might consider this to be inefficient interviewing but I think it can be a good tactic for settling the participants and asking a fairly routine question. I also need to allow participants time to answer my questions because they are not straight forward questions to answer.

Appendix 7: Evaluation of the research quality

The table overleaf provides a defence for the rigour of the research set against the criteria of quality in qualitative research devised by Spencer et al. (2003). The appraisal questions are taken directly from this document. I have interpreted some overlap with these questions and consequently some responses have been repeated within the table to answer all questions.

Appraisal questions	Responses in relation to this study
How credible are the findings?	The findings have been illuminated with interview data to illustrate the analysis. Where found, I have included negative cases i.e. those that disagree with the prevailing findings, to illustrate the limitations of the grounded theory. In section 9.3 (p.232) I have acknowledged the limitations of the research and I been explicit in stating the grounded theory is not a unifying theory for clinical pharmacy practice in neuroscience. The findings were orally presented to a small group of neuroscience pharmacists on 25th September 2014 and were positively received as representative of contemporary practice.
How has knowledge been extended by the research?	This research has illuminated the construction of the role of clinical pharmacists within a multidisciplinary specialist service. The research has identified how different forms of knowledge are required to support clinical pharmacy practice, congruent with empirical findings from studies of advanced practice in nursing and medicine. The research identifies ways to support clinical pharmacy practice in neuroscience.
How well does the evaluation address its original aims and purpose?	In section 8.3 (p.210) I have answered the initial research questions to the study through the findings of the grounded theory.

Scope for drawing wider inference – how well is this explained?	I have been explicit in stating the results as a substantive grounded theory of specialist clinical pharmacy practice in neuroscience. The participants for the study were drawn from across a range of NHS Trusts. The intention was not to produce generalisable results. However further studies, of other clinical pharmacy specialisms, would identify the wider relevance of these findings, helping to develop a wider theory for specialist clinical pharmacy practice.
How clear is the basis of evaluative appraisal?	The research did not set out to explore the effect of an intervention; it was an exploratory study of clinical pharmacy practice in neuroscience.
How defensible is the research design?	I have set out the reasons for using research interviews and the use of telephone interviews to circumvent the geographical spread of the participants. I utilised an evolving interview structure to explore emerging concepts from the study.
How well defended is the sample design/ target selection of cases/documents?	I set out the recruitment process in section 3.3.1 (p.61). The study population is a small one but I attempted to identify and recruit as many neuroscience pharmacists as I could. Although grounded theory research is not concerned with generalisable findings I recruited pharmacists from a range of NHS Trusts and was able to generate rich data about pharmacy practice in this area.
Sample composition/case inclusion – how well is the eventual coverage described?	Figure 3 (p.64) summarises the recruitment strategy for the study. I acknowledged a predominance of more experienced pharmacists within my sample.

How well was the data collection carried out?	The process of data collection is described in section 3.3.1 (p.61). Research interviews were audio recorded and transcribed verbatim so that no data were lost.
How well has the approach to, and formulation of, the analysis been conveyed?	The data analysis took place in accordance with grounded theory methods. I utilised coding of data, raising the level of theoretical abstraction to create the grounded theory.
Contexts of data sources – how well are they retained and portrayed?	A brief overview of the participating pharmacists is provided is section 3.5 (p.75). Where it is appropriate, I have included the interview questions to contextualise the participants' responses.
How well has diversity of perspective and content been explored?	I have acknowledged outlying cases within the findings. The grounded theory accounts for variation in the three conceptual processes identified from the study data.
How well has detail, depth and complexity (i.e. richness) of the data been conveyed?	I have retained *in vivo* codes. Within the interview data there are examples of where I have probed with questioning to elicit further meaning to participants responses.

How clear are the links between data, interpretation and conclusions – i.e. how well can the route to any conclusions be seen?	I have presented the conceptual processes separately and then the grounded theory, to explain how these processes are brought together.
How clear and coherent is the reporting?	I have attempted to present the study findings in a structured manner and by introducing and summarising each main chapter. I have separated the study findings from the discussion and wider literature to enable the reader to judge these in their own right. I have diagrammatically summarised concepts and processes that emerged from the data to aid clarity in their presentation.
How clear are the assumptions/theoretical perspectives/values that have shaped the form and output of the evaluation?	I have set out my epistemological and ontological perspectives towards the research in section 3.2.2 (p.51). I have acknowledged at the outset of the research my professional alignment towards it.
What evidence is there of attention to ethical issues?	I have set out the ethical considerations of the research in section 3.4 (p.71). The key considerations that I have addressed are informed consent by participants and maintaining anonymity. I have used pseudonyms to present the data findings.

Appendix 8: Poster presentation of the emerging grounded theory

The poster overleaf was presented at a University of Bradford research day on 2nd April 2014. It presents the emerging findings of the grounded theory. The poster illustrates the emergent nature of this grounded theory research through the way that the categories of the final theory have developed from the ones in this poster.

Defining and Developing the Specialist Clinical Pharmacist Role in Neurosciences: A Grounded Theory Study

B. J. Dorward*#, B. J. Lucas*#, A. Blenkinsopp*#

*Pharmacy Practice Research Group Pharmacy Education #Innovation Research and Development Group

UNIVERSITY OF BRADFORD
MAKING KNOWLEDGE WORK

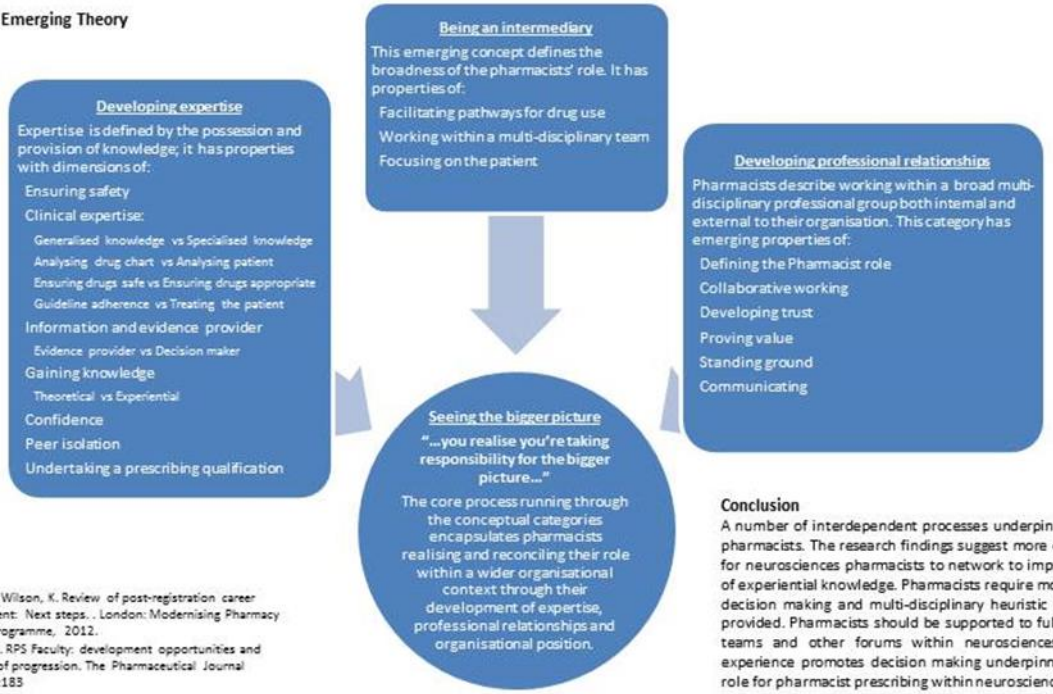
Introduction

Neurosciences is a diverse medical speciality dealing with disorders of the nervous system, and a relatively small clinical pharmacy specialism. An examination of current relevant policies, guidelines and research literature fails to provide a clear understanding of the role for a specialist pharmacist. Against a professional background of momentum for specialisation within clinical pharmacy[1,2] this study is exploring the role of clinical pharmacists in neurosciences and its development to understand how the role is defined and developed.

Methods

This is a Grounded Theory Method study. Data generation is via recorded telephone interviews with neurosciences pharmacists (n=11 to date) and occurs concurrently with data analysis. Data analysis involves coding interview transcripts and incorporates the constant comparative method, abductive logic and extensive memo writing around emerging concepts. Theoretical sampling is incorporated by an evolving question structure around the emerging concepts.

Results: The Emerging Theory



Conclusion

A number of interdependent processes underpin the broad role of neurosciences pharmacists. The research findings suggest more opportunities should be provided for neurosciences pharmacists to network to improve peer support and exchange of experiential knowledge. Pharmacists require more training and support in clinical decision making and multi-disciplinary heuristic training opportunities should be provided. Pharmacists should be supported to fully integrate into multidisciplinary teams and other forums within neurosciences directorates. This breadth of experience promotes decision making underpinned by wider considerations. The role for pharmacist prescribing within neurosciences should be further explored.

References

1. Howe, H., Wilson, K. Review of post-registration career development: Next steps. . London: Modernising Pharmacy Careers Programme, 2012.
2. Duggan, C. RPS Faculty: development opportunities and evidence of progression. The Pharmaceutical Journal 2013;290:183

Appendix 9: Previous published research from the candidate

BOURNE, R. S. and DORWARD, B. J. (2011) Clinical pharmacist interventions on a UK neurosurgical critical care unit: A 2-week service evaluation. International Journal of Clinical Pharmacy, 33 (5), 755-758.

Abstract

Objective

To identify the input of specialist critical care pharmacists into patient care, promoting safe and effective medication therapy; by quantifying medicines related interventions on a Neurocritical Care Unit.

Setting

UK 19-bedded Neurocritical Care Unit providing a tertiary referral service for Neurosurgical and Neurology patients.

Method

Prospective observational study of clinical pharmacist interventions conducted over a two week period in July 2010. Interventions were recorded, categorised and independently assessed by a panel of 5 healthcare professionals for potential patient harm if the intervention had not been made.

Main outcome measure

Quantity and potential severity of clinical pharmacist interventions recorded.

Results

246 interventions were made in 55 patients over the 10 day observational period. A median of 7.0 (1.5; 12.0) and 2.0 (1.0; 4.0) interventions were made in Level 3 and 2 patients respectively. Mean potential severity of patient harm per intervention was 3.7 (1.12); range 0.8-7.0. Thirty-two interventions (13.0%) were high patient risk. Central Nervous System medicines comprised the most

common therapeutic group affected (37.8%). Medication errors accounted for eighty-seven of the 246 interventions (35.4%).

Conclusion

The results of the clinical pharmacist intervention evaluation demonstrated an important role for critical care pharmacists in the safe and effective use of medicines in a UK Neurocritical care unit.

Introduction

Critical care patients are some of the most vulnerable to medicines related harm. This is due to the acuity of their illness, multi-organ failure, polypharmacy and proportion of intravenous drug use 1. It is therefore understandable that pharmacists make some of their most significant clinical contributions in critical care areas, but this also requires the greatest resource allocation 2.

The national United Kingdom (UK) standards for levels of clinical pharmacy service to critical care areas and the specialist training required for these posts have been clearly identified by the Department of Health 3,4. However there remains significant inter and intra-hospital variation in the levels of critical care pharmacy services. In Sheffield, there was a requirement to evaluate the clinical activity of pharmacists in the care of critically ill patients in the Neurocritical Care Unit, to support the development of enhanced clinical pharmacy services.

Aim of the study

To identify the clinical pharmacists input into patient care, promoting safe and effective medication therapy; by quantifying medicines related interventions on the Neurocritical Care Unit, made by specialist pharmacists with appropriate critical care training and service commitment time.

Method

The Neurocritical Care Unit in Sheffield Teaching Hospitals NHS Foundation Trust is a 19 bedded unit (6 Level 3 beds, 13 Level 2 beds) providing a tertiary referral service for Neurosurgical and Neurology patients.

A prospective observational study of medication interventions made as part of daily patient review by a specialist clinical pharmacist with critical care training 4. The evaluation was conducted by two clinical pharmacists over a two week period in July 2010. All pharmacist interventions made on review of patients on the Neurocritical Care Unit were recorded. Interventions were recorded, categorised and assessed for patient harm if the intervention had not been made. Assessment of patient harm used a visual analogue scale ranging from 0 (no patient harm) to 10 (patient death). A panel of five healthcare professionals (3 x clinical pharmacists; 1 x specialist nurse; 1 x intensive care consultant) independently assessed the potential patient harm with the average of the five scores presented. This is a valid and reliable method to assess medication errors 5.

Descriptions of parametric data are as the mean and standard deviation (SD); non-parametric data are presented as the median and interquartile range (IQR). Statistical analysis was undertaken using Sigmastat 3.1 (Systat Software Inc. California, USA). Registered STH Audit Department Service Evaluation No. 3379.

Level 3 care refers to patients needing advanced respiratory support alone or requiring a minimum of two organs supported (usually referred to as an “ICU patient”). Level 2 care refers to patients receiving single organ support but includes basic respiratory and cardiovascular support (commonly known as a “HDU patient”) 6.

Results

Interventions

246 interventions were made in 55 patients (43 (78.2%) Level 2; 12 (21.8%) Level 3) over the 10 day evaluation period. Patients in whom an intervention was made had a median of 3.0 (1.0; 5.0) interventions recorded; range 1 - 28.

177 patient episodes of a daily drug therapy review were undertaken in the 10 days, demonstrating that for every 7 patients reviewed per day; approximately 10 medication interventions are made.

Mean severity of potential harm assessment was 3.7 (1.12), range 0.8 to 7.0. Eighty-seven of the 246 interventions (35.4%) were classified as medication errors.

Daily activity

Averaged over the 10 day period there were 25 interventions per day.

Critical Care Level

141 interventions were made in 127 Level 2 patient episodes (daily drug therapy review); 105 interventions in 50 Level 3 patient episodes. There were 2.1 interventions per Level 3 patient per day; 1.1 per Level 2 patient per day. A median 7 interventions were made per Level 3 patient (1.5; 12.0); range 1 to 28. A median of 2 interventions were made per Level 2 patient (1.0; 4.0); range 1 to 12.

Acceptance of Interventions

221 of the 246 interventions (90%) were accepted; 15 were not accepted and 10 were lost to follow up. Level 3 and 2 interventions showed similar levels of acceptance; Level 3 91.4%; Level 2 89.4%.

Drug related problem

The most common drug related problem was Non-conformity to guidelines/best practice/Contra-Indication; 66 interventions (26.8%), followed by Administration related, 49 (19.9%), Adverse drug reaction 28 (11.4%) and Drug without indication 22 (8.9%) [Figure 1].

Insert Figure 1 near here

Reason for Intervention

The primary reason for the medicines intervention was for Patient safety/ Risk reduction, 115 interventions (46.7%); followed by Therapeutic optimisation 86 interventions (35.0%); then Information transfer (7.7%); Financial (5.3%); Guideline conformity (3.3%) and Infection control (2.0%).Medicine interventions

The most common intervention related to Optimisation of medicine administration, 71 interventions (28.9%), followed by Drug discontinuation 51 (20.7%), Dose adjustment 42 (17.1%) and Addition of new drug 34 (13.8%) [Figure 2].

Insert Figure 2 near here

Therapeutic Category

Ninety-three of the 246 interventions (37.8%) were recorded for drugs with implications primarily for Central Nervous System (CNS) activity. The other most common interventions affected Muscle/ Joint (primarily analgesia) (16.3%); Gastro intestinal system (primarily gastric motility; antiemetics) (12.6%); Infection (antibiotic use, dosing, monitoring) (10.6%); Blood (electrolytes) (8.5%).

Source of interventions

211 of the 246 interventions (85.8%) were proactive i.e. instigated by a pharmacist. Of the 35 reactive interventions (prompted by medical/ nursing staff), the majority were when the pharmacist was on the ward versus contact by bleep/phone, 32 of 35 (91.4%).

Medicines Reconciliation

Forty patients had medicines reconciliation completed by the pharmacists during the evaluation period, a mean of 4 (1.3) patients per day. The latter did not include patients admitted from other wards with prior medicines reconciliation. Interventions directly related to medicines reconciliation accounted for 29 of the 246 interventions (11.8%).

Discussion

Pharmacists with specialist critical care training identified a significant number of medicine interventions (246 in 55 patients with a mean potential severity of harm of 3.7); without which patient care would have been compromised in terms of increased clinical risk or reduced efficacy of therapy provided. As such, the high incidence of interventions made demonstrates an important service

provided by an appropriate clinical pharmacy service in terms of improving patient safety and clinical outcomes. Optimum Neurosurgical outcomes for patients also require similar high quality use of medicines in immediate post-operative periods. The latter include optimising anticonvulsant therapy, delirium prevention and management, reducing adverse CNS effects, therapeutic drug monitoring and management of drug interactions. Other clinical areas identified as areas that would benefit from further pharmacy support were acute pain management ("Muscle/Joint"), post-operative nausea and vomiting (PONV)/ gastric motility ("Gastro intestinal system") and antimicrobial optimisation (e.g. dosing in multi-organ failure, septic shock, therapeutic drug monitoring) ("Infection").

Acceptance of the pharmacist interventions was high, 90% (even including patients lost to follow up as non-acceptance). The acceptance rate is comparable to the results reported for other critical care pharmacist interventions studies 7,8.

The majority of interventions (86%) were instigated proactively by the clinical pharmacist as part of their independent patient review. As such these represent interventions that had not been identified by other health professionals such as medical or nursing. Appropriately trained and experienced clinical pharmacists are specialists in medicine use, which is their primary area of focus. One-third of the interventions were classified as medication errors, which identify opportunities for further pharmacist training and support of medical/ nurse prescribers.

Although Level 3 patients accounted for only one-fifth of the number of patients an intervention was made in, they accounted for 47% of the medicines interventions and a median 7 interventions were made per Level 3 patient. As would be expected, patients with the highest level of illness receive the most medicines, primarily by the IV route and as such would be expected to require the highest level of pharmacy input as reflected by the interventions made.

The intervention study was conducted over a relatively short period of 2 weeks. The evaluation design and timescale were chosen based on available staffing to undertake the study and requirement for the report to be presented to the Trust

in July 2010. A longer evaluation period would have provided further data on the pharmacist interventions made.

The financial impact of the interventions was not calculated even though 25% of the interventions were either made for a Financial indication or recommended a Drug discontinuation. However, the overall impact on patient care with reduction in harm and Length of Stay can be extrapolated from the existing literature 9,10.

Conclusion

There was a high incidence of medicines related interventions made by the critical care pharmacists, the majority of which were accepted and acted upon. One in eight interventions represented potential for severe patient harm if not identified and corrected.

The results of the clinical pharmacist intervention study demonstrated an important role for critical care trained pharmacists in the pharmaceutical care of Neurocritical care patients to improve patient care and reduce clinical risk.

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Conflicts of interest

None declared

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